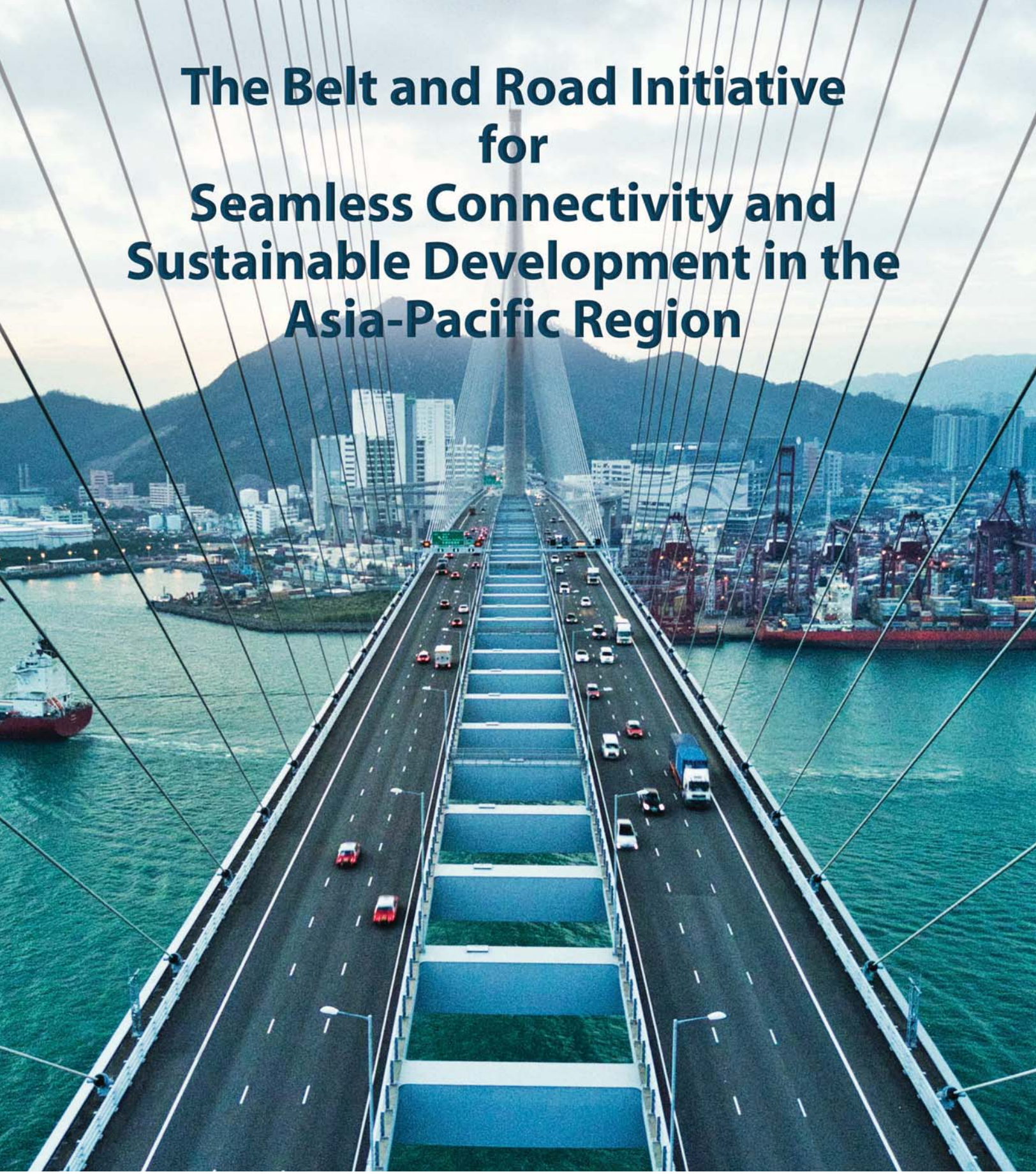
The Belt and Road Initiative for Seamless Connectivity and Sustainable Development in the Asia-Pacific Region



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EXECUTIVE SUMMARY

The Belt and Road Initiative is a long-term corridor-based transcontinental development strategy for enhanced global economic cooperation and integration. The Initiative, based on a proposal made by the president of China, Xi Jinping in 2013, strongly focuses on improving and creating new connectivity through an infrastructure led massive development programme and collaboration among countries along six international economic corridors. These corridors are discussed in the main text.

The results of multiple studies on the Belt and Road Initiative suggest that the impacts of the Initiative's infrastructure development generally have positive effects on the economy, income, poverty reduction, employment, equity and inclusion. The estimates vary, but the potential gains from the Initiative are very large. One estimate indicates that annual global welfare gains would be approximately $1.6 trillion in 2030, accounting for approximately 1.3 per cent of the global gross domestic product (GDP). Gains to the GDP and welfare of Belt and Road Initiative countries are estimated to be even higher – at approximately 3.4 per cent of GDP for Belt and Road Initiative countries and 2.61 per cent for non-Initiative countries. Findings of multiple studies show that transport networks have a beneficial effect on social inclusion in terms of education and gender equality and empowerment of women. In addition, the Initiative could potentially contribute towards lifting 7.6 million people from extreme poverty and another 32 million people from moderate poverty, mostly in corridor countries.

The development of region-wide seamless sustainable connectivity is key to realizing the potential gains from the Belt and Road Initiative corridor. There are, however, major barriers impeding the development, including, among them, uneven quality and capacity of road networks, major missing links and inefficient transhipment arrangements at break-of-gauge points along the railway networks, and inefficient cross-border facilitation and transit arrangements. Many countries along the Maritime Silk Road are among the low logistics performers; with a few exceptions, connectivity of their main ports with the liner shipping network are also low. Many new projects are being implemented or are being planned by the corridor countries to enhance physical and operational connectivity in the region. These efforts, however, need to be better coordinated to maximize the desired effects of the project investments.

The Belt and Road Initiative, similar to any large-scale development programme, poses environmental risks and can have adverse effects on the welfare of people if implemented without sufficient regard for sustainability and climate impacts. In addition, the distribution of development impacts can be uneven. To ensure more sustainable and inclusive development, the potential gains from Belt and Road Initiative investments must be balanced against the potential adverse impacts on the environment and society. The gains should be more equitably distributed across geographic areas and among groups in society. Sustainable development of the corridors also depends on a number of other important challenges that need to be addressed. These include the following:

- Sustainability of Belt and Road Initiative transport projects (economic and financial sustainability, environmental sustainability, social sustainability and resilience of transport infrastructure)
- Investment needs, financing gaps and the private sector's involvement
- Uneven distribution of Belt and Road Initiative impacts
- Negative externalities
- Detail design and complementary policy
- Development of corridor cities
- Rural-urban linkage

Each of these challenges are elaborated in the main text, which also includes discussions on how these challenges can be addressed.

The Belt and Road Initiative also presents many unique opportunities to countries and international organizations. Among them are the following:

- A broad framework for the integration of corridor development activities with other regional and subregional initiatives, and wider support for the development of integrated intermodal sustainable transport systems in Asia, Europe and other parts of the world
- Establishment and providing support for institutional, financial and other arrangements that can effectively reduce and/or eliminate adverse impacts of infrastructure projects on the environment, and create opportunity for unprecedented green economic growth
- Development and harmonization of technical standards, governance institutions, framework agreements, and technical and operational manuals on infrastructure development
- Collaborative applied research, technology transfer, and training and dissemination of knowledge and information related to development of sustainable transport systems
- Pandemic-induced positive changes in relation to more sustainable development such as digitalization of business processes including complete operational and regulatory transport controls at border points and e-services.

In many ways, the Belt and Road Initiative can reinvigorate the current efforts of ESCAP to develop seamless sustainable inclusive and resilient connectivity across the region. The Belt and Road Initiative programme can contribute towards activities related to the promotion of seamless transport connectivity under the Regional Action Programme for Sustainable Transport Connectivity in Asia and the Pacific.

The COVID-19 pandemic has added a new challenge to the Belt and Road Initiative. In general, the Initiative is not expected to be seriously affected in the long-term by the pandemic, but some adjustments and changes are inevitable in the medium and long term. There may be some changes in investment priorities between different sectors and even within the same sector. For example, business and other trade factors could lead to the partial relocation of manufacturing away from China, including by Chinese companies, to countries in South-East Asia and South Asia where the costs are low. Such changes are not expected to significantly affect the objectives of the Initiative over the longer term or make any major shift in trade volumes. Despite the adverse effects of the pandemic, trade volumes between China and other major trade partners have remained stable or increased – in 2020, the Association of South-East Asian Nations (ASEAN) has become the largest trading partner of China, and China has become the largest trading partner of the European Union. Most importantly, the political commitment of China to the Initiative has remained unchanged.

Several international initiatives have been launched to support green and sustainable development of the Belt and Road Initiative. The Belt and Road Initiative International Green Development Coalition, led by the United Nations Environment Programme and the Chinese Ministry of Environmental and Ecological Protection, and the China-United Kingdom Green Finance Taskforce are among these initiatives. The Coalition has established a number of thematic partnerships among its partners to support the Coalition's work. The Green Task Force is a special new investment group, launched by green funding experts from the United Kingdom of Great Britain and Northern Ireland and China, to promote green financing and investment in the Belt and Road Initiative projects. It is important to mention here that green finance has the potential to be a powerful tool to promote and ensure green development of the Initiative.

Several lessons can be learned from the effects of the COVID-19 pandemic on transport systems and the response of the countries to address the adverse effects. These are related to resilience of the transport systems, digitalization of the transport facilitation process, freight operations and substitution of in-person services by e-services. Uncoordinated actions by countries to control trade and transport flows across borders has created the need to put in place cooperation mechanisms to deal with coordinated emergency responses and minimize disruptions in supplies. These lessons and the pandemic-induced positive changes are important for considering future activities of ESCAP involving the Initiative and for reshaping it by the stakeholders in the public and private sectors.

One of the most important elements of a successful corridor is the establishment of a structurally and procedurally organized governance structure to promote and facilitate the coordination of activities undertaken by multiple

public and private sector stakeholders involved in the development, management and operation of the corridor. An organized institutional framework together with streamlined procedures can be helpful in many ways to make the operation of a corridor more efficient and productive.

With regard to Belt and Road Initiative corridors, some progress has been made in this respect; several countries have considered establishing a national authority and/or a multi-country joint cooperation committee or similar structures. The establishment of formal multilayer governance structures would, however, be preferable.

An important lesson learned to date is that the Belt and Road Initiative transport systems need to be more resilient against shocks of disruptions caused by the pandemic or other natural or man-made disasters. Shared controls and protocols, common contingency plans to deal with emergencies, norms and treaties must be pursued to moderate risks of disruptions during disasters.

Finally, the study presents a set of suggestions, which are elaborated in the main text and include the following identified areas:

- Corridor governance, harmonized institutional development
- Resilience of Belt and Road Initiative transport corridors
- Development of indicators on connectivity (hard and soft) for benchmarking and to monitor progress in connectivity along the corridors
- Green and sustainable infrastructure development
- Collaboration of knowledge-sharing among research organizations in corridor countries
- Development of new tools for ex-ante project appraisal to study the likely distributional impacts across geographic regions and between different groups
- Detail studies and planning at the project level to ensure sustainable development. (It may be noted that conditions can vary among corridors even within the same country.)
- Capacity development for infrastructure project development and implementation, especially for large multisectoral projects

The Economic and Social Commission for Asia and the Pacific (ESCAP) is promoting the development of an international integrated intermodal transport and logistics system (commonly referred to as a multi-modal system) through the development of the Asian Highway and the Trans-Asian Railway networks and the development and operation of a network of dry ports. The Asian Highway and Trans-Asian Railway networks form a large part of the potential transport routes along the six Belt and Road Initiative corridors. In 2016, ESCAP member States adopted the Regional Action Programme for Sustainable Transport Connectivity in Asia and the Pacific. The Programme has established model agreements on transport facilitation and international road transport and the Model Multilateral Permit for International Road Transport, which supports harmonization of legal and regulatory frameworks to operationalize the Belt and Road Initiative corridors.

The Sustainable Development Goals are at the forefront of the current development agenda. The Belt and Road Initiative involvement in transport development is linked to many of the Sustainable Development Goals and can be used as a policy intervention tool to achieve some of them. ESCAP, in collaboration with other Green Development Coalition partners, can support the member States to meet their targets under the 2030 Agenda for Sustainable Development, especially those relating to transport development.

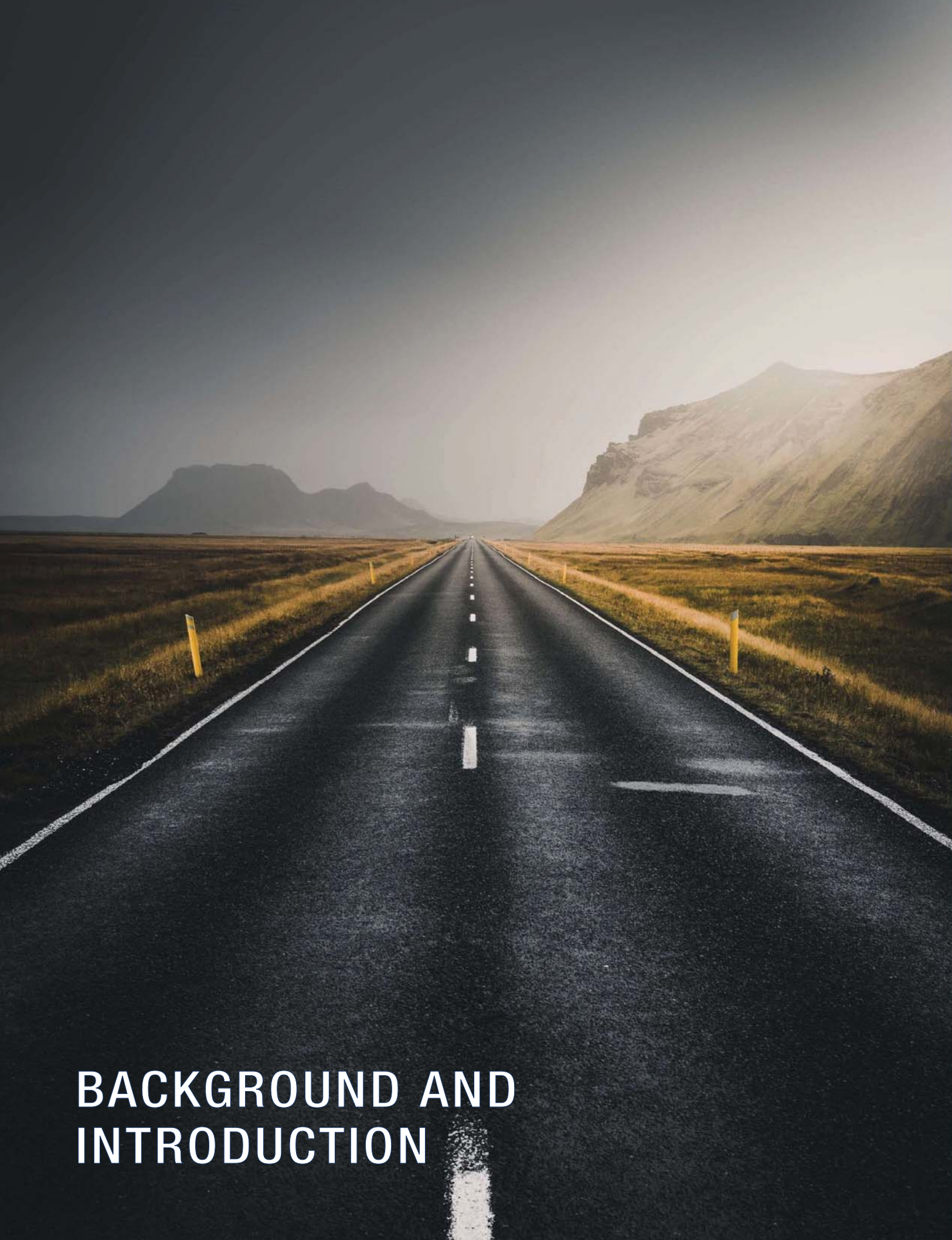
The next regional action programme may include work to draw on the lessons learned from the effects of the transport systems. Furthermore, the COVID-19 pandemic also has provided an opportunity to revisit and reset the international freight transport operations towards a more sustainable path, for example, greater use of rail transport. To date, the policy response of countries has been reactive. Going forward, it may be beneficial to design agreed measures within a broader framework and thereby reduce risks of any potential disruption in a supply line during a crisis.

The pandemic has brought some positive changes, such as reduced demand for transport services, especially personal travel, an increase in working from home and substitution of in-person services by e-services. The International Energy Agency (IEA) expects global industrial greenhouse-gas emissions to decline by approximately 8 per cent in 2020 from the previous year, the largest annual drop since World War II. These positive changes should be retained as much as possible.

The Green Development Coalition has created additional opportunities for collaboration among ESCAP member States, the Coalition members and partner institutions. In addition to the activities under the current and new regional action programmes, ESCAP can forge collaboration with the Coalition members and partner institutions in China and other countries and reorient its analytical, capacity-building and intergovernmental support to assist in the implementation of the Initiative, including facing the new challenges caused by the COVID-19 pandemic.

ABBREVIATIONS

ADB	Asian Development Bank
ADBI	Asian Development Bank Institute
AH	Asian Highway Network
AIIB	Asian Infrastructure Investment Bank
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BCIM	Bangladesh – China – India – Myanmar Corridor
CAREC	Central Asia Regional Economic Cooperation
CGE	Computable General Equilibrium (Model)
CIS	Commonwealth of Independent States
CMRF	China – Mongolia – Russian Federation Corridor
CO_2	carbon dioxide
CPEC	China – Pakistan Economic Corridor
EAEU	Eurasian Economic Union
EATL	Euro-Asian Transport Linkages
EBRD	European Bank for Reconstruction and Development
ECO	Economic Cooperation Organization
ESCAP	Economic and Social Commission for Asia and the Pacific
FDI	foreign direct investment
GDP	gross domestic product
GMS	Greater Mekong Subregion
GTI	Greater Tumen Initiative
ICD	inland container depot
ICT	information and communications technology
IEA	International Energy Agency
IMF	International Monetary Fund
IMO	International Maritime Organization
IOM	International Organization for Migration
JICA	Japan International Cooperation Agency
MOU	memorandum of understanding
ODA	official development assistance
OECD	Organisation of Economic Co-operation and Development
PPP	public-private partnership
SASEC	South Asia Subregional Economic Cooperation
SCO	Shanghai Cooperation Organization
TEN-T	Trans-European Transport Network
TEU	twenty-foot equivalent unit (container)
TIR	Transports International Routiers
TRACECA	Transport Corridor Europe – Caucasus – Asia
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations Office for Disaster Risk Reduction
UNODC	United Nations Office on Drugs and Crime
WHO	World Health Organization
WTO	World Trade Organization
WWF	World Wildlife Fund for Nature



BACKGROUND AND INTRODUCTION

The Belt and Road Initiative for Seamless Connectivity and Sustainable Development in the Asia-Pacific Region

1

BACKGROUND AND INTRODUCTION

The Belt and Road Initiative is a long-term corridor-based transcontinental development strategy for enhanced global economic cooperation and integration. It is based on a proposal made by the president of China, Xi Jinping in 2013. Although development initiatives at regional and subregional levels are not new, this Initiative operates at an unprecedented level in terms of geographical coverage, and long-term vision for wider development aims through regional integration among Asian, African, and European countries by enhancing infrastructure and institutional linkages, and policy coordination.

The Belt and Road Initiative has broad-based development objectives, including enhanced connectivity, unimpeded trade and financial integration. Its economic and financial initiatives are to be complemented by policy coordination and deeper cultural and personnel exchanges.[1] The Initiative is strongly focused on improving and creating new connectivity and collaboration among countries along six international economic corridors. They are the following: (a) China – Mongolia – Russian Federation Corridor (CMR); (b) New Eurasian Land Bridge Corridor (NELB); (c) China – Central Asia – West Asia Corridor (CAWA); (d) China – Pakistan Corridor (CPC); (e) Bangladesh – China – India – Myanmar Corridor[2] (BCIM), and (f) China – Indochina Peninsula Corridor (CIPC). The first five corridors are part of a land-based "Silk Road"[3] economic belt, and the sixth one is a maritime Silk Road, a sea route connecting the coastal regions of China with South-East Asia and South Asia, the South Pacific, the Middle East and Eastern Africa, and Europe.[4]

The Initiative is expected to link some 70 countries,[5] which collectively represent approximately 65 per cent of the world's population and one third of the world's GDP.[6] More than 50 per cent of the Belt and Road Initiative countries are in the Asia-Pacific region.

Many countries and international organizations have signed memoranda of understanding and collaboration agreements with China for implementation of the

1 National Development and Reform Commission, Ministry of Foreign Affairs, and Ministry of Commerce (2015).

2 The communique of the second Belt and Road Forum for International Coordination, held Beijing from 25 to 28 April 2019, refers the Bangladesh – China – India – Myanmar Economic Corridor as the China – Myanmar Economic Corridor.

3 Many consider the Belt and Road Initiative as a revival of the ancient Silk Road. For many centuries, East, South, Central and West Asia were connected to the Mediterranean region through an extensive network of caravan trade routes, collectively known as the Silk Road. The historic Silk Road was a successful effort in establishing a global land transport system, which for many centuries had contributed to the expansion of trade, and transfer of knowledge, technology, culture, languages and sharing of ideas (Quium, 2018).

4 For the CIPC corridor, this study considers the land routes in South-East Asia and the Maritime Silk Road.

5 For a list of countries, see annex 1.

6 See https://www.ebrd.com/what-we-do/belt-and-road/overview.html.

Initiative[7]. ESCAP and the Government of China have developed a partnership to collaborate on the development of the Initiative. This partnership conforms with the Commission's mandate to deepen regional economic cooperation and integration across the Asia-Pacific region and to strengthen its role to promote sustainable and inclusive development in the region in line with the framework provided by the 2030 Agenda for Sustainable Development. The ESCAP-China cooperation on the Belt and Road Initiative covers four main sectors: transport; trade and investment; information and communications technology (ICT); and energy.

Regarding improvement of connectivity in Eurasia, the Belt and Road Initiative may serve as an overarching initiative for development of transcontinental and intercontinental transport routes that include China. It encompasses an extensive network of transport routes in six main directions. As a result of this wide coverage, the projects or routes mentioned as part of the Belt and Road Initiative are also part of other regional and subregional transport corridor cooperation frameworks.

As an intergovernmental body at the regional level, ESCAP is in a strong position to further the Belt and Road Initiative development objectives. It has promoted regional connectivity for several decades. In this regard, the Commission has taken the lead to initiate intergovernmental agreements on the development and promotion of road and railway networks, and a network of dry ports in the region. Every 5 years, ESCAP member States consider to adopt the regional action programme to advance sustainable transport development in Asia and the Pacific. In many ways its previous and planned activities related to regional transport connectivity under these programmes can support the Belt and Road Initiative.

China is actively engaged in substantive coordination and cooperation related to the Belt and Road Initiative with other countries through existing multilateral cooperation initiatives (such as the Asia-Pacific Economic Cooperation (APEC), the Central Asian Regional Economic Cooperation (CAREC) Programme, G20, the Greater Mekong Subregion (GMS), the Greater Tumen Initiative (GTI) and the Shanghai Cooperation Organization (SCO).[8] Parts of the regional and subregional transport networks promoted by ESCAP and other initiatives overlap with the Belt and Road Initiative corridors. Because of these overlaps, it is expected that coordination and cooperation under the Initiative will also benefit ESCAP and other subregional and regional initiatives. In addition to planned activities under the regional action programmes, ESCAP can forge collaboration with Initiative-related organizations in China and reorient its analytical, capacity-building and intergovernmental support to assist the implementation of the Belt and Road Initiative.

Although the ESCAP-China cooperation covers four sectors, as mentioned earlier, this study covers only the connectivity issue along the Belt and Road Initiative corridors in the ESCAP region focusing on transport – the road and railway networks and dry ports, especially the ESCAP-promoted networks as well as maritime connectivity and seaports. Table 1.1 shows the Belt and Road Initiative corridors, their geographical coverage and other initiatives that share the Initiative.

In many respects, the Belt and Road Initiative is flexible and conceptual. As such, the transport routes in most parts of the Initiative's corridors are not yet defined. As already mentioned, there are potential overlaps of transport routes in the corridors and routes under ESCAP and other regional and subregional initiatives.[9] For the purpose of this study, a Belt and Road Initiative transport corridor is a combination of adjacent road and rail networks linking the same major origins and destinations within a geographic region defined by its economic potential rather than its political or geographic boundaries. The Belt and Road Initiative corridors are not confined within any single country's national boundaries; they stretch across national boundaries of multiple countries. The China-Pakistan Economic Corridor, however, is the only corridor that mainly involves just two countries.

[7] By the end of March 2019, the Government of China signed 173 cooperation agreements with 125 countries and 29 international organizations (Office of the Leading Group for Promoting the Belt and Road Initiative, 2019). The Communique (see footnote 1) also provides a list of recently signed such memoranda of understanding and agreements.

[8] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).

[9] Many other regional and subregional parallel connectivity initiatives or projects also cover parts of the same geographical areas as the Belt and Road Initiative, for example the Association of Southeast Asian Nations (ASEAN), the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Technical Cooperation (BIMSTEC), CAREC, ECO, the Eurasian Economic Union of Russia, the Greater Tumen Initiative, the South Asia Subregional Economic Cooperation (SASEC), the Transport Corridor Europe-Caucasus and TEN-T. It is also important to note that many of these initiatives also share parts of the same geographical area, for example, CAREC and SCO; and BIMSTEC and South Asia the Subregional Economic Cooperation.

Table 1.1. Geographical coverage of Belt and Road Initiative corridors and potential overlaps with other regional and subregional initiatives

Corridor	Geographical coverage*	Initiatives that share Belt and Road Initiative corridors
China – Mongolia – Russian Federation Corridor (CMR)	China, Mongolia, Russian Federation, Democratic People's Republic of Korea, Republic of Korea	ESCAP (AH and TAR networks); TEN-T; CAREC Corridor 4; EATL routes 1, 6; GTI Siberian Land Bridge; Organisation for Cooperation of Railways corridors 1, 11; Intergovernmental Organisation for International Carriage by Rail Corridor 1
New Eurasian Land Bridge Corridor (NELB)	China, Mongolia, Russian Federation, Uzbekistan, Turkmenistan, Georgia, Armenia, Azerbaijan, Turkey	ESCAP (AH and TAR networks); TEN-T; CAREC 1, 2, 3, 5, 6; EATL 3, 6, 7; ECO 1B, 5, 6; INSTC; OSJD 10; TRACECA 27, 31, 41; TRACECA 27, 31, 41; Trans-Caspian Corridor
China – Central Asia – West Asia Corridor (CAWA)	China, Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan, Islamic Republic of Iran, Turkey	ESCAP (AH and TAR networks); CAREC 5, 6; CPEC; EATL 4, 5, 6; ECO 1A, 6, 7; INSTC; OSJD 6, 11; OTIF 2
China – Pakistan Corridor (CP)	China, Pakistan (also Afghanistan, Islamic Republic of Iran)	ESCAP (AH and TAR networks); CAREC 5, 6; CPEC; ECO 6
Bangladesh – China – India – Myanmar (BCIM)	Bangladesh, China, India, Myanmar, Nepal and Bhutan	ESCAP (AH and TAR networks); ASEAN Highway; GMS Northern Corridor; SASEC 5, 11; GMS North-South Corridor
China – Indochina Peninsular Corridor (CIP)	Land routes: China (coastal areas), Viet Nam, Cambodia, Lao People's Democratic Republic, Myanmar, Thailand, Malaysia, Singapore Maritime Silk Road: Indo-China Peninsula, Indian Peninsula, Arabian Peninsula encompassing the South China Sea, Strait of Malacca, Bay of Bengal, Indian Ocean (covering countries in East and South of Africa), the South Pacific, Arabian Sea, Persian Gulf, Gulf of Aden and the Red Sea connecting to Europe	ESCAP (AH and TAR networks); ASEAN Highway; GMS Eastern, Central, North-South, Southern Corridors Indonesia-Malaysia-Thailand Growth Triangle Straits of Malacca corridor

* in part or full of a country in the ESCAP region
Notes: AH, Asian Highway; TAR, Trans-Asian Railway

A well-managed Belt and Road Initiative corridor can help to improve the quality of transport and logistics services in the corridor and reduce the cost of transport. The decline in trade cost resulting from the reduction in transport cost and a more efficient supply chain can stimulate trade, which, in turn, can lead to economic gains in Belt and Road Initiative countries. In addition, a Belt and Road Initiative corridor can bring together infrastructure facilities, policies and institutions, and investments to spur wider socioeconomic development in the corridor region and beyond.

Transport development under the Belt and Road Initiative can be linked to many of the Sustainable Development Goals and may be used as a policy intervention tool to achieve some of them.[10] For example, Belt and Road Initiative corridors and transport networks can be a tool to support achieving Goal 9 (sustainable infrastructure: targets 9.1 and 9.A), and Goal 10 (reduced inequalities: targets 10.2, 10.3 and 10.7).

Transport corridor development under the Belt and Road Initiative, similar to corridor development programmes in ESCAP and other regions, can initiate a transformational process, which may lead to a set of wider economic benefits and costs. Considering the objective of the Initiative to serve as an important policy

[10] See A/RES/70/1.

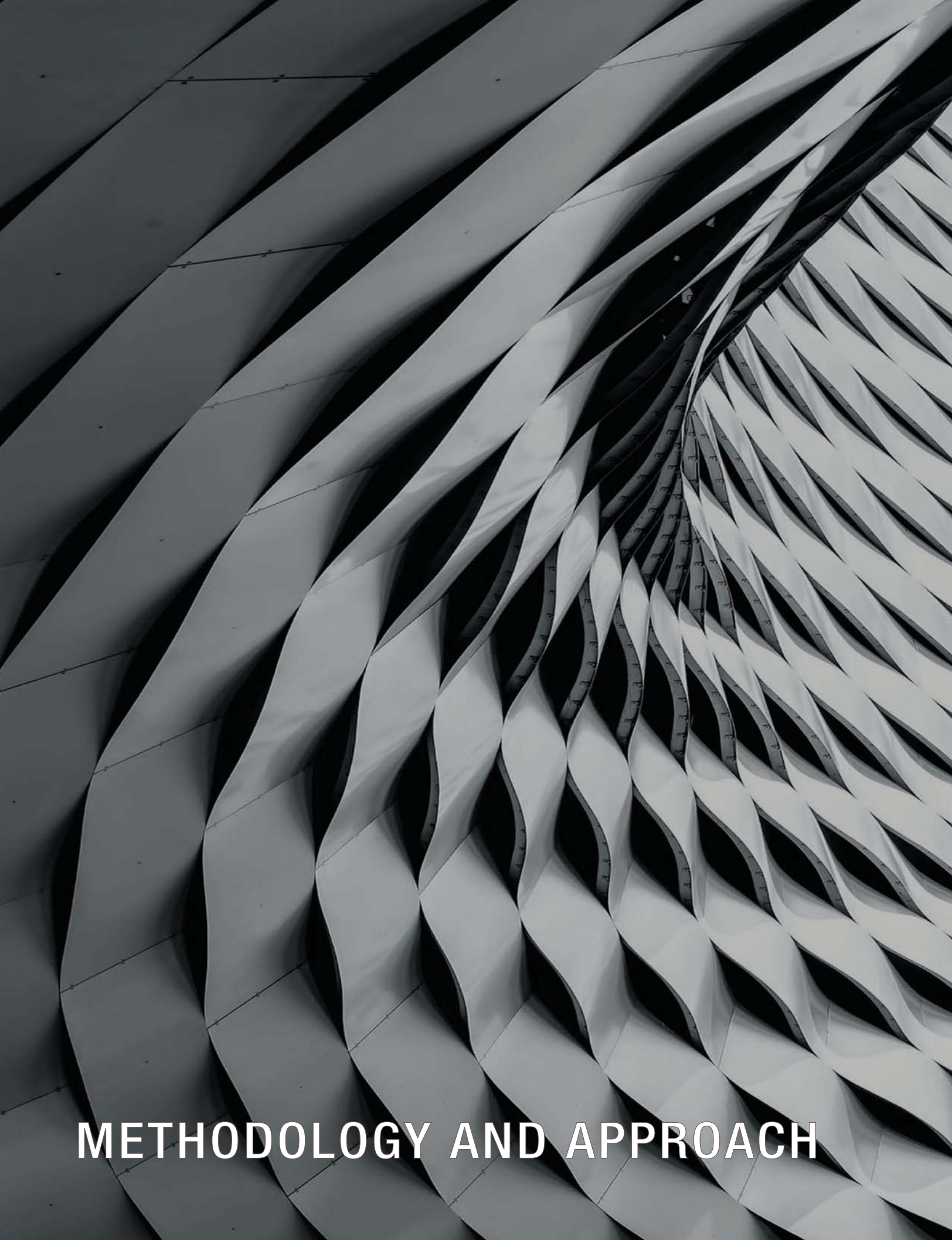
intervention tool, the purpose of the present study is to review progress in Belt and Road Initiative development, focusing on transport corridors, and wider economic benefits and costs of such corridor development. The specific objectives are the following:

- To review progress of Belt and Road Initiative connectivity (both "hard" and "soft" aspects);
- To examine the likely impacts of the Belt and Road Initiative on economies and welfare of the people along the corridors;
- To identify opportunities and challenges associated with the Belt and Road Initiative in accelerating efforts to achieve seamless connectivity in line with the Regional Roadmap for Implementing the 2030 Agenda for Sustainable Development in Asia and the Pacific;
- To identify sustainable corridor development issues from a policy perspective;
- To analyse the COVID-19 pandemic implications on the Belt and Road Initiative;
- To give recommendations and the way forward to address the economic, social, environmental and pandemic-related issues of the Belt and Road Initiative connectivity for sustainable development in a balanced and integrated manner.

To fulfil these objectives, relevant information from available open-source studies, materials and data from secondary sources focusing on the Asia-Pacific region were collected. Considering the wide geographical coverage of the Belt and Road Initiative, relevant information and evidence from other regions were also considered.

The Economic and Social Commission for Asia and the Pacific has conducted a study entitled "Comprehensive planning of Eurasian transport corridors to strengthen the intra- and inter-regional transport connectivity: study report 2017". A major objective of the study was to assess the connectivity along three Eurasian transport corridors – the Eurasian Northern Corridor, the Eurasian Central Corridor and the Eurasian Southern Corridor. However, a major difference between this study and the 2017 study is that the present study takes into account connectivity along the six Belt and Road Initiative corridors based on information from the earlier studies and new information that has become available. Another important difference is that the for the present study, the implementation of the 2030 Agenda is taken into account in the focus on likely Belt and Road Initiative transport development impacts, and corridor development issues. A third important difference is that the present study considers the COVID-19 pandemic implications for the Belt and Road Initiative. The pandemic has affected all aspects of the economy and some changes are inevitable in the post-COVID-19 world. In this study, the likely changes and how they might affect the Belt and Road Initiative transport corridors in the future are considered.

This study provides a general review of the current status of connectivity along the six Belt and Road Initiative corridors, the likely impacts of transport development on economies and welfare of the people along the corridors, and a discussion on sustainable corridor development issues from a policy perspective. The study also provides some recommendations and the way forward to further development under the Belt and Road Initiative. It is expected that the development of Belt and Road Initiative corridors will provide a framework for a coordinated approach to address sustainable development issues across all transport modes along the corridors in the ESCAP region and beyond, including interoperability, technological innovations and how resilience of transport systems can be maintained in case of disruptions caused by a pandemic or other hazardous events.



METHODOLOGY AND APPROACH

METHODOLOGY AND APPROACH

The findings and discussion in this study are based mainly on a desktop review of available open-source relevant studies on the Belt and Road Initiative and regional, subregional and national corridor development in Asia and elsewhere. Relevant information was also collected from government and other reliable sources, and official documents, databases and publications of ESCAP.

Efforts were made to contact some stakeholders in a few countries to get their views on different issues related to transport corridor development, especially in the context of the Initiative. This was done mostly through electronic and telephonic communication.

The reviewed literature includes those directly related to the Initiative and those on transport corridor development relevant to the Initiative. For this study, official documents and peer-reviewed and open-source literature have been used. Using search engines (Google Scholar, Google), an extensive search of online databases, namely CrossRef, JStor, Research Gate, Science Direct, was undertaken to find and access the reviewed and cited literature in this study.

The open-source literature came from ESCAP, especially official documents; other United Nations organizations; development banks and their institutes, such as the World Bank, the Asian Development Bank (ADB), the African Development Bank and the Asian Development Bank Institute (ADBI); the International Monetary Fund (IMF); the World Economic Forum, international organizations; and relevant research organizations.

The Belt and Road Initiative corridor routes were identified in consultation with the concerned members of ESCAP staff and in consideration of the general direction of the corridors, findings from the recent studies, official maps, databases of ESCAP and other organizations.[1]

The United Nations Sustainable Development Goals are at the forefront of the current development agenda. The Belt and Road Initiative involved in transport development is linked to many of the Sustainable Development Goals and can be used as a policy intervention tool to achieve some of them.

The Sustainable Development Goals and the targets specifically relevant to the Belt and Road Initiative transport corridors are as follows:

- Target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents;
- Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination;
- Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all;
- Target 9.A: Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African

[1] Including the Center for Strategic and International Studies Reconnecting Asia (https://reconasia.csis.org/); UNCTADStat of UNCTAD (https://unctadstat.unctad.org/EN/); and China Global Investment Tracker of the American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

countries, least developed countries, landlocked developing countries and small island developing States;

- Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situation, women, children, persons with disabilities and older persons.

An objective of this study is to discuss the Belt and Road Initiative transport corridor development issues in the context of the above-mentioned Sustainable Development Goals objectives and targets. As applicable, the recommendations and way forward presented in chapter 8 are in line with the relevant Sustainable Development Goals objectives and targets and the Regional Roadmap for Implementing the 2030 Agenda in Asia and the Pacific, and take into consideration the implications of the COVID-19 pandemic.

THE BELT AND ROAD INITIATIVE PROGRESS – CONNECTIVITY IN THE BELT AND ROAD INITIATIVE CORRIDORS

3

THE BELT AND ROAD INITIATIVE PROGRESS – CONNECTIVITY IN THE BELT AND ROAD INITIATIVE CORRIDORS

3.1 The Belt and Road Initiative corridors and potential routes

To improve connectivity, most countries in the Asia-Pacific region are progressively developing transport infrastructure within their geographical boundary under national, bilateral, subregional, regional or interregional initiatives. Among these initiatives are ASEAN, BIMSTEC, ECO, CAREC, the Eurasian Economic Union of the Russian Federation, GMS, SASEC, SCO and the Trans-European Transport Network (TEN-T network) in the European Union, and initiatives promoted by international organizations and development banks. It is also important to note that many of these initiatives share parts of the same geographical area, for example, as in the case of CAREC and SCO; BIMSTEC and SASEC; and GMS and ASEAN. Many transport routes (or part of their sections) developed under such initiatives form part of the Belt and Road Initiative transport corridors.

In recent years, important road, railway and other transport projects have been implemented or are being implemented under the Belt and Road Initiative in many countries; a number of new projects are also planned for implementation in the medium and long term. A list of such projects is available in the annex (table 3.1).[1] The Belt and Road Initiative projects together with the infrastructure developed under other initiatives and shared by Belt and Road Initiative corridors will vastly improve regional and interregional connectivity in Asia and Europe with other parts of the world. Similarly, many facilitation agreements signed before the launch of the Initiative may also be applicable for the Initiative's corridors.[2]

In this chapter, progress in implementing the Belt and Road Initiative is reviewed in terms of land and maritime transport connectivity in the corridors. Belt and Road Initiative corridors are defined only in broad directional terms. Only a few countries have identified the actual road and rail routes that may form part of the corridors. The identification of routes, however, is necessary to assess the current status of connectivity, monitor progress, and identify projects and estimate investment needs. In addition, to ensure operational efficiency, safety and security, international traffic in a country needs to be routed through designated routes; this also requires identification of routes.[3]

[1] The number of transport infrastructure projects discussed, planned or ongoing under the Belt and Road Initiative mentioned in various publications is overwhelming; not all of them can be easily identified as relating to a particular corridor; clearly evident ones are mentioned.

[2] Agreements made before the Initiative was announced, such as the Quadruple Transit Traffic Agreement (Agreement for Traffic in Transit among the Governments of the People's Republic of China, the Kyrgyz Republic, the Republic of Kazakhstan and the Islamic Republic of Pakistan, signed in 1995).

[3] To meet the challenges presented by the COVID-19 outbreak, the European Union has requested its member States to designate all the relevant internal border-crossing points on TEN-T as "green lane"' border crossings. This was done to expedite the crossing of all freight vehicles (with whatever goods they carry) with minimum checks. For transiting freight trucks, some countries introduced a convoy system.

To overcome this issue, an attempt was made in this study to identify the regional and subregional corridors and transport routes (road and rail) and current transport projects that may overlap with Belt and Road Initiative corridors. Following the definition of Belt and Road Initiative corridors in broad terms, potential important highway and railway routes along each of the six corridors have been identified. Tables 3.1 and 3.2 provide the lists of such highway and railway routes. It is important to note that the routes shown in the tables are not the only possible routes in the corridors or are officially endorsed by the concerned countries. Additional routes may also be considered. After noting the Belt and Road Initiative routes, progress in physical and operational connectivity in the corridors is reviewed based on the available information on the routes from official sources and previous studies.

Photo credit: Kyryl Gorlov via iStock Photo

Table 3.1. The Belt and Road Initiative major highway routes

Belt and Road Initiative corridor	Potential and/or defined highway routes	Overlaps with	Shared with
China – Mongolia – Russia Corridor (CMR)	CR1: Tianjin – Beijing – Ulaanbaatar – Ulan-Ude – Novosibirsk – Chelyabinsk – Samara – Moscow – St. Petersburg	AH3, AH6, AH8	CAREC Corridor 4; EATL routes 1, 6; GTI Siberian Land Bridge
	CR1A: Vladivostok – Harbin – Chita – Ulan Ude	AH6	GTI Suifenhe Corridor
	CR1B: Vladivostok – Khabarovsk – Chita	AH30	EATL routes 1, 6; GTI Siberian Land Bridge; OSJD Corridor 1
	CR1C: Dalian – Harbin – Chita	AH31, AH6	GTI Dalian and Suifenhe Corridors; OSJD Corridor 1
	CR2: Urumqi – Hovd – Novosibirsk	AH4	CAREC Corridor 4
New Eurasian Land Bridge Corridor (NELB)	LB1: Lianyungang – Urumqi – Horgos – Khorgas – Almaty – Taraz – Shymkent – Kyzylorda – Aktobe – Zhaisan – Sagarchin – Orenburg – Samara – Togliatti bypass – Ulyanovsk – Moscow – St. Petersburg	AH9 (new route adopted in 2019), AH5	CAREC Corridors 1, 2, 5; EATL routes 2, 4, 5
	LB2: Urumqi – Kashi – Sary-Tash – Dushanbe – Termez – Bukhara – Atyrau – Astrakhan – Volgograd – Moscow – Europe	AH4, AH63, AH8	CAREC 1, 2, 3, 5, 6; EATL 3, 6, 7; ECO 1B, 5, 6; INSTC; TRACECA 27, 31, 41
	LB2A: Astrakhan – Baku – Qazvin	AH8	EATL 5, 6; ECO 3; CAREC 6; INSTC; OSJD 11
China – Central Asia – West Asia Corridor (CAWA)	CW1: Urumqi – Almaty – Bukhara – Mary – Ashgabat –Turkmenbashi – Baku – Ganja – Tbilisi – Batumi – Samsun – Gerede – Istanbul – Kapikule	AH5, AH1	CAREC 2, 3, 6; EATL 3, 4; ECO 2; TRACECA 18, 20, 22, 24; Trans-Caspian Corridor
	CW1A: Mary – Sarakhs – Mashhad – Sabzevar – Kerman – Anar – Bandar Abbas	AH5, AH78, AH70	CAREC 3; EATL 4, 5, 6; ECO 1B, 2, 3, 5, 6; INSTC
	CW2: Kashi – Dushanbe – Kabul – Kandahar – Quetta – Gwadar	AH65, AH7, AH1	CAREC 2, 5, 6; CPEC; EATL 5; ECO 1B, 7
	CW3: Karachi – Rohri – Quetta – Taftan – Kerman – Yazd – Qom – Tehran – Qazvin – Tabriz – Askale – Ankara – Istanbul – Europe	AH7, AH2, AH1	CAREC 5, 6; CPEC; EATL 4, 5, 6; ECO 1A, 6, 7; INSTC

Table 3.1. *(continued)*

Belt and Road Initiative corridor	Potential and/or defined highway routes	Overlaps with	Shared with
China – Pakistan Corridor (CP)	CP1: Kashi – Honqiraf – Khunjerab – Islamabad – Peshawar – Quetta – Besima – Gwadar	AH4, AH51	China, Pakistan
	CP2: Islamabad – Lahore – Rohri – Karachi	AH2 (AH4)	CAREC 5, 6; CPEC; ECO 6
	CP3: Karachi – Gwadar	–	
Bangladesh – China – India – Myanmar Corridor (BCIM)	BC1: Kunming – Mandalay – Tamu – Imphal – Dhaka – Kolkata – Mumbai	AH14, AH1	ASEAN Highway; GMS Northern Corridor; SASEC 5, 11
	BC2: Kunming – Jinghong – Meiktila – Naypyidaw – Yangon	AH14, AH1	ASEAN Highway; GMS North-South Corridor
China – Indochina Peninsular Corridor (CIP)	IP1: Kunming – Vientiane – Bangkok – Kuala Lumpur – Singapore	AH3, AH12, AH2	ASEAN Highway; GMS Central, North-South, Southern Corridors; IMT-GT Straits of Malacca corridor
	IP2: Nanning – Hanoi – Ho Chi Minh City – Phnom Penh – Siem Reap – Poipet – Bangkok	AH1	GMS Eastern, Northern, Southern Corridor
	IP3: Kunming – Mandalay – Yangon – Bangkok – Kuala Lumpur – Singapore	AH14, AH1, AH2	ASEAN Highways

Sources: Based on information in the ESCAP Eurasia study, ESCAP Asian Highway and Trans-Asian Railway databases, CAREC corridor maps (available at https://www.carecprogram.org/?page_id=20), China-Pakistan Economic Corridor official website (http://cpec.gov.pk/infrastructure)and other sources.
Notes: Identified potential routes and their numbering are subject to discussion; AH, Asian Highway.

Table 3.2. Belt and Road Initiative major railway routes

Belt and Road Initiative corridor	Potential and/or defined railway routes	Overlaps with	Shared with
China – Mongolia – Russian Federation Corridor (CMR)	CR1: Tianjin – Beijing – Erenhot – Zamin-Uud – Ulaanbaatar – Sukhbaatar – Naushki – Ulan – Ude – Novosibirsk – Omsk – Yekaterinburg – Kotelnich – Moscow – St. Petersburg	TAR North Corridor	CAREC Corridor 4; EATL routes 1, 6; GTI Siberian Land Bridge; OSJD Corridors 1, 11; OTIF Corridor 1
	CR1A: Vladivostok – Harbin – Chita – Ulan-Ude	TAR North Corridor	GTI Suifenhe Corridor; OSJD Corridor 1
	CR1B: Vladivostok – Khabarovsk – Belogorsk – Chita	TAR North Corridor	EATL routes 1, 6; GTI Siberian Land Bridge; OSJD Corridor 1
	CR1C: Dalian – Harbin – Manzhouli – Zabaykalsk – Chita	TAR North Corridor	GTI Dalian and Suifenhe Corridors; OSJD Corridor 1
	CR2: Wuhan – Urumqi – Horgos – Altynkol – Almaty – Chu – Astana – Kokshetau – Petuhovo – Kotelnich – Moscow – (Belarus – Poland – Germany)*	TAR North Corridor	CAREC Corridors 1, 2, 5; EATL routes 2, 4, 5; OSJD Corridors 2, 5
	CR2A: Urumqi – Aktogai – Mointy – Astana – Tobol – Kochetovka – Rayazan – Moscow	TAR North Corridor	EATL rail routes
New Eurasian Land Bridge Corridor (NELB)	LB1: Lianyungang – Baoji – Turpan – Kashi – Osh – Navoi – Bukhara – Beyneu – Aksarayskaya – Volgograd – Gryazi – Moscow – Warsaw – Germany	North-South Corridor	CAREC 1, 2, 3, 5, 6; EATL 3, 6, 7; ECO 1B, 5, 6; INSTC; OSJD 10; TRACECA 27, 31, 41
	LB1A: Qazvin – Astara – Baku – Mahachkala – Astrakhan – Volgograd	North-South Corridor	CAREC 2
	LB1B: Baku (Ferry) – Aktau – Beyneu – Aksarayskaya – Volgograd	North-South Corridor	CAREC 2
	LB2: Hami – Urumqi – Aktogai – Mointy – Shalkar – Beyneu – Aktau – Baku – Tbilisi – Batumi	–	CAREC 1, 2

Table 3.2. *(continued)*

Belt and Road Initiative corridor	Potential and/or defined railway routes	Overlaps with	Shared with
China – Central Asia – West Asia Corridor (CAWA)	CW1: Kashi – Osh – Bukhara – Mary – Ashgabat – Turkmenbashi – Baku – Tbilisi – Kars – Istanbul – Kapikule	North-South Corridor	CAREC 2, 3, 6; EATL 3, 4; ECO 2; OSJD 10; TRACECA 18, 20, 22, 24; Trans-Caspian Corridor
	CW1A: Kashi – Osh – Bukhara – Mary – Mashhad – Bafq – Bandar Abbas	North-South Corridor	CAREC 3; EATL 4, 5, 6; ECO 1B, 2, 3, 5, 6; INSTC
	CW2: Karachi – Rohri – Quetta – Taftan – Zahedan – Bafq – Qom – Tehran – Qazvin – Tabriz – Malatya – Ankara – Istanbul	North-South Corridor	CAREC 5, 6; CPEC; EATL 4, 5, 6; ECO 1A, 6, 7; INSTC; OSJD 6, 11; OTIF 2
China – Pakistan Corridor (CP)	CP1: Kashi – Havelian dry port – Islamabad – Lahore – Rohri – Karachi	Southern Corridor	CAREC 5, 6; CPEC; ECO 6
	CP2: Havelian dry port – Quetta – Zhob – Rohri – Karachi	Southern Corridor	CAREC 5, 6; CPEC; EATL 4, 5, 6; ECO 1A, 6, 7; INSTC; OSJD 6, 11; OTIF 2
Bangladesh – China – India – Myanmar Corridor (BCIM)	BC1: Kunming – Dali – Ruili – Muse – Lashio – Mandalay – Yangon	Southern Corridor	
	BC2: Kunming – Dali – Ruili – Muse – Lashio – Mandalay – Kalay – Tamu – Jiribum – Akhaura – Dhaka – Kolkata – Nagpur – Mumbai	Southern Corridor	
China – Indochina Peninsular Corridor (CIP)	IP1: Kunming – Jinghong – Mohan – Boten – Vientiane – Bangkok – Hat Yai – Padang Besar – Kuala Lumpur – Singapore (SKRL)	TAR Indo-China Corridor	
	IP2: Kunming – Nanning – Hanoi – Ho Chi Minh City – Phnom Penh – Siem Reap – Poipet – Bangkok	TAR Indo-China Corridor	

* Main railway route between China and Western Europe; ensured vital supplies to Europe during coronavirus pandemic.
Source: Based on information in the ESCAP Eurasia study and ESCAP Asian Highway and Trans-Asian Railway databases, CAREC Corridor maps (available at https://www.carecprogram.org/uploads/carec-designated-rail-corridors.pdf), CPEC official website and other sources.
Notes: Identified potential routes and their numbering are subject to discussion; TAR, Trans-Asian Railway.

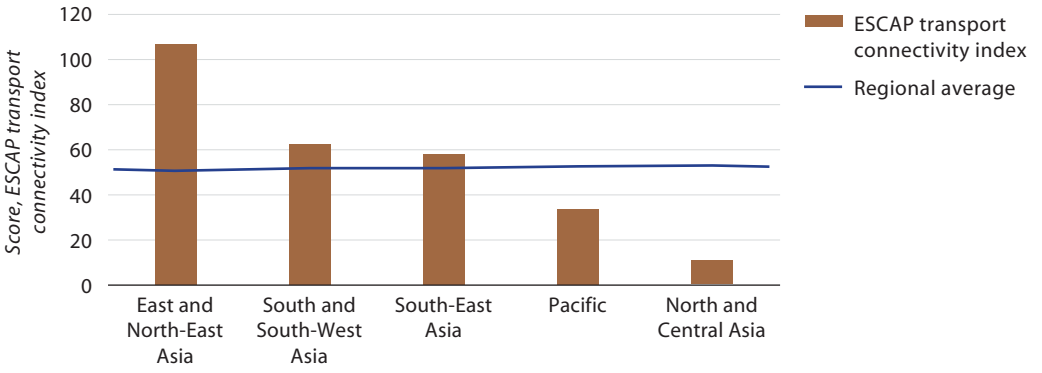
3.2 Measuring Connectivity along the Belt and Road Initiative corridors

Many international organizations have developed indices to measure connectivity. The most commonly referred to indices are the Globalization Index (Earnest Young and Economic Intelligence Unit); Global Connectedness Index (Deutsche Post DHL Group); KOF Index of Globalization (ETH Zurich); Global Competitiveness Index (World Economic Forum); Liner Shipping Connectivity Index (UNCTAD); Global Connectivity Index (International Transport Forum); Logistics Performance Index (World Bank); and Connectedness Index (McKinsey Global Institute).[4] These indices were developed with specific objectives in mind and can be used to measure connectivity of a country as a whole considering some specific aspect of transportation.

The Economic and Social Commission for Asia and the Pacific has developed an index to measure the progress of freight transport connectivity in the region. The index is based on five components of the freight transport sector, namely road, rail, air, maritime and logistics. The index assigns a score that indicates how well each transport mode is connected in a country. While the index is based on a new methodology for air and land transport modes, it uses the current Liner Shipping Connectivity Index and the Logistics Performance Index scores for the maritime and logistics sectors. More details of the ESCAP freight transport connectivity index as well as connectivity scores by subregion can be found in ESCAP (2019). Figure 3.1 shows the ESCAP transport connectivity score by subregion. As shown, there is considerable variation of connectivity by subregion. However, relative variation in terms of the best performer Singapore (100 per cent) is very high;

[4] A short discussion on the concept of connectivity and about these indices can be found in ESCAP (2019).

Figure 3.1. ESCAP transport connectivity index by subregion



Source: ESCAP (2019, p. 17).

many countries' score is less than 10 per cent. It is important to mention here that the ESCAP freight transport connectivity score uses the current Liner Shipping Connectivity Index and the Logistics Performance Index scores for the maritime and logistics sectors. These two indices have also been used to assess the progress in connectivity along the Maritime Silk Road discussed in Section 3.6.

It is important to note that these indices are designed to measure the connectivity of a country as a whole, not any specific transport route or corridor, while the focus of this section is to consider connectivity along a specific transport corridor or route. The above-mentioned indices can be used to measure progress in connectivity of a country as a whole considering some aspects of transport, but they are not suitable for measuring connectivity along a land transport corridor or route.

The basic concept of connectivity is more easily understood than defining it in operational terms. The level and performance of connectivity along a route or corridor may be measured by the ability and ease with which movements can be efficiently organized primarily between a set of origins and destinations (including across national borders) and intermediary points along the corridor. The more points that can be accessed raises the potential number of movements, and the more frequent and better the services are along the corridor or route in question, the higher the level of connectivity. A set of agreed indicators to measure these aspects and data on them are required to measure connectivity. Currently, such a set of agreed indicators are not available.

In the absence of such indicators or relevant data on them, for this study, connectivity is discussed in a more general connotation – primarily considering the physical existence of transport linkages and their broad quality and capacity, and institutional arrangements for border crossing and traffic rights in transit countries. The following sections include discussions on connectivity along the identified potential routes in Belt and Road Initiative in line with this broad definition.

3.3 Road and Railway Physical Connectivity along the Belt and Road Initiative corridors

3.3.1 Highway connectivity

China – Mongolia – Russian Federation Corridor (CMR)

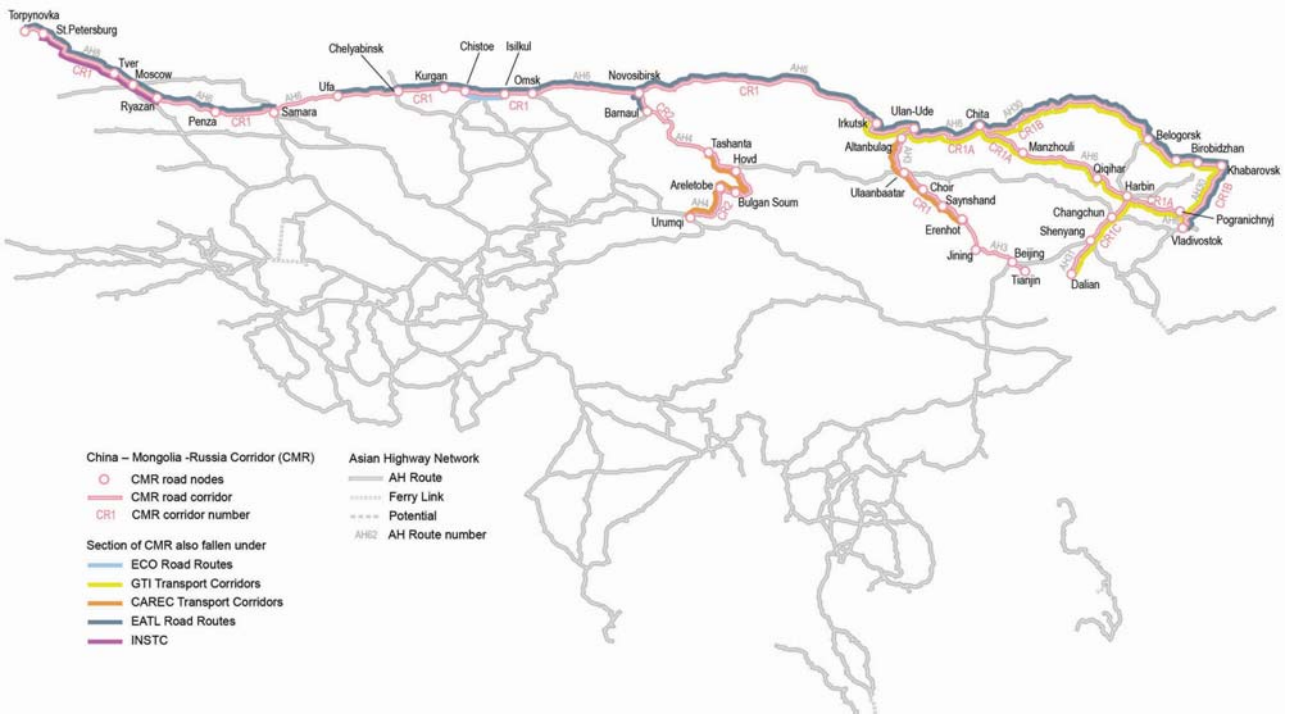
The overall quality of roads along the corridor is good. Most of the roads are a mix of primary and class I or a mix of class I and class II types; some parts are of class III or a mix of class III and higher types.[5]

The entire section of the road AH3 between Zamin-Uud – Ulaanbaatar – Sukhbaatar – Naushki – Ulan-Ude in Mongolia was paved and upgraded to class II type. Only a short section of the Urumqi-Novosibirsk road between Hovd in Mongolia and Ulaanbaishint at the border with the Russian Federation is a mix of below class III and higher types.

In addition, there are low-class road links, with a mix of class III and below-class III roads along the route in the Russian Federation from Chita to Zabaykalsk, and from Ussuriysk to Pogranichny.

[5] The quality of roads as mentioned in this study refer to standards defined in the Intergovernmental Asian Highway Agreement; see annex II, table 1 of the Agreement.

Figure 3.2. Map of the roads along the China-Mongolia-Russian Federation (CMR) corridor

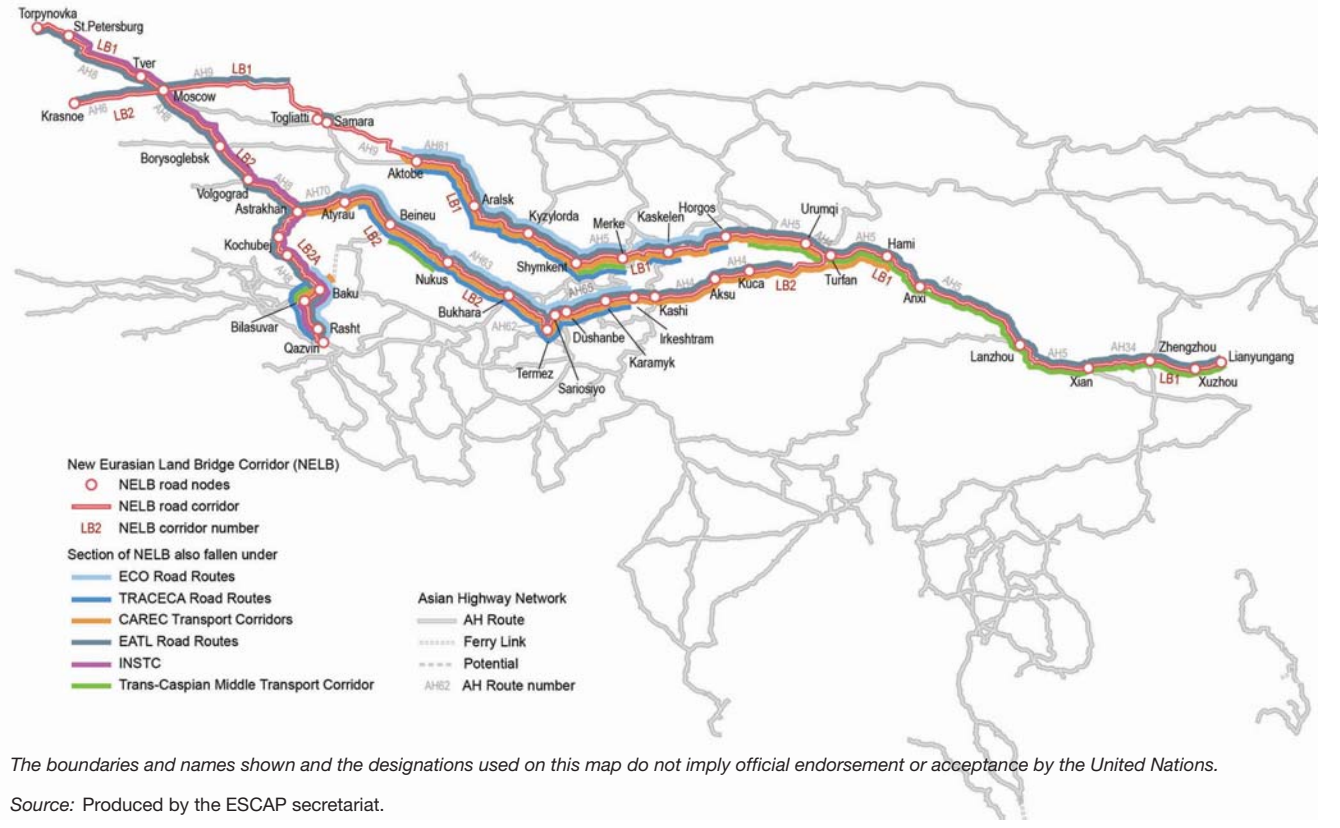


The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

New Eurasian Land Bridge Corridor (NELB)

Figure 3.3. Map of the roads along the New Eurasian Land Bridge (NELB) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

The overall quality of roads along the corridor is good. Most of the roads are a mix of primary and class I or a mix of class I and class II types; some sections, however, are of class III or a mix of class III and higher types (class I and II).

The highway connecting western China, Kazakhstan and the Russian Federation with Western Europe is almost complete. Only a section between Mahachkala and Astrakhan is below class III.[6]

China – Central Asia – West Asia Corridor (CAWA)

The quality of most of the road sections along routes in Azerbaijan, the Islamic Republic of Iran and Turkey are very good (primary and class I or a mix of class I and II). Generally, the overall quality of road sections in Kyrgyzstan, Tajikistan and Uzbekistan is also good (class II or a mix of class I and II). However, two short sections between Kashi and Dushanbe are below class III type.

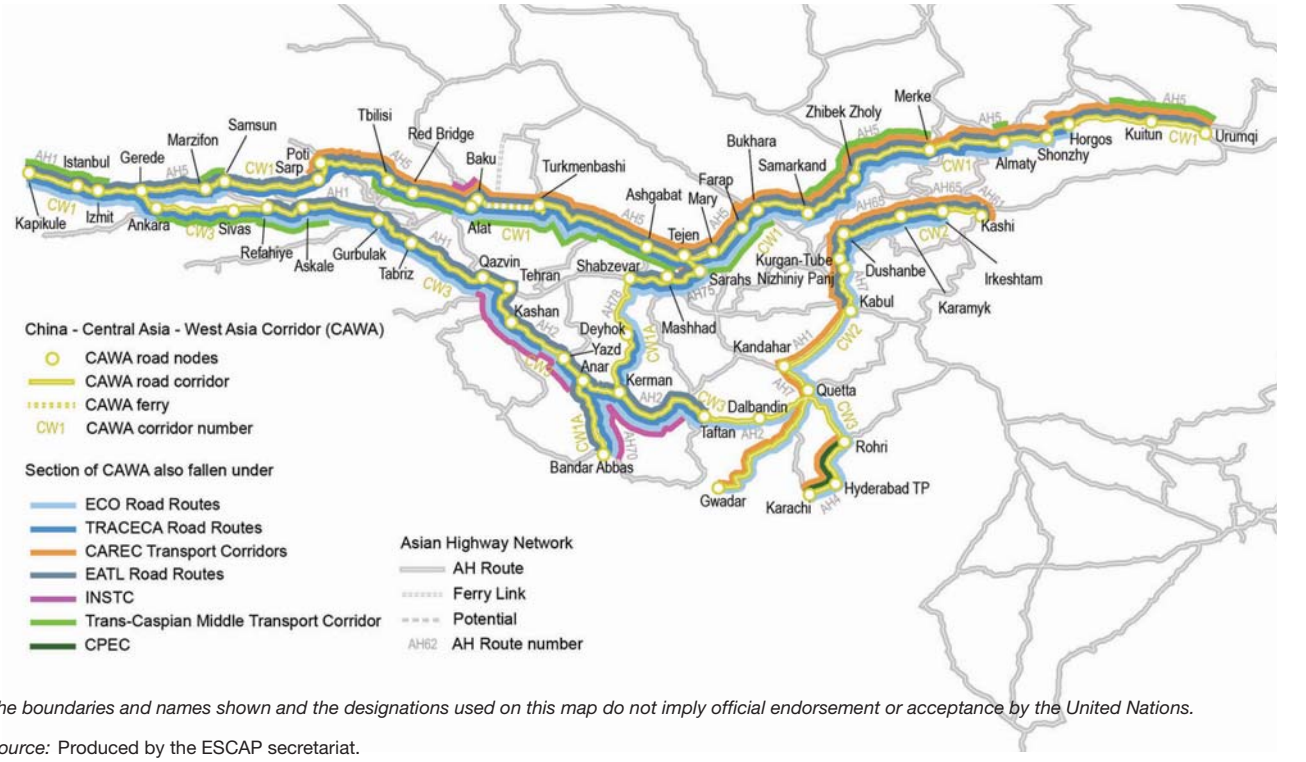
Road sections in Turkmenistan are of class III or a mix of class III and higher types. The section between Turkmenbashi and Baku is served by a ferry service.

A considerable part of the road along route CW3 between Quetta in Pakistan and Mirjaveh, in the Islamic Republic of Iran, is below class III type. Pakistan is implementing highway projects to upgrade this section.

Road infrastructure along the Central Asian sections of the corridor is being improved under the CAREC framework. In the CAREC region, 7,229 km of expressways or national highways were built or improved over the period 2008-2015.[7] The road sections of the corridor that were or are being rehabilitated include the road from Dushanbe to the Kyrgyzstan border, the road from Dushanbe to the Uzbekistan border, and the Aktau to Beyneu, and Ashgabat to Turkemenbashi routes.[8]

Many roads in North and Central Asia require significant repairs. For example, 60 per cent of the roads in Kyrgyzstan, 54 per cent of the roads in Kazakhstan and 48 per cent of the roads in Tajikistan do not have asphalt or concrete cover.[9] Accordingly, road development is a top priority in many countries in the subregion. In this context, Kazakhstan plans to expand its expressway network from the 210 km toll road connecting Nur-Sultan (Astana) with Buranbay.

Figure 3.4. Map of the roads along the China – Central Asia – West Asia (CAWA) Corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

[6] Office of the Leading Group for Promoting the Belt and Road Initiative, (2019).
[7] CAREC (2016).
[8] Ibid.
[9] Levina (2018).

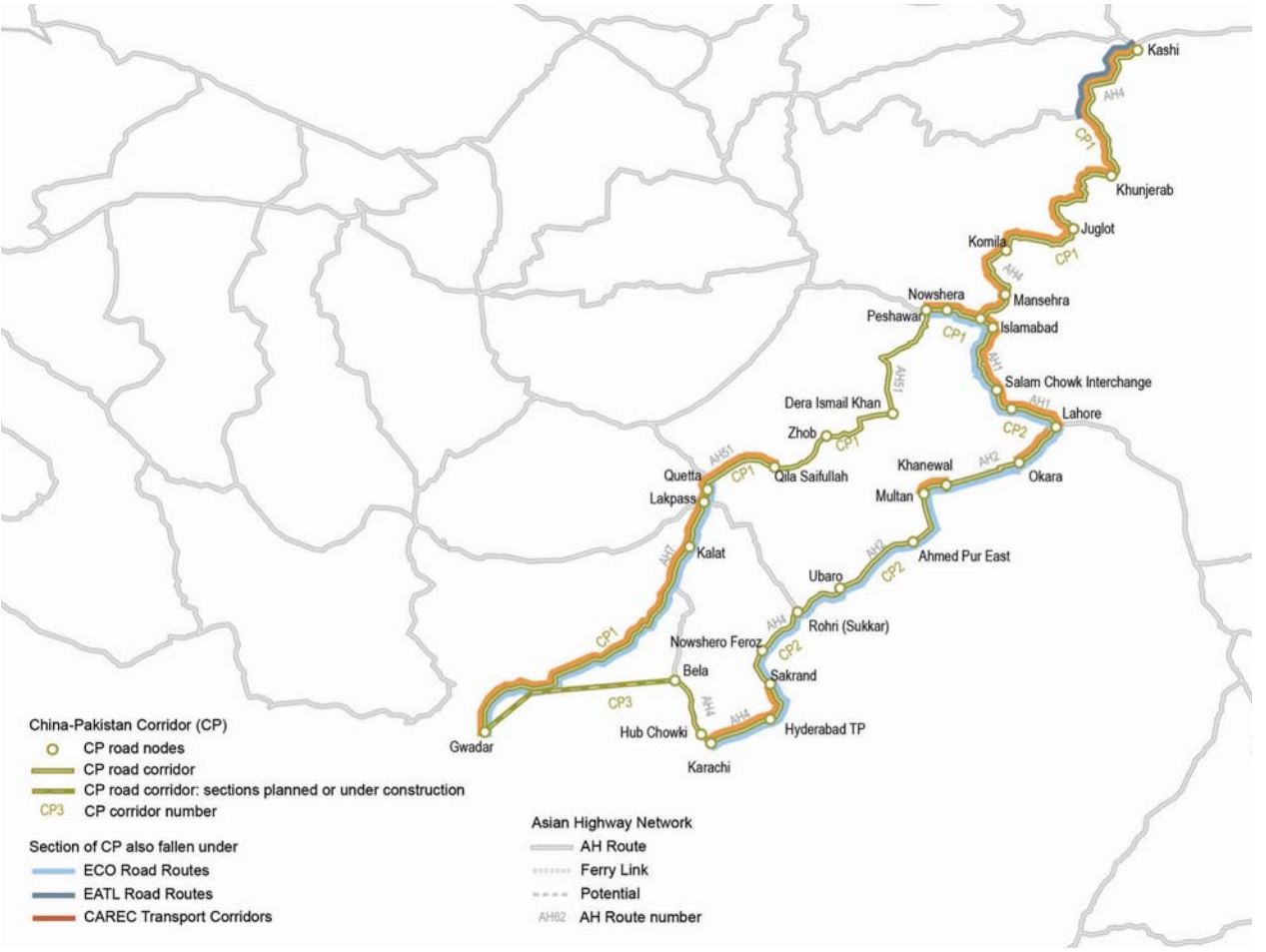
China – Pakistan Corridor (CP)

The China – Pakistan Economic Corridor (CPEC) is a recent major transnational development initiative along the Asian Highway route AH4, which will connect Gwadar Port in southern Pakistan to the North-Western autonomous region of Xinjiang in China. A central component of the corridor is a 2,700-km highway from Kashi, China to Gwadar through Khunjerab (AH4).

The overall quality of the road sections between Kashi in China and Karachi in Pakistan is good. The sections between Kashi and Manshera consist of a mix of class III and higher types. Road sections between Islamabad and Karachi are a mix of primary and class I type, except for a short section of a mix of class III and a higher type.

Pakistan is implementing a number of highway projects to upgrade the two routes along this corridor. These include upgradation of D.I. Khan (Yarik)-Zhob Phase-I (210 km) (from a two-lane road to a four-lane road), and the Peshawar-Karachi Motorway (392 km long Multan-Sukkur Section).[10]

Figure 3.5. Map of the roads along the China-Pakistan Economic Corridor (CPEC)



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

[10] See http://cpec.gov.pk/project-details/29.

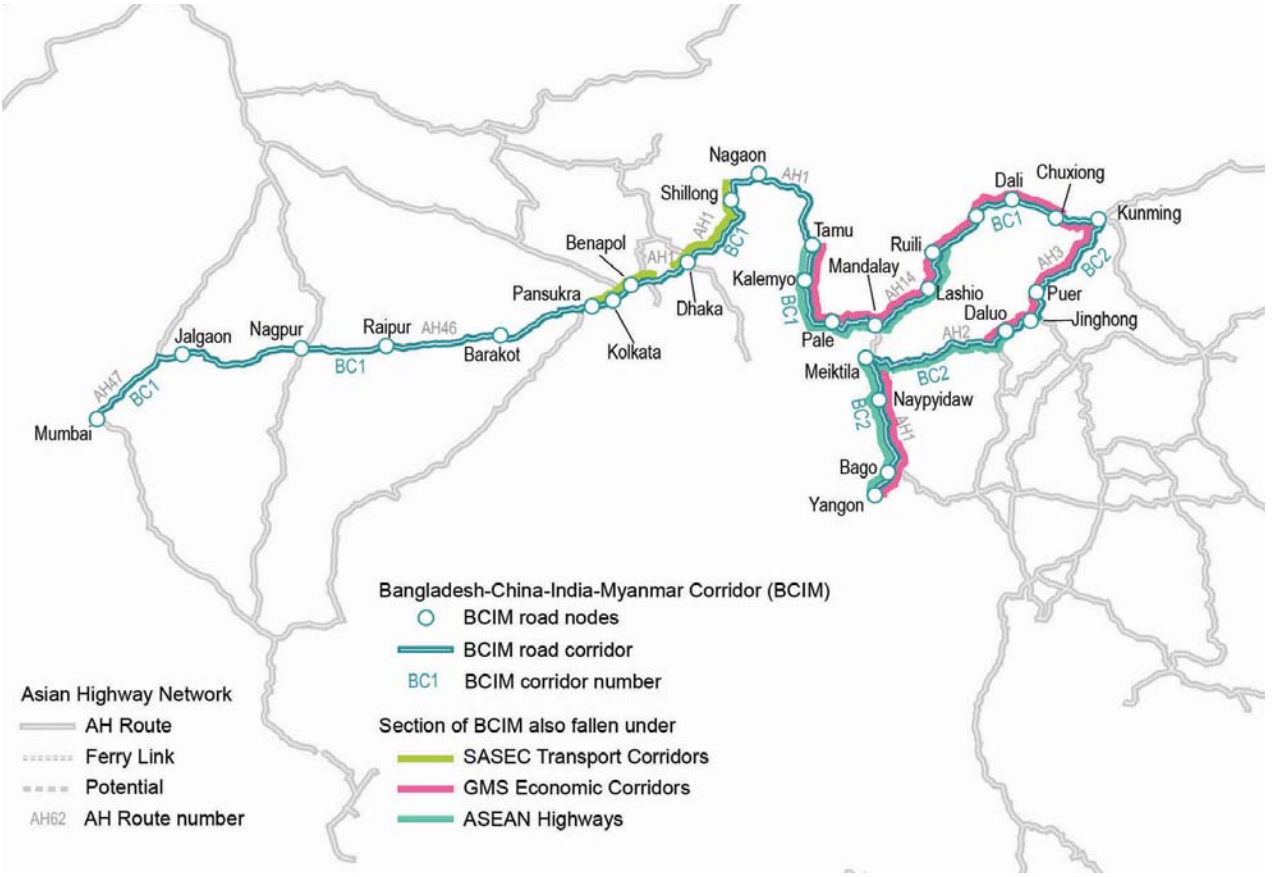
Bangladesh – China – India – Myanmar (BCIM)

The quality of most road sections in China is very good: primary or class I type or a mix of primary and class I. The overall quality of roads in Bangladesh and India is generally good: mostly primary or class I types or a mix of class I and class II types.

India is upgrading some sections of the Golden Quadrilateral Highways, which includes the BC1 route of the corridor to a dual carriageway with six lanes. Bangladesh is also progressively upgrading the sections of this route into primary[11] and/or class I standards. Bangladesh is also constructing a major road and rail bridge on the Padma River along this route to enhance connectivity between Bangladesh and India.

The quality of roads in Myanmar are uneven: mostly class III or a mix of class III and higher types. In addition, a considerable section along the BC2 route of the corridor is below the class III type. The longest section below class III is in Myanmar, between Meiktila and Kyaing Tong. Sections below class III are also dispersed along the route on the stretch from Bangladesh to the Indian border at Benapole/Bongaon, and in North-East India up to the China – Myanmar border at Ruili/Muse. The capacity of many bridges in Myanmar does not meet traffic requirements.

Figure 3.6. Map of the roads along the Bangladesh – China – India – Myanmar (BCIM) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

[11] The Dhaka – Mawa section of the expressway was opened to traffic on 11 March 2020. Another section of the route is expected to be opened in April 2020 (Daily Star, 2020).

China – Indochina Peninsular (CIP)

The overall quality of roads in this corridor is good. Almost all sections of the roads in China, Thailand and Malaysia are of primary and class I type or a mix of primary and class I type. Only a short section in southern Thailand is a mix of class I and II types.

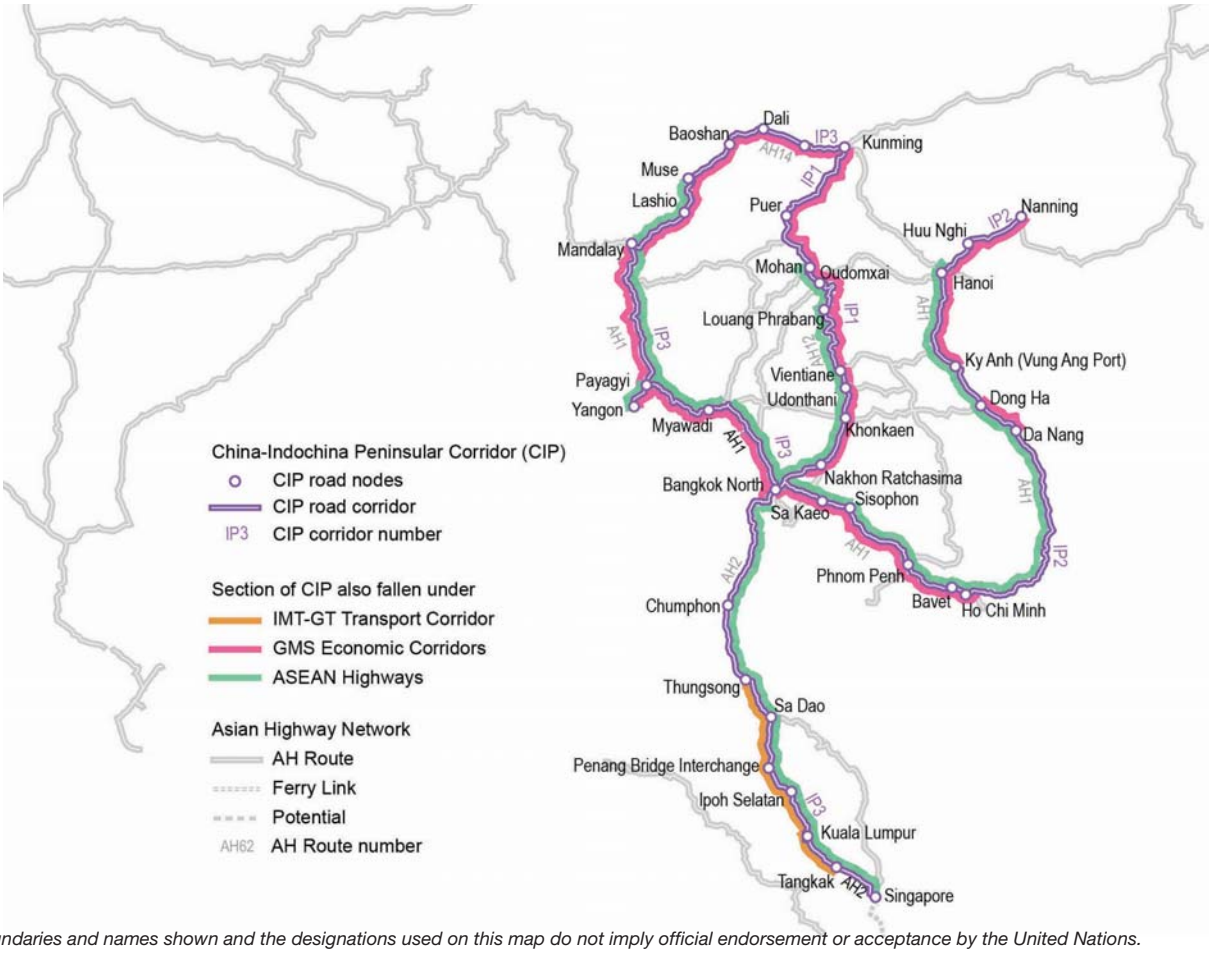
Road sections of Route S2 in Viet Nam mostly consist of a mix of class I and II types. Road sections in Cambodia and the Lao People's Democratic Republic are of a mix of class III and higher types (I and II).

Viet Nam is implementing phase 1 of the North-South Expressway Project 2017-2020, which is a major section of the S2 route in this corridor. The North-South corridor plays a very important role in the economic development of Viet Nam, passing through 32 provinces and cities and connecting Hanoi in the north to Ho Chi Minh City in the south. The China-Viet Nam Beilun River Bridge was completed and is open to traffic.[12] This is an important step in developing connectivity along this corridor.

Some road sections in Cambodia and the Lao People's Democratic Republic are dominated by class III roads. Roads in the Lao People's Democratic Republic lack safety structures. The capacity of many bridges in the country does not meet traffic requirements, posing safety risks.

The above discussion shows that generally the quality of road infrastructure in most countries along the six corridors is good to very good. In a few countries the quality is uneven and needs to be improved. The Belt and Road Initiative countries are implementing numerous road projects (see table annex 2.1 in the annex) to improve domestic and cross-border connectivity in the region. However, as the traffic projection indicates,[13] most countries may need to enhance the capacity of their road networks.

Figure 3.7. Map of the roads along the China – Indochina Peninsular (CIP) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

[12] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).
[13] See discussion in section 5.2.2.

3.3.2 Railway connectivity

The railway network along the Belt and Road Initiative corridors is comprised of five different track gauges: 1,676 mm (broad gauge in the Indian subcontinent); 1,520 mm (Russian gauge in the Russian Federation and Central Asian countries); 1,435 mm (standard gauge in China, the Islamic Republic of Iran and Turkey); 1,067 mm (Indonesia); and 1,000 mm (metre gauge in South-East Asia and parts of Bangladesh and India). The break of gauge is another issue in the development of the network. It exists when railway lines with two different gauges meet at a point. Discontinuities of track gauges exist between some neighbouring countries in the Belt and Road Initiative rail routes, such as between China and Kazakhstan, Mongolia, Russian Federation, Myanmar, the Lao People's Democratic Republic and Viet Nam; and between the Islamic Republic of Iran and Pakistan, Armenia, Azerbaijan and Turkmenistan. Such discontinuities also exist within some national railways systems, such as in Bangladesh and India. A break of gauge causes interruptions in seamless railway operations and involves additional[14] costs in railway operation and transhipment of goods at break of gauge points. There are different measures[15] to overcome railway network discontinuity resulting from differences in track gauges.

Many routes along the Belt and Road Initiative railway corridors have missing links. A "missing link" is the absence of continuity between the railway networks of neighbouring countries or an absence of continuity of railway links within the same country. As of 2019, there is an estimated 12,405 km of missing links in the trans-Asian railway network, most of which are in South-East Asia and Mongolia (ESCAP, 2019).

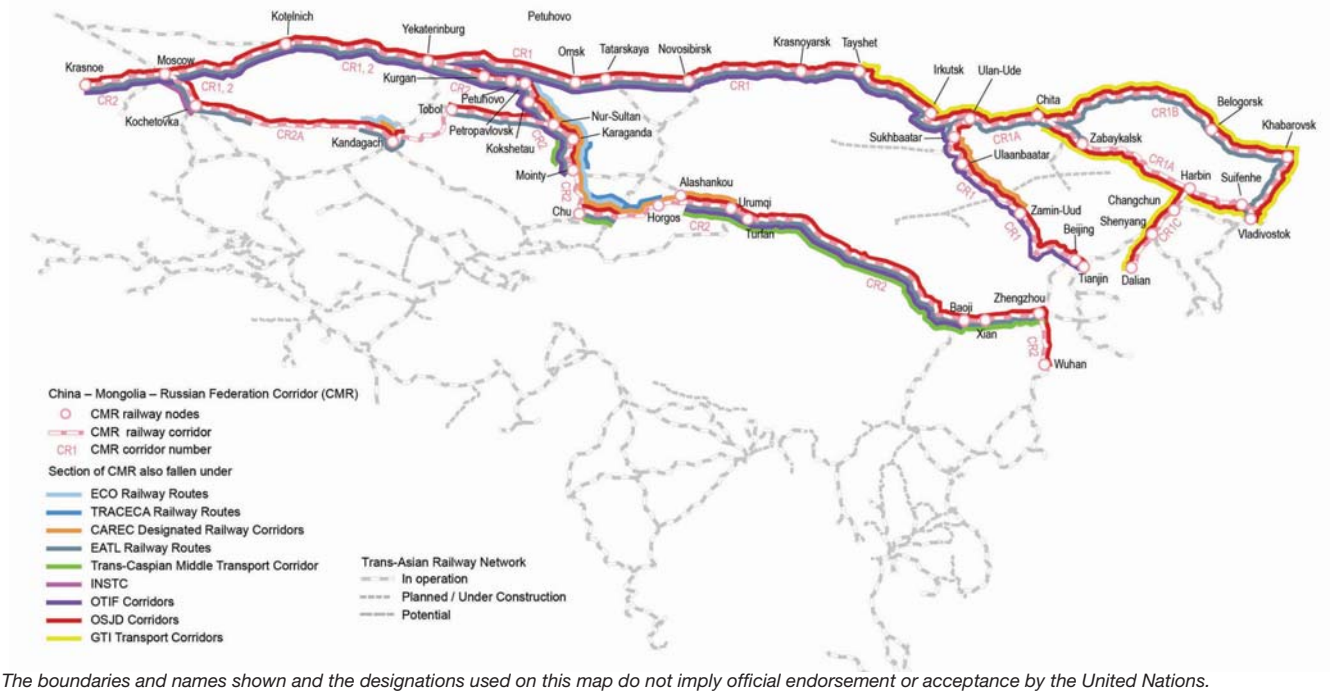
A large part of the network is non-electrified and single-tracked; differences of electrification systems exist even along a single route; and the lengths and standards of track structure and length of station and yard loops varies among the railways. All of these issues affect the line capacity along the routes.

The following sections contains a brief discussion of the status of railway connectivity along the six corridors.

China – Mongolia – Russian Federation Corridor (CMR)

Break of gauge occurs at four places along the corridor; coupled with a lack of customs facilitation, these points are sources of delays. Routes CR1 and CR1B of the corridor are the main trunk of the Trans-Siberian Railway, which has been for an extensive period a

Figure 3.8. Map of the railways along the China – Mongolia – Russian Federation (CMR) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

[14] ESCAP (2019).

[15] Such measures may include unification of track gauges, conversion to dual gauge, transhipment and other technical solutions involving bogies.

relatively stable land connection between Asia and Europe. This route (Moscow – Nahodka) is a 9,288 km electrified double-tracked railway. Because of differences in electrification systems, at least three changes of locomotives are required along the way.[16]

The Trans-Siberian branch line to China (Karimskaya – Zabaykalsk, section of CR1A) is undergoing modernization, which includes the laying of secondary tracks, electrification and laying of 1,435 mm standard gauge tracks in yards.

The double-tracked Manzhouli – Harbin section of CR1A on the Chinese side is undergoing electrification works, which were scheduled to be completed in 2017. The CR1C railway route (928 km), connecting the ports of Dalian and Yingkou to North-East China and then connecting with the Trans-Siberian Railway, is electrified double-tracked.

The Ulan-Ude (Russian Federation) – Ulaanbaatar (Mongolia) – Tianjin (China) section of route CR1 is called the Trans-Mongolian route or the Trans-Siberian branch to Mongolia. The part from Ulan-Ude up to Zamyn – Uud on the Mongolian/China border is 1,520 mm broad gauge, single-tracked and non-electrified. The Chinese section to Tianjin is 1,435 mm standard gauge, the Erenhot – Jining part is single-tracked non-electrified and the Jining – Beijing section is electrified double-tracked. In addition to the delays usually taking place at border crossings, especially at Zamyn – Uud – Erenhot due to break of gauge, the route also needs stopping points at Choir, Saynshand and Ulaanbaatar for technical inspection and locomotive changes.

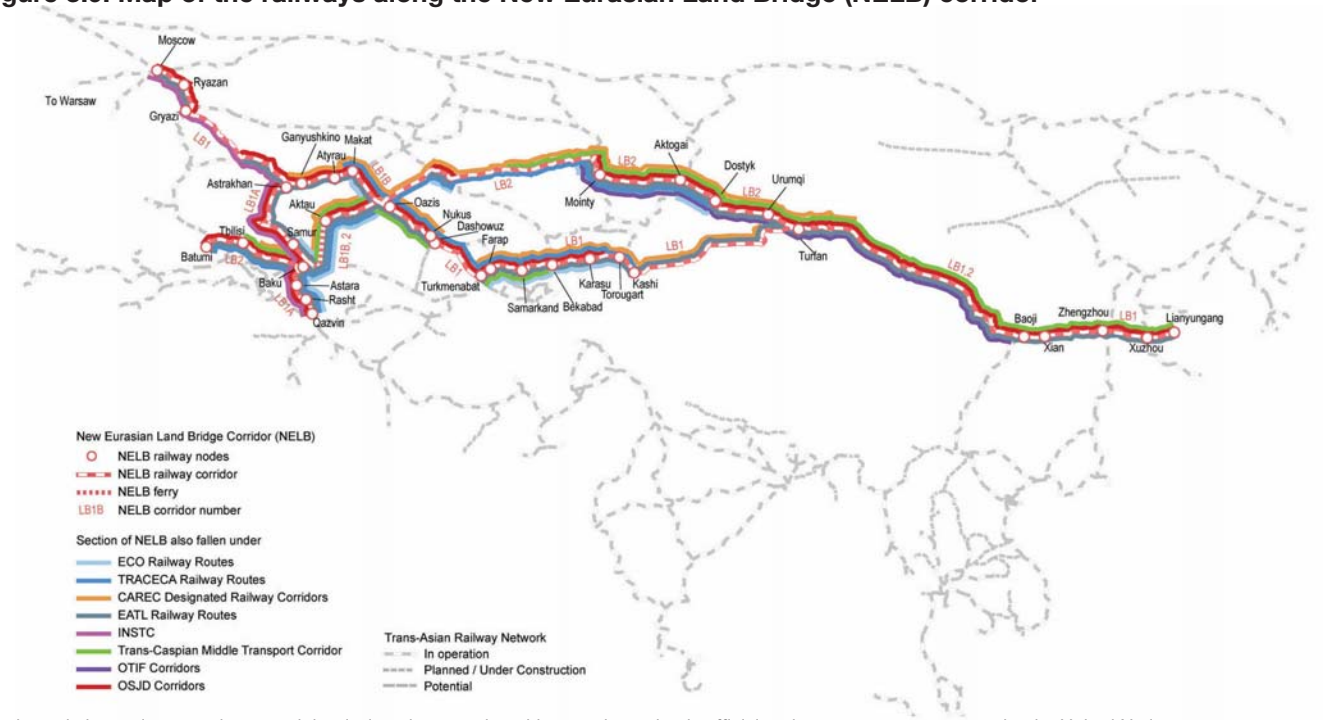
CMR Corridor

Break of gauge	Yes; at four points
Missing link	None
Infrastructure standard	Varies; most parts are double-tracked
Electrification	Yes, most parts are electrified but due to difference in electrification systems, engine changes required
Overall operational connectivity	Good

New Eurasian Land Bridge Corridor

The Chinese section of the CR2 route is standard gauge, while the Russian Federation and Kazakhstan use a 1,520 mm Russian gauge. Breaks of gauge on this route are at Horgos on the China – Kazakhstan border. Rail traffic on the Russian Federation –

Figure 3.9. Map of the railways along the New Eurasian Land Bridge (NELB) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

[16] ESCAP (2017b).

Kazakhstan part of the corridor enjoys the advantages of requiring the same technical conditions and common procedures. On the Chinese part of the corridor, the Horgos-Yining section is single-tracked, non-electrified, Yining – Jinghe is electrified single-tracked and the entire route from Jinghe to Lianyungang is electrified double-tracked. The Kazakhstan section of route CR2 is mostly electrified double-tracked, while Kokshetau Petropavlovsk and the newly built Zhetyken – Horgos lines are non-electrified single-tracked.

NELB Corridor

Break of gauge	Yes; two points, China-Kazakhstan and Belarus-Poland
Missing link	None; ferry crossing in one route
Infrastructure standard	Varies; some sections are single-tracked
Electrification	Some sections electrified
Overall operational connectivity	Good

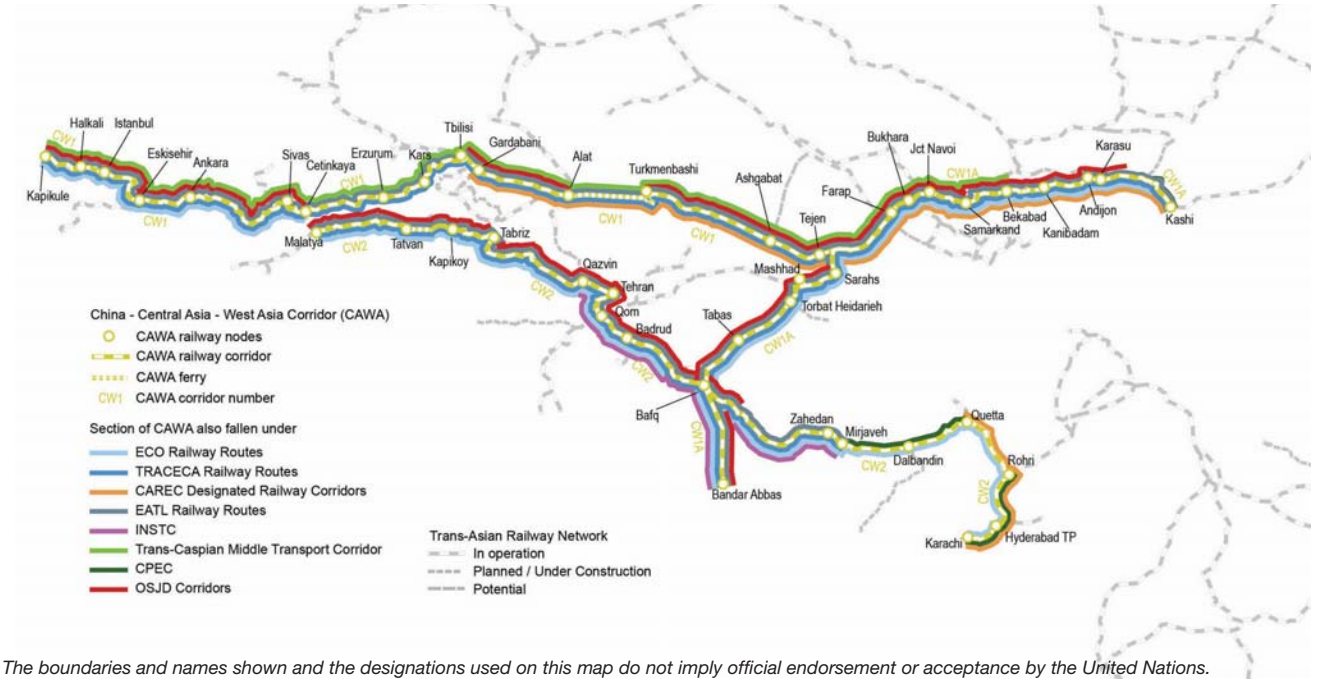
China – Central Asia – West Asia Corridor

Three track gauges are used along the corridors: 1,435 mm (China, the Islamic Republic of Iran, Turkey), 1,520 mm (Azerbaijan, Georgia, Kazakhstan, Turkmenistan, Tajikistan, Uzbekistan), and 1,676 mm (Pakistan). Currently, three railway cross-border connections require gauge change: Akhalkalaki (Georgia, 1,520 mm to 1,435 mm); Taftan (Pakistan, 1,676 mm) – Mirjaveh (the Islamic Republic of Iran, 1,435 mm); and Sarakhs (the Islamic Republic of Iran, 1,435 mm) – Sarahs (Turkmenistan, 1,520 mm).

This corridor has four break of gauge points (Taftan in Pakistan, Sarakhs and Astara in the Islamic Republic of Iran and Tblisi in Georgia) and a ferry link between Baku and Turkmenbashi. With the completion of the projects planned for the railway missing links along the corridors, the number of break-of-gauge points could increase to six. The completion of the Baku-Tbilisi-Kars railway line in October 2017 opened a new railway transit route to connect countries of Europe with Turkey, Azerbaijan, Georgia and Central Asia. This route is the shortest link between the Caspian Sea and Europe, making it of geostrategic importance.

The opening of the Qazvin-Rasht railway line in March 2019, a previously missing link of the network in the Islamic Republic of Iran, is another noteworthy and recently completed project with wider implications for regional connectivity. The new railway line is part of the International North-South Transport Corridor. The only remaining missing link is between Rasht and Astara. Once completed, South Asia will be connected to Europe through railway lines crossing Azerbaijan, the Islamic Republic of Iran and the Russian Federation.[17]

Figure 3.10. Map of the railways along the China – Central Asia – West Asia (CAWA) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

[17] ESCAP (2019).

CAWA Corridor

Break of gauge	Yes; four points
Missing link	Yes, a short missing link in one route; ferry crossing in one route
Infrastructure standard	Varies; some sections are single-tracked
Electrification	Some sections electrified
Overall operational connectivity	Medium

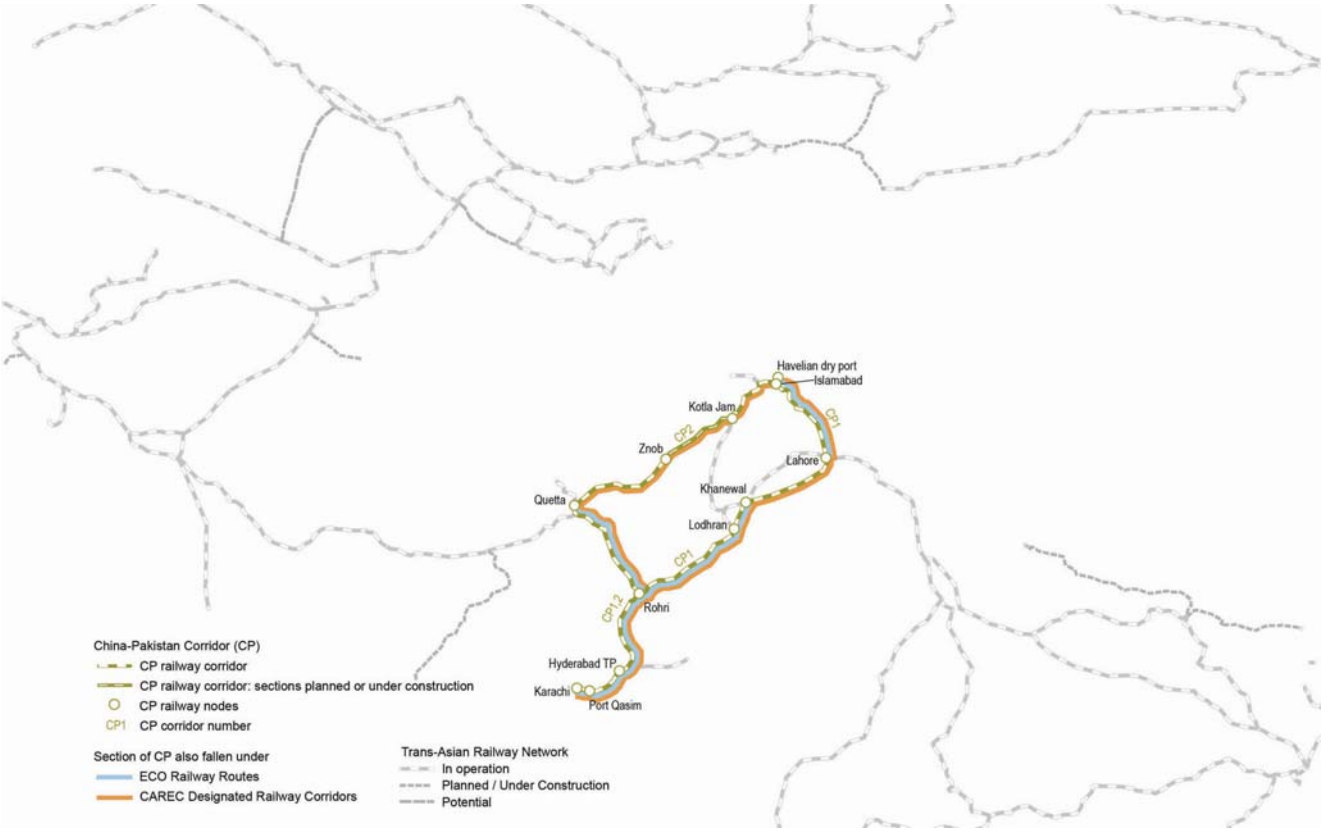
China – Pakistan Corridor

In Pakistan, only the 1,675-track gauge is used. Neighbouring China and the Islamic Republic of Iran use the 1,435-standard gauge. As currently there is no direct railway connection with China, the break of gauge is an issue only with the Islamic Republic of Iran.

The railway connectivity in this corridor is quite limited. However, a number of railway improvement projects are being carried out or planned to improve railway connectivity along the corridor and enhance connectivity with the neighbouring countries. Chief among these projects is the rehabilitation and upgrading of Karachi – Lahore – Peshawar Main Line-1 (ML-1) Railway Track (1,872 km).[18]

A new railway line linking Gwadar port with Quetta and Zhob and Kotla Jam, and capacity expansion of the existing line between Quetta and Taftan (border station with the Islamic Republic of Iran are also planned.

Figure 3.11. Map of the railways along the China – Pakistan (CP) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the ESCAP secretariat.

[18] See http://cpec.gov.pk/project-details/30).

CP Corridor

Break of gauge	Yes; in one route, between Pakistan and Islamic Republic of Iran
Missing link	Yes, between China and Pakistan
Infrastructure standard	Moderate
Electrification	No
Overall operational connectivity	Low

Bangladesh – China – India – Myanmar Corridor

Multiple gauges are in use along this corridor (broad gauge – 1,676 mm, standard gauge – 1,435 mm, and metre gauge – 1,000 mm). India and Bangladesh use multiple gauges, which affects connectivity along the BC2 route in Bangladesh. The railway network in this corridor has missing links along every route; the missing links are in the following sections: Jiribam (India) – Kalay (Myanmar); Lashio (Myanmar) – Ruili (China); and between China and the Lao People's Democratic Republic.

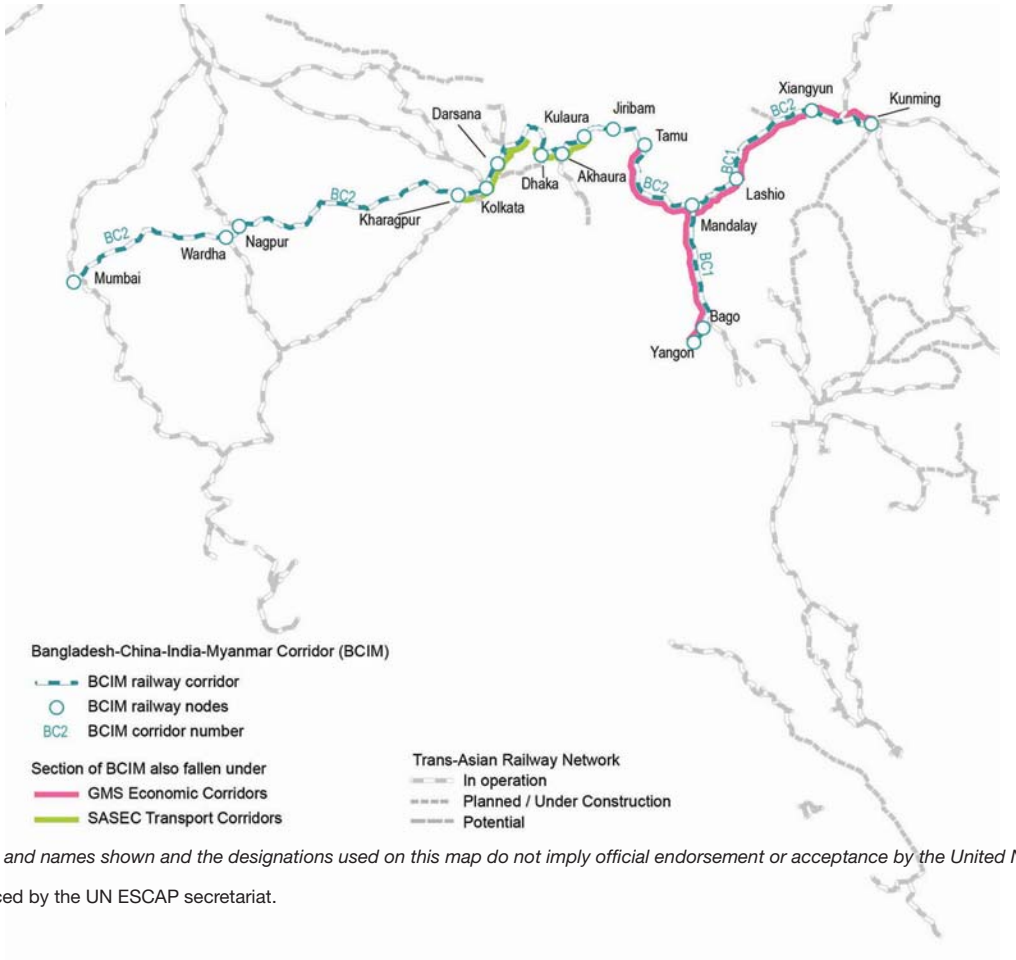
In India, the section from Jiribam to Mahisasan (border with Bangladesh) is non-electrified single-track and the Karimganj – Mahisasan line was recently converted from 1,000 mm to 1,676 mm gauge, unifying the gauge width within India. The sections of the BC2 in India from the border with Bangladesh at Gede to Mumbai are fully 1,676 mm electrified double-track.

Railway routes in Bangladesh are not electrified. The section from the border with India at Shahbazpur to Tongi is a single-tracked 1,000 mm line; Dhaka to Ishwardi is dual-gauge single-tracked and the rest of the line from Ishwardi to the border with India is 1,676 mm double-tracked.

As mentioned earlier, there are missing links in this corridor. However, some of these missing links are expected to be closed in the future. A new line in China Dali-Baoshan – Ruili, a 330 km long line bordering with Myanmar is under construction and scheduled to be completed in 2021.

In October 2019, China signed an agreement with Nepal to construct a rail link connecting Lhasa with Kathmandu. Nepal is also exploring several options

Figure 3.12. Map of the railways along the Bangladesh – China – India – Myanmar (BCIM) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the UN ESCAP secretariat.

proposed by India to establish railway connectivity with India.[19]

China and Myanmar have also signed a memorandum of understanding on building the China – Myanmar Economic Corridor, and papers on a feasibility study for the Muse – Mandalay Railway.[20]

BCIM Corridor

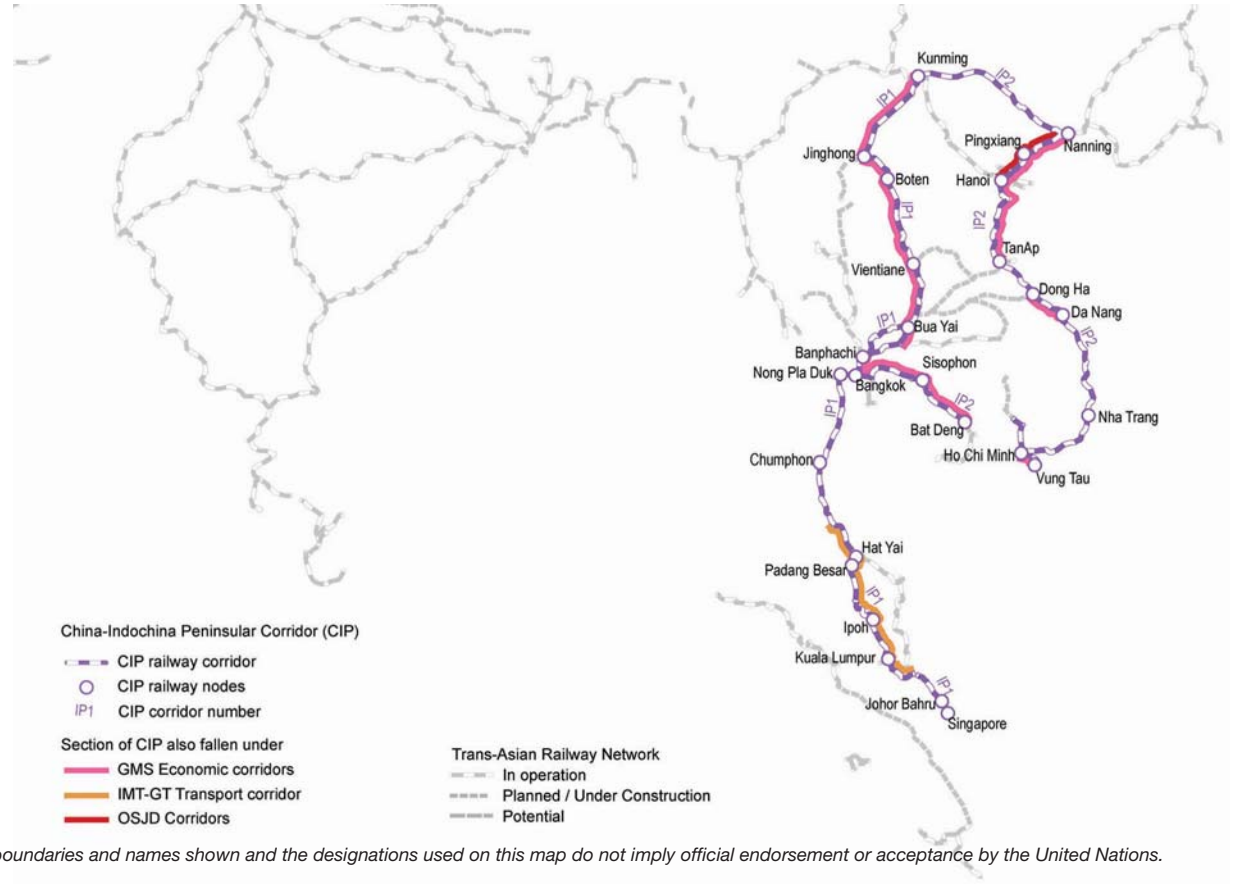
Break of gauge	Yes; multiple
Missing link	Yes, between China and Myanmar and Myanmar and India
Infrastructure standard	Vries; some sections in India and Bangladesh good, double-tracked
Electrification	Yes; a large part in India
Overall operational connectivity	Low

China – Indochina Peninsular Corridor

Multiple gauges are in use along this corridor (1,435 mm standard gauge and 1,000 mm metre gauge). The railway network has missing links along every route of the corridor, including notably along Yuxi (China) – Thanaleng (Lao People's Democratic Republic) and Ho Chi Minh City (Viet Nam) – Bat Deng (Cambodia). The railways along the corridor are disconnected at most of the borders, making the break-of-gauge issue redundant. In places where different gauge railways are connected, a dual gauge stretch is operated (China – Viet Nam).

In China, the Nanning-Kunming – Guangtong railway line is electrified single track. The Dali to Ruili electrified single-tracked section is under construction. The railway route is disconnected at the China – Myanmar border: this is a missing link within the Trans-Asian Railway network.

Figure 3.13. Map of the railways along the China – Indochina Peninsular (CIP) corridor



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Produced by the UN ESCAP secretariat.

[19] Katiyar (2019).
[20] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).

Myanmar uses 1,000 mm (metre) gauge tracks, and the railway section Lashio – Mandalay – Kalay is non-electrified single-track. The link to the railways in India is missing. In 2005, a feasibility study was completed for the section running Kalay (Myanmar) – Jiribam (India). Construction works have started only on the Jiribam-Imphal section (125 km) in India (Indian Railways Knowledge Portal, 2016).

In Viet Nam (route S2), the section from the border with China to Hanoi is dual gauge 1,000 mm/1,435 mm, while the rest up to Ho Chi Minh City is 1,000 m gauge. The whole section is non-electrified single-track.[21] The line from Ho Chi Minh City to Loc Ninh and further on to the border with Cambodia is missing at the moment. The Hanoi – Ho Chi Minh line will be electrified and double-tracked with a 1,000 mm gauge, which will be able to be converted to 1,435 mm.[22]

The section of Route IP1 between China and Thailand has only two short sections in operation, one in China and the other in Thailand. The missing links in China and the Lao People's Democratic Republic on the route are under construction. The Laotian section will be built by China. This line will be constructed to Chinese standards: 1,435 mm standard gauge, electrified single-track. The Lao People's Democratic Republic opted for the technologies and gauges used by China for its main railway line. Accordingly, the break-of-gauge issue will be shifted to the border with Thailand.

The China – Lao People's Democratic Republic and China – Thailand railways and some other railway projects are well underway.[23] China is closing another missing link in this corridor: the Yux – Xishuangbanna – Mohan link, a line of approximately 508 km bordering the Lao People's Democratic Republic. This line is expected to be completed by 2021.

CIPC Corridor

Break of gauge	Yes, multiple
Missing link	Yes, multiple; between Viet Nam and Cambodia, Lao People's Democratic Republic and Thailand; missing link between China and Lao People's Democratic Republic will be completed in 2021
Infrastructure standard	Varies; mostly single-tracked
Electrification	Yes; sections in China and Lao People's Democratic Republic (under construction)
Overall operational connectivity	Low

The status of railway networks shows that the railway connectivity along the Belt and Road Initiative corridors is generally uneven. Compared with road connectivity, for most of the corridors, the connectivity is impeded because of three main issues: break of gauge along a route; missing links; and limited line capacity. There are also other physical and operational issues that constrain connectivity along the routes. However, some important railway projects have been or are being implemented, especially in the China – Central Asia – West Asia and China – Indochina Peninsular corridors, to improve railway connectivity in the region.

3.4 Road and rail operational connectivity along Belt and Road Initiative corridors

Seven subregional facilitation agreements, 16 international and regional conventions and agreements,[24] and many bilateral agreements or arrangements (see annex 3) govern the operation of Belt

[21] UMIASIA (2014).
[22] See https://www.unescap.org/sites/default/files/Viet%20Nam%20-%20Present%20status%20and%20its%20plan%20in%20railway%20connectivity%20the%20GMS%20and%20ASEAN.pdf.
[23] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).
[24] A list of such conventions is provided in table C1 in annex C.

and Road Initiative transport corridors.[25] The seven subregional agreements are related to the following:

- Commonwealth of Independent States (CIS)
- Eurasian Economic Union (EEU)
- Economic Cooperation Organization (ECO)
- Shanghai Cooperation Organization (SCO)
- Intergovernmental Commission TRACECA
- ASEAN Framework Agreement on the Facilitation of Goods in Transit (Protocol 1)
- Greater Mekong Subregional Cross-Border Transport Facilitation Agreement (Protocol 1)

In addition to these seven agreements, many multilateral agreements have been signed to facilitate cross-border movements of goods by road, such as the Afghanistan – Pakistan – Tajikistan Trilateral Transit Trade Agreement and the Bangladesh – Bhutan – India – Nepal Motor Vehicles Agreement and Intergovernmental Agreement on International Road Transport along the Asian Highway Network. In addition, negotiations are ongoing for a motor vehicle agreement to facilitate cargo movement along the India – Myanmar – Thailand Trilateral Highway. The positive aspects of those initiatives have yet to be felt because of difficulties associated with their implementation.[26]

China formally joined the Convention on International Transport of Goods Under Cover of TIR Carnets (TIR Convention). It has signed 18 bilateral and multilateral international transport facilitation agreements with 15 Belt and Road Initiative countries, including the Intergovernmental Agreement of the Shanghai Cooperation Organization Member States on the Facilitation of International Road Transport. In addition, further progress was made in implementing the Greater Mekong Subregion[27] Cross-Border Transport Facilitation Agreement.[28]

In general, the cross-border road connectivity along the Belt and Road Initiative networks can be divided into three categories.[29]

(a) No permission for cross-border transport by road: traffic rights are not granted to foreign vehicles to cross borders for commercial transport and transloading of cargo takes place at the border areas.

(b) Cross-border transport by road permitted subject to quota: traffic rights are granted to foreign vehicles through a road permit system. Specific numbers of road permits are granted to road transport operators, depending on bilateral or multilateral arrangements among countries. Road permits are usually issued with conditions. For example, foreign trucks are required to use certain border-crossing points and follow designated routes upon entering foreign countries. Cabotage is frequently not allowed.

(c) Cross-border transport by road permitted and not subject to a quota: there are no quota restrictions on foreign road freight vehicles. This is usually the case when a number of countries enter into a "customs union", such as the Eurasian Economic Union.

China – Mongolia – Russian Federation Corridor (CMR)

Most parts of the road and rail routes in this corridor are covered by CIS, ECO, EEU, ECO and SCO subregional agreements. In addition, the Intergovernmental Agreement on International Road Transport Along the Asian Highway Network, signed and approved by China, Mongolia and the Russian Federation in 2016, has entered into force.[30] This Agreement allows issuance of road transport permits for transport of goods among the three countries along the designated AH4 and AH3 routes. The AH4 route would also allow operational connectivity with Central Asian countries.[31]

The Agreement on Economic and Trade Cooperation between the Eurasian Economic Union and Its Member States, and China of 2018, Part One, among other issues, requires parties to simplify and streamline

[25] There are several international treaties and conventions, which are also followed, but compliance with them is not universal among all Belt and Road Initiative BRI countries in the ESCAP region.
[26] See ESCAP/CTR/2018/1.
[27] OLF (2029).
[28] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).
[29] ESCAP (2019).
[30] ESCAP (2019).
[31] AH4: Novosibirsk – Barnaul Tashanta (Russian Federation)/Ulaanbaishint (Mongolia) – Hovd – Yarantai (Mongolia)/Takeshikan (China) – Urumqi – Kashi – Honqiraf.

procedures for customs control, limit documentations and procedures needed, implement risk management techniques, mutually recognize appropriate documents, accept electronic documentation, develop and use single window services and negotiate the establishment and mutual recognition of authorized economic operators.[32]

The break-of-gauge at railway border-crossing posts cause delays due to congestion in yards at Erenhot (China) and shortages in transloading equipment at Zamin-Uud (Mongolia). In general, the railway border-crossing posts require upgrading in both capacity and equipment.

New Eurasian Land Bridge Corridor (NELB)

Three subregional agreements, involving CIS, EEU and SCO, cover the routes in this corridor. In addition, the recently adopted Intergovernmental Agreement on International Road Transport Along the Asian Highway Network also covers the road routes in China, the Russian Federation and Mongolia. The Lianyungang – Horgos section is covered by the SCO Agreement.

The Agreement on Economic and Trade Cooperation between the Eurasian Economic Union and Its Member States, on the One Part, and the People's Republic of China on the Other Part, mentioned above, also applies to this corridor.

Under the Agreement on Facilitation of International Road Transport of the SCO, the member countries have agreed to harmonize and simplify the requirements, documentations and procedures for international road transport among each other; mutually recognize vehicle and driver's documents and work together to develop transport infrastructure. A single round-trip permit is required for operations. However, the number of actual road sections covered is limited by those mentioned in appendix I of the agreement.[33]

Permit-free bilateral road transport with no restrictions on routes or border-crossing posts is possible between Kazakhstan and the Russian Federation. However, a bilateral road transport permit is required between China and Kazakhstan.

The Intergovernmental Agreement on International Road Transport Along the Asian Highway Network between China, Mongolia and Russian Federation will enhance operational connectivity between Asian and European countries along the AH4 route in this corridor.

The break-of-gauge and deficiencies at railway border-crossing posts is a major issue in railway operational connectivity in this corridor.

China – Central Asia – West Asia Corridor (CAWA)

The Economic Cooperation Organization Trade Agreement and the Intergovernmental Commission TRACECA Agreement cover most sections of the routes in this corridor. The Agreement Establishing the Commonwealth of Independent States Agreement, the Eurasian Economic Union Agreement and the Shanghai Cooperation Organization Charter also cover some sections of the routes in the corridor. Many sections are covered by more than one agreement, but no section is covered by a multilateral agreement or arrangement.

The China – Central Asia – West Asia Corridor is almost entirely covered by relevant agreements or arrangements. No transhipment is required at most borders. The most common permit system along this corridor is the "single round trip permit". However, there are cases of permit-free bilateral transport arrangements, for example between Turkmenistan – Islamic Republic of Iran, Kyrgyzstan – Tajikistan, Uzbekistan – Kazakhstan, and Kazakhstan – Russian Federation.[34] Road transport permit is required with or without restrictions on routes and border-crossing posts for the following pairs of countries: Afghanistan and Tajikistan; Uzbekistan and Turkmenistan; Azerbaijan and the Islamic Republic of Iran; Azerbaijan and the Russian Federation; Azerbaijan and Georgia; Turkey and the Islamic Republic of Iran; and Turkey and Georgia.

There are no reciprocal traffic rights between Uzbekistan and Tajikistan; transhipment at the border is required.

Some countries along the corridor, such as Armenia, Georgia and Turkey, are also parties to the Black Sea Economic Cooperation multilateral permit system,

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[32] Agreement on Economic and Trade Cooperation between the Eurasian Economic Union and Its Member States, of the One Part, and the People's Republic of China, of the Other Part, Astana, 17 May 2018 <http://www.eurasiancommission.org/ru/act/trade/dotp/sogl_torg/Documents/%d0%a1%d0%be%d0%b3%d0%bb%d0%b0%d1%88%d0%b5%d0%bd%d0%b8%d0%b5%20%d1%81%20%d0%9a%d0%b8%d1%82%d0%b0%d0%b5%d0%bc/%d0%a2%d0%b5%d0%ba%d1%81%d1%82%20%d0%b0%d0%bd%d0%b3%d0%b8%d0%b9%d1%81%d0%ba%d0%b8%d0%b9%20%28EAEU%20alternate%29%20final.pdf> (accessed 3 March 2020).

[33] Agreement of the Shanghai Cooperation Organization Member States on the Facilitation of International Road Transport (Dushanbe, Tajikistan, 2014) http://mddoc.mid.ru/api/ia/download/?uuid=ddef70c8-e3c5-4296-b8fd-d7f6b49ef53f).

[34] ESCAP (2017b).

which is modelled after the European Conference of Ministers of Transport international road haulage permit system.[35]

In April 2016, a regular container train service was introduced between China and the Islamic Republic of Iran along a 10,400 km route via Kazakhstan and Turkmenistan.[36]

The quality of border crossing points facilities and available technologies differs along the corridor. The situation is better at border crossing points between Azerbaijan and the Russian Federation, Azerbaijan and Georgia, Georgia and Turkey, and China and Kyrgyzstan; upgrading of facilities is required at the border crossing points with Tajikistan, Turkmenistan, Pakistan and Uzbekistan. The main issues with the facilities are delays because of queuing, lengthy inspections and inefficient document processing. Generally, border-crossing points in the corridor require upgrading in facilities or procedures or in both.

China – Pakistan Corridor (CP)

The Economic Cooperation Organization Agreement covers the routes in this corridor in Pakistan.

A road transport permit is required on routes or border-crossing posts between China and Pakistan and Pakistan and the Islamic Republic of Iran. There is no traffic right between Afghanistan and Pakistan.

No considerable delays occur at the border crossing point between Pakistan and China, but because of extreme weather conditions in the winter, the border crossing point may remain closed for an extended period.[37]

The road and rail border crossing point at the border between Pakistan (Taftan) and the Islamic Republic of Iran (Mirjaveh) has poor facilities at Taftan.[38] Facilities and procedures on the Islamic Republic of Iran side is better but complicated. The border crossing point operates only during the day.

Bangladesh – China – India – Myanmar Corridor (BCIM)

The sections in Myanmar are covered by the ASEAN Framework Agreement on the Facilitation of Goods in Transit (Protocol 1), and the section in China is covered by the Greater Mekong Subregional Cross-Border Transport Facilitation Agreement (Protocol 1). The other sections of the corridor routes, in Bangladesh, Nepal and India, are not covered by any multilateral agreements.

Bangladesh, Bhutan, Nepal and India have signed the Bangladesh – Bhutan – India – Nepal Motor Vehicles Agreement. The Agreement has not entered into force. Bilateral agreements govern the operation of the corridor routes in these four countries.

Regular passenger and freight trains operate between Dhaka and Kolkata, India. In cases in which there is no road traffic, no traffic rights between India and Bangladesh are in place. There are also no traffic rights between India and Myanmar, or Myanmar and China. Transhipment of goods is required at the borders.

India is building integrated inspection facilities at border crossings with its neighbours.[39] Two such facilities at Petrapole and Agartala at borders with Bangladesh, and one at Moreh at the border with Myanmar are operational; a few more are planned or under construction.[40]

China – Indochina Peninsular Corridor (CIP)

Most parts of the routes in this corridor are covered by the ASEAN Framework Agreement on Facilitation of Goods in Transit (Protocol 1), and the Greater Mekong Subregional Cross-Border Transport Facilitation Agreement (Protocol 1). The Hanoi – Ho Chi Minh City section is not covered by any agreement.

A road transport permit is required on routes or border crossing posts between China and the Lao People's Democratic Republic, Cambodia and Thailand, China and Viet Nam, and Cambodia and Thailand. No permit is required between the Lao People's Democratic Republic and Thailand. There is no traffic right between Thailand and Malaysia; transhipment of goods takes place at this busy border point.

The situation and facilities at the border crossing points in this corridor vary. There are single-window facilities at the border crossing points in Thailand, and plans are afoot for coordinated border management at the

[35] ESCAP (2019, p. 35).
[36] AFP (2016).
[37] ESCAP (2017b).
[38] Ibid. p. 49.
[39] Bhattacharjee (2019).
[40] Ibid.

Thailand – Cambodia, and Cambodia – Viet Nam borders. The Bukit Kayu Hitam (Malaysia) – Sa Dao (Thailand) road border crossing point is the busiest in GMS. It takes a long time to pass through, as transloading of cargo is required. The Mohan (China) – Boten (Lao People's Democratic Republic) road border crossing point is also used for containerized cargo movement between China and Thailand. It requires transhipment because of the difference of container standards used by China (45 ft) and Thailand 20/40 ft). Because of the lift-on/lift operations, the border crossing point is more expensive than the other ones in GMS.[41]

In addition to the details given above, some more progress was made in the recent years. China has signed bilateral agreements on international road transport with Kazakhstan, Uzbekistan, Turkey, and other countries, multilateral agreements involving China, Pakistan, Kazakhstan and Kyrgyzstan; China, Kazakhstan and the Russian Federation; China, Kyrgyzstan and Uzbekistan; and some other multilateral agreements on international road transport.[42]

An international railway operation mechanism with cooperation among multiple countries was established. Railway companies of China, Belarus, Germany, Kazakhstan, Mongolia, Poland and the Russian Federation have signed an agreement on deeper cooperation between Chinese and European rail service. By the end of 2018, the China – Europe rail service connected 108 cities in 16 countries in Asia and Europe. A total of 13,000 trains had carried more than 1.1 million twenty-foot equivalents (TEUs). Among the trains starting from China, 94 per cent were fully loaded and among those arriving in China, 71 per cent were fully loaded.[43] (Office of the Leading Group for Promoting the Belt and Road Initiative, 2019).

3.5 Dry ports and intermodal facilities

Dry ports and intermodal interface facilities can play an important role in promoting sustainable connectivity in Belt and Road Initiative corridors. All major countries are developing a network of dry ports and other intermodal facilities along the corridors. These facilities can serve as intermodal interfaces and enable the efficient transfer of goods between different modes of transport, and also help make operations of highway and railways routes in a corridor more efficient.

This section contains brief descriptions of dry port and other intermodal facilities along the Belt and Road Initiative corridors.[44]

China – Mongolia – Russian Federation Corridor (CMR)

Russian Railways has planned 20 terminal logistics centres along the CMR Corridor (CR1, CR1A, CR1B, routes), in Moscow, Novosibirsk, Nizhniy Novgorod, Samara, Yekaterinburg, Khabarovsk, Ufa, Ulan-Ude, Krasnoyarsk, Ussuriysk, Zabaykalsk, Irkutsk, Chita, Omsk, Chelyabinsk and Ryazan, and in the St. Petersburg region.[45]

Mongolia has four logistics terminals: Zamin-Uud; Altanbulag; Ulaanbaatar; and Saynshand; all of them are located along the CR1 corridor.

Under the Intergovernmental Agreement on Dry Ports, the main dry ports on the Chinese sections of the CMR Corridor (CR1C) are: Manzhouli New International Freight Yard (15 sq. km – processes containers, timber and wood, coal, cars, mineral ores, dangerous chemicals); Changchun Xinglong Bonded International Logistics Port (first of three development stages completed; 4.89 sq. km area – includes bonded processing zone, tax-bonded logistics zone, border examination zone, comprehensive service zone);[46] Harbin Longyun Logistics Park (first stage of construction completed; area 515 thousand sq. m – includes unloading and loading area, warehouses, logistics transaction area and container area;[47] Suifenhe Cargo Centre; Erenhot South International Logistics for the CR1; Horgos International Logistics Park for the CR2 (40 ha of warehouses, transport and loading facilities were envisaged in 2011 plan);[48] and Xinjiang Railway International Logistics Park in Urumqi (works started in 2014, area 153 ha).[49]

[41] ESCAP (2017b).
[42] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).
[43] Ibid.
[44] Much of the information provided on dry ports and other facilities in this section are from the Eurasian Corridor Study and the Intergovernmental Agreement on Dry Ports. Additional information was collected from other sources.
[45] ESCAP (2017).
[46] Changchun Xinglong Free Trade Zone. See www.ccftz.gov.cn.
[47] Harbin City People's Government. Available from http://www.harbin.gov.cn (accessed 24 November 2016).
[48] Party Committee of Khorgos Economic Development Zone.
[49] Intergovernmental Agreement on Dry Ports.

In summary, the terminal network in the Russian Federation is being developed to support the operation of container trains between Asia and Europe. In China, Kazakhstan and the Russian Federation, in addition to country-wide plans for the development of terminals networks, multiple private sector initiatives of various scope are being implemented at almost every location along the corridor's routes. Despite the large volume of information available on the logistics facilities along the corridor, progress on the development of dry ports listed in the Intergovernmental Agreement on Dry Ports is not available.

New Eurasian Land Bridge Corridor (NELB)

The main terminals along the CR2 route in Kazakhstan are Astana (area 24 ha, 15 feeder tracks, 722 sq. m of sheltered warehouses, and open storage – processes cables, tubes, chemicals, road vehicles, construction materials and containers), and Petropavlovsk.

Other transport and logistics centres along the corridor are Karaganda (area 8.06 ha, 11 feeder tracks, sheltered warehouse, open storage – processes mid-size containers, overweight cargoes and road vehicles, among others); Kokshetau (area 24 ha, four feeder tracks – processes coal, overweight cargoes, containers and break-bulk); and Kostanai (area 3.5 ha, three feeder tracks, open storage, sheltered warehouse – processes timber, cars, chemicals, ceramics and stones, machinery and paper, containers, among others).

Korgas International Border Cooperation Centre: (Khorgos Eastern Gateway, area 579 ha, container yard, warehouses, rail tracks for standard and Russian gauges (1,425 mm/1,520 mm). Facilities on the Kazakhstan side are being developed under the framework of the Khorgos – Eastern Gate Special Economic Zone project. The zone is 5,740 ha and includes a dry port, an exhibition centre, and logistics and industrial zones.

A dry port is at Xi'an (area 44.6 sq. km, includes tax-bonded area, railway container centre, highway port; focuses on multimodal transportation). Another dry port is planned for Lanzhou (planned area 200 ha, 10 feeder routes; planned cargoes are containers, cars, electronics, machinery and steel, among others).

The Government of China is focusing heavily on the development of inland logistics facilities. The objective of this project is to build a country-wide network in accordance with the National Logistics Park Development Plan for 2013-2020. A total of 99 such facilities are planned. A facility will be located in every provincial capital and in most large cities.

Most of the terminal networks are being created under State supervision, for example, as part of the plans of state railways (Russian Federation, Pakistan and Turkey).

China – Central Asia – West Asia Corridor (CAWA)

In summary, the terminal network in this corridor is not complete; much constructions is ongoing. Countries in the corridor are building or exploring options to build logistics facilities (logistics centres, dry ports, terminals) at important inland transport nodes and seaports. Many of the existing facilities are insufficient or outdated. In most cases, the facilities include customs services, handling equipment, warehousing and storage, as recommended by the Intergovernmental Agreement on Dry Ports. In the cases of Azerbaijan, Georgia and Islamic Republic of Iran, the dry ports are accompanied by zones with special economic regions: special trade; or economic or industrial zones.

Development of similar logistics terminals is needed in Afghanistan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

China – Pakistan Corridor (CP)

The status of dry ports in the corridor are as follows:

Silk Route Dry Port, Sost, Gilgit, Baltistan, Pakistan. Included in the Agreement; provides sea, land, air transport services, has storage facilities, equipment for containers transloading, assists in customs clearance; in operation.

- Margalla Dry Ports, Islamabad. Included in the Agreement; established in 1990 and operated by Pakistan Railways; in operation.
- Lahore Dry Port, Mughalpura, Pakistan. Included in the Agreement; established in 1973; operated by Pakistan Railways; in operation.
- National Logistics Centre, Container Freight Station, Lahore, Pakistan. Included in the Agreement; in operation.
- Multan Dry Port Trust, Multan, Pakistan. Included in the Agreement; in operation.

Pakistan is planning to develop a major dry port at Havelian near its border with China. The dry port will have a capacity of 450 million TEUs and an intermodal facility. Initially, it will serve as a dry port and container terminal for goods transported by the KKH highway from China. Transhipment arrangements will be provided at Havelian for loading and unloading on railway wagons.

Bangladesh – China – India – Myanmar (BCIM)

In summary, India has the most established network of logistics terminals in the corridor but growing domestic and international traffic dictates that more such facilities and dry ports are needed. Myanmar has limited terminal facilities, while the existing ones need to be modernized and expanded.

Some important terminal are the following:

- Majerhat, Kolkata, West; Bengal, India; included in the Agreement; in operation; container freight station of 13,770 sq. m, transit warehouses of 1,076 sq. m, customs facility, connections to highways and railways.[50]
- Nagpur Inland Container Depot, Maharashtra, India; not included in the Agreement. Export warehouse of 2,000 sq. m, combined warehouse of 2,100 sq. m, bonded warehouse of 275 sq. m, bonded trucking facility, air cargo services, empty park facility, customs facility, connection to railway and roads; in operation.
- Inland Container Depot New Mulund, Mumbai, India; not included in the Agreement. Warehouses of 8,500 sq. m, paved area of 72,000 sq. m, works with export and import cargoes; in operation.
- Dronagiri Node, Mumbai, India; not included in the Agreement; container freight station, warehouses of 41,840 sq. m, paved area of 100,000 sq. m, customs facilities; in operation.
- Kamalapur Inland container depot, Dhaka; included in the Agreement; in operation; constrained by limited capacity; operation to be shifted to the Gazipur Inland Container Depot.
- Benapole, Jessore, Dhaka, Bangladesh; included in the Agreement; in operation.
- An inland container depot at Dhirasram, Bangladesh Gazipur is planned (Sultana, 2010) to be built by Bangladesh Railway; planned capacity 354,000 TEUs.
- Yangon; not included in the Agreement; road cargo terminal: existing facilities are not suitable for modern operations; in operation.
- Mandalay, Myanmar; not included in the Agreement; a new road cargo terminal facility was built in 2012, however, its design is not satisfactory; in operation.

China – Indochina Peninsular Corridor (CIP)

In summary, the corridor has a large number of dry ports and other terminal facilities in China, Cambodia, the Lao People's Democratic Republic and Viet Nam, but further development is required. Even operating terminals, included as existing dry ports in the Agreement, are not necessarily fully completed (Pingxiang, China; Phnom Penh). Myanmar has limited terminal facilities and its existing ones need to be modernize and expanded. China is upgrading some existing facilities from their current status as pure logistical centres into free trade or special zones by adding the functions of the bonded areas with activities that are not purely transport- or customs- related, such as processing and financial services.[51] Plans for dry port networks in Cambodia, the Lao People's Democratic Republic and Viet Nam are at an early stage. Some important centres are discussed below.

Mohan International Logistics Centre, Xishuangbanna, China; not included in the Agreement, area of approximately 500,000 sq. m, open storage, warehouses, 7 km from the border; in operation.

- Dawei Trade, Xishuangbanna, China; not included in the Agreement; facilities include customs bonded warehouse, cargoes are transferred between Laotian and Chinese trucks, 5 km from the border; in operation.
- Nanning Bonded Logistics Centre, Nanning, China; included in the Agreement; upgraded in 2015 to the Nanning Comprehensive Bonded Area (integrated free trade zone); already completed; facilities include: customs inspections area; four logistics zones; bonded warehouses of 30,420 sq. m, inspection warehouses of 2,400 sq. m, storage of 58,954 sq. m; the functions of the bonded area are manufacturing, logistics and bonded services; in operation; further construction stages are ongoing.
- Tengjun International Land Port, Kunming, China; included in the Agreement; area of 1.6 sq. km (projected 2.45 sq. km); capacity 1.2 million TEUs; services include logistics and multimodal transport services; storage and warehousing, exhibition, ecommerce and financing; in operation.
- Kunming Wangjiaying Hub, Kunming, China; not included in the Agreement; container yard with a capacity of 1.6 million TEUs (underutilized);

[50] See http://www.concorindia.com.

[51] China has opened pilot free trade zones for global business and experimented with free trade ports to attract investment from participating countries Initiative (Office of the Leading Group for Promoting the Belt and Road Initiative 2019).

provides storage, multimodal transport, information, logistics financing, office services; in operation.

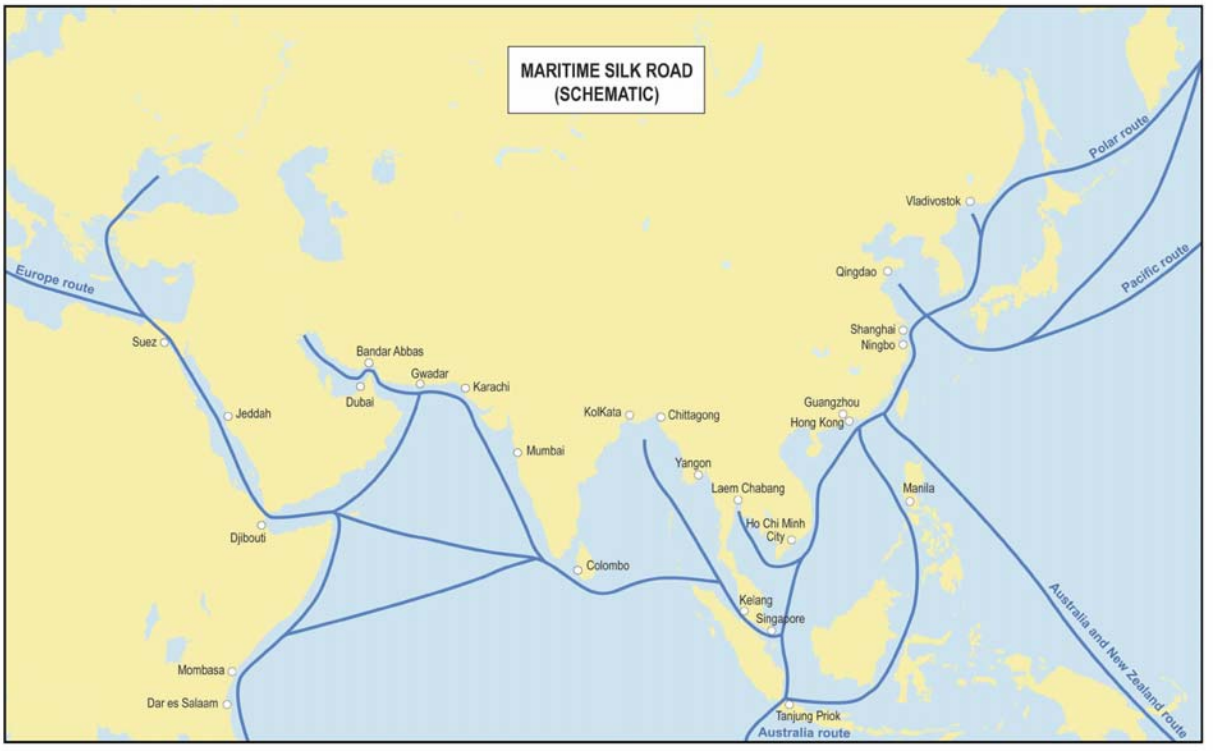
- Inland Container Depot Hai Phong New Port, Viet Nam; not included in the Agreement; in operation.
- Inland Container Depot Tan Cang – Long Binh, Dong Nai Province, Viet Nam; included in the Agreement; area of 230 ha; in operation.
- Inland Container Depot Song Than, Binh, Duong Province, Viet Nam; included in the Agreement; area of 50 ha; in operation.
- So Nguon Dry Port, Bavet, Cambodia; included in the Agreement; customs inspections and clearance, temporary storage, container depot (4,000 containers), warehouses of 6,000 sq. m; in operation.
- Phnom Penh International Port, Phnom Penh; included in the Agreement; container (120,000 TEU/year) cargo; passenger terminals, inland container depot of 92,000 sq. m; warehouses of 5,000 sq. m.; in operation.
- Lat Krabang Inland Container Depot, Bangkok; included in the Agreement; operated by the State Railway of Thailand; area of 103.6 ha, capacity one million tonnes, provides consolidation distribution, handling, storage, inspection and customs clearance services for rail and road cargoes; in operation.
- Inland Container Depot, Padang Besar, Malaysia; included in the Agreement; in operation.
- Ipoh Cargo Terminal, Ipoh, Malaysia; included in the Agreement; container storage area of 4.8 ha, bonded warehouse of 2,600 sq. m, other warehouses of 1,250 sq. m, open storage of 0.4 ha; in operation.

3.6 Maritime Connectivity

3.6.1 Maritime Silk Road

The Maritime Silk Road is a key component of the Belt and Road Initiative. It connects coastal areas of China to the rest of the Asia-Pacific region, Africa and Europe. More specifically, the Road connects coastal areas of China to the Philippines, Indonesia, the Indo-China peninsula, Pacific countries, India, Pakistan, the Arabian Peninsula, Somalia, South Africa, Mozambique, Kenya, the United Republic of Tanzania, Djibouti, Egypt and European countries, surrounding the South China Sea, the Strait of Malacca, the Bay of Bengal, the Indian Ocean, the South Pacific, Arabian Sea, the Persian Gulf, the Red Sea and the Mediterranean Sea. A map of the Maritime Silk Road (schematic) is shown in figure 3.14.

Figure 3.14. Maritime Silk Road Map



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Maritime transport is the backbone of international trade and the global economy. Approximately 80 per cent of global trade in goods by volume and more than 70 per cent by value are carried by sea and are handled by ports worldwide.[52] The share of maritime transport is even higher for most developing countries. For sea-enclosed countries, such as Australia, Indonesia, New Zealand, Maldives, the Philippines and Sri Lanka, almost all international trade in goods is carried by sea. As such, the Maritime Silk Road plays a vital role in international trading among the Belt and Road Initiative countries.

As the major share of the merchandise trade, in both volume and value terms, is handled by ports worldwide and nearly two thirds of this trade is loaded and unloaded in the ports of developing countries, the strategic importance of well-functioning, efficient and well-connected ports for the economic growth of a country cannot be overstressed. The two most commonly used measures to indicate how well a country's logistics sector is performing, and how well a country (or a seaport) is integrated into the existing liner shipping network are discussed in section 3.6.3.

In the view of the importance of seaports in international trading, this section provides a review of the main physical features of the major ports along the Maritime Silk Road. This review is followed by an analysis of progress made by some of the Initiative countries in attaining maritime connectivity. The analysis also considers the functioning and connectivity of these major ports, as indicated by the Logistics Performance Index and the Liner Shipping Connectivity Index. Finally, the section provides a discussion based on the outcome of the analysis and key findings.

3.6.2 Major ports along the Maritime Silk Road

China

Most of the large and well-functioning ports in the world, as well as those along the Maritime Silk Road are in China. The linear shipping connectivity of Chinese ports are among the highest in the world; so is the performance of the country's logistics sector. The largest ports are in Shanghai, Ningbo, Shenzhen, Guangzhou, Qingdao, Tianjin and Dalian.

China has five port clusters: the Bohai Sea Region, Yangtze River Delta, South-East Coastal Areas, Pearl River Delta and South-West Coastal Area. Over the years, China has invested heavily to develop and modernize its ports, including constructing intelligent unmanned port terminals; these include the Xiamen Ocean Gate Container Terminal and the fourth phase of the Shanghai Yangshan Deep Water Port. Shanghai is the largest port in the world; it handled 43.5 million TEUs of containers in 2020.

The Qingdao Qianwan Container Terminal is the first fully automated container terminal in Asia. It uses advanced technologies, such as the Internet of Things, intelligent control, big data and cloud computing, which enable robots to carry out terminal operations that were previously done by humans. The first 5G unmanned container trucks in September 2020 passed through the Xiamen Ocean Gate Container Terminal, which is part of Xiamen Port in Fujian Province.[53]

In terms of container throughput, the largest ports in the Pearl River Delta Area are Shenzhen and Guangzhou. Shenzhen is the third largest port and Guangzhou is the fourth largest port in 2020 world rankings.[54]

Hong Kong; Hong Kong, China

The Port of Hong Kong, located by the South China Sea, is a deep-water seaport. The Kwai Tsing Container Terminals, located in the north-western part of the harbour, has nine container terminals with 24 berths along 7,694 metres of deep-water frontage. It covers a total terminal area of about 279 hectares, which includes container yards and container freight stations. The total capacity of the nine container terminals exceeds 20 million TEUs a year. The navigation depth of the Kwai Tsing port basin and the approaching channel have been dredged to 17 metres to enable ultra large container vessels to access Kwai Tsing container terminals at all tide levels. Hong Kong port handled 19.6 million TEUs of containers in 2018, making it one of the world's busiest container ports.[55] In 2020, the port handled 17.953 million TEUs of containers.

Singapore; Singapore

Singapore is the second largest port along the Maritime Silk Road. It is also the second largest port in the world by total cargo and container throughput. The port functions as a major hub port for several countries in South and South-East Asia. The terminals are managed

[52] See UNCTADstad (https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=170026).

[53] See https://www.hellenicshippingnews.com/china-has-7-of-worlds-top-10-ports-by-cargo-container-throughput/#:~:text=China%20has%20five%20port%20clusters,%2DWest%20Coastal%20Areas%2C%20respectively.&text=Xiamen%20Ocean%20Gate%20Container%20Terminal%2C%20a%20part%20of%20Xiamen%20Port,container%20trucks%20in%20September%202020.

[54] See https://lloydslist.maritimeintelligence.informa.com/one-hundred-container-ports-2020.

[55] See https://www.mardep.gov.hk/en/fact/hkfactsheet.html.

by two commercial port operators – PSA Singapore Terminals, which runs the major share of container handling and Jurong Port Pte Ltd., the ports' main bulk and conventional cargo terminal operator. PSA Singapore Terminals operates four container terminals with a total of 52 berths.[56] In 2020, the port handled 590.7 million tonnes of cargo, including 36.9 million TEUs of containers.[57] The port is connected to the IP3 land route of the China – Indochina Peninsular corridor (see figure 3.7).

Kelang and Tanjung Pelepas, Malaysia

Malaysia has two main ports – Port Kelang and Tanjung Pelepas. Port Kelang is the country's largest port; it is a hub port, which handles different types of cargo – container, general cargo and dry bulk. The port has two container terminals comprised of 34 berths with an annual capacity of 19.6 million TEUs.[58] Container throughput of the port in 2020 was 13.2 million TEUs.

Tanjung Pelepas is exclusively a container port. With an annual capacity of 12.5 million TEUs, the port has the largest and most advanced container terminal in Malaysia. The port is a joint venture between APM Terminals (30 per cent) and MMC's ports and logistics division.[59] Located strategically at the confluence of the main east-west shipping lanes, the port offers shipping lines a minimal deviation time of 45 minutes. Accessible from the Strait of Malacca, the port is a naturally sheltered deep water port and has no tide restrictions. The container throughput in 2020 was 9.846 million TEUs.[60]

Manila

The Port of Manila, the largest in the Philippines, is government-owned, and is operated by the Philippine Ports Authority. The port is divided into three areas: Manila North Harbour; Manila South Harbour; and Manila International Container Terminal. Terminal operator International Container Terminal Services operates the Manila International Container Terminal under a concession contract for 25 years with an option for another 25 years.[61] The annual capacity of the terminal is 3.3 million TEUs.[62]

Tanjung Priok, Indonesia

The Port of Tanjung Priok is the busiest and most advanced seaport in Indonesia, handling more than 50 per cent of the country's transhipment cargo traffic. Located in North Jakarta, on the island of Java, Tanjung Priok is operated by the State-owned Indonesian Port Corporation. The corporation also operates many other seaports in ten provinces of Indonesia. The port has three container terminals and terminals that provide specialized services for general cargo, dry bulk, liquid bulk, oil and chemicals.[63] It is being expanded to increase capacity and facilitate the movement of the largest container ships in service. Once completed, the project will have seven new container terminals and two product terminals, increasing the port's container handling capacity to 18 million TEUs.[64]

Yangon and Thilwa, Myanmar

The Yangon port is the main port of Myanmar, handling approximately 90 per cent of its foreign trade by weight. There are two port areas, Yangon and Thilawa. Asia World Port Terminal and Myanmar Industrial Port are located in the Yangon area and the Myanmar International Terminal is located in Thilawa, about 25 km from Yangon. The port processes all types of general cargo and containers. Adani Yangon International Terminal of India is building a new terminal, namely the Ahlone International Port Terminal in the Yangon port area at a cost of $290 million under a 50-year build-operate-transfer contract with the Government. Once completed, the annual capacity of the port will increase to 800,000 TEUs.[65] Yangon port is connected to the BC2 land route (see figure 3.6). A deep seaport is also planned in Kyaukpyu in Rakhine state, under a new economic partnership agreement between China and Myanmar as part of the Belt and Road Initiative.[66]

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[56] See https://www.mpa.gov.sg/web/portal/home/port-of-singapore/operations/port-infrastructure/terminals.
[57] See https://www.mpa.gov.sg/web/portal/home/maritime-singapore/port-statistics.
[58] See https://www.pka.gov.my/index.php/en/facilities/container.
[59] https://www.apmterminals.com/en/tanjung-pelepas/about/our-terminal.
[60] See https://www.mot.gov.my/en/maritime/agencies/all-ports-authorities.
[61] See https://www.ictsi.com/what-we-do/our-terminals/manila-international-container-terminal.
[62] Ballesteros and TMT (2021).
[63] JOC. Com (2021).
[64] See https://reconnectingasia.csis.org/database/projects/port-tanjung-priok-expansion/c830a12b-2f25-4c58-a85c-5c308a78079f/#:~:text=Port%20of%20Jakarta%2C%20commonly%20known,capacity%20to%2018%20million%20TEUs.
[65] Chern and Ko (2019). https://www.mmtimes.com/news/new-yangon-port-be-constructed-trade-volumes-rise.html.
[66] Port Technology (2020).

Sihanoukville, Cambodia

Sihanoukville is the main and only deep-seaport of Cambodia. The country has two other ports – Phnom Penh on the Mekong River and the provincial port of Koh Kong. Sihanoukville port is on the Bay of Kompong Som. A string of islands protects the port from strong winds and tidal waves and does not require permanent dredging.[67] The port has 12 berths equipped with modern cargo handling equipment. The container throughput was 541,228 TEUs in 2018; in the same year, total cargo throughput was 5,238,348 tonnes.[68] Japan is expected to finance the construction of a new container terminal at the port.

Hai Phong and Ho Chi Minh City port area (Saigon), Viet Nam

Viet Nam has 39 ports, located along the IP2 Corridor (see figure 3.13). The main ports are Hai Phong and Ho Chi Minh City port area (Saigon port) in the south; the other ports are small. Haiphong is the main gateway to the sea of the Red River delta and the northern provinces in Viet Nam. In 2018, the Haiphong International Container Terminal, a deep-water port, opened. The terminal is 750 m long, has two berths and an annual capacity of one million TEUs.[69] Container throughput at Hai Phong was 1,110,239 TEUs in 2017. Hai Phong port processes containers and all types of general cargo. The port has a major expansion plan, namely a $299 million project for to build container terminals 3 and 4 with a capacity of 1.1 million TEUs, which is underway.[70]

Saigon New Port holds the leading market share among the terminal operators in the Ho Chi Minh City port area and in Viet Nam. The import-export container throughput of the port accounts for more than 92 per cent of the market share in the Ho Chi Minh City area and approximately 60 per cent of it nationwide. It manages several terminals in the Ho Chi Minh City area.[71] As a whole, the country's container port volumes increased 8.5 per cent in 2020 to 16.94 million TEUs, up from 15.62 million TEUs in 2019.

Laem Chabang and Bangkok, Thailand

Thailand has two main ports: Lam Chabang and Bangkok. Located about 130 km from Bangkok, the Port of Laem Chabang is the country's major deep-seaport for handling international freight. It has eight container terminals with a capacity of 7.7 million TEUs per year. In 2019, Laem Chabang handled 7.98 million TEUs of containers. A major expansion plan for the port is ongoing. In the third phase of the development of the port, a new terminal (Terminal F) will be constructed.

The Bangkok port is close to the city centre, on the eastern side of Chao Phraya River. The annual container handling capacity of the port is approximately one million TEUs. However, because of the port's location, its capacity has been restricted to reduce traffic congestion in the area.

Chittagong, Bangladesh

Chittagong port is the main seaport of Bangladesh, which serves the major share of the country's external trade. The port is among the top 100 world ports globally by total and container volumes. Chittagong port has facilities to handle grain, chemicals, cement, containers and general cargo. A major constraint is that the port's access channel is shallow and large vessels are not able to moor. The port handles transhipment traffic from nearby hub ports.

A new deep-seaport is under construction at Matarbari near Cox's Bazar in the south of the country. The estimated cost is about $2 billion is being financed mostly by Japan. The first phase will be completed in 2025. The initial annual capacity of the container terminal will be 600,000 to 1.1 million TEUs; it will be increased to 2.8 million TEUs at a later phase. Another multipurpose terminal at the port will have a cargo handling capacity of 2.25 million tonnes.[72]

Mumbai, Mundra and Kolkata, India

India has several large ports; the main ones are Mumbai (Jawaharlal Nehru Port Trust, popularly known as JNPT), Mundra (a new private port), and Kolkata and its Haldia terminal. JNPT, the largest port in India, has five container terminals and the second largest port Mundra, a private port, has four container terminals. The container throughput was 5.3 million TEUs in 2020 at JNPT, and 4.7 million TEUs at Mundra in 2019. The ports are planned to be connected by a dedicated rail freight corridor in the near future. This new railway

[67] See http://www.pas.gov.kh/en/page/overview.
[68] See http://www.pas.gov.kh/en/page/statistics.
[69] See https://www.ceicdata.com/en/vietnam/port-statistics-sea-cargo-traffic-by-port/sea-cargo-throughput-teus-north-hai-phong.
[70] Labrut (2021).
[71] See https://saigonnewport.com.vn/en/about/Pages/overview.aspx.
[72] Maritime Gateway (2020).

linkage will enhance land transport connectivity of the ports to the main production and distribution centres of the country.[73]

In the 2018-2019 financial year, Kolkata Port Trust, the main port in the eastern part of India, handled 63 million tonne of cargo and 830,000 TEUs of containers.[74] The port also handles transhipment cargo for landlocked Nepal. The ports in India mainly handle transhipment traffic from hub ports in Colombo and Singapore.

Colombo

Strategically located, the port of Colombo on the Arabian Sea coast of Sri Lanka is an important transhipment port along the Maritime Silk Road. Being on the main East-West shipping lane is a major attraction. Colombo is also the main transhipment hub for Indian cargo. Colombo port has five container terminals.[75] To relieve current congestion at the port, the Government recently announced that it would develop another terminal at the port – the West Container Terminal – with India and Japan.[76] In 2020, the container throughput of the port was 6.85 million TEUs, lower than 7.2 million TEUs in 2019.

Karachi, Qasim and Gwadar, Pakistan

The port of Karachi is the largest port in Pakistan; it connects to the China – Pakistan Economic Corridor. It has facilities to handle dry and liquid bulk, general cargoes, minerals and containers. The port also handles transhipment traffic bound for Afghanistan. The container throughput of the port in 2019 was 3.367 million TEUs. In 2019, Hutchinson Ports began the second phase of work on a deep-water container port project. Agreeing to a concession contract to operate the port for an initial period of 25 years with options for another 25 years, Hutchinson Ports will invest $240 million to upgrade the port with a target to raise the terminal's annual container handling capacity to 3.2 million TEUs.[77]

Port Qasim, the second largest port in Pakistan, is a deep-water seaport located in the vicinity of Karachi port. Among the types of cargo, it handles dry and liquid bulk, general cargoes and containers, and processes grain, coal, fertilizers, agricultural products, crude oil and cement. In 2017-2018 the port handled 45.5 million tonnes of cargo[78] and 1.175 million TEUs of containers.[79]

The port of Gwadar is a flagship project of the China – Pakistan Economic Corridor (see figure 3.5). Located at the mouth of Persian Gulf, Strait of Hormuz, the Gwadar deep seaport holds great strategic and economic significance for Pakistan and China. In addition to reducing dependence on the Sea of Malacca and South China Sea routes, the port of Gwadar provides China an alternative and shorter route to receive energy imports from the Middle East. The initial development of the port was carried out jointly by the Governments of Pakistan and China at a cost of $248 million. The port is managed by the China Overseas Port Holding Company. A $1.02 billion major port expansion project is being implemented.[80] The planned long-term expansion includes several new terminals for different types of cargo and a special economic zone.

Bandar Abbas, Islamic Republic of Iran

Located strategically on the Strait of Hormuz, the Port of Bandar Abbas is the main maritime outlet in the southern part of the Islamic Republic of Iran. It directly connects to the CW1A corridor of the China – Central Asia – West Asia Corridor (see figure 3.10). The port is connected to Tehran and the rest of the Islamic Republic of Iran by road and railway. It has 35 berths; five berths are at the container terminal. The total cargo throughput of the port in 2020 was 126 million tonne.[81]

Maputo

The port of Maputo is linked to the Maputo Corridor, a major trade corridor, which connects several provinces of South Africa to the port in Mozambique. It is a transhipment port, handling more than 80 per cent of cargo moving to and from neighbouring countries. The port has one container terminal and one cargo and one bulk terminal. Maputo Port Development Company, a private company, operates the port under a concession contract. DP World Maputo, which operates the

[73] See https://www.adaniports.com/Ports-and-Terminals/Mundra-Port.
[74] Press Trust of India (2019).
[75] See https://www.slpa.lk/port-colombo/terminals.
[76] Mallawarachi (2021).
[77] World Maritime News (2019).
[78] See https://www.pqa.gov.pk/en/port-operations/port-performance.
[79] See https://www.ceicdata.com/en/pakistan/port-statistics/qasim-port-cargo-handled-container-terminal-total.
[80] China Daily USA (2015).
[81] See https://www.pmo.ir/en/statistics/annualreport (Report-2020-English).

container terminal, holds a concession granted to manage, develop and operate the container terminal until 2043. The terminal has capacity of 350,000 TEUs; in 2018, it handled 162,000 TEUs of containers.[82] The port handled 18.3 million tonnes of cargo in 2020 compared with 21 million tonnes in 2019, a reduction of 13 per cent.

Mombasa, United Republic of Tanzania

The Northern Corridor links the landlocked countries of East and Central Africa, namely Burundi, the Democratic Republic of the Congo, Rwanda, South Sudan and Uganda, to the seaport of Mombasa in Kenya. The Port of Mombasa is served by road and railway to inland destinations, including to the capital Nairobi, and the landlocked neighbouring states of Uganda, Rwanda, Burundi, the eastern Democratic Republic of the Congo and South Sudan.[83, 84] A new standard gauge railway line between Mombasa and Nairobi was completed in 2018. The Nairobi ICD, which was opened in 2018 at a cost of $200 million, can handle 450,000 TEUs of containers. Kenya has introduced double stack trains between Mombasa and Nairobi to speed up the evacuation of cargo at the port.

Dar es Salaam Port, United Republic of Tanzania

Two East African transport corridors connect to Dar es Salaam Port. The Central Corridor connects to the port by road, railway and inland waterways to the landlocked countries of Burundi, Rwanda and Uganda, the eastern part of the Democratic Republic of the Congo and all of the central and north-western part of the United Republic of Tanzania. The Dar es Salaam Corridor connects the port of Dar es Salaam to Lusaka (Zambia) and Lilongwe (Malawi). Capacity of the port is as follows: general cargo – 3.1 million tonnes; and container – one million TEUs; fuel – six million tonnes.

Djibouti

The most critical asset of the Port of Djibouti is its strategic location, at the cross-roads of one of the busiest shipping lanes in the world. Djibouti provides access to the Red Sea and the Indian Ocean, and links Europe, the Asia-Pacific, the Horn of Africa, and the Persian Gulf. Its geographical location at the mouth of the Red Sea mouth makes Djibouti an ideal transhipment hub for cargo in and out of the Middle East and North Africa region and offers long-term growth potential. A newly constructed $3.4 billion standard gauge electrified railway line connects Addis Ababa in landlocked Ethiopia to Djibouti. Because of its location, the port plays an important role along the Maritime Silk Road.

A summary of the ports discussed above with their latest available container and cargo throughput is shown in table 3.3.

Table 3.3. Selected major ports along the Maritime Silk Road

Country	Port	Port infrastructure, facilities, capacity, planned expansion*	Container throughput, (Thousand TEUs) (Year)
China	Shanghai	The largest port in the world; comprises a deep seaport and a river port	43 501 (2020)
	Shenzhen	Ranked third largest container port in the world in 2020; located along vast coastline of Shenzhen city; 90 operational cargo berths, of which 18 are container berths (2019).	26 553 (2020)
	Guangzhou	Main hub port of South China; located in the geographical centre of the Pearl River Delta; has four port areas; container terminals are located at all port areas; handles all types of cargo.	23 192 (2020)
Hong Kong, China	Hong Kong	Deep seaport on the South China Sea; nine container terminals with 24 berths; capacity 20 million TEUs.	17 953 (2020)
Singapore	Singapore	Second largest port; a major hub port for the region; two terminal operators operate container and main bulk and conventional cargo terminals; four container terminals with 52 berths	36 871 (2020)

[82] See https://www.portmaputo.com/terminal/container-terminal/.
[83] See https://www.kpa.co.ke/Pages/Port-of-Mombasa-records-minimum-vessel-delays.aspx.
[84] Port News (2020).

Table 3.3. *(continued)*

Country	Port	Port infrastructure, facilities, capacity, planned expansion*	Container throughput, (Thousand TEUs) (Year)
Thailand	Laem Chabang	Deep water seaport; handles all types of cargo; eight container terminals with a capacity of 7.7 million TEUs.	7 980 (2019)
Myanmar	Yangon	Two port areas: Yangon and Thilawa. Asia World Port Terminal and Myanmar Industrial Port are in Yangon area and Myanmar International Terminal in Thilawa. A new terminal is under construction in the Yangon area.	1 121 (2019)
Cambodia	Sihanoukville	A natural deep-water seaport; 12 berths for all types of cargo and containers; a new container terminal is planned.	541 (2018)
Philippines	Manila	Port has three areas: Manila North Harbor, Manila South Harbor and the Manila International Container Terminal; container terminal annual capacity 3.3 million TEUs.	4 438 (2020)
Indonesia	Tanjung Priok	Largest port; three container terminals and terminals for specialized services for general cargo, dry bulk, liquid bulk, oil and chemicals.	8 100 (2020)
Malaysia	Port Kelang	Largest port; two container terminals and terminals for other cargo.	13 244 (2020)
	Tanjung Pelepas	Exclusively a container port	9 846 (2020)
Bangladesh	Chittagong	Port facilities for grain, chemicals, cement, containers and general cargo; shallow access channel restricts port access.	2 839 (2020)
	Matarbari	A deep-water port under construction; will handle all types of cargo.	NA
Pakistan	Karachi	Largest port in Pakistan; connects to the China – Pakistan Corridor; has facilities for dry and liquid bulk, general cargoes, and containers; a $240 million container terminal is under construction, will increase capacity to 3.2 million TEUs.	3 367 (2019)
	Qasim	A deep-water port near Karachi; International container terminal capacity of 0. 85 million TEUs per year.	1 175 (2017)
	Gwadar	Holds strategic and economic significance due to location; $1.02 billion port expansion project under implementation; planned expansion includes several new terminals and a special economic zone.	NA
India	Jawaharlal Nehru Port Trust (JNPT)	Five container terminals: the Jawaharlal Nehru Port Container Terminal, the Nhava Sheva International Container Terminal, Gateway Terminals India Pvt. Ltd., Nhava Sheva International Gateway Terminal and Bharat Mumbai Container Terminals Limited.	5 030 (2020)
	Mundra	Private sector port; has overtaken JNPT in 2020. Four container terminals – combined capacity of 7.5 million TEUs; dedicated freight corridor connectivity would reach by 2020.	4 700 (2019)
Sri Lanka	Colombo	Five container terminals – capacity 7.2 million TEU, annual cargo tonnage of nearly 40 million tonne; a new container terminal is planned.	6 850 (2020)
Islamic Republic of Iran	Bandar Abbas	Largest port in the country; handles all types of cargo.	126 million tonnes (2020)
Mozambique	Maputo	Private sector operated largest port in the country; a transhipment port connected to the Maputo corridor; has facilities for handling container, general cargo and bulk materials.	18.3 million tonnes (2020); 162 TEUs

Table 3.3. *(continued)*

Country	Port	Port infrastructure, facilities, capacity, planned expansion*	Container throughput, (Thousand TEUs) (Year)
Kenya	Mombasa	A major transhipment port in East Africa; connected to the Northern Corridor that links several countries to the port; capacity 2.65 million TEUs.	1 080 (2020) 1 425 (2019)
United Republic of Tanzania	Dar es Salaam	Connected to two overland corridors – the Central and Dar es Salaam Corridor; capacity: general cargo – 3.1 MT; container – 1 million TEUs; fuel – 6 million MT.	591 (2018)
Djibouti	Djibouti	Provides access to Red Sea and the Indian Ocean, and links Europe, Asia and the Pacific, the Horn of Africa, and Persian Gulf region; ideal transhipment hub for cargo in and out of the Middle East and North Africa region.	932 (2019)

Source: Compiled by the author from different official and industry sources.
* Asymmetric information subject to availability.

3.6.3 Logistics Performance and Liner Shipping Connectivity

The Logistics Performance Index of the World Bank and the Liner Shipping Connectivity Index of the United Nations Conference on Trade and Development (UNCTAD) are measures that indicate how well a country's logistics sector is performing, and how well a country (or a seaport) is integrated into the existing liner shipping network, respectively. The Logistics Performance Index considers an assessment of six components of the logistics sector of a country, namely infrastructure, customs, international shipment, logistics quality and competence, tracking and tracing and timeliness on a scale of 1 to 5.[85] The Liner Shipping Connectivity Index is intended to capture the level of integration into the existing liner shipping network by measuring liner shipping connectivity. The Index is computed based on six components of the maritime transport sector: scheduled ship calls; deployed capacity; number of shipping companies and liner services; average and vessel size; and directly connected ports.[86]

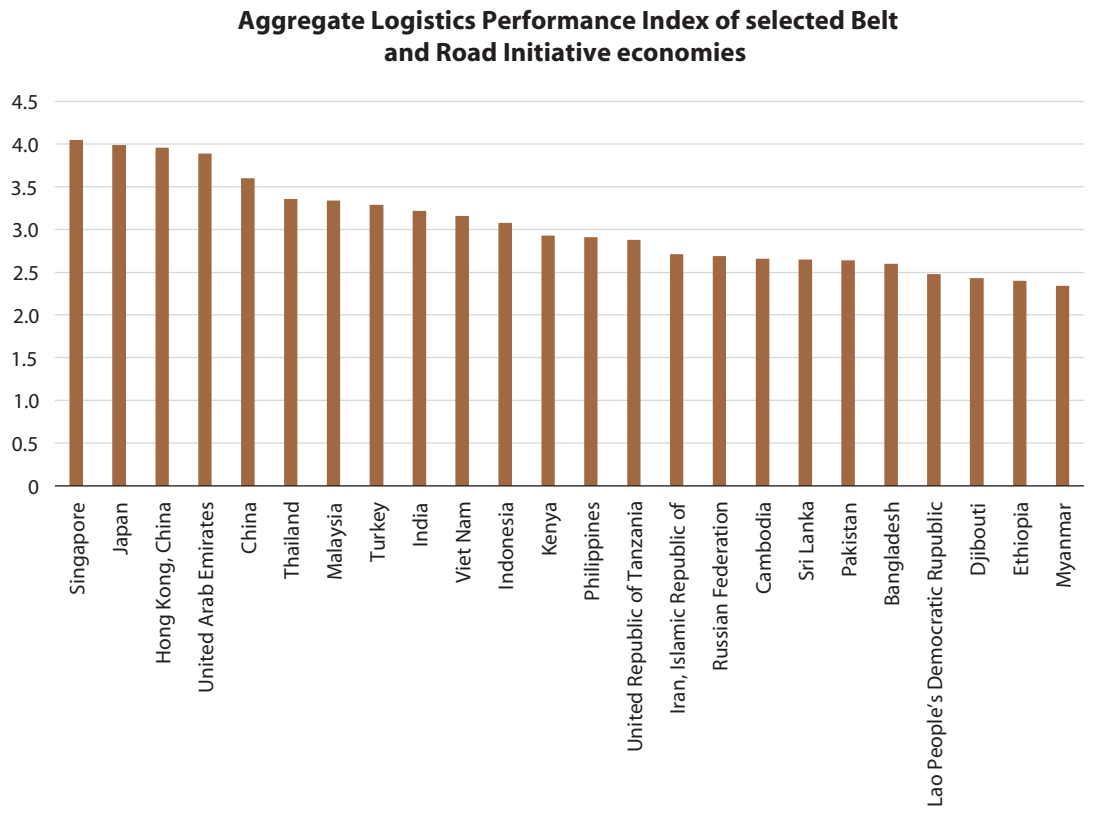
Recently the World Bank published the weighted aggregated Logistics Performance Index score, which combines the four most recent Index editions of the 2012, 2014, 2016 and 2018 surveys. This approach reduces random variations from one survey data to another, and shows an overall situation to better reflect countries' logistics performance. Each year's scores in each component were given weights: 6.7 per cent for 2012, 13.3 per cent for 2014, 26.7 per cent for 2016, and 53.3 per cent for 2017. In this way, the most recent data carry the highest weight.[87] Figure 3.15 shows the latest aggregate logistics performance score for selected Belt and Road Initiative coastal countries.

Logistics performance is strongly correlated with the quality of service. While the score of most developing countries have generally improved, detail analysis in a recent study shows that some countries had experienced a drop in the scores for quality of infrastructure, customs performance, and quality of logistics services.[88] In addition, there is still a noticeable gap in scores between the high-performing and low-performing developing countries. If an Index score of 3.0 is considered as a benchmark that has been achieved by countries, such as Indonesia, Viet Nam and India, a large number of countries falls short of this mark (figure 3.15). Improvement of logistics performance would help to increase their international trade competitiveness.

Liner shipping connectivity of a country indicates its connectedness to the liner shipping network. Figure 3.16 shows the liner shipping connectivity index for selected coastal countries (excluding the Pacific Island developing countries). As expected, countries that record high volume of merchandise trade and good port facilities have high connectivity. Countries with ports that handle large volume of transhipment traffic,

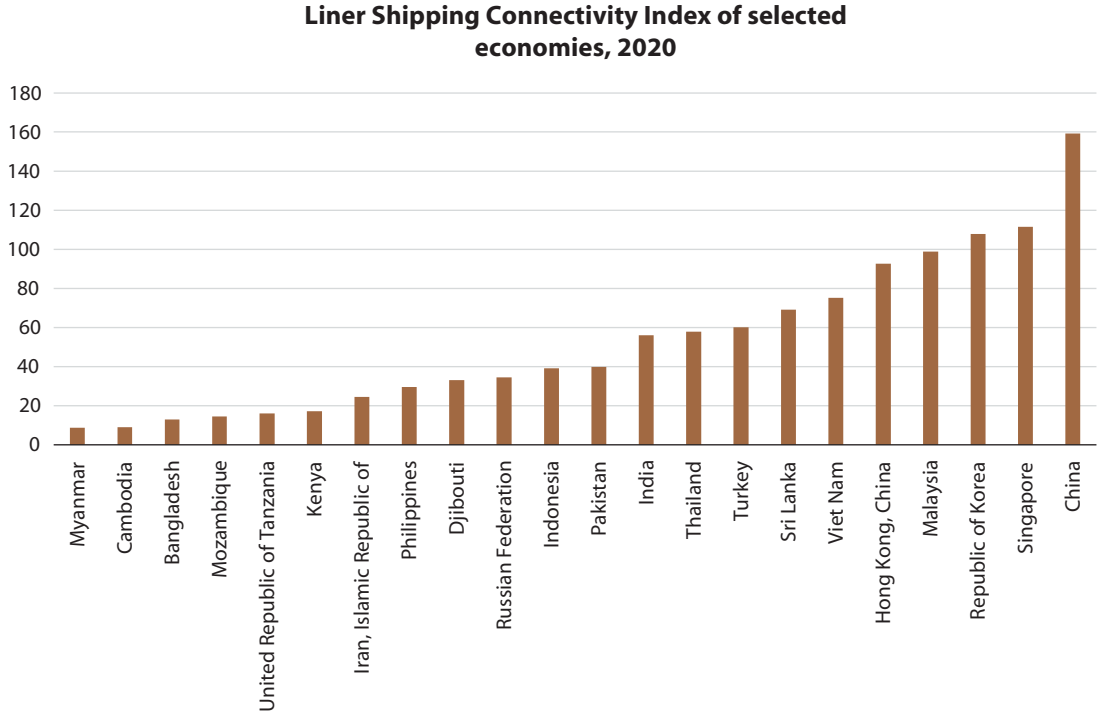
[85] The details of LPI can be found at: https://lpi.worldbank.org/international/aggregated-ranking.
[86] UNCTADstad (https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=170026 (Accessed 23 March 2021)).
[87] See https://lpi.worldbank.org/international/aggregated-ranking.
[88] Arvis and others (2018).

Figure 3.15. Aggregate logistics performance index for selected Belt and Road Initiative economies



Source: Based on data from World Bank (2018).

Figure 3.16. Liner Shipping Connectivity Index for selected Initiative economies, 2020



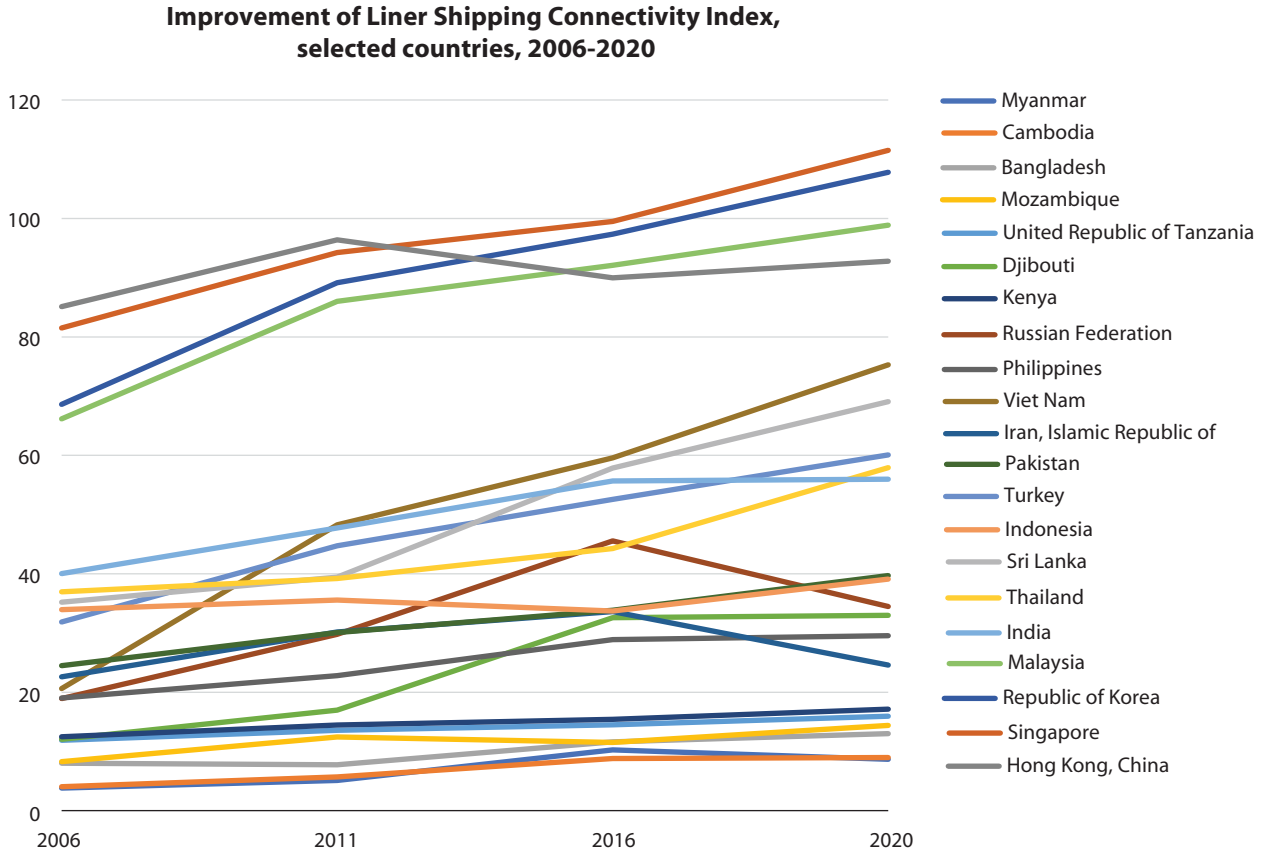
Data source: UNCTADSTAT (https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=92).

such as Malaysia and Sri Lanka, also have high connectivity. Countries that record relatively low volume of merchandise trade and ports that do not handle any transhipment traffic have low connectivity. The Maritime Silk Road connects some of the most connected countries in Asia and Europe. Some of the least connected countries are also along the Road. UNCTAD data indicate that all countries have improved their connectivity between 2006 and 2020. However, the improvement was greatest in the most connected countries, such as China, Malaysia and Singapore, while the improvement was slight in countries such as Myanmar and Cambodia (figures 3.17 and 3.18). Consequently, there is a growing connectivity divide – an increasing difference between the most and least connected countries.

The Pacific Island developing countries are among the countries with the lowest liner shipping connectivity (figure 3.18), well below the world median value. The Index values indicate that their connectivity performance is not stable and fluctuates significantly from year to year. This indicates that shipping services to Pacific Island developing countries are irregular and not stable. While most other countries have improved connectivity, there has not been any systematic improvement in the Pacific Island developing countries.

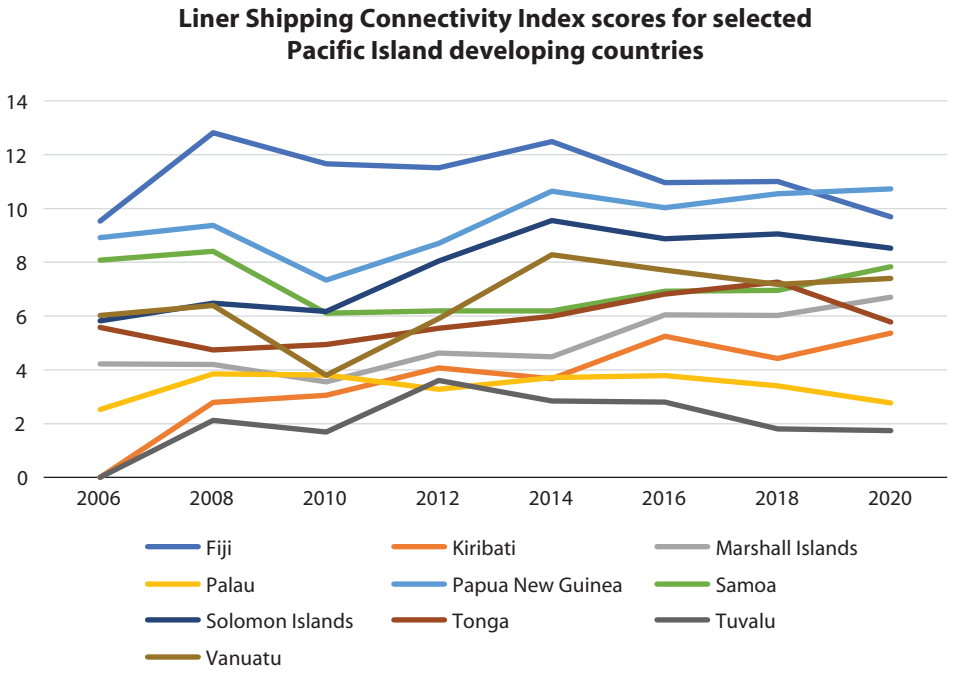
Liner shipping connectivity of a port indicates its connectedness with the existing liner shipping network. Figure 3.19 shows the liner shipping connectivity index scores for the major ports along the Maritime Silk Road. There is sharp difference in connectivity between the

Figure 3.17. Liner shipping connectivity index – selected economies, 2006-2020



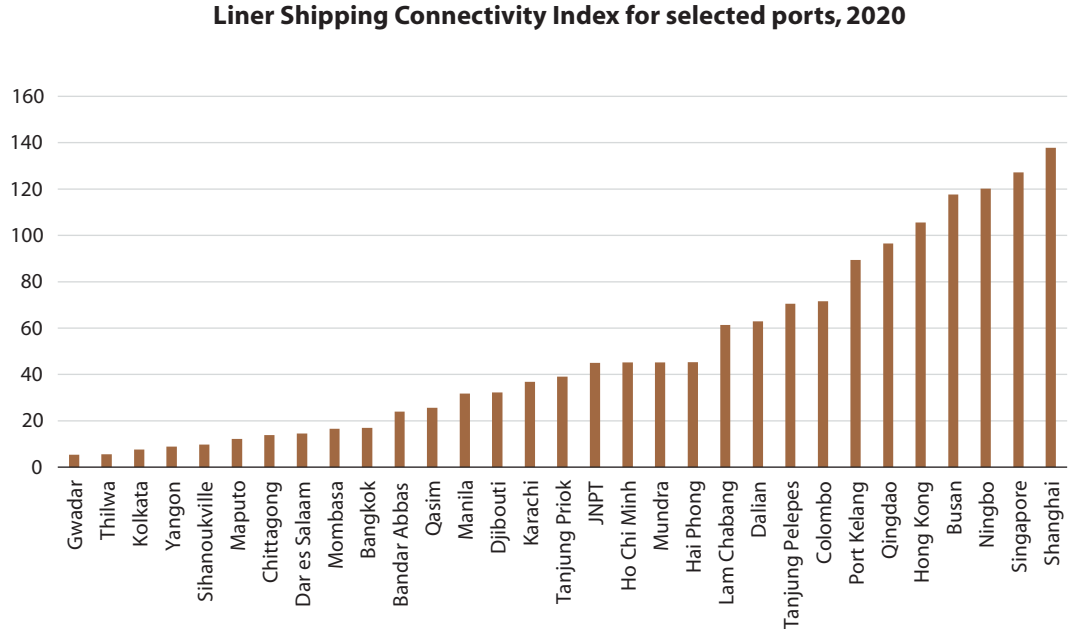
Source: UNCTADSTAT (https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=92).

Figure 3.18. Liner Shipping Connectivity Index for selected Pacific island countries



Source: UNCTADSTAT (https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=92).

Figure 3.19. Liner Shipping Connectivity Index for selected ports, 2020



Source: UNCTADSTAT (https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=170026).

best-connected ports, such as those in Shanghai, Singapore, and Hong Kong, China and least connected ports, such as those in Gwadar, Yangon, Chittagong and Bangkok.

Most ports have improved their connectivity between 2006 and 2020. However, the progress has been uneven. While some ports, such as Shanghai, Tanjung Pelepas, Ho Chi Minh, Lam Chabang, Colombo, Mundra and Karachi have made remarkable progress, and some others such as Manila, JNPT, Bandar Abbas, Qasim, Mombasa, Dar es Salaam made impressive progress, there has been limited improvements in most other ports.

The ports of countries that record large trade volumes, such as China and Japan, and ports that where major transhipment functions take place, such as Singapore, Colombo and Kelang, have high liner shipping connectivity scores. Most other ports have a low maritime connectivity and logistics performance. It is important to note that maritime connectivity of a port is dependent on the choice of shipping lines, as it is based on carriers' port calling strategy, geographical location, volume of traffic and the capacity of the port. The choice of port of a shipping line depends on a number of factors including, among them, port location, quality of service, port charges, terminal investment and operational strategies and volume of traffic. While it is possible to enhance connectivity through improvement of port operations and other measures, connectivity depends mainly on the volume of traffic, shipping lines port calling strategy and geographic location of a port in relation to main shipping routes.

3.6.4 Discussion and summary of key findings

All major countries along the Maritime Silk Road have taken measures for capacity expansion of their existing ports, built new terminals, developed new ports, modernized port facilities and operations, improved land connectivity or considered other measures for port development, including the participation of the private sector. Many terminals (at Colombo, Karachi, Manila, Mundra, for example) are built and operated by the private sector under long-term concession contracts. These improvement measures have significantly increased port throughput, reduced the level of congestion and increased efficiency in port operations, which are reflected in the gradual improvement of countries' logistics performance over the years.

However, the progress to date, has been uneven. Some countries, such as China, India, Indonesia, Malaysia, Singapore, Thailand, Turkey and Viet Nam have made remarkable progress, and some other countries, such as Kenya, the Untied Republic of Tanzania, the Philippines and Sri Lanka also made good progress. Other countries' performance also has improved but to a lesser scale than the above-mentioned countries.

It should be noted that major port capacity expansion, new ports and facilities improvement projects are either underway or planned in many countries, such as in Bangladesh (Chittagong, Matarbari – new port), Cambodia (Sihanoukville – a new terminal), Islamic Republic of Iran (Chabahar), Indonesia (Tanjung Priok – new terminal), Myanmar (Yangon – a new terminal; Kyaukpyu – new port), Pakistan (Gwadar – new terminals), Sri Lanka (Colombo – a new terminal), and Viet Nam (Hai Phong – new container terminals). After these projects are completed, the logistics performance of the countries of these ports are also expected to improve.

High level of connectivity with the existing liner shipping network is one of the major criterion to be competitive in international trading. High level of liner shipping connectivity can ensure more direct and competitive shipping services with trading partners. Ports in China and some ports (such as Colombo, Djibouti and Mundra) have made remarkable progress in improving their liner shipping connectivity; some ports (such as Laem Chabang and Karachi) have also made good progress, but most other ports have made limited improvement.

To improve connectivity, ports need to increase their attractiveness through efficient port operation and other measures. The improvement of logistics performance can also help to increase the attractiveness of ports and motivate more shipping lines to make use of them, which, in turn, would increase their connectivity and enhance the competitiveness of countries where the ports are located in international trading.

Notably, improvement of maritime connectivity of the Pacific Island developing countries is not easy given their limited trade volume, industry structure, resources, small population and geographic spreading over a vast area of the Pacific Ocean. Low-trade volumes discourage shipping companies and ports from investing in better maritime transport connectivity, consequently they suffer from low shipping connectivity and face challenges in providing commercially viable and reliable shipping services. Special measures, including government support, are needed to provide reliable shipping services.

3.7 Summary of main findings

Tables 3.4 and 3.5 contain a summary of the current connectivity status, operational readiness and issues for each of the highway and railway corridors.

The information compiled in this study, as presented in earlier sections, indicates that the seamlessness in the operationalization of the corridors differs widely. It also indicates that there is divergence in the effectiveness and efficiency of operational connectivity within segments of the same corridors. This is mainly the result of different bilateral and multilateral initiatives carried out by countries, which are often influenced by political and economic factors, and the varied timelines of the initiatives when they were developed.

The operational connectivity along the Belt and Road Initiative corridors varies widely. It is generally good for the China – Mongolia – Russian Federation (CMR) and New Eurasian Land Bridge (NELB) Corridors; and moderate or low for the other four corridors.

The use of dry ports and intermodal interfaces can increase the modal share of more resource-efficient transport modes, such as railways and inland waterways. This shift can help to reduce the demand for road transport and thereby reduce the need for expanding the capacity of existing highways or limit the need for building new ones. Greater utilization of railways and inland waterways would also help to reduce the cost of freight transport. However, it is not clear from the information available how extensively the current intermodal facilities along the Belt and Road Initiative corridors are being used for transfer of goods between the modes.

Maritime connectivity of the coastal developing countries varies widely, reflecting the difference in volume of their merchandise trade, geographical location of ports with respect to the liner shipping routes, as well as their logistics performance, including port facilities and performance. Over the past years, countries have taken various measures, including port capacity expansion and improvement of logistics performance, to improve their connectivity. However, the progress has been uneven. While some countries have made remarkable progress, many countries have made only limited progress. To improve connectivity, which is crucial for competitiveness in international

Table 3.4. Belt and Road Initiative highway corridors – summary of connectivity status, operational readiness and issues

Corridor	Operational readiness	Current status, issues and comments
China – Mongolia – Russian Federation Corridor (CMR)	High	Overall road conditions are good; multilateral agreements allow road transport between countries; road permits are required, however; permit-free road transport is possible between Kazakhstan and the Russian Federation; trial of non-stop transport operations carried out on China – Russian Federation (Dalian-Novosibirsk section) route.
New Eurasian Land Bridge Corridor (NELB)	High	Generally overall road conditions are good; multilateral agreements allow road transport between countries; road permits are required.
China – Central Asia – West Asia Corridor (CAWA)	Medium; varies	Overall road conditions are mixed; trial of non-stop transport operations on the China – Kyrgyzstan – Uzbekistan highway carried out and regular operation began in 2018.
China – Pakistan Corridor (CP)	Medium	Overall road conditions are mixed; no traffic rights, transhipment at borders; China – Pakistan border crossing point operation susceptible to harsh weather conditions in winter; poor facilities and complicated procedures at the border crossing points on the Pakistan – Islamic Republic of Iran border, operates only during the day.
Bangladesh – China – India – Myanmar (BCIM)	Low	Overall road conditions are mixed; no traffic rights between countries, inefficient transhipment at borders.
China – Indochina Peninsular Corridor (CIP)	Low	Overall road conditions are mixed, excellent in China, Thailand and Malaysia, condition varies in other countries; traffic rights in few cases, otherwise, transhipment at borders; trial of non-stop transport operations between China and Viet Nam carried out; high potential future corridor.

Source: Based on information in earlier sections.

trading, countries with low connectivity need to increase the attractiveness of their ports through efficient port operation, improvement of logistics performance and other measures.

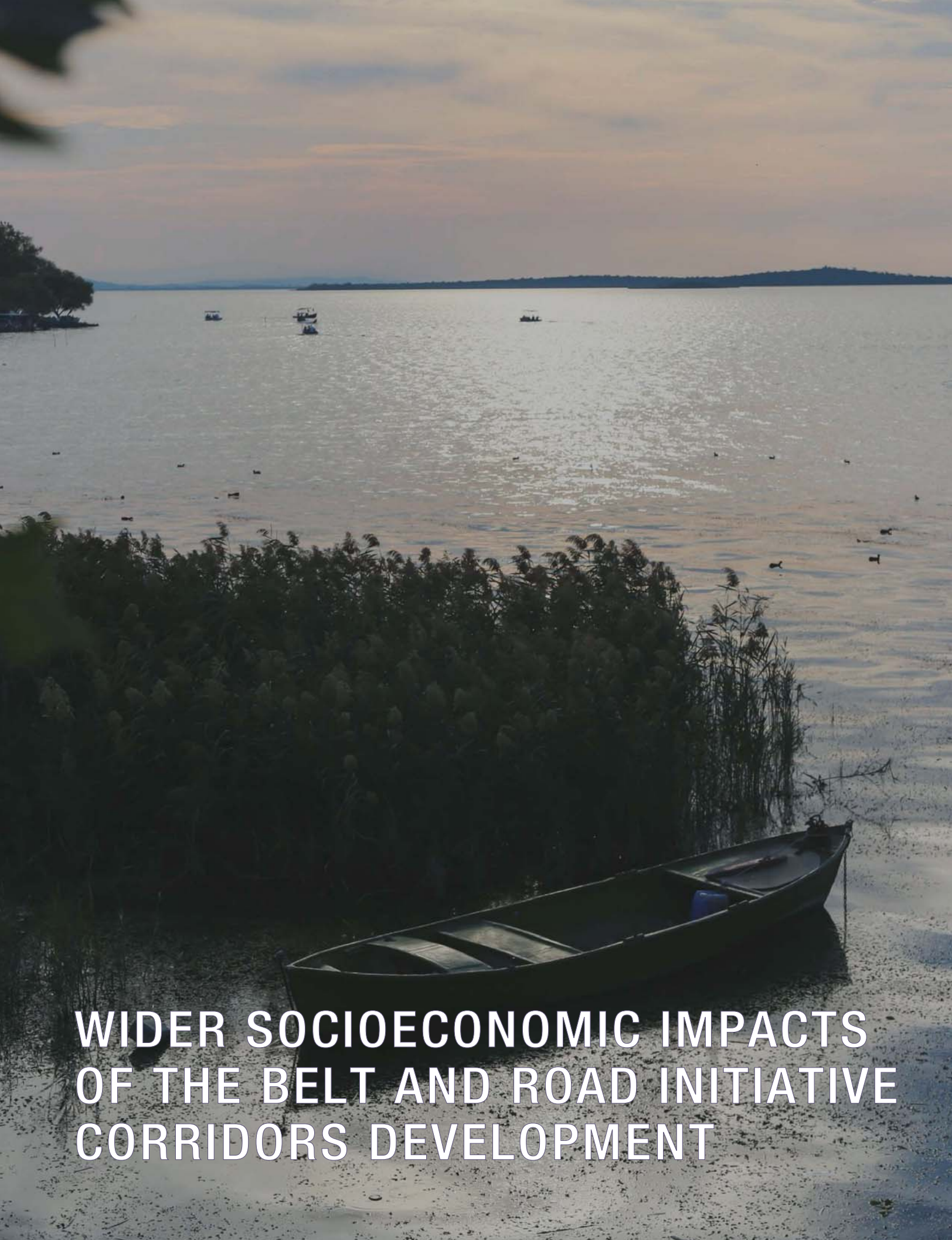
The Pacific Island developing countries are in a more difficult situation given their limited trade volume, industry structure, resources, small population and geographic spreading over a vast area of the Pacific Ocean. They suffer from low shipping connectivity and face challenges in providing commercially viable and reliable shipping services. Given these structural issues, the Pacific Island countries need to implement special measures, including government support to provide reliable shipping services.

Table 3.5. Belt and Road Initiative railway corridors – summary of connectivity status, operational readiness and issues

Corridor	Operational readiness	Current status, issues and comments
China – Mongolia – Russian Federation Corridor (CMR)	High	Current main railway route connecting China with Europe – two breaks of gauge; four breaks of gauge in the corridor; missing links, mostly in Mongolia; most sections in the corridor are electrified double-tracked; regular train operations on most routes; break-of-gauge at railway border crossing points cause delays due to congestion in yards (Erenhot, China) and shortages in transloading equipment (Zamin-Uud, Mongolia).
New Eurasian Land Bridge Corridor (NELB)*	High	Breaks of gauge; missing links; most sections in the corridor are electrified double-tracked; break-of-gauge and deficiencies at railway border-crossing posts is a major issue in railway connectivity; high potential railway corridor connecting China with Europe.
China – Central Asia – West Asia Corridor (CAWA)	Medium	Breaks of gauge; missing links (about 1,400 km) – countries are closing these gaps; some sections in the route have regular freight train operations; Baku-Tbilisi-Kars railway line opened a new railway transit route to connect Europe with Turkey, Azerbaijan, Georgia and Central Asia; high potential future corridor.
China – Pakistan Corridor (CP)	Low	Break of gauge with the Islamic Republic of Iran; no railway connectivity with China, missing link; lack of facilities and complicated procedures at border crossing points between Pakistan and the Islamic Republic of Iran.
Bangladesh – China – India – Myanmar (BCIM)	Low	Break of gauge between all neighbours; missing links on both routes of the corridor; limited train operation (passenger and freight) in some sections between Bangladesh and India; India in its territory is constructing part of missing link with Myanmar (Jibram – Imphal).
China – Indochina Peninsular Corridor (CIP)	Low	Breaks of gauge; dual gauge linkage between China and Viet Nam; missing links (about 4,760 km); limited train operation in some sections; limited electrified sections; missing links in China and the Lao People's Democratic Republic are under construction; high potential corridor in post-coronavirus world.

Source: Based on information in earlier sections.

* Proved to be a vital rail corridor between China and Europe to resume medical and other supplies to Europe after the initial disruption caused by the COVID-19 pandemic.



WIDER SOCIOECONOMIC IMPACTS OF THE BELT AND ROAD INITIATIVE CORRIDORS DEVELOPMENT

4

WIDER SOCIOECONOMIC IMPACTS OF THE BELT AND ROAD INITIATIVE CORRIDORS DEVELOPMENT

The Belt and Road Initiative transport networks are expected to substantially enhance region-wide connectivity in Asia and establish vital linkages with the European networks. The enhanced connectivity will create unprecedented development opportunities in the Asia-Pacific region. As such, the impacts of the investments can be substantial. The focus of this chapter is on some of the major impacts of the Belt and Road Initiative on the economy and welfare.

As mentioned earlier, Belt and Road Initiative corridors share other transport corridors that were launched before the Initiative and are still being developed. As such, Belt and Road Initiative corridor development shares the development of these earlier launched regional and subregional initiatives. Based on a review of the recent literature on the Initiative and other transport corridor development, the following section includes a summary of the anticipated major impacts of Belt and Road Initiative corridor development.

4.1 Travel time and cost

There is a negative relationship between trading times and trade: a one-day reduction in trading time increases exports between Belt and Road Initiative economies by 5.2 per cent.[1] Investment in Belt and Road Initiative transport projects are expected to significantly reduce shipment time along the corridors, and, in turn, reduce trade costs. As a result, domestic and cross-border trade is expected to increase and stimulate economic growth in the corridor regions. The Initiative will significantly reduce shipment times and trade costs in corridor countries – the change in shipment times and trade costs will range between 1.7 and 3.2 per cent and 1.5 and 2.8 per cent, respectively.[2] The decline will be more noticeable along the corridors, with shipment times along the them potentially declining by up to 11.9 per cent and trade costs declining by up to 10.2 per cent.

4.2 Trade

Lower transport cost is the major factor supporting an increase in international trade.[3] In one study, the results show that Belt and Road Initiative increases trade flows among participating countries by up to 4.1 per cent.[4] Another study finds that the Initiative's transport projects are estimated to increase trade by between 2.8 and 9.7 per cent for corridor economies and between 1.7 and 6.2 per cent globally.[5] Other estimates suggest that the Initiative is expected to boost global trade by 5 per cent in 2030.[6]

Simulation results of a study by Hahm and Raihan show that the countries involved in the Belt and Road Initiative will experience a rise in exports of goods and services. For example, the increase for Bangladesh, India, and

1 Baniya and others (2019; p. 3).
2 De Soyres and others (2018).
3 Hummels (2007).
4 Baniya and others (2019).
5 De Soyres and others (2018).
6 Zhai (2018).

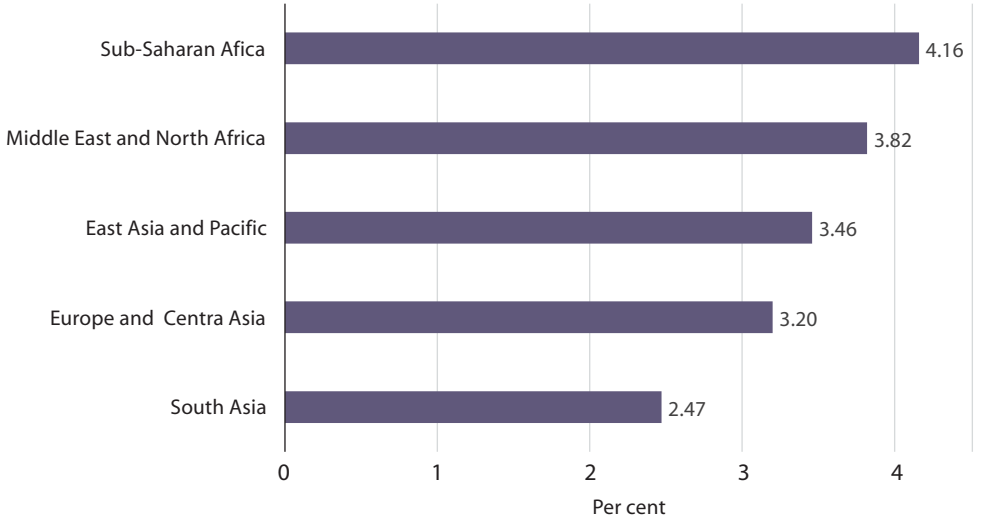
Myanmar is estimated to be between 3 and 7 per cent and for Pakistan, 14 per cent; in addition, other countries, such as Thailand and Viet Nam, are expected to register a high increase in exports. Exports of agricultural commodities are projected to increase more than manufactured products. The increase in exports of agricultural commodities from Bangladesh, Cambodia, the Lao People's Democratic Republic and Myanmar could contribute to poverty reduction in those countries.[7]

Not all countries may experience positive trade effects from the Initiative. Hahm and Raihan suggest that the increase in imports would be higher than exports. For example, they project that the increase in imports to Bangladesh, India, and Myanmar would be about 8 to 14 per cent, as compared to a 3 to 7 per cent increase in exports, while for Pakistan, the increase in imports and exports would be 14 per cent. For some countries, they project that the increase in imports and exports could potentially exceed 5 per cent. The researchers have noted that this would lead to a deterioration in the trade balance in many countries, which, in turn, could adversely affect their economic growth.[8] A similar large variation in export trade gains by Belt and Road Initiative countries has also been shown in another study.[9]

4.3 Investment and the economy

Many of the recent studies on transport network development suggest, that as a whole, the potential impacts of the Belt and Road Initiative transport corridor development would largely be beneficial to the economy, income, poverty reduction, employment, equity and social inclusion.[10] However, the estimates of benefits to countries, either in nominal or relative terms, vary;[11] the results of some studies suggest that if all the Belt and Road Initiative projects were to be implemented, the annual global welfare gains would be about $1.6 trillion in 2030, accounting for about 1.3 per cent of the global GDP. More than 90 per cent of this gain is expected to be captured by Belt and Road Initiative countries.[12] Results from another study show that Belt and Road Initiative transport investments increase GDP for Belt and Road Initiative countries by as much as 3.35 per cent and welfare, which accounts for the cost of infrastructure, by as much as 2.81 per cent.[13] Gains to countries and regions, however, are projected to vary (see figure 4.1).

Figure 4.1. Impact of infrastructure improvement on gross domestic product of Belt and Road Initiative countries



Source: de Soyres and others. (2018, p. 23).
Note: The effect on Belt and Road Initiative countries as a whole will be about 3.4 per cent, non-Belt and Road Initiative countries, 2.61 per cent and for the world, 2.87 per cent.

7 Hahm and Raihan (2018).
8 Ibid.
9 Baniya and others (2019, table A-8, pp. 36-38).
10 For example, Melecky and others (2018; World Bank (2019a)).
11 The variation in estimates is believed to be mainly the result of differences in characteristics of individual studies, including methodology, and differences in context, type of infrastructure and their location, size of the country's GDP and other factors.
12 World Bank (2019a).
13 de Soyres and others (2018).

Estimates of benefits from other studies on transport investment suggest cumulative gains range from less than 1 per cent to more than 10 per cent of GDP. A meta-analysis of the results from 78 studies conducted in Africa and Asia has revealed statistically significant benefits of transport projects for real and nominal income, consumption, gender, education and job creation.[14]

An important observation that may be made from the results of the cited studies is that while Belt and Road Initiative investments are expected to be largely beneficial, gains to countries will be uneven in relative and in nominal terms. Gains to some countries may be even less than their infrastructure costs.[15]

4.4 Rural economy, poverty reduction and social impacts

A major part of the Belt and Road Initiative corridor transport routes run through deep hinterland areas. Improvement of market access for these areas can greatly help in their economic development. Investments in Belt and Road Initiative transport projects could contribute towards lifting 7.6 million people from extreme poverty (less than $1.90 a day at purchasing power parity (PPP) and 32 million people from moderate poverty (less than PPP$3.20 a day), mostly in corridor countries.[16]

Findings from many *ex-post* studies also provide evidence that people living in rural areas may also benefit from major transport networks. Such networks have positive social impacts on rural people through poverty reduction and increased employment in non-farm activities.[17] Some studies have found a structural shift in the rural economy in terms of increases in non-farm activities and more employment. A recent study in Pakistan indicates that a significant majority (92.4 per cent) of the respondents think that free economic zones and industrial parks along the China – Pakistan Economic Corridor will be helpful in alleviating absolute poverty in the country.[18]

The NH-5 Highway corridor in Viet Nam (a road section in the Initiative's CIP corridor) has provided substantial benefits in the corridor region. The number of households living in poverty dropped by 35 per cent between 1995 and 2000. Cities closer to and further away from NH-5 both experienced higher income growth per capita, in addition to a more rapid reduction in poverty in comparison to the rest of the country. The poverty rate in Viet Nam as a whole declined by 27 per cent during this period as a result of broader spillovers from NH-5 to other regions.

Similar other studies in Southern Thailand along the Asian Highway network route AH18 (also a section of the CIP corridor), and in India, along the National Highway NH2, have found positive impacts on the rural people in terms of poverty reduction, and an increase in income, literacy and employment.[19]

The findings of some of the above-mentioned studies show that transport development resulting in improvements in access in rural areas can have direct welfare impacts for people living in rural areas. These impacts, however, may vary in different situations and for different groups. The development of transport corridors and networks are of strategic significance to a national economy, but their direct benefits to the rural people can be limited unless they are linked with a system of feeder roads providing access to remote areas.[20] Such feeder roads, by providing access to markets, can vastly improve the welfare of the rural people.[21]

4.5 Equity and inclusive development, employment

Among the limited number of studies conducted on the impacts of Belt and Road Initiative corridor development on equity, the findings have been generally positive.

One study indicates that transport networks have had a beneficial effect on social inclusion in terms of

[14] Roberts and others (2018).

[15] A study conducted by de Soyres and others (2018) find that some countries (Azerbaijan, Mongolia and Tajikistan) may experience welfare losses, as infrastructure costs overweigh gains. However, as the Belt and Road Initiative is expected to have a systemic impact on the whole network of transportation links, the rest of the world is expected to gain from the initiative. This finding has major policy implications for regional network infrastructure development.

[16] Maliszewska and van der Mensbrugghe (2019).

[17] Melecky and others (2018); Asian Institute of Transport Development (2011); Neupane and Calkins, (2012); Blankespoor and others (2018).

[18] Menhas and others (2019).

[19] More details about the findings from these studies can be found in Quium (2019).

[20] Quium (2019).

[21] See E/ESCAP/FAMT/SGO/5. It is estimated that post-harvest losses of cereal due to poor storage and transport may account for 4 to 16 per cent of total production, and about 50 per cent of fresh food and vegetables may be lost on their way to market. A feeder road system can change the situation.

Photo Credit: Tanes Ngamsom via iStock Photo

education and gender equality and empowerment of women in most of the studies reviewed.[22] Notably, approximately 75 per cent of the studies show benefits for boosting equality in terms of spatial distribution, while all of them show substantial negative effects in terms of overall income distribution.

Dave Donaldson has investigated the impact of the vast colonial railway network in India using archival data and found that "railroads reduced the cost of trading and interregional price gaps, and increased trade volumes". He also has found that when the network was extended to a typical district, real agricultural income in that district rose by approximately 16 per cent.[23] The results of another study has confirmed that the high-speed railway network in China contributed towards decreasing regional economic disparity, and the promotion of regional economic convergence and rail network density has had a positive effect on regional economic growth in some regions.[24]

One study indicates that roads have a beneficial effect on social inclusion in terms of job creation.[25] More jobs, especially in non-farm activities, and greater participation of women in the labour force are also observed in the Asian Institute of Transport Development study in India along the National Highway NH2 in 2011.[26]

The rehabilitation and improvement of the Maputo corridor in sub-Saharan Africa has successfully boosted transit trade flows and bilateral trade between South Africa and Mozambique. The Maputo corridor has led to more than $5 billion worth of investments, and 15,000 direct jobs in the construction and operation of transport, logistics, energy, and industrial ventures along the corridor.[27]

The extensive contribution of the NH-5 highway corridor in Viet Nam to poverty reduction in the country was mentioned earlier. The highway corridor has attracted investment and created jobs. In 2006, 83,453 and 134,846 jobs were generated along the corridor in Hung Yen and Hai Duong provinces, respectively.[28] Two studies on the Jamuna bridge in Bangladesh also have provided evidence of its impacts on rural employment and job transition patterns.[29]

The findings of the above studies suggest that the Belt and Road Initiative can be an important policy instrument to create jobs in the corridor regions and may contribute towards decreasing regional economic

[22] Roberts and others. (2018).
[23] Donaldson. (2018, p. 931).
[24] Zhenhua and Haynes (2017).
[25] Roberts and others (2018).
[26] Asian Institute of Transport Development (2011).
[27] ADB and others (2018).
[28] Ibid.
[29] Blankespoor and others (2018); Mahmud and Sawada (2018).

disparity. The results of some studies suggest that transport development in conjunction with appropriate complementary interventions, such as in Viet Nam,[30] can make substantial positive changes in the economy.

4.6 Location and spatial effects

Differential impacts of development are important issues in Belt and Road Initiative corridor development. The Initiative, however, is not an exception in that respect – different groups in society, regions (at the subnational level) and countries are affected differently by the transport network development. While the estimated overall impacts of transport networks are generally beneficial, there are often negative effects in some country regions and for some groups in society; the distribution of gains either in relative or nominal terms are uneven.

The results of on empirical study on the impacts of railways in colonial India shows that the network extended to a typical district increased its real agricultural income but it reduced the real income of the neighbouring district without rail access.[31]

The Economic and Social Commission for Asia and the Pacific assessed the development impacts of three Asian Highway routes from Kunming, China through South-East Asia to South Asia. These routes are parts of the Initiative's BCIM and ICP corridors. The results show that, although most country regions would remain unaffected, some would have substantial gains in GDP of approximately 2.2 to 2.8 per cent. For other regions, the average losses would be small, about 0.3-0.4 per cent in GDP[32] (ESCAP, 2012). Other simulation-based studies have also found an uneven distribution of economic benefits along transport corridors, such as the Dhaka – Kolkata corridor in Bangladesh (a part of the BCIM corridor),[33] and the Delhi Mumbai Industrial Corridor in India.[34]

The Belt and Road Initiative will change the connectivity map of the region – a new order will emerge, which, in turn, may influence the economic geography of the region. The Belt and Road Initiative transport networks can motivate businesses to relocate in areas or cities that are strategically located along the networks, as they would offer agglomeration economies and more favourable conditions, such as availability of skilled labour force, better infrastructure conditions and connectivity to a gateway port. Because of the changed growth dynamics of such cities and regions, they will grow much more rapidly, become the hubs of new supply chains and production networks and attract higher order services. In a spatial effect analysis of the Belt and Road Initiative transport network development, the researchers have identified cities along the corridors that may benefit most from the network's connectivity effects. These cities will need special development strategies to attain sustainable development.[35]

The studies discussed above clearly show that the distribution of impacts can be uneven across geographical areas. The uneven distribution has important implications for the planning and design of sustainable transport networks. To ensure more inclusive and sustainable development, it is important to understand the distribution of the impacts across population groups and across geographical areas so that remedial measures can be considered at the network's project design stage.

4.7 Cross-border facilitation

Transport facilitation relates to operational connectivity, which involves institutions and putting in place the legal and regulatory measures and other necessary rules and procedures to permit transactions or traffic flows across national borders.

Facilitation arrangements at borders can have a profound effect on operational connectivity, which in turn, affects operational performance and trade cost along a transport corridor. The results from multiple studies confirm that there is a negative relationship between trading times and trade. For example, one study shows that the welfare effects of the Belt and Road Initiative transport projects could increase by a factor of four if participating countries were to reduce by 50 per cent the delays at the border and tariffs.[36]

Prabir De has analysed the effects of inefficient facilitation on trade flow and concludes that transaction costs and delays at borders affect trade flows in the

[30] Among the complementary interventions included human resource development, SME finance, and policy support package for industrial development (ADB and others, 2018, p. 52).
[31] Davidson (2010).
[32] ESCAP (2012).
[33] Malecky and others (2018).
[34] Kumagai and others (2013).
[35] Derudder and others (2018).
[36] De Soyres and others (2018).

same way that tariffs do. The higher the transaction costs, the less trade between partners in neighbouring countries (De, 2011). Other studies also find that intercountry trade in goods and services can be greatly enhanced with efficient facilitation at border points and improved transit procedures and would boost trade between landlocked countries.[37] However, the gains to countries may not be equal in either relative or nominal terms.

The results of the cited studies point to a strong complementarity between infrastructure improvements and policy reforms aimed at reducing border delays and those that enable better management of corridors that span multiple countries.

In the recent years, some countries have taken initiatives to streamline their border control and clearance procedures. Among them are integrated check posts by India and a single window system for South-East Asian countries, which allows synchronized submission and processing of data, and more rapid clearance and release of shipments. To date, no major study is available on these initiatives or their impacts on trade flows and other aspects.

4.8 Environment

There are direct costs of transport development to the environment, such as deforestation, loss of biodiversity, and general degradation of ecosystems.[38] Another study has found among that transport networks and corridors have a harmful impact on the environment in terms of deforestation and carbon dioxide (CO_2) emission.[39]

The transport sector is a major consumer of energy resources and also one of the major emitters of CO_2. Globally, the road sector accounts for most of the energy consumption in the transport sector. In 2018, the transport sector in the Asia-Pacific region consumed 52.23 per cent of total oil consumptions.[40]

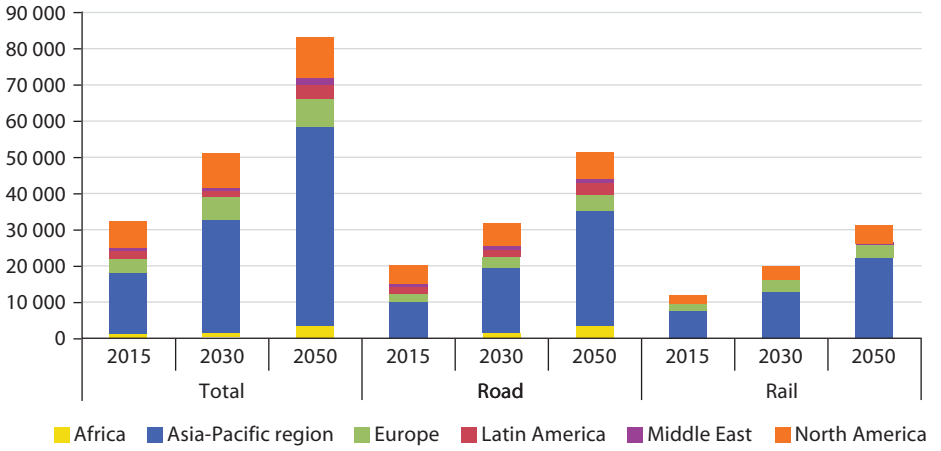
In a report by the Energy Information Administration of the United States of America, it is projected that during the period 2012-2040, the annual growth of the transport sector's energy consumption in Asia (2.9 per cent) (excluding China and India) will be higher than in other regions.[41] Globally, transport accounted for 25 per cent of total emissions in 2016 (about 8 $GtCO_2$) which was 71 per cent higher than in 1990.[42] Of this amount, the share of road transport emissions was 74 per cent. In line with the global increase, CO_2 emissions from the transport sector in Asia also have been trending upward. CO_2 emissions in the transport sector in Asia increased from 0.78 $GtCO_2$ in 1990 to 2.44 $GtCO_2$ in 2016.[43] Compared with the global share (24.21 per cent), the share of emission from the transport sector in Asia was much lower (about 14 per cent). This may change in the future.

The road sector has accounted for more than 80 per cent of the total energy consumption in the transport sector.[44] In most countries in Asia, the road sector plays a dominant role in freight transport and accounts for more than 75 per cent of the modal share. For example, the share is 89 per cent in Myanmar, 83 per cent in Thailand, 76 per cent in Viet Nam, 85 per cent in Turkey, 94 per cent in the Islamic Republic of Iran and 78 per cent in the Russian Federation.[45] Consequently, compared with the global increase, energy consumption by the road sector in the region is rising more steeply.

The sharp rise in CO_2 emissions from the sector is expected to continue in line with further economic development stimulated by the Belt and Road Initiative, especially from the freight sector. An estimate by the International Transport Forum suggests that in the Asia-Pacific region, tonne-kilometres from surface freight alone will increase by 261 per cent from 2015 to 2050 and account for more than two thirds of surface freight globally (see figure 4.2).[46] Consequently, a matching increase of emissions from the sector can be expected.[47] As emissions from the sector are a major source of negative impacts on the environment and

[37] Arvis, Smith and Carruthers (2011); Freund and Rocha, 2011.
[38] Damania and others (2018).
[39] Roberts and others. (2018).
[40] ESCAP calculations based on: IEA World Energy Balances 2020 https://www.iea.org/subscribe-to-data-services/world-energy-balances-and-statistics (Accessed on 27 August 2021).
[41] United States (2016).
[42] IEA (2019).
[43] Ibid.
[44] ESCAP (2013).
[45] ESCAP (2019).
[46] International Trade Forum (2017).
[47] Globally, CO_2 emissions from transport could increase by 60 per cent by 2050, despite the significant technology progress assumed in the baseline scenario used in the *ITF Transport Outlook 2017*. If no additional measures are taken, CO_2 emissions from global freight could increase by 160 per cent (International Trade Forum, 2017).

Figure 4.2. Surface freight tonne-kilometres by region, baseline scenario, billion tonne-kilometres



Source: Organization for Economic Cooperation and Development, International Transport Forum, *ITF Transport Outlook, 2017* (Paris, OECD Publishing, 2017).

welfare, greater efforts are required to reduce the current trend of increasing emissions from the transport sector.

Further discussion on recent initiatives and providing support for institutional, financial and other arrangements set up to effectively reduce and/or eliminate the adverse impacts of infrastructure projects on the environment, and create opportunities for green economic growth in the Belt and Road Initiative countries is presented in chapter 6.

4.9 Road Congestion and road safety

Cities located along Belt and Road Initiative corridors that are well placed or connected to benefit most from Initiative.[48] Among these cities are Bangkok, Beijing, Dhaka, Hanoi, Kuala Lumpur, and Tehran. Already traffic congestion is an important source of welfare loss in many of these cities, as well as in other major cities in Belt and Road Initiative countries. Belt and Road Initiative development can further worsen traffic congestion, especially in the well-connected cities.

In an ADB webpost it is suggested that road congestion costs countries in the region approximately 2 to 5 per cent of GDP every year because of lost time and higher transport costs.[49] For example, Kuala Lumpur, the capital city of Malaysia, has serious traffic congestion. According to a World Bank report, the city wastes 1.2 billion litres of fuel on traffic congestion, which is approximately 2 per cent of GDP.[50] The results of another study show that the traffic congestion cost in Beijing in China was approximately RMB 58 billion (Chinese renminbi) ($8.2 billion) (4.22 per cent of GDP) in 2010.[51] Another study indicates that the estimated annual congestion cost in Dhaka was $3.9 billion, which included an environmental externality cost of $375 million.[52]

Congestion also has other negative impacts on the welfare of people. Some of the Belt and Road Initiative cities already suffer from the highest air pollution levels in the world, approximately 80 per cent of it is from transport.[53] Unless remedial measures are considered, Belt and Road Initiative development can adversely impact the welfare of the people living in major cities in the Initiative's corridors.

Approximately 813,000 road traffic fatalities occurred in the Asia-Pacific region in 2016, representing an 11 per cent increase as compared to 2013.[54] The burden of road traffic injuries and deaths is disproportionately borne by vulnerable road users and those living in low- and middle-income countries.[55] In addition to a public health problem, road traffic injuries are

[48] Lall, Lebrand and Maria (2019).
[49] ADB (undated webpost) https://www.adb.org/sectors/transport/key-priorities/urban-transport.
[50] World Bank (2015).
[51] Mao, Zhu, and Duan (2012).
[52] Khan and Islam (2013).
[53] According to a global report, of the world's 100 most polluted cities 99 are in Asia. See the list available at https://www.airvisual.com/world-most-polluted-cities?continent=&country=&state=&page=1&perPage=50&cities=.
[54] Economic and Social Commission for Asia and the Pacific, Report of the Working Group on the Asian Highway on its 8th meeting, Bangkok, 18-20 September 2019 (ESCAP/AHWG/2019/2).
[55] WHO (2019).

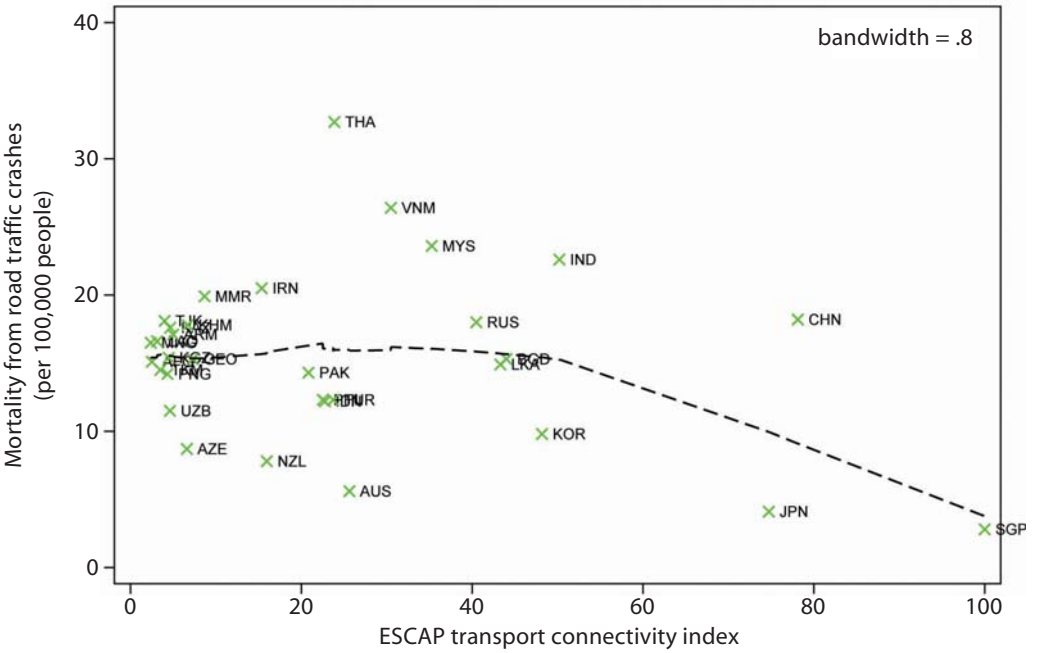
Photo credit: Tuoyi via iStock Photo

a development issue. Low- and middle-income countries lose approximately 3 per cent of GDP as a result of road traffic crashes[56] (WHO, 2015).

The low standard and poor condition of roads and inadequate or lack of road infrastructure facilities in most developing countries are among the causes of high road traffic fatalities in the ESCAP region.

However, Belt and Road Initiative Road network development (with appropriate safety improvement measures) can have a positive effect on road safety. The analysis presented in an ESCAP study indicates that as corridor development under the Initiative gradually improves connectivity performance in Belt and Road Initiative countries, mortality from road crashes may decline (figure 4.3).

Figure 4.3. Correlation between road traffic crashes and connectivity performance, selected Asia-Pacific countries



AFG, Afghanistan; ARM, Armenia; AUS, Australia; AZE, Azerbaijan; BGD, Bangladesh; BRN, Brunei Darussalam; KHM, Cambodia; CHN, China; GEO, Georgia; IND, India; IDN, Indonesia; IRN, Islamic Republic of Iran; JPN, Japan; KAZ, Kazakhstan; KOR, Republic of Korea; KGZ, Kyrgyzstan; LAO, Lao People's Democratic Republic; MYS, Malaysia; MMR, Myanmar; NZL, New Zealand; PAK, Pakistan; PNG, Papua New Guinea; PHL, Philippines; RUS, Russian Federation: SGP, Singapore; LKA, Sri Lanka; TJK, Tajikistan; THA, Thailand; TUR, Turkey; TKM, Turkmenistan; VNM, Viet Nam.

Source: ESCAP (2019, p. 26).

[56] WHO (2015).

4.10 Trafficking, spread of disease and sociopolitical issues

Cross-border transport is accompanied by a wide lrange of negative externalities, such as the spread of HIV/AIDS and other diseases, trafficking of vulnerable groups, women and girls, in particular, illegal trading of narcotics and other items, effects on local farmers and businesses, and erosion of social values and cultural identities.

Human Rights Watch has reported on the trafficking of women and girls from Bangladesh, Myanmar, Nepal, and Thailand.[57] As posted in a United Nations Sustainable Development blog, according to a recent report from the United Nations Office on Drugs and Crime (UNODC), the vast majority of all human trafficking victims – some 71 per cent are women and girls and one third are children.[58]

The number of persons trafficked each year is impossible to determine, but it is considered to be a large-scale problem. Academic researchers have conducted studies to understand the extent and dimensions of the problem. Trafficking of women and girls is a serious problem in border areas of many countries in South and South-East Asia. Temeshnie Deane has examined cross-border trafficking of women and girls from Nepal to India. Different sources are cited in the study to estimate that 7,000 to 10,000 girls between the ages of 9 to 16 years are trafficked each month from Nepal to India.[59] The extent of trafficking problem between other countries is examined in other studies.[60] In the context of this study, it is important to note that that transport routes, especially land routes, are used to facilitate such illegal trafficking. Consequently, they need to be considered in cross-border transport project development.

Cross-border transport infrastructure can also have other adverse social impacts on the local people. Transport systems can act as a vector for the spread of diseases. One study has reported alarming vulnerability rates in ethnic minorities to sexually transmitted diseases and HIV/AIDS along a new major intercountry road in South-East Asia.[61] Another one shows evidence of the spread of HIV/AIDS along the road network in Southern Africa.[62] The number of HIV-positive persons and AIDS patients increased sharply in Savannakhet in the Lao People's Democratic Republic during the construction of the Second Mekong Bridge.[63] These externalities need to be identified, and accounted for, and carefully designed mitigation measures need to be considered as part of a project design.

Transport systems can act as a vector for the spread of diseases directly or indirectly. A pandemic refers to a widespread outbreak of a disease over several countries or the whole world and can profoundly affect an extremely large number of people. Although a pandemic may not directly damage the physical components of transport systems, the consequent shutting of transport services in the wake of a pandemic can severely disrupt supply chains (especially, food, energy, medical and other essential supplies) and incur ravaging impacts on the economy and human welfare.

The COVID-19 pandemic of 2020 testifies the human tragedy of a pandemic and the far-reaching damaging impacts it can have on the global economy. In many parts of the world, domestic and international transport systems, especially air transport, have remained paralysed or shut down for a prolonged time. Considering its importance, possible implications of the pandemic for the Belt and Road Initiative are discussed separately in chapter 6.

A summary of the main impacts of the Belt and Road Initiative transport corridor investment, discussed in this chapter, is presented in table 4.1.

[57] Ralph (2000).
[58] See https://www.un.org/sustainabledevelopment/blog/2016/12/report-majority-of-trafficking-victims-are-women-and-girls-one-third-children/.
[59] Deane (2010).
[60] Molland (2010); IOM (2005).
[61] Slesak and others (2012).
[62] Regondi, George, and Pillay (2013).
[63] JICA and ALMEC Corporation (2007).

Table 4.1. Summary of wider socioeconomic impacts of the Belt and Road Initiative

Area/aspect of Impact	Summary of main impacts
Travel time and trade cost	• Can reduce travel times for countries along the Belt and Road Initiative transport corridors by up to 12 per cent, reducing trade costs • A negative relationship between trading times and trade: a one-day reduction in trading times increases exports between Belt and Road Initiative economies by 5.2 per cent • Shipment times along the corridors decline by up to 11.9 per cent and trade costs by up to 10.2 per cent
Transport infrastructure investment	• If all the Belt and Road Initiative projects are implemented, the annual global welfare gains would be about $1.6 trillion in 2030, accounting for about 1.3 per cent of the global GDP • More than 90 per cent of this gain is expected to be captured by Belt and Road Initiative countries • Substantial positive impacts on economy; gains from investment will vary from less than 1 per cent to more than 10 per cent of GDP • Estimated gains for most Belt and Road Initiative countries 3 to 10 per cent of GDP • Expected real income gains for corridor countries are between 1.2 and 3.4 per cent • Generation of wider economic benefits may need complementary investment, policy, and other measures; depends on initial condition and other factors
Trade and investments	• Improved cross-border transport infrastructure can substantially increase trade • Belt and Road Initiative increases trade flows among participating countries by up to 4.1 per cent • Estimated to increase trade by between 2.8 and 9.7 per cent for corridor countries and between 1.7 and 6.2 per cent globally • Some other estimates suggest that the Belt and Road Initiative is expected to boost global trade by 5 per cent in 2030 • Not all countries could see positive effects; some Belt and Road Initiative corridors in South Asia can increase imports by between 8 and 14 per cent and exports by 3 to 4 per cent • Increased trade can deteriorate trade balance in many countries; risk for the overall balance of payments
Rural economy, poverty reduction and social impacts	• Could contribute towards lifting 7.6 million people from extreme poverty (less than $1.90 a day at purchasing power parity (PPP) and another 32 million people from moderate poverty (less than PPP$3.20 a day), mostly in corridor economies • Access improvements have direct welfare impacts for rural people • Positive impacts on rural people through poverty reduction and more jobs in non-farm sector • NH-5 Highway corridor in Viet Nam (a segment of the CIP Corridor): poverty dropped by 35 per cent between 1995 and 2000
Equity and inclusive development, employment	• Beneficial effect in terms of substantial number of new jobs • More jobs, especially in non-farm activities • Greater participation of women in the labour force • Benefits of more equality in terms of spatial distribution • Substantial negative effects in terms of overall income distribution
Location and spatial effects	• Uneven impacts on countries, geographical areas and population groups • Cities in the Belt and Road Initiative corridors that are well placed or connected to the Belt and Road Initiative transport network stand to benefit most; they will play an important role to stimulate economic activities and will need special development strategy.

Table 4.1. *(continued)*

Area/aspect of Impact	Summary of main impacts
Cross-border facilitation	• Inefficient facilitation arrangements deter trade expansion • Welfare effects of Belt and Road Initiative transport projects would increase by a factor of four if countries were to reduce by 50 per cent the delays at the border and tariffs • Cost reduction at borders increases exports and welfare; 10 per cent drop in costs increases exports by about 2 per cent in South Asia • Moderate improvements in infrastructure and trade facilitation can increase welfare gains of 8.1 billion in the Greater Mekong Subregion • Gains to countries are not equal in relative nor absolute terms
Environment	• Harmful impact on the environment in terms of deforestation and loss of biodiversity • Transport sector is a major consumer of energy resources and emitter of CO_2 • Globally transport sector emitted 25 per cent of total emissions in 2016; share of road transport was 74 per cent • Surface freight will increase by 261 per cent from 2015 to 2050 in the Asia-Pacific region; a matching increase of emissions from the sector is expected • Increase in global CO_2 emissions, with a complex set of negative outcomes at the national and local levels
Road congestion and road safety	• Congestion costs Asian countries 2 to 5 per cent of GDP every year; Kuala Lumpur wastes 1.2 billion litres of fuel, about 2 per cent of GDP • Approximately 80 per cent of air pollution in major Asian cities is from transport • Road congestion is an important source of welfare loss in Asian developing countries • Road traffic death rates in many Belt and Road Initiative countries are among the highest in the world • Low- and middle-income countries lose about 3 per cent of GDP from road traffic crashes • Evidence from multiple studies show that safety improvement measures and better infrastructure can reduce road traffic deaths and injuries
Trafficking, spread of disease and socio-political issues	• Trafficking of women is a serious problem in many border areas in the corridors • Adverse impacts on local people, including displacement and marginalization, effects on local firms and businesses • Transport development can help spread of HIV/AIDS and other diseases • Outbreak of diseases can cause devastating impacts on the economy and human welfare • Illegal trading of narcotics, firearms and other items in border areas

Source: Compiled from information presented in chapter 4.

OPPORTUNITIES AND CHALLENGES OF THE BELT AND ROAD INITIATIVE

5

OPPORTUNITIES AND CHALLENGES OF THE BELT AND ROAD INITIATIVE

5.1 Opportunities

A broad framework for integration of initiatives

The Belt and Road Initiative provides a unique opportunity for the development of seamless sustainable connectivity in Asia and Europe. There are many regional, subregional and bilateral initiatives to develop transport networks in Asia and Europe.[1] Some of them are limited to transport network development, while a few others have a broader scope, not just limited to transport. These initiatives were launched at different times with little or no coordination among the countries involved. Although some of their geographical coverages overlap, they have not followed any common set of standards in terms of physical or operational connectivity. Consequently, there is divergence in the effectiveness and efficiency of operational connectivity even between segments of the same corridor. This can mainly be attributed to differences in political and economic objectives of the concerned countries along a corridor.

The divergence in the effectiveness and efficiency of operational connectivity is a major barrier towards developing a seamless sustainable connectivity in the region. The full value of network development has remained unrealized as each country or initiative has made their investment decisions separately without much consideration of the spill over effects of network development. In terms of improvement of connectivity in Eurasia, the Belt and Road Initiative may be regarded as a unique overarching initiative for the development of transcontinental land transport routes connecting Asia with Europe. With the strong political commitment of China and support of other countries, the Initiative can leverage the progress made by different regional and subregional initiatives to develop more unified transport networks to support sustainable connectivity for economic cooperation in Asia and Europe. To this end, the economic and financial initiatives of the Initiative, complemented by its policy coordination, would help further development of transport networks following a harmonized set of physical and operational standards, as far as practical.

Sustainable connectivity requires a broad framework for developing an integrated intermodal transport network. Such a network can increase the modal share of more resource-efficient transport modes, such as railways and inland waterways.[2] This shift can help to reduce the demand for road transport and thereby reduce the need to expand the capacity of existing highways or limit the need for building new ones. Greater use of railways and inland waterways would also help reduce the cost of freight transport, increase efficiency in the overall supply and distribution chain, and reduce the carbon footprint of freight transport.[3]

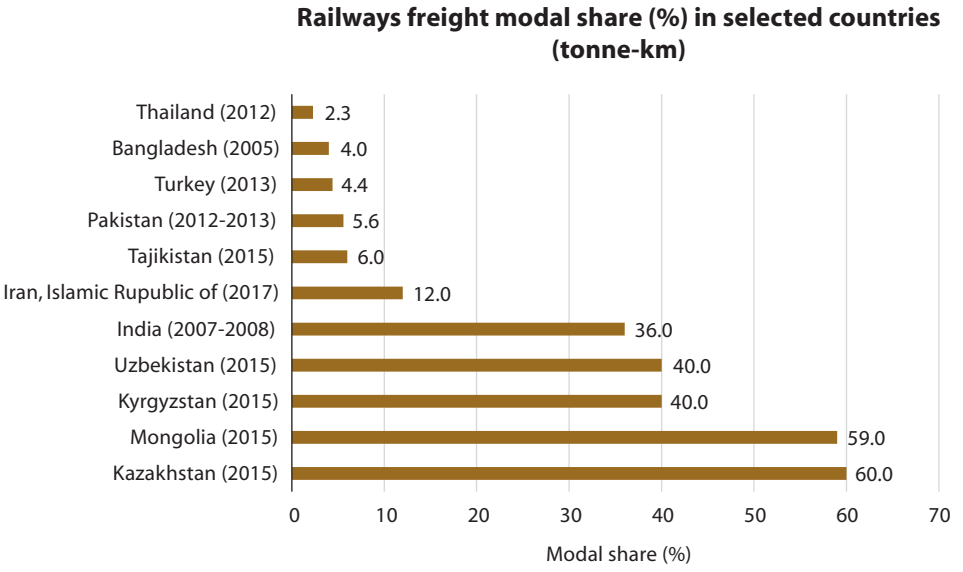
For most countries, the current modal share of rail freight is rather low (see figure 5.1). The Belt and Road Initiative provides a good opportunity to increase the share of freight transport by railways. The railways in most countries in Asia are small and do not have sufficient volume of domestic rail freight to make them competitive with road transport; it is difficult to make

[1] See chapter 1 of this study.

[2] For example, the relative energy efficiencies of road, rail and inland water transport in India are: 24 ton-km/l of fuel, 85 ton-km/l of fuel and 105 ton-km/l of fuel, respectively. (*Source:* World Bank, Clean Ganga project) http://www.worldbank.org/content/dam/photos/780x439/2017/mar-4/in-inlandwaterwaysfreightcheaper.jpg.

[3] Hanoka and Regmi (2011).

Figure 5.1. Railways freight modal share in selected countries



Source: Author's compilation based on data collected from different sources.

railways commercially viable without transporting a sufficient volume of freight. In fact, this may be one of the main reasons why there is low investment in the railway sector. The overdominance of road transport in the region can change if smaller railways gain the capacity to carry transit traffic from their neighbouring countries. To enhance railway connectivity, Belt and Road Initiative countries can prioritize railway facilitation and efficient transhipment arrangements at the break-of-gauge points. With enhanced railway connectivity and transit traffic, railways along the Belt and Road Initiative corridors can boost their modal shares and consequently make the Belt and Road Initiative transport corridors more sustainable.

The Belt and Road Initiative also presents an opportunity to introduce new highway and railway routes to enhance regionwide connectivity in Asia and Europe. In this context, the expansion and integration of the Asian Highway network,[4] the Trans-Asian Railway network and the network of dry ports can allow maximum modal integration, and the extension of connectivity to rural areas.

In support of the Belt and Road Initiative, The work of ESCAP will complement the development and integration of maritime connectivity with land transport connectivity, and implementation of regional transport facilitation frameworks and other technical standards to operationalize the networks.

Development of technical standards, framework agreements and manuals

Technical standards and interoperability

Building a transport network adds value to a country. However, if investment decisions in a cross-border transport route are taken by each country separately, the spill over effects of network developments to other countries along the route are not taken into account. The value of investments also depends on the standards that are used to build transport networks and the border-crossing procedures at the border gates. This is even more important when transport infrastructure crosses more than one border, pointing to the value of international cooperation in this area.

The efficient operation of a transport corridor requires a common set of technical standards needed to secure the optimum interoperability of all sections of the transport corridor, including interoperability between the various transport modes. Such technical standards need to cover such areas as electrification, track gauge and signalling and communication systems for railways, and axle load capacity and other road design standards for roads. Some other standards common to both road and railways are safety regulations, environmental requirements regarding fleet and cargo, and user charges. Internationally accepted technical and operational standards for the various transport modes

[4] At the eighth Biennial Meeting of the Working Group of the Asian Highway, held in Bangkok on 18 and 19 September 2019, new routes were adopted to improve Euro-Asian connectivity. The proposals for a new route AH9, conversion of more than 15,000 km of the potential routes in China, and the introduction of new potential and actual routes in Georgia and the Islamic Republic of Iran were adopted by the Working Group (ESCAP/AHWG/2019/4).

should be adhered to in order to secure interoperability with other relevant technical systems. For example, the technical standards for road and railway infrastructure development may include the following aspects.

Road:

- Physical standards of roads, bridges and other structures
- Permissible vehicle weight and dimensions
- Axle load
- Design speed
- Road geometrical standards
- Vertical clearance under overhead structures
- Traffic signage and signals

Railway:

- Hauling power of locomotives
- Gauge (track gauge and loading gauge)
- Permissible axle load
- Vertical clearance under overhead structures
- Braking system (vacuum-brake, air-brake stock etc.)
- Coupling
- Switching and signaling
- Lengths and standards of track structure and length of the station and yard loops
- Loop capacities, marshalling of wagons
- Train operation system
- Electrification standards (voltage, current, contact system, among others)

Handbooks on design standards, such as intelligent transport systems, road safety and green development

Under the framework of the Belt and Road Initiative, ESCAP and other intergovernmental organizations may consider developing guidelines, handbooks, and manuals on different aspects of technical and regulatory design standards for the development of regional and subregional transport networks. These design standards can help ensure interoperability of the networks. Some recent developments in this respect are discussed below.

In 2016, ESCAP member States adopted the Regional Action Programme for Sustainable Transport Connectivity in Asia and the Pacific. This Programme has established model agreements on transport facilitation and the International Road Transport and the Model Multilateral Permit for international road transport, which can support harmonization of legal and regulatory frameworks to operationalize the Belt and Road Initiative corridors.

The Economic and Social Commission for Asia and the Pacific has recently published "Guidelines for the regulatory frameworks of intelligent transport systems in Asia and the Pacific".[5] This report provides an assessment of the state of intelligent transport systems and operation in Asia and the Pacific and offers policy recommendations for establishing intelligent transport systems regulatory frameworks at the national and regional levels.

The Economic and Social commission for Asia and the Pacific has also published "Handbook on cross-border transport along the Asian Highway Network". The handbook can be used as a one-stop source of practical information and a tool for policymakers, transport operators, logistics service providers and other stakeholders in relation to border crossing processes and formalities.[6]

Development banks, such as ADB and the World Bank, have developed guidelines for environmental impact assessment and ADB has developed a resettlement handbook. Other organizations also have developed similar guidelines or handbooks, which may be reviewed and used to develop suitable guidelines and handbooks for the Belt and Road Initiative.

China has issued documents, such as "Guidance on promoting green belt and road" and the "Belt and road ecological and environmental cooperation plan", with the aim of fulfilling its responsibilities and standards in building a green belt and road.[7] Similar documents can also be considered on other aspects of sustainable development of the Belt and Road Initiative as well as for other regional networks.

It would also be helpful to develop guidelines on road safety, especially on road safety audits, to support training of professionals as certified road safety auditors in Belt and Road Initiative member countries.

[5] The document is available at https://www.unescap.org/resources/guidelines-regulatory-frameworks-intelligent-transport-systems-asia-and-pacific.

[6] The handbook is available online at https://www.unescap.org/resources/handbook-cross-border-transport-along-asian-highway-network.

[7] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).

Border crossing and customs cooperation

Many studies indicate that improvement in border crossing can significantly reduce cost of trading and thereby enhance the welfare effects of Belt and Road Initiative transport corridors.[8]

To overcome the excessive waiting times at border crossings that may impede improvements resulting from the development of the transport corridor, the countries in a transport corridor can consider installing joint border crossing posts, joint or shared controls and coordination and cooperation of their activities. They can also consider integrating customs services to minimize waiting times for rail and road traffic. This would reduce transport costs and enhance overall transport cost efficiency. Corridor countries may also promote joint studies on infrastructure and organizational measures required for this purpose and agree on timetables for the implementation of the measures, which would form part of a transport corridor action plan. It is important that standards set by international agreements are complied with. Some of the important issues to be considered are the following:

- Traffic rights
- Legal and regulatory instruments and procedures at borders and in transit countries
- Data exchange
- Technology standards and physical facilities for border clearance
- Operations hour and practice
- Physical facilities to meet the requirements of road/rail transport at border points

In recent years, some countries have taken initiatives to streamline their border control and clearance procedures. These include the establishment of integrated check posts by India;[9] and a single window system for South-East Asian countries, which enables synchronized submission and processing of data, and more rapid clearance and release of shipments. The clearance process at border posts in the Maputo Corridor in Southern Africa and other corridors elsewhere also was streamlined. Joint studies on these initiatives can provide important insights into how cross-border facilitation arrangements can be improved and adapted for other situations.

Collaborative applied research, technology transfer, training and dissemination of information

The major countries involved in the Belt and Road Initiative have credible national research institutes and centres. These research facilities, in collaboration with relevant national government departments and other authorities and international organizations with funding and other support from national governments and donor agencies, could consider conducting joint or collaborative research on different economic, social, technological and other issues or relevant studies related to more sustainable development of the corridors. These may include, for example, ex-*ante*- and *ex-post* assessments of projects, technologies and design standards; development of new project assessment methodologies and techniques; policy analysis; new design standards for physical facilities; data science and intelligent transport system applications; and environment friendly and carbon-neutral building materials. A few suggestions on research topics or studies are also included in the last chapter of this study. It is important to mention here that many of the reported results from studies cited in this report result from the efforts of such research organizations.

The national research facilities can form networks of similar research organizations in countries from within and outside the Belt and Road Initiative to help in the transfer and uptake of new technologies, management know-how, and training of human resources (for example, in the areas of sustainable project development, data analytics, intelligent transport system applications and new analytical tools); serve as a knowledge portal and depository of knowledge products; and share relevant data and information. There are important gaps in the current knowledge related to corridor development and management. Collaborative research by the network could help fill some of these gaps.

5.2 Challenges in the Belt and Road Initiative corridor development and their potential resolutions

The challenges in Belt and Road Initiative corridor development can be broadly grouped into three categories: issues related to sustainable development; investment; and corridor governance and other matters. In this section, some of the major issues in each of

[8] For example, de Soyres and others (2019) finds that the welfare effects of the Belt and Road Initiative transport projects would increase by a factor of four if participating countries were to reduce by 50 per cent the delays at the border and tariffs.

[9] Integrated check posts are sanitized zones at border crossings, with adequate passenger and freight-processing facilities; they integrate three main border-crossing related functions: customs; immigration; and security.

these three areas that need to be considered in corridor development, management and operation are examined.

Sustainability of Belt and Road Initiative transport projects

A major focus of this study is on sustainable transport development in the Belt and Road Initiative corridors. The major issues in sustainable transport development are examined against three main pillars of sustainability: economic (and financial); social; and environmental. In this section, the importance of resilient transport infrastructure development is considered. This has recently become an important issue in sustainable development and is drawing increasing attention from development practitioners.

Economic and financial sustainability

There are two main issues pertaining to economic and financial sustainability: (a) while the corridors can increase economic benefits and the welfare of the people in corridor countries as a whole, gains to individual countries will be uneven; and (b) not all projects in the corridors may be economically financially viable.

The estimates of welfare gains to Belt and Road Initiative countries vary considerably. Compared to the baseline, some of the countries that would gain most by 2030 are Pakistan (10.5 per cent), Kyrgyzstan (10.4 per cent) and the Lao People's Democratic Republic (3.1 per cent).[10, 11] However, for some countries, the costs of new infrastructure could outweigh the welfare gains. The gains from increased trade are highly uneven and may not necessarily justify the investments paid by each country.[12] Such countries can serve, however, as important transit countries along the Belt and Road Initiative corridors and provide vital road and rail links for the Belt and Road Initiative network. Much of the potential of the Initiative will remain unrealized without their participation. As such, the gaining countries in some way or another may have to compensate any such countries. How that may be done requires deliberation by researchers and policymakers.

The economic and financial viability of an individual project depends on many factors, including, among them, realistic projection of traffic demand, project structure and design, financing cost, maintenance and operational cost, and procurement practice. Investment decisions based on a rigorous appraisal of transport projects applying standard methodologies, such as cost-benefit analysis or financial and cash flow analysis and transparent procurement practice can ensure economic and financial viability of projects and also reduce their financial risks. Otherwise, especially if borrowed funds are used, the projects may become burdened with unsustainable debt, which would lead to unintended consequences.[13] In addition, there are capacity constraints in many developing countries to structure and develop viable large transport projects. The limited delivery capacity of the public sector is another issue faced by some countries. These issues in relation to viable project development and implementation need to be addressed.

Environmental sustainability

Transport development can impose a heavy burden in terms of deterioration in environmental quality and deforestation along transport routes, loss of biodiversity and a general degradation of ecosystems, and other social costs (see box 5.1). The transport sector is a leading contributor to greenhouse gas emissions and a major consumer of fossil fuels. With the growth of the population and increased economic activities in Asia, the demand for transport infrastructure is increasing rapidly. As discussed in chapter 4, some estimates suggest that in Asia, ton-kilometres from surface freight alone will increase by 261 per cent between 2015 and 2050 and account for more than two thirds of surface freight globally.[14]

The discussion in this section considers some actual measures that can reduce the adverse impacts on the environment, for example, in terms of estimated reduction of CO_2 emissions by some studies. Further discussion on this topic is presented in chapter 6, which focuses on recent initiatives, and institutional, financial and other arrangements that can effectively reduce and/or eliminate the adverse impacts of infrastructure projects on the environment, and create opportunities for green growth in the Belt and Road Initiative countries.

[10] See de Soyres (2019).
[11] Results of multiple studies cited in chapter 4 show gains to countries will be uneven.
[12] De Soyres and others. (2019) finds that three countries (Azerbaijan, Mongolia and Tajikistan) may experience welfare losses as infrastructure costs can be more than gains.
[13] See Shah (2019). Considering the cases of Pakistan and Sri Lanka, Abdur Shah argues that disregard for the economic viability of projects and the domestic limitations of countries can have both external and internal consequences for the project countries.
[14] International Transport Forum (2017).

The International Transport Forum estimates that, on the basis of current CO_2 emissions rates and policies in effect today, emissions from global transport will rise by 60 per cent between 2015 and 2050. This would effectively outweigh mitigation measures currently being deployed. The sharp expected rise in demand for freight transport in Asia and the Pacific, in particular would, under this scenario, place the ESCAP region among the highest emitting regions in the world.

In the case of passenger transport, many environment-friendly measures and technologies are being increasingly accepted. However, freight transport continues to rely heavily on fossil fuel-based transport systems. The expansion of national and regional road networks has strengthened the position of road transport as the main vehicle for domestic, intraregional and even interregional connectivity, bringing, with its negative externalities, such as emissions, road crashes, congestion and noise pollution.

Transport is necessity for development, but it should itself be sustainable. This would, among other factors, require incorporating effective mitigation strategies and adaptation measures. The current situation can be changed with the development of an integrated intermodal transport system in the region. It may also be pragmatic to consider the environmental impacts of some transport projects from a different perspective, for example, the Delhi – Mumbai dedicated rail freight corridor. The alternative to dedicated freight corridor would have far more detrimental impacts in terms of CO_2 emissions. An estimate shows that the annual CO_2 emissions under the low-carbon scenario with the dedicated freight corridor (0.28 million tonnes) are less than one fortieth under the business-as-usual scenario without the dedicated freight corridor (12.32 million tonnes).[15]

The promise of a more sustainable multimodal transport system can be found in another study, which provided estimated savings in emissions from multimodal freight operation compared with total freight operation by road.[16] The results of the study indicated that the Birgunj rail-based inland container depot in Nepal handled 16, 928 TEU of containers and 237,104 MT of cargo in 2008/09. The multi-modal freight operation uses a rail route from Haldia port in India (Haldia-Kolkata-Sitarampur – Patna – Raxaul-Birgunj) to the Birgunj inland container depot in Nepal, and from there a highway route. In the absence of such an intermodal facility, all the freight would have been transported by road. The estimated savings in CO_2 emissions for 2008/09 was 57,687 MT.[17]

Social sustainability

Transport development may come with a heavy burden of social negative externalities. In addition to the above-mentioned more commonly discussed externalities, there are other forms of adverse social impacts, especially those associated with cross-border transport, such as human trafficking (women and girls, in particular), illegal trading in narcotics and firearms, spread of disease, displacement of marginal groups and loss of livelihood, and sociopolitical issues. The social costs for these negative externalities also need to be duly accounted for and appropriately compensated.

All of these externalities need to be identified and accounted for, and carefully designed mitigation measures need to be considered as part of a project design. Human trafficking, illegal trade in narcotics and other items, and spread of diseases are some of the major challenges that must be tackled through appropriate legal, regulatory and social interventions. For example, a study may be conducted to consider the effectiveness of the current mitigation measures and, how better to design remedial measures as needed, and to examine how these measures may be incorporated in corridor project design and in legal and regulatory instruments for border-crossing procedures.

Some other issues, such as road crashes, may be incorporated in project design. Other issues, such as congestion and emission may need to be dealt with through improved traffic management, higher technology standards (especially fuel and emission standards), intelligent transport system applications,[18] pricing and other policy interventions.

Resilience of Transport Infrastructure

Resilience of a transport system generally refers to its integrity, service reliability, functionality and rapid recovery after any major disruption or disaster, such as those caused by natural, extreme weather conditions (for example, floods, cyclones, tornadoes and droughts) or climate-change related disasters, such as rising sea level, cyberattacks, pandemic outbreaks such as

[15] Pangotra and Shukla (2012).
[16] Hanaoka and Regmi (2011).
[17] Ibid.
[18] See discussion on intelligent transport systems in chapter 6.

Image by Wenjie Dong via Getty Images/iStock Photo

COVID-19 virus or ageing infrastructure. There are many recent examples of such disruptions and disasters. One such example is the flooding that occurred in Thailand in 2011 from which it is estimated that the disruptions reduced the country's GDP growth rate from an expected 4 per cent to 2.9 per cent and global industrial production by 2.5 per cent.[19] One of the airports in Bangkok had to be closed for months and required extensive reconstruction before it was reopened.

Another disaster during the same year, the Great East Japan Earthquake of 11 March and tsunami that followed severely affected the transport system over a wide area.[20] The estimated cost of damage to transport infrastructure alone was 577.2 billion Japanese yen (¥) ($5.4 billion). In 2015, a blockade of the Nepal-India border crossing at Birgunj, resulted in prices spiking within short periods, and significant economic losses.[21]

The transport systems have been badly affected due to outbreak of the Covid-19 pandemic in 2020. The supply of essential commodities, including food and emergency medical supplies remained low and businesses suffered because of abrupt disruptions in supply chains. A discussion on how the Belt and Road transport systems can be made more resilient against such abrupt disruptions are presented in Chapter 7. This discussion considers lessons learned from the COVID-19 pandemic.

Most of the transport infrastructure in use today was built decades ago when the onset of climate change and growing frequency of extreme weather events and natural disasters was not anticipated. ESCAP has estimated the vulnerability of transport infrastructure in the region. The estimated percentage of infrastructure at risk of all-natural disasters (earthquake, flood, cyclone and landslide) for road, airport and ports are 42, 32 and 1, respectively.[22] The Asian Highway network is considered to be increasingly exposed to high risks of disruptions because of these natural disasters. Many routes of the network are also part of Belt and Road Initiative corridors and routes, and, as such, they are also exposed to high risks of disruptions.

Transport systems also need to be resilient against any abrupt disruptions caused by a pandemic. This issue is discussed at length in chapter 6.

According to a recent report by the World Meteorological Organization (WMO), the period 2015-2019 was not only set to be the warmest five-year period in recorded history, but also the period during which CO_2 growth rates exceed those of the previous five years by a staggering rate of approximately 20 per cent. Preliminary data have indicated that global concentrations of CO_2 were on track to reach or even exceed 410 parts per million by the end of 2019. On that basis, WMO has warned that climate change

[19] UNISDR (2012).
[20] The extensive destruction and damage to the transport system, costs and recovery time can be found in Okumura and Kim (2018).
[21] Japan G20 Development Working Group (2019).
[22] ESCAP (2019; p. 9).

causes and impacts are increasing rather than slowing, as evidenced by the frequency and intensity of climate disasters in this period.[23]

The Asian Development Bank estimates that among its 45 developing member countries, disaster losses averaged $126 million a day between 2006 and 2015.[24] The costs to more vulnerable countries, such as Bangladesh, are usually very high. A Word Bank study of 2014 estimates that increased salinity in coastal areas would cause an increase in road maintenance expenditure by 252 per cent.[25]

The Asian Development Bank estimates Asia needs to invest $1.5 trillion a year in infrastructure from 2016 until 2030 to keep pace with economic growth. The estimated investment requirement increases by 16 per cent to more than $1.7 trillion a year when taking into account climate adaptation and mitigation measures. Mitigation costs could amount to $200 billion annually, while adaptation costs are estimated at $41 billion a year, mostly for transport infrastructure.[26] ESCAP estimates that to upgrade the regional transport systems and construct missing links in the region's rail, road and intermodal network alone $126 billion is required.[27] Estimates from another recent study covering 53 ports in the Asia-Pacific region indicate that the cost for adapting these ports to future climate realities can range from $31 billion to $49 billion.[28]

Many Asian countries, such as the Republic of Korea, have already considered adaptation and mitigation strategies. These include, among others, changes in basic design parameters (for example, longer return periods of flood and higher freeboard), construction material specifications (higher concrete strength), higher factor of safety and higher design standards.[29]

Climate-adapted transport projects are already being promoted by multilateral development banks and other development actors, often with loans being contingent upon adaptation planning. The banks are also supporting technical assistance projects to develop climate-adapted resilient transport infrastructure design, and planning and mitigation strategies.[30] These considerations, however, need to be integrated into the national and regional transport planning processes. Further work is required to cover the resilience needs of critical routes in the regional networks, including the Belt and Road Initiative.

Investment needs, financing gaps and the private sector's involvement

Increased trade along the Belt and Road Initiative corridors will significantly boost demand for new transport infrastructure services. The International Transport Forum forecasts that by 2030, container traffic across the Belt and Road Initiative corridor countries will increase most in South Asia (193 per cent) followed by in South-East Asia (163 per cent).[31] The container traffic in 2030 in South Asia is projected to be 93 per cent higher than container port capacity in 2013, and 86 per cent higher in South-East Asia.[32]

The connectivity infrastructure needs are substantial in the Belt and Road Initiative countries. Average transport investment requirements to satisfy future mobility demand in Asia amounts to 0.53 to 1.3 per cent of GDP per year until 2030.[33] As mentioned earlier, ADB estimates Asia needs to invest $1.5 trillion per year until 2030.[34] The estimated requirements increase to $1.7 trillion per year when adjusted for climate resilience, which represents approximately 5.9 per cent of the region's GDP. Investments in transport represent 32 per cent of the requirements.[35]

The investment requirements by subregion and country vary considerably. The requirements as a percentage of GDP are higher than average for Asia and the Pacific (5.9 per cent) in Central Asia (7.8 per cent), South Asia (8.8 per cent) and the Pacific (9.1 per cent). The overall

[23] WMO (2019).
[24] ADB (2017).
[25] Dasgupta and others (2014).
[26] ADB (2017).
[27] ESCAP (2019, p. 22).
[28] McCarron, Giunti and Tan (2018).
[29] Further information on practices in other developed countries see https://www.fhwa.dot.gov/environment/climate_change/adaptation/publications_and_tools/international_practices/page05.cfm.
[30] For example, the ADB-supported Coastal Climate-Resilient Infrastructure Project in Bangladesh.
[31] International Transport Forum (2016).
[32] World Bank (2019a).
[33] Rozenberg and Fay (2019).
[34] ADB (2017).
[35] World Bank (2019, p. 31).

infrastructure investment requirements of India, including transport, increase to 8.8 per cent of its GDP when adjusted for climate resilience. In South-East Asia, it rises to 5.7 per cent, while in the Pacific the expected additional investment is the highest among the subregional, at 9.1 per cent of GDP.[36]

The Asian Development Bank has also estimated investment gaps in infrastructure development. For example, the estimated investment needs for a group of countries in South and South-East Asia is approximately 8.2 per cent of their combined GDP, but the current level of investment is about 3.2 per cent of GDP.[37, 38] The financing gap is, therefore, 5 per cent of GDP.

Large gaps between required and available funds are a major challenge for developing transport infrastructure in most the Belt and Road Initiative countries. To date, the majority of Initiative projects have been financed mainly by Chinese State-owned banks and State-owned enterprises, with limited private participation.[39] The State-owned banks and State-owned enterprises have the largest share in financing; they account for approximately 50 per cent of the Belt and Road Initiative projects and 70 per cent of the contract value of projects.[40]

Some new vehicles for financing also have been established. These include the Silk Road Fund by China, and the newly established multilateral Asian Infrastructure Development Bank. In addition to other multilateral banks, these new institutions are also supporting financing of the Belt and Road Initiative projects. In November 2014, the Government of China pledged $40 billion to establish the Silk Road Fund. In 2017, it announced an additional RMB100 billion contribution to the fund. As at the end of 2018, investment by the fund totalled approximately $11 billion.[41] The Asian Infrastructure Development Bank has a membership of 93 countries. It has approved $75 million worth of loans and leveraged other investments totalling almost $40 billion. The approved 35 projects are distributed in 13 countries, including, among them, Azerbaijan, Egypt, Indonesia, Oman, Pakistan, Tajikistan and Turkey.[42] Compared to State-owned banks and State-owned enterprises, financing by these institutions are limited.

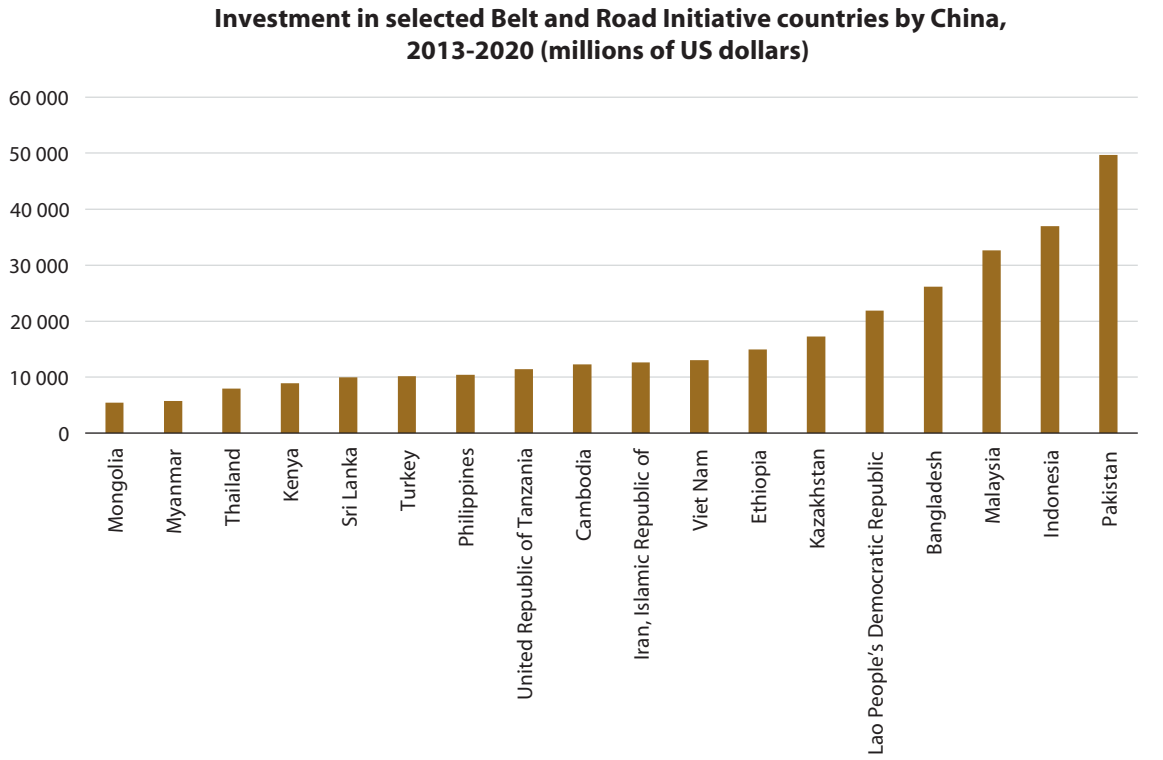
There is no single source from which investment data from all sources including by Chinese financing institutions, are available. For this , multiple sources have been used, including, among them, Reconnecting Asia of the Centre for Strategic and International Studies, and China Global Investment Tracker of the American Enterprise Institute. It may be mentioned here that the China Global Investment Tracker of the American Enterprise Institute is based on Chinese databases. Data used in this report also include various other sources, such as from the countries, regional and sub-regional development initiatives (GMS, for example), development banks and confirmed media reports. As finance from the Chinese sources has been the main source for most countries, tables and figures presented in this study are based mainly on data from the China Global Investment Tracker. Where applicable, data on investment from other sources have been used to complement information from the Chinese sources.

An analysis of investment in the Initiative countries by Chinese financing institutions since 2013 (when the Belt and Road Initiative was launched) is presented here. Figure 5.2 shows the total investment in selected Initiative countries between 2013-2020. Some of the countries that received the largest shares of the total investment are Pakistan, Indonesia, Malaysia, Bangladesh, Kazakhstan and the Lao People's Democratic Republic. Each of these countries received more than $15 billion of investment; Pakistan received the largest amount, $49.68 billion.

Total investment in selected countries by infrastructure sector is provided in figure 5.3. In the transport sector, some of the countries that received the large shares of investment are Pakistan, Indonesia, Bangladesh, Cambodia, Ethiopia, Islamic Republic of Iran, Kazakhstan, Malaysia, the Lao People's Democratic Republic, Sri Lanka and Thailand.

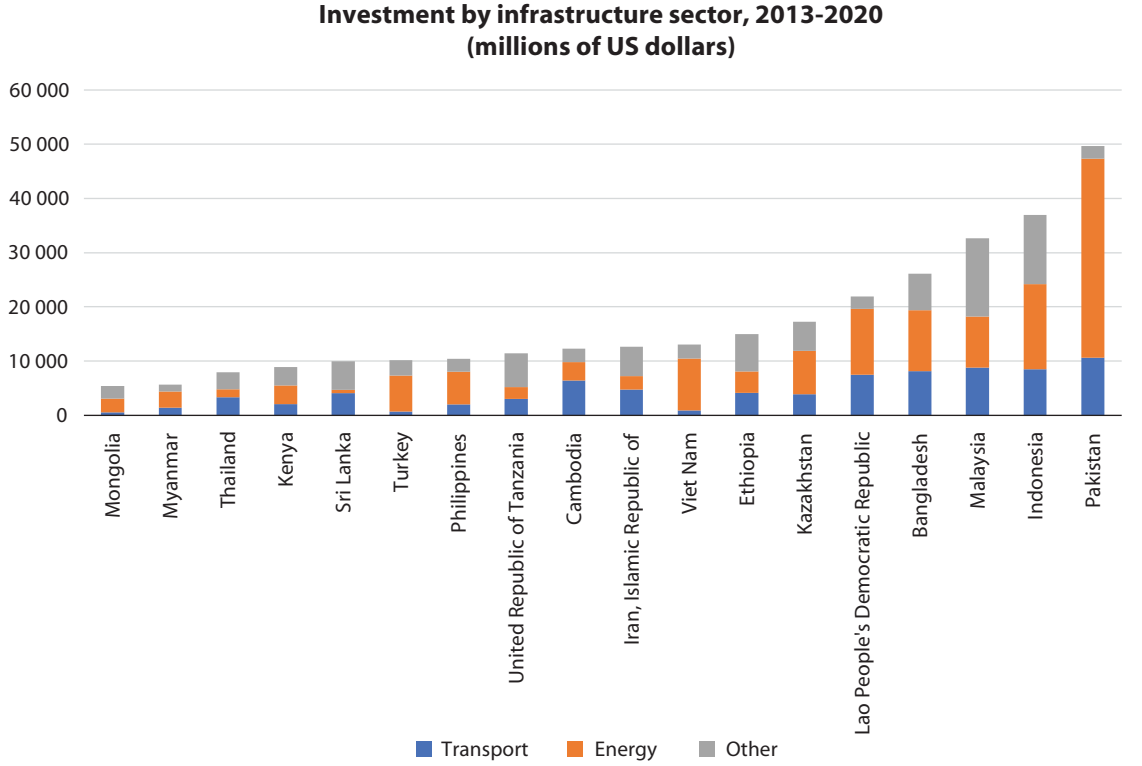
[36] (ADB, 2017, table 4.3).
[37] ADB (2017).
[38] ST/ESCAP/2832.
[39] Cader and others (2019), as mentioned in World Bank (2019a).
[40] OECD (2018).
[41] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).
[42] Ibid.

Figure 5.2. Investment in selected Initiative countries by China, 2013-2020



Data source: China Global Investment Tracker, American Enterprise Institute.
Source: China Global Investment Tracker, American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

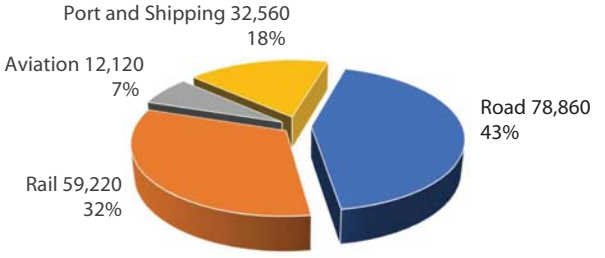
Figure 5.3. Investment in selected countries by infrastructure sector, 2013-2020 (millions of dollars)



Data source: China Global Investment Tracker, American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).
Note: Utilities, real estate, irrigation, technologies and, tourism, among others.

For the selected countries, the transport sector projects received some 26 per cent of the total investment between 2013 and 2020. For all countries, within the transport sector, investment in road projects received the highest share (43 per cent), followed by railways (32 per cent), port and shipping (18 per cent) and aviation (7 per cent) (figure 5.4).

Figure 5.4. Total investment in Belt and Road Initiative countries by transport subsector, 2013-2020



Source: China Global Investment Tracker, American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

Some developing countries, such as India, the Philippines, Thailand and Turkey, have been successful in implementing infrastructure projects through the PPP mechanism. However, more recent data suggest that globally, private investment in infrastructure has declined,[43] The same trend has been observed in Asian countries.[44] In most developing countries, only a small percentage of private-financed transport projects have been implemented. It is necessary to understand the reasons for the decline in private investment and what can be done to increase private participation in transport infrastructure. Given the limited success in implementing private-financed projects, most developing countries may need to explore alternative financing options, such as commercial borrowing by the government, issuing of bonds and other financing modalities that may be available.[45, 46]

In addition to arranging financing, the PPP mechanisms can help to overcome the limited delivery capacity of the public sector, and benefit from access to the private sector's efficiency and advanced technology. Progress in PPP development in most developing countries has been significantly constrained for various reasons, including, among them, lack of capacity in project development, implementation and contract management; practice of non-standardized processes and contract documents; and absence of national partnership programmes on local- or community-level infrastructure projects whose social return could be high.

A survey of PPP units in several countries was conducted by the ESCAP secretariat in preparation for the High-level Expert Group Meeting and the AMPC 2010 Conference in Jakarta in 2010. In that survey, officials of the PPP units and programmes in the region were requested to identify and submit up to ten "barriers to public-private partnerships" in their respective countries. The responses were grouped under the following headings:[47]

a) Lack of ownership of, and support for PPP programmes;
b) Lack of awareness or poor understanding about PPPs by politicians and decision makers;
c) Lack of capacity in the public (and private) sector (at the working level) concerning project development and implementation;
d) Absence or inadequate coverage of PPP legal regime or institutional framework;
e) PPP process not clearly defined;
f) Non-availability of model concession agreements;
g) Lack of public sector project development funds;
h) Difficulties in obtaining long-term finance;
i) No provision by governments of incentives, subsidies or viability gap funding;
j) Land acquisition difficult and time consuming;
k) Lack of coordination between central and local governments;
l) Contagion effects of domestic or regional economic and political environment.

These issues and other known issues may need to be revisited to understand the current PPP issues and consider how the PPP modality may be revived.

The main findings from this section can be summarized as follows:

- Large funding gaps in most Belt and Road Initiative countries for infrastructure development.

[43] Harris and Chao (2017).
[44] ESCAP (2017b).
[45] For other options see, Financing mechanisms for transport infrastructure and services can be found in Iwasaki (2018, pp. 421-445), and Hann and Mack (2005, pp. 299-324).
[46] See E/ESCAP/MCT/SGO/6.
[47] For the full list, see Information Paper 2, High-level Expert Group Meeting on Public-Private Partnerships for Infrastructure Development; 14 April 2010, Jakarta.

- China has established multiple financing organizations and funds. State-owned enterprises are playing a major role in financing; they account for approximately 50 per cent of Belt and Road Initiative projects and 70 per cent of the contract value of projects; other projects are financed mostly from other external sources, including development banks, such as the Asian Infrastructure Investment Bank, ADB and the World Bank.
- Financing of the Belt and Road Initiative projects to date is mainly provided by State-owned-banks and State-owned enterprises of China, with limited private investment.
- Only 4 per cent of private-financed projects have taken place in low-income countries.
- Globally, as well as in the ESCAP region, private investment has declined in recent years.

Corridor governance

Transnational corridor development and operation are complex because of their wide reach and scope, and the involvement of a large variety of stakeholders. Corridor management can be unique for various reasons, including, among them, the historical development of the corridor, initial conditions and political objectives and institutions in countries along the corridor.[48] As a result, several management structures have emerged, most of which are employed in Africa.[49] These structures are the following:

- Public-private partnership management structures, such as the Maputo Corridor Logistics Initiative for the Maputo Development Corridor;
- Consensus-building structure, such as the Dar-es-Salaam Corridor Committee for the Dar-es-Salaam corridor;
- Project coordination structure, such as the CAREC corridors in Central Asia;
- Legislative management structure based on treaties between countries, such as the Northern Corridor Transit and Transport Coordination Authority.

Some countries, such as India, Malaysia and Thailand, have also established national-level authorities to deal with corridor development issues. For Belt and Road Initiative corridors and routes, Pakistan has established the China-Pakistan Economic Corridor Authority for coordination of development in the Belt and Road Initiative corridor within Pakistan.[50] Some other governments have also established corridor management structures.

Most transnational corridor managements have a multilayer structure, including an apex and umbrella body, an executive and coordination committee, and a secretariat. However, the details of their structures and institutional arrangements vary. National corridors in India, and Malaysia also have multilayer management structures.[51]

There are major challenges in corridor development and management, especially relating to operationalization of the corridors and policy coordination for their development. The corridor management authorities and other intergovernmental platforms, such as ASEAN, CAREC, ECO and SCO, are facilitating movements in Asian corridors. Many of these platforms overlap with some Belt and Road Initiative corridor routes in part or in full. However, these arrangements fall short of a formal management authority, such as the case of the Northern Corridor Transit and Transport Coordination Authority managing the Northern Corridor running along Burundi – Democratic Republic of the Congo – Kenya – Rwanda – Uganda – South Sudan.

Transit transport is most heavily constrained by delays and costs incurred at border crossings. Time-consuming border-crossing and customs procedures, complicated non-standard documentation, poor organization and a lack of skills in the transport sector are some of the major contributory factors behind the delays and costs. Overlapping obligations brought about by several bilateral, trilateral and subregional agreements, and the lack of a harmonized legal regime for transit transport, including arrangements for transit fees, further compound the complexity of the transit transport process.[52]

Legal instruments, such as treaties, conventions, agreements, protocols, covenants, compacts, exchange of notes and memoranda of understanding, govern corridor management and operations. Legal instruments can be bilateral, covering two countries, or multilateral, covering many countries along a particular corridor, a subregion or region, or globally. A list of corridor governance instruments in Belt and Road Initiative are provided in annex 3.

[48] Arvis, Smith and Carruthers (2011).
[49] Adzibgey, Kunaka, and Charles (2007); de Matons (2014); Sequeira and others (2014); ADB, (2014a).
[50] See http://cpec.gov.pk/infrastructure.
[51] Quium (2019).
[52] See ST/ESCAP/2270.

Transport corridors in Asia operate mainly under bilateral or subregional agreements. Some 42 subregional agreements have been signed in Asia alone. However, only some of them are in force.[53] In recent years, many multilateral agreements have been signed to facilitate cross-border movements of goods by road, such as the Pakistan, Afghanistan and Tajikistan Trilateral Transit Trade Agreement and the Bangladesh, Bhutan, India-Nepal Motor Vehicles Agreement. In addition, negotiations are ongoing for a motor vehicle agreement to facilitate cargo movement along the India – Myanmar – Thailand Trilateral Highway. Notably, the positive aspects of these initiatives have yet to be felt because of difficulties associated with implementing them.[54] In addition, non-uniformity of these agreements remains a major challenge for region-wide trade and movement of traffic, as envisaged by the Belt and Road Initiative.

Inefficient facilitation arrangements at border crossings are a major deterrent to trade expansion. If countries were to exploit the full opportunity that that Belt and Road Initiative corridors provide, they would need to address the current inefficient facilitation arrangements at most border crossings along the corridors.

Belt and Road Initiative countries should seriously consider setting up governance structures for the corridors. These structures are needed to tackle issues related to corridor development and management, especially those pertaining to operationalization of the corridors and policy coordination for their development and promotion, and at the operational level, for managing the day-to-day operational issues along the corridors. Some progress has been made in this respect. The following are some of the recent developments:

- China has established the China – Kazakhstan Khorgos International Border Cooperation Center.[55]
- China and Pakistan have established the Joint Cooperation Committee for the China-Pakistan Economic Corridor; the Committee meets regularly.[56]
- Pakistan has established the China-Pakistan Economic Corridor Authority for coordination of Belt and Road Initiative development activities within Pakistan.
- The Establishment of the Joint Committee for the China-Myanmar Economic Corridor.
- The Establishment of the Program of China-Mongolia-Russia Economic Corridor in Tashkent in June 2016; the Program is supplemented by more than 30 cooperation projects in which more than 50 per cent of them are in the area of trade and transport facilitation and transport infrastructure.[57] In 2018, a working group was created for implementation of the Program.[58]

The main findings from this section can be summarized as follows:

- Several cross-border corridor management structures have emerged in Africa and Asia.
- Some segments of the Belt and Road Initiative corridors have formal governance structures (segments overlapping with CAREC corridors, for example).
- A few countries, such as Pakistan, has established a special authority to manage projects in the Belt and Road Initiative corridors and routes.
- A wide array of legal instruments governs corridor management and operations; most agreements are either bilateral or subregional.
- Non-uniformity of agreements is a challenge for region-wide trade expansion in Belt and Road Initiative countries.

Uneven distribution of Belt and Road Initiative impacts

Equitable sharing of resources, costs and benefits are important issues in sustainable development. The distribution of gains from the Belt and Road Initiative is expected to be uneven across different locations and

[53] ESCAP (2014b).
[54] See ESCAP/CTR/2018/1.
[55] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).
[56] Ibid.
[57] Программа Создания Экономического Коридора Китай – Монголия – Россия (=Program of Creation of the Economic Corridor China - Mongolia - Russia)' (Government of Buryat Republic) <http://minpromtorg.govrb.ru/rus-ch-mn.pdf>.
[58] Ministry of Economic Development of the Russian Federation, 'Россия, Монголия и Китай Создадут Рабочую Группу По Реализации Программы Экономического Коридора (=Russia, Mongolia and China to Establish Working Group on Implementation of the Program on the Economic Corridor)' <https://www.economy.gov.ru/material/news/rossiya_mongoliya_i_kitay_sozdadut_rabochuyu_gruppu_po_realizacii_programmy_ekonomicheskogo_koridora_.html>.

population groups. Many studies discussed earlier show that the results from the Initiatives are positive on aggregate, but they are unevenly distributed across countries, with some economies potentially losing from the infrastructure investment.[59]

In addition, the benefits of transport networks may be distributed unevenly across geographical areas and between segments of people within a country. Multiple studies show that some areas may even gain at the expense of other areas.[60] Counter measures are necessary to address these effects. Some of the problems of uneven distribution can be tackled through Belt and Road Initiative project design (complementary policy and investments in affected regions, for example). In addition, other counter-policy measures may also be necessary at national and regional levels.

Addressing the negative externalities

In the following discussion, various technical, economic and other improvement measures that can address the adverse effects of transport development on the environment and human welfare are considered. However, discussions on recent initiatives and establishment of various organized facilities and other arrangements to institutionalize, promote and support green development of the Belt and Road Initiative corridors are presented in chapter 6.

Negative externalities from transport development are expected, however their effects can be substantially reduced through various measures. Promising new technologies, such as perpetual pavement, new methods and techniques in highway design and construction, and different types of building materials can potentially reduce overall life-cycle costs of road and highway construction and maintenance. The use of perpetual pavement, for example, can substantially increase the life of asphalt pavements from 15 to 20 years currently to 40 to 50 years. Owing to the longer life of pavements and reduced need for maintenance, greenhouse gas emissions from the production of building materials and the construction and maintenance of roads are projected to be lower.[61, 62]

The replacement of existing concrete pavements by asphalt pavements is another area that deserves consideration when their replacement or rehabilitation is necessary. Compared with concrete pavements, asphalt pavements have a much smaller carbon footprint over their life cycle; for perpetual pavements the carbon footprint is even smaller.[63] Greater use of cold and warm mix asphalt, where possible, is another option to reduce carbon emissions from road construction.

Some standard road design measures can be considered; highways may be designed with minimal gradients and curvature, which can reduce vehicle operating costs resulting from less fuel consumption, and lower emissions and maintenance costs. The provision of overtaking lanes, where possible, on steep road sections to allow passing of slower vehicles can also reduce the adverse impacts of road transport on the environment. Measures, such as amending concrete specifications (by adding other binding materials, such as fly ash and blast furnace slug), and the use of low temperature asphalt concrete can reduce greenhouse gas emissions from the road sector.

Even though an environmental impact assessment is customary in most countries, further research may be necessary to guide the planning of transport infrastructure projects in environmentally sensitive areas. Other measures, such as price instruments (congestion and pollution charges, for example) and regulations (such as emission and fuel standards) are useful tools to change the behaviour of individuals and firms and address environmental externalities; some countries have applied these measures, however, the use of these tools, especially price instruments, is not common in developing countries. These tools should be considered to reduce the burden of negative externalities, where feasible.

Road safety is an important development issue in most of the Asian developing countries. Improvement in the quality of road infrastructure can reduce the burden of road traffic crashes. Although road safety is a cross-sectoral issue, evidence from multiple studies suggests that the incidence of road crashes can be cut substantially through road development with proper road safety audits at the road design stage (see chapter 7 for a further discussion). An analysis of the 2010 road safety data covering 34,370 km of highways in 23 countries, available in the Asian Highway database, clearly shows that the higher class of roads

[59] de Soyres (2018).
[60] Donaldson, 2010; ESCAP, 2012; Kumagai and others, 2013; among others.
[61] ESCAP (2013).
[62] See E/ESCAP/AHWG(5)/3.
[63] A study by the Asphalt Pavement Alliance shows 50-year life cycle CO_2 emissions for perpetual asphalt, conventional asphalt and concrete pavements as follows: 463; 500; and 1,610 tonnes/km, respectively (Asphalt Pavement Alliance, 2010).

are generally much safer than the lower class of roads.[64] As mentioned earlier, a recent analysis of road crash data by the ESCAP secretariat also shows that as the connectivity performance score of a country improves, the mortality rate from road traffic crashes decreases (see figure 3.4).

Detail design and complementary intervention

Apart from bringing efficiency in the overall transport process, Belt and Road Initiative corridor development can be instrumental in generating wider socioeconomic development in the corridor region. The development of transport and other infrastructure is essential but it may not be sufficient to generate wider economic benefits. Additional complementary interventions may also be required. For example, in the case of the Golden Quadrilateral Highways in India, non-availability of land for non-farm uses and low education and skills of the local labour force are viewed as the main constraints for wider sharing of socioeconomic benefits of the highways in some districts.[65]

The success of NH-5 highway corridor in Viet Nam is a good example of coordinated complementary interventions by the Government and a donor agency.[66] As a complementary intervention, China has established the China – Lao People's Democratic Republic Mohan – Boten Cross-Border Economic Cooperation Zone.[67] These examples also show that transport investments and complementary policies should be based on a better understanding of the underlying mechanisms and the initial conditions that may affect the development outcomes. While designing complimentary interventions, it is also important to consider measures which may be necessary to ensure social inclusion in terms of education, gender equality and empowerment of women. Otherwise, there is a risk that transport investments may not always produce the expected outcomes.

Development of corridor cities

Belt and Road Initiative corridors and networks can create agglomeration effects in some locations, especially in cities or centres with enhanced connectivity and other existing favourable factors, and natural endowment. These cities will have a crucial role in stimulating development along the corridors.[68] Consequently, they will experience much faster growth by attracting and generating new economic activities from new supply chains and production networks at national, regional and global levels, and attract higher level of education, health and other services. The economic growth effects, in turn, can have substantial physical, social and environmental impacts that would need attention.

The magnitude of the economic growth effects depends on, among other factors, location of a city relative to other countries, economic centres and gateway ports. It also depends on whether a city merely facilitates trade flows in the network or serves as a centre of new economic activities that produces inbound and outbound flows because of such activities. Cities that are not well connected in the Belt and Road Initiative network may not experience much positive impact.

To ensure more balanced spatial development in all regions, emphasis should, therefore, be placed on the improvement of weak transport links within the networks so that cities or economic centres along the weak links can be in a better position to generate new economic activities. However, enhanced connectivity alone may not be sufficient, further complementary policies and interventions also may be necessary to generate growth in these cities.

As the connectivity of cities improve, they will experience rapid growth and new opportunities for new economic activities will be generated. In order to open up these growth opportunities, new strategies for sustainable development of these cities will be required. In the context of the present study (limited to transport issues), this would mean sustainable transport development for these cities and the city regions. It should be noted in the pursuit of stainable development of cities, tackling growing congestion and air pollution problems is also important.

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[64] ESCAP (2014a).
[65] Roberts and others (2018).
[66] Melecky, and others (2018, pp. 50-54).
[67] Office of the Leading Group for Promoting the Belt and Road Initiative (2019).
[68] Derudder and others (2018) based on a connectivity analysis have identified such cities and examined their role in the corridor's economy. They have found that some cities in the Belt and Road Initiative countries +are well placed or connected to benefit most from the Initiative. The list of cities is the following: Novosibirsk; Irkutsk; Yekaterinburg; and Krasnodar (Russian Federation); Ulaanbaatar (Mongolia); Almaty; and Astana (Kazakhstan); Tehran (Islamic Republic of Iran); Istanbul (Turkey); Kabul (Afghanistan); Yangon (Myanmar); Kuala Lumpur (Malaysia); Bangkok (Thailand); Hanoi (Viet Nam); Singapore (Singapore); Rawalpindi; Bahawalpur; Islamabad; and Karachi (Pakistan); Dhaka (Bangladesh); and Kolkata (India). In China, the major nodal cities in the network are Beijing, Harbin, Urumqi, Kunming, Guangzhou and Shanghai.

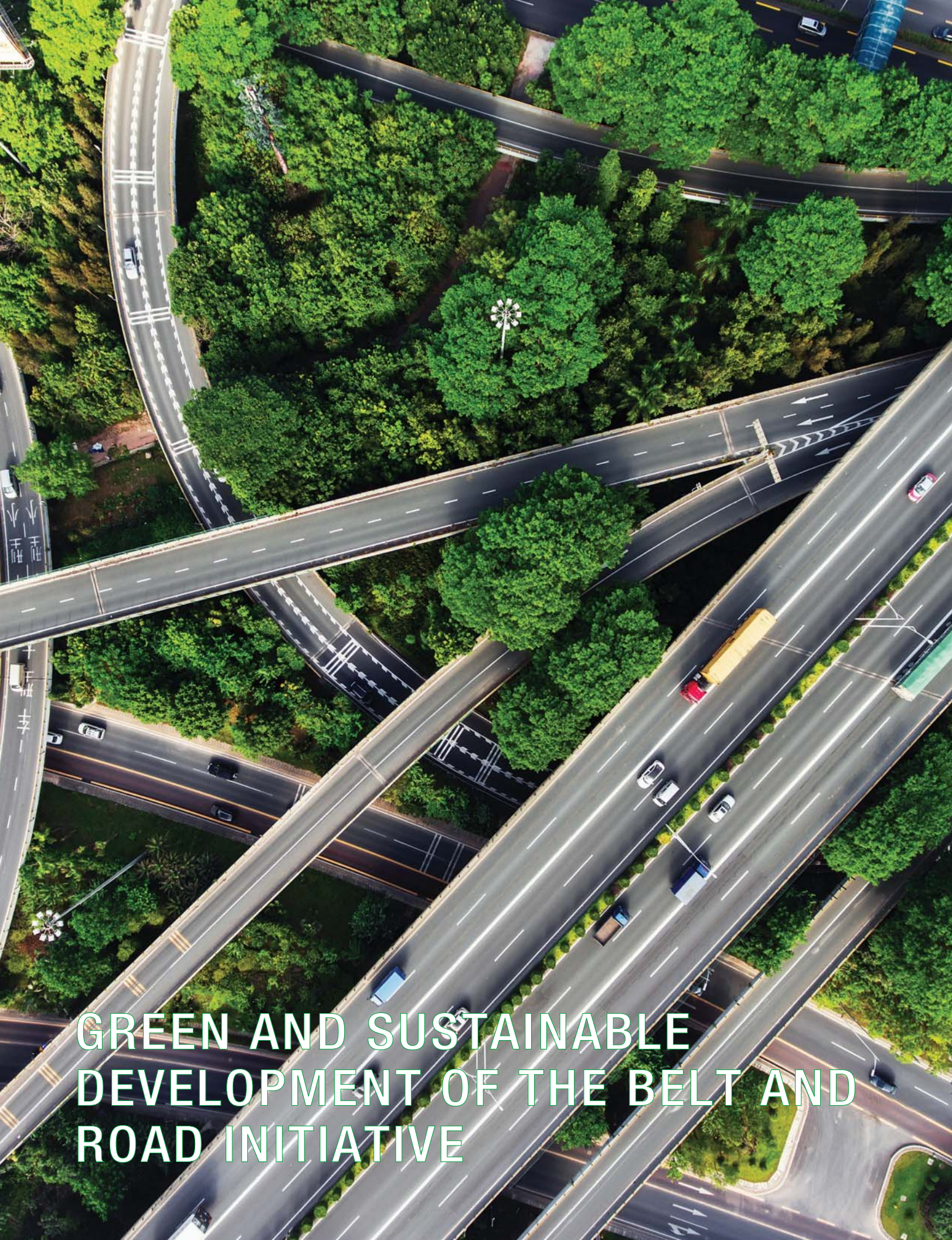
Rural-urban linkage

The establishment of functional linkages between local and rural communities and the urban and national economy by using major highways and railways is a major challenge. The direct benefits of major highways and railways to the rural population can be limited unless they are linked with a system of feeder roads that provide access to remote areas. In addition to rural feeder road networks, some countries have considered other complementary interventions, such as promotion of rural transport services, and, improvement of rural supply and distribution chains by establishing rural logistics and market centres and government service delivery points, such as for ICT, health care, education and training along the major transport networks.[69] These centres also serve as a direct market outlet for local produce, and generate non-farm local employment.[70] However, these initiatives are not widespread and do not follow a coordinated approach to establish effective rural-urban linkages.

The potential multiple roles of these centres make them suitable for use as important intervention tools to make highway networks directly supportive of more inclusive development in rural areas. Such centres can be designed to make them beneficial, especially for women and girls living in rural areas. Belt and Road Initiative countries may consider promoting such rural logistics centres along the highways in the corridors, and other important national highways. They may also consider promotion of rural transport services in areas where such services are not readily available.

[69] The post-harvest losses of cereal and other crops because of poor storage and transport is an important development issue for most developing countries. A large proportion of fresh food and vegetables is also lost on their way to market. The establishment of such centres can reduce such losses and increase the welfare of the rural population.

[70] *Michinoeki* (Japanese for a roadside station or centre) provides organized space as a rest and service area for travellers and space for various types of commercial, social and public services for the local community. There are about 1,000 such facilities in Japan. International development and funding agencies helped to establish such centres in many developing countries in Asia, including in Bangladesh, China and Thailand, and in Africa.



GREEN AND SUSTAINABLE DEVELOPMENT OF THE BELT AND ROAD INITIATIVE

6

GREEN AND SUSTAINABLE DEVELOPMENT OF THE BELT AND ROAD INITIATIVE

In this chapter, the significance of green and sustainable development in the context of the Sustainable Development Goals is highlighted. It includes discussions on the current initiatives on green development and the progress to date, and the direction of future work to support green and sustainable development of the Belt and Road Initiative. Finally, some suggestions are provided to support countries in their efforts to achieve their targets under the 2030 Agenda.

6.1 Green development and the Sustainable Development Goals

Any large infrastructure project comes with significant environmental challenges. These challenges are discussed in chapter 5. The Belt and Road Initiative is an infrastructure-led massive development programme, involving hundreds of infrastructure projects across all sectors. Invariably, for any such large-scale development programme, the environmental challenges are heightened many times and poses serious environmental risks if implemented without sufficient regard for sustainability (see box 5.1 in chapter 5).

As observed by the United Nations Environment Programme (UNEP): "In addition to the immediate biophysical impacts, if Belt and Road investments lock in unsustainable infrastructure, technology, and resource extraction, this will create long-lasting negative environmental consequences. These could, in turn, seriously undermine the ability of many countries to meet their targets under the 2030 Agenda for Sustainable Development".[1] Infrastructure projects have high capital costs and long-life spans. If developed without taking into account environmental risks, they will result in unsustainable high-carbon infrastructures for decades to come. Already a large number of projects has been implemented or are in advanced stages of development, many of which may have been developed without full considerations of the environmental risks.

The real risks of unsustainable and high-carbon infrastructure are acknowledged in various policy, cooperation and guidance documents on the Belt and Road Initiative issued by China. For example, the significance of green and sustainable development for the Initiative is emphasized in an official policy document of China issued in 2015.[2] In that document, the Government recognizes that "efforts should be made to promote green and low-carbon infrastructure construction and operation management, taking into full account the impact of climate change on the construction". To harmonize development plans and promote joint actions among countries along the Maritime Silk Road, China has released another policy document outlining the Vision for Maritime Cooperation under the Belt and Road Initiative.[3] These official documents spell out the broad goals of implementing the Belt and Road Initiative in a manner that preserves and enhances environmental quality while delivering economic development.

[1] See https://www.unep.org/regions/asia-and-pacific/regional-initiatives/belt-and-road-initiative-international-green.
[2] China, Ministry of Foreign Affairs (2015).
[3] China (2017).

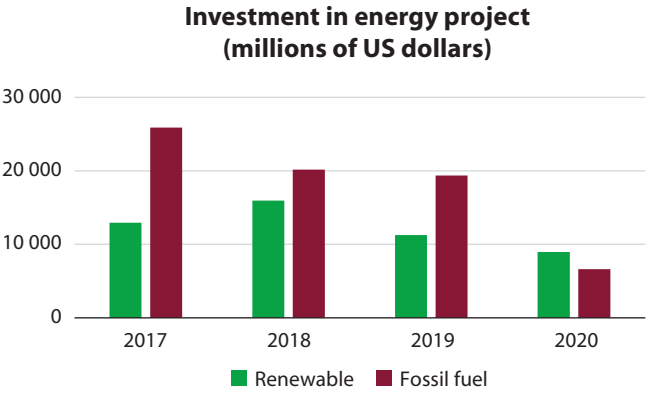
In addition to realization of the requirements for green and sustainable development, member States need to fulfil the commitments that they have stated in their Nationally Determined Contributions, prepared for and submitted to the United Nations Framework Convention on Climate Change (UNFCCC) pursuant to the Paris Climate Agreement.[4] The Nationally Determined Contributions demonstrate clear needs for green development of the Initiative; they can also serve as a logical reference point to assess the progress in attaining green development.[5] Failure to meet the Nationally Determined Contributions may seriously undermine the ability of the Initiative countries to meet their targets under the 2030 Agenda.

Nevertheless, any large-scale infrastructure development programme, if steered in the right path, also provides a golden opportunity to effectively deal with the adverse impacts on the environment and support sustainable green growth. Owing to the large scale of the Initiative, it becomes possible to consider, establish and support institutional, financial and other arrangements that can effectively reduce and/or eliminate adverse impacts of the projects of the Initiative on the environment, and create opportunities for unprecedented green economic growth in the Initiative countries. The Belt and Road Initiative thereby provides an excellent opportunity for a big-push towards developing a solid foundation for green economy.

6.2 Progress towards green development

Some progress towards green development is noticeable. The carbon intensity of the energy sector is among the highest of all sectors. In the recent years, between 2017 and 2020, Chinese overseas investment in fossil fuel power generation has declined; and for the first time, in 2020, investment in renewable energy (alternative and hydro) projects exceeded those in fossil fuel energy projects (figure 6.1). The share of investments in renewable energy (alternative and hydro) increased from 38 per cent in 2019 to 57 per cent in 2020.

Figure 6.1. Investment in energy projects, 2017-2020



Source: China Global Investment Tracker, The American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

It should be noted here that significant progress in renewable energy has been made not just in the Belt and Road Initiative countries, but also in other countries. Globally, more than 80 per cent of all new electricity installation in 2020 was renewable, with wind and solar accounting for 91 per cent of new renewables.[6] Access to clean, affordable and sustainable energy is necessary for achieving Goal 5 of the Sustainable Development Goals, which relates to gender equality and empowerment of all women and girls (see box 6.1).

Box 6.1. The Belt and Road and Sustainable Energy

Approximately 421 million people living in the Asia-Pacific region do not have access to electricity, and approximately 50 per cent of them still use polluting and unhealthy cooking fuels and technologies on a daily basis.[a, b] In addition, some 389 million rural residents in the region lack reliable access to energy sources and purified water.

Access to energy has a profound effect on people's well-being, increases productivity, and improves health, education and women's empowerment. Sustainable Development Goal 7 is fully dedicated to providing affordable, reliable and sustainable energy for everyone. However, energy is also an "intermediate" commodity, which enables the achievement of other Sustainable Development Goals, such as poverty alleviation (Goal 1) and reduction of inequalities (Goal 10). Without reliable, clean energy, the poor will remain poor, the sick will remain sick and education will remain unattainable for many rural

[4] See https://www4.unfccc.int.
[5] List of Nationally Determined Contributions are available at https://www4.unfccc.int.
[6] International Renewable Energy Agency (2021).

children. Reliable and sustainable sources of energy will make it possible to improve connectivity in the region and further develop ICT infrastructure, which will have a profound impact on economic and social development in the Asia-Pacific region. The Belt and Road Initiative can provide the region with sustainable clean energy through the implementation of its energy projects. These projects will not fully cover the region's need for clean energy, but they will substantially help in meeting the region's requirements and provide access to energy to millions of people.

For the Asia-Pacific region, the Belt and Road Initiative offers several energy projects, which will address the region's needs in energy. The project will also reduce dependence on solid fuels and through creating energy infrastructure and jobs, will lead to the overall rise of living standards. Diamer-Bhasa Dam and Suki Kinari Hydropower Project in Pakistan, Lower Se San Hydropower Dam in Cambodia and Nurek Hydropower Rehabilitation Project in Tajikistan are examples of the Initiative's energy projects, net in the Asia-Pacific region. As agriculture remains a central industry for many countries in the region, reliable sources of water and energy are essential for irrigation and other agricultural activities. Implementation of these projects will help boost agricultural productivity and incomes of rural residents.

Access to clean, affordable and sustainable energy is vital for gender equality and the empowerment of women. It reduces their household chores, which, in turn, allows them to dedicate more time to education and widen their employment perspectives. Reliable electricity sources will allow the poorest children to spend more time on studying after dark, increase productivity, help generate incomes for families in rural and urban areas and improve access to health services.

The rapid development of the Asia-Pacific region, economic growth, urbanization and growth of transport sector not only has highlighted the region's growing need in energy, but it also has significantly contributed to air pollution in the region and to climate change. The Asia-Pacific region emits more pollution than any other region in the world. Some 2.2 million out of the seven million of those who die from air pollution globally live in the Asia-Pacific region.[c, d] The main sources of pollution in the Asia-Pacific region are carbon emissions from fuel combustion, wastes burning, and haze from forests burnt for agricultural needs.[e, f] To ensure that the development will continue in a sustainable way and to reduce emissions, countries must transition from traditional fossil-based energy to renewable sources. Gulshat Solar Power Plant in Kazakhstan, the extension of the Tarbela power station with the new 1410-MW hydropower plant in Pakistan and Dawood Wind Power Farm, among others, are examples of the Initiative's energy projects in the Asia-Pacific region, which can help in the region's transition to use of renewable energy sources.

Consumption of sustainable energy will have a profound positive effect on health in the region. Currently, approximately 44 per cent of the population of the Asia-Pacific region are using unclean and inefficient fuels, such as kerosene, wood, coal or other solid fuels for cooking.* Use of kerosene, coal, dung or wood for cooking with open fire leads annually to almost four million deaths globally. These inefficient cooking practices are being used in rural and urban areas, result in air pollution, respiratory diseases and heart diseases. Women and children are particularly at high risk as, in many countries, women take primary responsibility for cooking. Fuel gathering also puts significant challenges on women and children, as often they are the prime collectors. Fuel gathering is time-consuming and limits the time that may be spent on more productive activities, such as generating income or studying. Access to clean energy can make cooking more sustainable, alleviate the already-mentioned problems and lead to an improvement in health, education, women's empowerment and poverty alleviation.

The energy projects of the Belt and Road Initiative can be a viable option for narrowing the gap in sustainable clean energy for the Asia-Pacific region and lay a foundation for the region's further transfer to the use of renewable energy. However, closer cooperation among all the stakeholders is crucial for the successful realization of the projects and debt management.

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* See https://www.unescap.org/events/clean-cooking-evidence-and-innovations-filling-gap.

[a] ESCAP (2017a).
[b] ESCAP (2018b).
[c] WHO (2018).
[d] Akhtar (2017).
[e] Asia Pacific Foundation of Canada (n.d).
[f] WHO (2018).

A noticeable change also can be observed in the transport sector. Notably, there has been a resurgence of railway projects in the Belt and Road Initiative countries. Rail transport is more sustainable than road transport because of its higher energy efficiency and smaller carbon footprint. In recent years, railway projects have attracted large investments; as a result, the share of investments in railways has increased. Between 2013 and 2020, while the overall share of investments in railways was 32 per cent, the share, on average, has been higher in the more recent years (table 6.1).

Table 6.1. Investment in railway projects in the Belt and Road countries by China in recent years

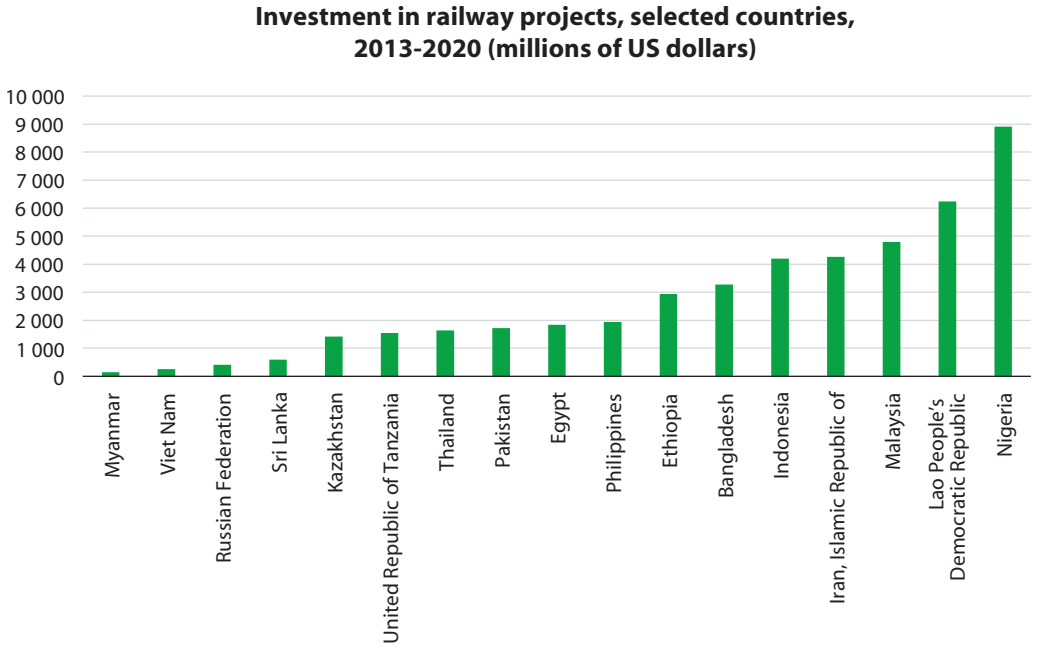
Year	Investment (millions of US dollars)		Percentage of investment in railways
	Transport sector	Railways	
2017	23 040	10 200	44.27
2018	34 180	13 580	39.73
2019	27 680	9 170	33.12
2020	14 640	8 120	55.46
2013-2020	182 760	59 220	32.40

Source: China Global Investment Tracker, The American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

As shown in figure 6.2, many countries, such as Bangladesh, Ethiopia, the Lao People's Democratic Republic, Indonesia, the Islamic Republic of Iran, Kenya, Malaysia, Nigeria, the Philippines and Thailand, have invested substantially in railway projects. It should be noted, however, that the size of total investment in railways in some countries (Bangladesh and Thailand, for example) is much higher than the amounts shown in figure 6.2, which covers investment only from Chinese sources.

Some of the railway projects are high speed railway link projects connecting China through the Lao People's Democratic Republic, Thailand and Malaysia to Singapore (Kunming – Singapore railway). A deal for the first 40 km segment of the China – Thailand High Speed Railway linking Bangkok to the border of Thailand with the Lao People's Democratic Republic was signed in 2020. The China – Laos railway line, a $4.6 billion 414 km electrified standard gauge line, is under construction in the Lao People's Democratic Republic. Another high-speed railway, a $6 billion 142 km project between Jakarta and Bandung in Indonesia is under construction. In 2020, Thailand signed an agreement with China to build a $1.62 billion segment of a high speed railway linking Bangkok and Nakhon Ratchasima.[7] In 2021, China and the Philippines signed a $940 million 71 km long freight railway project linking

Figure 6.2. Investment in railway projects by China, 2013-2020



Sources: China Global Investment Tracker, The American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

[7] Kishimoto (2020).

Subic Bay Freeport Zone and Clark International Airport and linking the country's North Railway Project.[8] In Bangladesh, China is involved in financing a $3.4 billion 172 km Padma Bridge railway link project with a loan of $2.76 billion. China is also involved in financing several other railway projects in Kazakhstan, Malaysia, Myanmar, Nigeria, the Russian Federation, the Islamic Republic of Iran, Singapore and the United Republic of Tanzania.

China has been involved in several railway projects in Africa; among them are a $3.4 billion standard gauge railway project connecting Addis Ababa in landlocked Ethiopia to Djibouti port city, and the $3.8 billion 480 km long Mombasa – Nairobi standard gauge railway in Kenya.[9] The new Mombasa – Nairobi railway operates double-stack container and passenger train services.[10]

China also invested in several urban rail transport projects, such as $900 million in a subway project in Hanoi, and a $1.6 billion metro line in Lahore, which opened in October 2020.

In addition to financing from Chinese sources, many large railway projects, financed from other external and own sources, are also being implemented. For example, Japan is financing a metro rail project in Bangladesh; Japan is also involved in financing the first high speed rail project in India. India and Thailand are investing heavily to upgrade their railway networks. India is developing several dedicated rail freight corridors, some of which will have port connectivity. These rail freight corridors are expected to significantly reduce carbon emissions from the transport sector (see section 5.2). In many countries the current modal share of railways is very low (see figure 5.1), but it will increase considerably after these projects are implemented.

The discussion so far has focused on actions within the transport sector in support of green and sustainable development. There also has been some remarkable changes in another sector that is expected to lower the demand for personal travel and thereby contribute to more sustainable development.

The COVID-19 pandemic has brought some positive changes, which have reduced the demand for transport services, especially personal travel, for example, work from home and substitution of in-person services by e-services. The pandemic has led to a surge in e-commerce and accelerated digital transformation. A recent report by UNCTAD indicates that "as lockdowns became the new normal, businesses and consumers increasingly 'went digital', providing and purchasing more goods and services online, raising e-commerce's share of global retail trade from 14 per cent in 2019 to about 17 per cent in 2020".[11] The economic slowdown has led to greater use of e-services, which, in turn, has created new opportunities for reducing transport demand. Digital transformation has an important place in the 2030 Agenda framework (box 6.2). As such, these positive changes should be retained as much as possible. There are, however, other ways to reduce transport demand, which are discussed in the previous chapter.

6.3 Current initiatives on green and sustainable development

Several initiatives have been launched that are aiming to improve the environmental, social and governance aspects of the Belt and Road Initiative. Below is a list of some of the most important ones:

- The Belt and Road Initiative International Green Development Coalition, initiated by the Chinese Ministry of Ecology and Environment and international partners;[12]
- UK-China Green Finance Task Force;
- Sustainable infrastructure finance and green funds
- Standardization and establishment of research institutes and networks.

The Belt and Road Initiative International Green Development Coalition

The Coalition on greening the Belt and Road Initiative was launched during the Second Belt and Road Forum for International Cooperation, which took place in Beijing from 25 to 27 April 2019. It is an open, inclusive and voluntary international network that brings together the environmental expertise of partners to ensure that the Initiative achieves long-term green and sustainable development to countries in support of the 2030 Agenda.[13] One of the main objectives of the Coalition

[8] XINHUANET (2021c).
[9] New China (2017).
[10] See https://www.maritime-executive.com/article/increase-in-cargo-at-mombasa-port-prompts-use-of-double-stack-trainsMuchira (2021).
[11] UNCTAD (2021).
[12] See http://eng.greenbr.org.cn/icfgd/aboutus/introduce/.
[13] See https://www.unep.org/regions/asia-and-pacific/regional-initiatives/belt-and-road-initiative-international-green.

is to integrate sustainable development into the Belt and Road Initiative through joint efforts and to facilitate participating countries to realize the Sustainable Development Goals related to the environment and development. Some 20 United Nations agencies, funds and programmes, 26 environmental ministries of the member States, and other partners are involved in the Coalition.[14] The Coalition is open to participation of government departments, local and international organizations, think tanks, private sector stakeholders and civil society organizations.

The secretariat of the Coalition is in Beijing. It provides the members a platform for the following:

- Policy dialogue, communication opportunities for stakeholder groups and forging joint research network to support policy recommendations for green development;
- Sharing knowledge, data, and analysis related to environmental issues, and capacity-building on environmental management and sustainable infrastructure development.

The Coalition's work is planned to be delivered through a biennial high-level round table for green development of the Belt and Road Initiative. Several thematic round tables on issues, such as international connectivity and cooperation, sustainable urban development, green urbanization, collaborative governance on climate and the 2030 Agenda and the High-level Roundtable on Nationally Determined Contributions and Short-Lived Climate Pollutants already have been organized.

The Coalition also considers a number of thematic partnerships comprised of coalition partners that can conduct research studies to support its work. The thematic partnerships are based on a wide range of topics related to green and sustainable development of the Belt and Road Initiative. In addition, other activities supported by the Coalition are research, seminars and workshops, pilot projects, capacity-building and outreach activities.

Many activities, such as research projects and meetings, relating to thematic partnerships in the areas of biodiversity and ecosystem management, renewable energy and energy efficiency, green finance and investment, improvement of environmental quality and green cities, South-South environmental cooperation and capacity-building for achieving the Sustainable Development Goals, green technology innovation and corporate social responsibility, sustainable transportation, global climate change governance and green transformation, environmental laws, regulations and standards have been organized. More details on the activities in these thematic partnership areas are given in a review published by the Coalition's secretariat.[15] In 2020, the Coalition published a guide on green development.

UK-China Green Finance Task Force

Green finance has the potential to be a powerful tool to promote and ensure green development. Green financing instruments, such as green bonds and carbon market instruments, can be developed and applied by traditional banks or special green financing institutions. The Green Task Force is a special alliance for the promotion of green financing and investment in the Belt and Road Initiative projects.

The Green Finance Task Force is led by the Green Finance Committee of China Society for Finance and Banking, and the Green Finance Initiative of the City of London. It is a special new investment group launched by green funding experts from the United Kingdom of Great Britain and Northern Ireland and China. The group brings together public and private initiatives in green finance. It promotes, analyses and initiates pilot projects offering environmental, social, and financial benefits. It is expected to support a sizable number of green infrastructure projects across Asia over the next few years.

The group, in collaboration with other stakeholders in green finance, developed the Green Investment Principle, a set of principles for greening investment in the Belt and Road Initiative. The Green Investment Principle was first published in London in November 2018. By December 2020, it expanded to 37 signatories, including among them more than 27 banks and financial institutions, and 12 supporters from 14 countries and regions around the world.[16]

Investments in green economy can be profitable in the long term and hold the promise of higher welfare compared with conventional investments. However, they are not yet attractive to traditional financing institutions. The Task Force hopes to ensure that the

[14] More details about the Coalition and its envisaged activities are available at https://www.unep.org/regions/asia-and-pacific/regional-initiatives/belt-and-road-initiative-international-green.
[15] Secretariat of BRI International Green Development Coalition (2019).
[16] See https://green-bri.org/green-investment-principle-gip-belt-and-road-initiative/.

projects it finances will be sustainable as well as profitable. In addition, the group aims to create a financial structure and assessment process for the relevant projects. This system would encourage private investors to commit funding alongside development banks – thereby maximizing investment in the Belt and Road Initiative projects.[17]

Coalition partners have carried out several research and other activities under the thematic partnership area of green finance and investment. The World Resources Institute has released a research report entitled "Moving the Green Belt and Road Initiative: from words to actions". The International Institute for Sustainable Development has developed tools for sustainable asset valuation, a tool that was applied and evaluated in Senegal. The PBC School of Finance at Tsinghua University had organized a symposium on the Green Finance Leadership Program (GFLP) in Africa and released the Green Investment Principle.

Sustainable infrastructure finance and green funds

Multilateral development banks have made a commitment to fund sustainable transport projects from their climate finance portfolio. They have agreed to provide financial and technical support to assist developing countries to achieve greater mobility and connectivity in a sustainable way. Eight multilateral development banks[18] (later on, two more multilateral banks joined the group) targeted to provide more than $175 billion of loans and grants for sustainable transport projects in developing countries between 2012 and 2022.[19]

The MDB Working Group on Sustainable Transport has extended more than $20 billion in 2016, $22 billion in 2017, and approximately $19 billion in 2018 of new funding for more sustainable transport projects, which, among other transport projects, included 49 railway and 44 inland waterways and maritime projects.[20] According to the latest available report of the multilateral development banks, the total climate finance by the banks in 2019 was $61.6 million. Of this amount, mitigation finance for the transport sector was $13.6 million. In the same year, total adaptation finance for all infrastructure, which included energy, transport and other built environment and infrastructure, was $3.8 million.[21]

The Green Climate Fund is a critical element of the historic Paris Agreement. The Fund is the world's largest climate fund, mandated to support developing countries raise and realize their Nationally Determined Contributions ambitions towards low-emissions, climate-resilient pathways.[22] Financing from the Fund can be used to leverage financing from other sources for the development of green and sustainable infrastructure. However, Green Climate Fund financing is not available for all types of infrastructure projects, but it may be considered for renewable energy projects and other climate resilient infrastructure projects.

Standardization and establishment of research institutes and networks

There are a many social, environmental and governance tools and frameworks designed to facilitate the application of best practices for infrastructure sustainability. Included among them are the following:

- SuRe® – The Standard for Sustainable and Resilient Infrastructure;[23]
- Dagong ESG Credit Rating methodology;[24]
- CHINCA ESG Guidelines;[25]
- Green Development Guidance for BRI projects.[26]

Despite the existence of these standards and other tools and frameworks, such as those developed by development banks on environmental and social impact assessment, their application or compliance for the Belt and Road Initiative projects is not known to be

[17] See https://www.treasurers.org/hub/treasurer-magazine/uk-china-team-pushes-worldwide-green-finance-growth.
[18] African Development Bank, Asian Development Bank, CAF-Development Bank of Latin America, European Bank, European Investment Bank, Inter-American Development Bank, Islamic Development Bank and World Bank. Later on, the Asian Infrastructure Investment Bank and the European Bank for Reconstruction and Development joined the group.
[19] This target is included in the Multilateral MDBs' Development Bank Joint Statement of 2012 during the United Nations Conference on Sustainable Development, also known as Rio 2012 (Rio+20).
[20] See https://www.adb.org/documents/progress-report-2016-2018-mdb-wg-sustainable-transport.
[21] 2019 joint Report on Multilateral Development Banks' Climate Finance; available at: www.ebrd.com/2019-joint-report-on-mdbs-climate-finance.
[22] See https://www.greenclimate.fund/about.
[23] See https://sure-standard.org/.
[24] See http://en.dagongcredit.com/.
[25] See 中国对外承包工程商会 (chinca.org).
[26] BRI International Green Development Coalition (2020).

widespread. However, one document provides an analysis of lending in energy and transportation projects over the period 2014-2017 based on data that are publicly available on lending by the major Chinese banks.[27] The authors find that most deals in energy and transportation were tied to carbon-intensive sectors and did not show alignment with the low-carbon priorities included in countries' Nationally-Determined Contributions.

There are several reasons for the lack of application of the available sustainability standards. One, for example, is that environmental and social safeguards are often treated as impediments to development goals for near-term economic development, especially when host country's planning for environmental and social protection and enforcement systems are weak. The other main reasons are lack of capacity of project planners and implementers, additional time and cost implications, lack of incentives for contractors to implement high environmental and social governance standards, lack of clarity as to what standards should apply to specific projects, diversity of projects and their complexities, and deficiencies in national legal and regulatory frameworks. These impediments need to be addressed to make the Initiative's projects compliant with sustainable development and environmental standards.

The Green Development Guidance for BRI Projects Baseline Study Report, published in late 2020,[28] is the most recent standard published and is backed by relevant Chinese ministries. As being very recent, the Guidance's application is yet to be found in practice. The objectives of the Guidance are to assist in formulating guidelines for assessing and classifying projects from the perspective of preventing ecological and environmental risks, provide green solutions for participating countries and projects, and support decision making for stakeholders. While the Guidance is excellent for providing a set of general guidelines, further work may be needed to make them more specific to cover individual host countries and for projects in different infrastructure sectors and settings.

Further to these initiatives, many research centres and institutes have been established to promote green and sustainable development in the Belt and Road Initiative countries and to facilitate, cooperate and collaborate in conducting joint research, capacity-building and technology transfer, and diffusion of information. Some of these research centres and institutes are the following:

- UK-China Green Finance Centre in London;
- Green Belt and Road Initiative Center in Beijing;
- One Belt-One Road Strategy Institute, Tsinghua University, Beijing.

The Green Finance Centre together with the Green Finance Task Force will work to support the Global Green Finance Leadership Programme;[29] harmonize green standards; demonstrate that green finance is cost effective; develop innovative green finance products; extend capacity-building at different levels; and support initiatives for investment in the green Belt and Road Initiative.

The Green Belt and Road Initiative Center is part of the International Institute for Green Finance of the Central University of Finance and Economics in Beijing. The Center provides research, analyses, policy engagement, capacity-building and intelligence on policies, economics, environment, sustainability and green finance for the Belt and Road Initiative. It works for and with many Chinese and global partners, including Chinese ministries, banks and research academies, United Nations organizations, the European Commission, ADB, universities and research organizations.[30] Knowledge products, reports and information related to Green Belt and Road Initiative activities and projects are available through the Center.

The One Belt-One Road Strategy Institute, Tsinghua University, Beijing was established to conduct in-depth studies on global, strategic and prospective issues during the implementation of the Belt and Road Initiative. The Institute holds scholar forums and the Chinese businessmen forums at regular intervals.

6.4 Alternative approaches for adoption of environmental and social governance standards for the Belt and Road Initiative

The adoption of appropriate environmental and social governance standards is vital for green and sustainable infrastructure development under the Belt and Road Initiative. Standards and assessment frameworks

[27] Zhou and others (2018).
[28] See https://green-bri.org/green-bri-development-guidance-puts-coal-in-negative-list/.
[29] See http://www.gflp.org.cn/.
[30] See https://green-bri.org/about-us/.

already exist – the main challenge is the uptake of the standards to support carbon-neutral infrastructure development. The existing standards and guidance, however, may need to be adapted to suit individual countries and projects. Several issues related to this are discussed in the preceding sections.

The adoption of environmental and social governance standards can follow several alternative approaches.[31] These include the following:

- Binding environmental and social governance frameworks;
- Building an international coalition for green development;
- Development and implementation of industry-led communities of practice.

The legal and regulatory framework of a country may require the following a set of binding environmental and social governance standards and performance standards for infrastructure projects. The performance standards may be sector or even subsector specific, as applicable. In terms of implementation, this approach is straightforward and reliable. Many countries already have established environmental and social impact assessment frameworks. However, some of them still need to update the frameworks to make them compliant with the new environmental and social governance standards to ensure more sustainable development and to implement the 2030 Agenda.

This approach has a major drawback, however. If followed from the beginning, there can be unintended consequences. Many developing countries have capacity constraints in the public sector to plan, develop and implement environmentally and socially sustainable projects. As a consequence, the number of projects implemented may become limited. In addition, for this approach to be successful, financing institutions' lending policy based on projects impact assessment need to be well developed. Except for multilateral development banks, this may not be the case for most other financing institutions.

The second approach – building an international coalition for green development – is more flexible and adaptive to the situation of an individual country. This approach is already in practice; an international coalition for green development has been established, as discussed earlier. This approach, a voluntary collaboration effort, is less effective than binding legal and regulatory requirements to meet the required green and sustainable development standards, but it can exert positive influence. Similar to the first approach, the success of this approach also depends on institutional capacity within the countries and the presence of strong advocacy groups.

As institutional capacity is crucial for the ultimate success of the Initiative, the International Coalition focuses on building institutional capacity on green sustainable development in recipient countries. If the host government has effective capacity, it is to align development objectives of a country with the prospects for a green and sustainable Belt and Road Initiative. However, developing institutional capacity and resolving associated governance issues in applying the institutional capacity takes time. Moreover, concerned officials may prefer to respond to near-term economic development and choose to ignore the potential negative environmental and social impacts of approved projects. Capacity-building can contribute to, but cannot solely be relied upon to deliver green and sustainable development; some form of imperatives and pressure from the citizens also need to be there.

Industry-led communities of practice is the third approach. This model could be developed and applied to one or more industries that have the major shares of the investment portfolio, such as transport and power generation, or that represent a lesser share of the portfolio but possess serious environmental threats. Such communities of practice can be developed, among others, to do the following:

- Making a commitment to take practical actions to limit climate change;
- Reducing greenhouse gas emissions and boosting resilience against future climate change impacts;
- Ensuring infrastructure is compliant with international sustainability standards;
- Collaborating to find and apply effective solutions for evaluation and mitigation of the environmental threats on a timely basis;
- Sharing of best practices without undue risk to the competitive interests of participating companies;
- Measuring and recording of results of actions taken;
- Building a system that allows external stakeholders to verify results, enhance public confidence in their action and environmental result.

[31] Elkind (2019).

Communities of practice can also assist in uptaking new technologies that already exist but are not widely applied or known to the participating partners.

A good example of such communities of practice is the Oil and Gas Climate Initiative, a voluntary organization of 13 companies that has considered practical actions to limit climate change.[32] These practical actions relate to achieving Sustainable Development Goal 13, which aims to combat climate change and its impacts. The Sustainable Sanitation Alliance (SuSanA) is a good example in the sanitation sector. The Alliance promotes "sustainable sanitation systems, which are economically viable, socially acceptable, technically and institutionally appropriate, and protect health, the environment and natural resources".[33] SuSanA is dedicated to achieving Sustainable Development Goal 6, which calls for water and sanitation for all.

There are also communities of practice for other sectors, including transport. For example, as discussed earlier, the commitment of the multilateral development banks for financing of sustainable transport projects from their climate finance portfolio.

Despite being the most environmentally friendly mode of transport, maritime transport also causes adverse effects to the environment. Global regulations have been formulated and measures have been taken to protect the air and marine environment. The Marine Environment Protection Committee of the International Maritime Organization (IMO) adopted a strategy that envisages reducing greenhouse gas emissions by at least 50 per cent by 2050 based on emission levels of 2008. To achieve this target, similar to the Oil and Gas Climate Initiative, a voluntary industry-led initiative of the major container shipping companies can be promoted. The initiative can work to find practical actions, including limiting and ultimately stopping the use of fossil fuels to achieve the greenhouse gas emissions target for the sector. A similar initiative for crude tanker companies may also be promoted to limit marine pollution.

These three approaches are not necessarily mutually exclusive. Instead, they may complement each other. For example, many countries, if not most, have in place an environmental impact assessment framework. However, the framework may not be aligned with their Nationally Determined Contributions or enforcement is weak. In such situations, the second and third approaches could be useful to meet the deficiencies of the existing framework. Institutional capacity development could help align the national framework with the Nationally Determined Contributions, which is critical for realizing the Sustainable Development Goals. Governments can also urge or require the existing operators or contractors to form industry-led communities of practice to find solutions to reduce the environmental footprint of the existing and future assets and plants to meet the targets of the Goals.

6.5 How development organizations can support countries

International and bilateral development organizations, in collaboration with United Nations organizations and relevant bodies, can support the broad goal of the International Green Coalition to integrate sustainable development, in particular environmental sustainability, international standards and best practices across the priorities of the Belt and Road Initiative.

Institutional capacity development on green and sustainable transport project planning, development and implementation in the public and private sector is expected to remain a major task for years to come. Development organizations, including ESCAP, can contribute to the work of the International Green Coalition by providing capacity-building in collaboration with other agencies and/or national centres in the region. Development organizations can also carry out policy advocacy to make legal and regulatory frameworks compliant with international sustainability standards.

Many new technologies, such as intelligent transport system, highway and pavement design standards, new materials and construction methods to reduce the environmental footprint of transport projects already exist, but they are not widely applied or known to the participating countries. Development organizations can support the uptake of such new technologies through diffusion of knowledge and capacity-building and, where possible, facilitating technology transfer.

[32] See https://www.ogci.com/.
[33] See https://www.susana.org/en/.

Box 6.2. Information and communications technologyand the Belt and Road Initialtive

Information and communications technology (ICT) is one of the central tools for economic growth and poverty reduction.[a] Development of ICT has an important place in the Sustainable Development Goals framework and is instrumental for raising living standards in the Asia-Pacific region. ICT provides needed infrastructure for the achievement of the Sustainable Development Goals. Goal 9 target 1 and C pertain directly to ICT, but other goals and targets can be achieved only through stronger use of ICT. One of the targets under Goal 4, for example, requires countries to expand educational opportunities in ICT. Goal 5 target B requires Member States to "enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women" (see A/RES/7/1). The global COVID-19 pandemic has highlighted the importance of a strong ICT infrastructure for education and the reduction of poverty through e-commerce and global inclusion. However, the development of the modern ICT infrastructure may be unattainable for developing countries. The Digital Silk Road aspect of the Belt and Road Initiative is, accordingly, vital for building resilient ICT infrastructure in the Asia-Pacific region.

The Digital Silk Road is intended to develop ICT connectivity among the member States and has the potential to positively affect economic development and poverty reduction in the Asia-Pacific region. It complements the Belt and Road Initiative, significantly affects logistics and connectivity and has profound social implications. Automation of custom procedures through the Digital Silk Road information technology can improve logistics, cut delays and promote seamless cross-border trade between countries. The Digital Free Trade Zone between China and Malaysia (part of the Belt and Road Initiative) is a successful case, which shows how the effective implementation of Digital Silk Road can significantly improve trade between countries, lead to job creation and provide stable income to people in the region. Resilient ICT infrastructure and a wider spread of electronic payment systems will also allow for safer circulation of remittances sent by international labour migrants.

Investment in ICT infrastructure can promote economic growth and poverty reduction in the Asia-Pacific countries. Studies show that for every 10 per cent increase in high-speed Internet connections, there is a 1.3 per cent increase in economic growth.[b] Accordingly, development of ICT is essential not only for better connectivity in the region but also for reducing inequalities. As a part of the Digital Silk Road, the next-generation cellular networks and data centres will be built across the Asia-Pacific region, and faster Internet connectivity will be achieved through laying fibre optic cables. As a part of the Initiative, Tashkugran, a small town in the autonomous region of Xinjiang, China, was fully electrified and telecom infrastructure was built there. Connectivity has also brought e-commerce to the city. Further implementation of the Digital Silk Road will result in the narrowing of the digital gap. It will also help create educational and economic opportunities and reduce inequalities in the Asia-Pacific region.

Information and communications technology infrastructural investment through the Belt and Road Initiative will translate into wider implementation of ICT for education, which will ultimately result in better educational opportunities for students in the Asia-Pacific region. The current global pandemic has led to the blanket comprehensive use of distant education and turned it into a widespread practice globally. Minding the dynamics of how countries use online education more widely, there are reasons to believe that large-scale online education will continue to be used even after the end of the pandemic. Accordingly, that would require further development of the ICT infrastructure. The Digital Silk Road offers a viable option for many developing countries in the region.

Strong ICT infrastructure could broaden the window of opportunities for people and make their employment less dependent on their physical location. Studies show that e-commerce can alleviate poverty in rural areas and create employment for low-and-semi-skilled workers, women and other population groups.[c] Statistics show that the household income of rural residents involved in e-commerce is 80 per cent higher than for those who do not engage in commercial transactions over the Internet. Moreover, e-shop workers have wage levels equal to or higher than workers in urban private industries.[d]

Accordingly, modern and sustainable ICT infrastructure of Digital Silk Road can positively affect social development in the Asia-Pacific region and help in achieving several of the Sustainable Development Goals. To make this project successful, closer cooperation among the stakeholders is vital.

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* See https://www.miti.gov.my/miti/resources/Media%20Release/Fact_Sheet_DFTZ_at_Malaysia_Digital_Economy_2018_SME_Fact_Sheet.pdf.

[a] ADB (2013).

[b] Khalil and others (2009).

[c] World Bank (2019b).

[d] Ibid.

RAMIFICATIONS OF THE COVID-19 PANDEMIC – A NEW CHALLENGE TO THE BELT AND ROAD INITIATIVE

7

RAMIFICATIONS OF THE COVID-19 PANDEMIC – A NEW CHALLENGE TO THE BELT AND ROAD INITIATIVE

The focus of this chapter is on countries' response to the effects of the COVID-19 pandemic on the transport sector. It includes an assessment of the factors that may reshape the Belt and Road Initiative and a discussion on the lessons learned and the pandemic implications for the future work of ESCAP relating to the transport sector.

7.1 Introduction

The COVID-19 pandemic is a human tragedy, which also has had devastating impacts on the global economy. The pandemic outbreak has badly affected more than 200 countries and territories. As of 24 April 2021, globally, there were more than 145.2 million confirmed COVID-19 cases and more than three million related deaths.[1] In addition to the devastating blow to public health and human well-being, economies of the pandemic affected countries have been badly ravaged.

To contain the spread of the coronavirus, many countries have remained under repeated lockdowns or imposed various forms of restrictions for months. Production facilities were closed for a considerable period of time. In many parts of the world, domestic and international transport systems, especially air transport and ports remained paralysed or shut down for a prolonged time. The land transport borders between some countries remained closed or partially closed for months. As a consequence, the production and supply of commodities, including medical, food and other essentials, have been badly disrupted.

To grapple with the pandemic crisis and its ramifications, countries have taken various urgent measures, including declaring a health emergency, launching stimulus packages to revive the economy and providing livelihood support for the affected people. To recover from the adverse impacts of the pandemic, it is anticipated that countries will be taking different steps in the coming years. As a result, there may changes in development priorities, which may affect previously planned programmes and projects. Likewise, businesses affected by the disruptions in production and supply chains may consider various options to avoid or minimize such disruptions in the future. The change in national policies and priorities and business practises may affect the Belt and Road Initiative activities, which pose new challenge to the Initiative.

7.2 Effects on transport systems and policy response of governments

Transport and travel have been directly affected by the pandemic due to restrictions on movement and social distancing. Other than directly affecting the travel and tourism industry and the related sectors, businesses have suffered because of abrupt disruptions in supply chains. In addition to the closure of production facilities, disruptions in supply chains can be attributed primarily to lockdowns, new controls and quarantine measures at border posts, ports and airports, and shortage of domestic and international transport services.[2]

[1] See the WHO website: https://covid19.who.int/.

[2] For example, in the first quarter of 2020, 16.5 per cent of international container routes from the eight major ports of China did not have any vessels running (Lang, 2020). As reported in the *Economist*, 21 per cent of transpacific container-sailings in May 2020 had been cancelled (Economist, 2020).

During the crisis, countries have issued new policies on trade and transport regulations without warning or consulting their trading partners. They also have implemented partial or complete closure of border crossing points and introduced new requirements at the borders, which severely affected cross-border flow of goods, including supply of essential commodities. Consequently, transported goods were in short supply or not available in destination countries for quite some time.

The road transport industry and the press reported cases of severe bottlenecks at the borders in all subregions. This can be attributed primarily to new controls or quarantine measures imposed on the transport crew, particularly truck drivers, sea crews and other transport personnel. Cargo congestion at ports and airports were also reported. As a result of the national lockdowns, there were extensive delays in claiming of cargoes by consignees and cargo owners.[3]

Nevertheless, after the initial shock, countries have considered various measures to keep the supply lines open, including acceleration of the flow of essential supplies through their ports, airports and border posts. The European Union, for example, has taken urgent measures to keep borders open for the smooth passage of freight traffic. As an alternative to air and sea freight services, countries have also introduced additional rail freight services. Some of these measures are discussed in this chapter.

Many countries have implemented emergency measures to minimize the disruption of medical and other essential supplies as well as general cargo. The pandemic prompted the acceleration of innovation and digitalized facilitation of transport processes. Several countries have introduced priority lines (so called "green lanes") and accelerated customs procedures for essential goods, started accepting electronic documents, piloted new automated and digital technologies, promoted contactless processing and delivery and many other measures. Many countries have introduced emergency trade and transport measures to ensure and accelerate the flow of essential commodities through their ports and land borders, including along the Initiative corridors. Table 7.1 shows the special measures that some economies have implemented.

Table 7.1. Policy Response to Coronavirus Pandemic: Transport Connectivity in Asia and the Pacific

Economy	Policy response/special measure
Azerbaijan	Introduced a special quarantine regime (until 31 May 2020). It includes border closures, restriction on domestic movements; closure of airports, and transportation hubs; social distancing, and disinfection of public spaces.
Georgia	Within the frames of the measures to prevent the spread of the COVID-19 virus, movement of freight vehicles through the customs checkpoint at the Georgian-Azerbaijani border (including transit and rail freight traffic) is ensured according to the specially developed protocol in a 24-hour regime.
China	Fast clearance of anti-epidemic supplies. For imported supplies, all local customs are required to open exclusive counters and green lanes 24/7 to ensure fast clearance of imported pharmaceuticals, disinfection supplies, protective suits, treatment equipment and other supplies to be released without delay. For exported supplies, green lanes are provided 24/7 to minimize the clearance time. Transport facilitation measures taken include removing all road tolls (including for bridge and tunnels) across the country for all vehicles, until the pandemic ends; putting in place a no-stop, no-check, toll free policy for vehicles transporting emergency supplies and essential personnel and cutting operational costs of international air cargo, including exemptions from the civil aviation development funds and reduction of airport charges and air traffic control. Passenger airlines are also encouraged to turn passenger planes into all-cargo freighters for carrying out freight transportation to make up for the shortage of air freight capacity amid the escalating pandemic.
Russian Federation	Launch at the customs "green corridor" for food and non-food essential goods to be procured by large trading networks and importers); a headquarters has been set up at Russian Railways to provide operational support to shippers and ensure coordination of all links in the transport chains in the context of preventing and eliminating the spread of new coronavirus infection; Temporary exemption from weight control of vehicles, carrying essential goods and temporary cancellation restrictions on the movement of such vehicles and their loading and unloading within the city limits.

[3] Philippines Port Authority (2020).

Table 7.1. *(continued)*

Economy	Policy response/special measure
Singapore	The Singapore-Malaysia Special Working Committee agreed that the transport of all types of goods between Malaysia and Singapore would be facilitated during the duration of the Movement Control Order set by Malaysia. As such, those conveying essential services, or supplies (such as lorry drivers, vegetable supply truckers and, frozen supply truckers) via land and sea crossings will be exempted from the entry approval and quarantine set by the Ministry of Manpower ("Stay Home Notice" (SHN)) requirements.
Uzbekistan	The Government set up an operational headquarters to ensure expedited passage of goods through border customs posts, their uninterrupted customs clearance and the issuance of permits for exported and imported goods. It also introduced, starting from 1 April 2020, a mechanism for customs clearance of imported food products in an expedited manner, including by issuing permits before the goods arrive in Uzbekistan. A software has been developed on the website of the Uzbekistan Temir Yollari JSC for processing and providing preliminary electronic information to customs authorities on goods transported by rail.
Hong Kong, China	Reduction and partial suspension of cross-border transport and border control point services, including suspension of transit services at Hong Kong International Airport.
Kazakhstan	The Government is promoting green corridors for road freight movement of medical and socially-significant goods. The authorities have taken drastic measures to prevent the outbreak, including the closure of borders with China, border restrictions with Kazakhstan and Uzbekistan, a quarantine of people coming from abroad, a lockdown of all non-essential activities, and a curfew.
Malaysia	Special measures were introduced for transporters of essential services, or supplies, such as trucks carrying vegetable supplies or frozen supply, through land and sea crossings.
European Union	Member States to designate, without delay, all the relevant internal border-crossing points on the Trans-European Transport network (TEN-T) as a "green lane" border crossings. (should be open to all freight vehicles, whatever goods they are carrying) and; procedures at green lane border crossings should be minimized and streamlined to what is strictly necessary. Controls on "green lane" inland border crossings should not exceed 15 minutes, including health screening of transport workers. For transiting freight trucks, some countries are using a convoy system. For rail freight, trains and drivers are changed at some borders.

Sources: ESCAP (2020); International Transport Forum (2020).

To restore the supply lines after the initial disruption, countries have taken measures to increase transport services through their borders. For example, after recovering from the initial shock, the first container train left Wuhan, a production hub in China, for Germany with medical supplies and intermediate goods. According to the Ministry of Commerce of China, freight trains between China and Europe increased by 15 per cent to 1,941 and the number of containers transported increased by 18 per cent to 174,000 in the first quarter of 2020. For the whole year, a record 12,400 China-Europe freight train trips were made, a 50 per cent increase from the previous year. The trains transported 1.14 million TEUs of containers in 2020.[4]

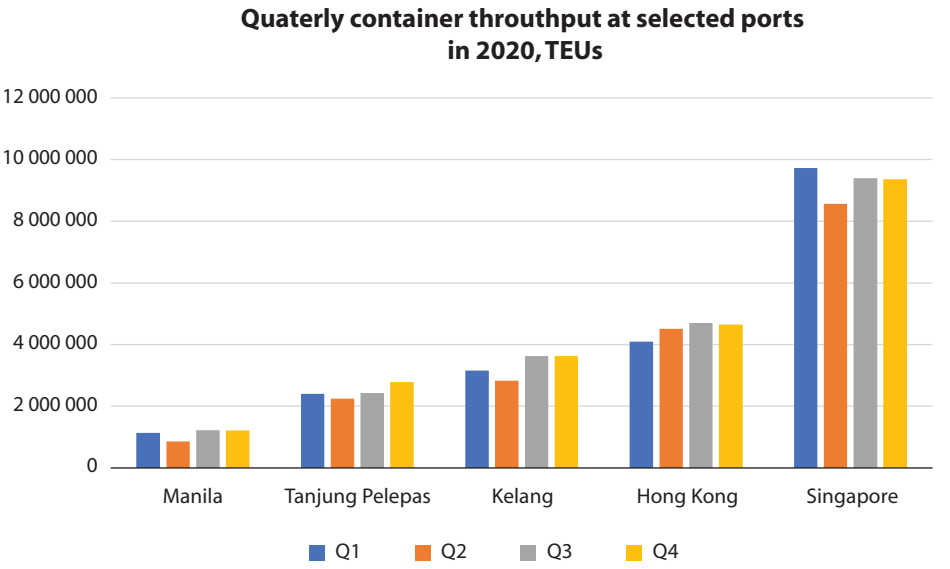
Most of the policy measures introduced by countries exempted essential commodities and, in some cases, the general freight movement. These measures helped to ease the situation, but not necessarily enough for freight transport to flow freely across national borders.[5]

Effects on port throughput

Port operations in China were severely affected in the initial months of the pandemic outbreak. In the first quarter of 2020, 16.5 per cent of international container routes from the eight major ports of China did not have any vessels running.[6] As reported in the *Economist*, 21 per cent of transpacific container-sailings in May 2020 had been cancelled.[7] As the pandemic outbreak spread to other countries, port operations in other countries also were affected. Port operations gradually started to recover after the initial shocks as indicated in figure 7.1, which shows the effect on quarterly container throughput at some major ports in 2020.

4 XINHUANET (2021a).
5 ESCAP (2020)
6 Lang (2020).
7 Economist (2020).

Figure 7.1. Quarterly container throughput at selected ports 2020, twenty-foot equivalent unit



Source: Compiled by the author from official sources.

The pandemic outbreak affected economic activities in most countries. Consequently, their port traffic also decreased; many ports experienced a decline in traffic, including, among them, Chittagong, Colombo, Dubai, Hong Kong port, Kelang, Maputo, Singapore and Tanjung Priok. In China, the traffic at most ports recovered to the levels of the previous year. Notably, ports in Viet Nam experienced an overall growth of port traffic.

7.3 Impacts of the COVID-19 pandemic on the economy

The pandemic started as a health crisis, but soon it evolved into an economic crisis. To contain the spread of the virus and save people's lives, governments introduced various forms of restrictions including lockdown and social distancing which led to the shutdown of production facilities, offices, businesses and events as well as operation of transport services. The closure of production and processing facilities, and disruptions in domestic and international transport operations severely affected global supply chains and economic activities.

The International Monetary Fund (IMF) predicted the global economy would contract by 3 per cent in 2020.[8] An assessment by ADB suggests that the global economy could suffer between $5.8 trillion and $8.8 trillion in losses – equivalent to 6.4 per cent to 9.7 per cent of global gross domestic product (GDP).[9] Global employment is expected to have declined between 158 million and 242 million jobs, with Asia and the Pacific accounting for 70 per cent of total employment losses. Labour income around the world will decline by $1.2 trillion to $1.8 trillion – 30 per cent of which will be felt by economies in the region, or between $359 billion and $550 billion. An estimate by the World Trade Organization (WTO) suggests that world trade is expected to fall by between 13 per cent and 32 per cent in 2020 as the pandemic disrupts normal economic activity and life around the world.[10]

In a January 2021 press release, the World Bank mentioned that the global economy is growing again after a 4.3 per cent decline in 2020.[11] Many developed countries as well as major developing countries, such as India, the Philippines and Thailand, recorded significant negative growth in 2020; only a few developing countries, such as Bangladesh, China, Indonesia and Viet Nam managed to report modest growth; China reported real GDP growth of 2.3 per cent in 2020 – the lowest level in many decades. The overall outlook for 2021 is brighter compared to 2020. A projection by IMF shows that global growth will be at 6 per cent in 2021 and moderate to 4.4 percent in 2022.[12]

[8] IMF (2020).
[9] ADB (2020).
[10] World Trade Organization (2020).
[11] World Bank (2021).
[12] IMF (2021).

Early indications suggest that the incidence of poverty is expected to increase in many countries.[13] An estimate by the World Bank suggests that the COVID-19 pandemic will push an additional 88 million to 150 million people into extreme poverty in 2020.[14] The decline in trade and employment and the anticipated increase in poverty are likely to affect all sectors of the economy. In some areas, such as air transport, it may take a few years to return to the pre-pandemic level.

The anticipated increase in poverty incidence may undermine the efforts of some countries in achieving the targets of many of the Sustainable Development Goals, especially Goals 1 (no poverty), 2 (zero hunger) and 3 (good health and well-being).

7.4 Effects on infrastructure investment in the Belt and Road Initiative countries

Table 7.2 shows infrastructure investment in recent years by China in the Belt and Road Initiative countries. The total investment was highest in 2018, at approximately $118 billion, lower in 2019, at approximately $103.5 billion, and declined to $46.5 billion in 2020, about 54 per cent lower than in 2019. Investment in transport was highest in 2018, but investment in other sectors was slightly higher in 2017 than in 2018 (figure 7.2).

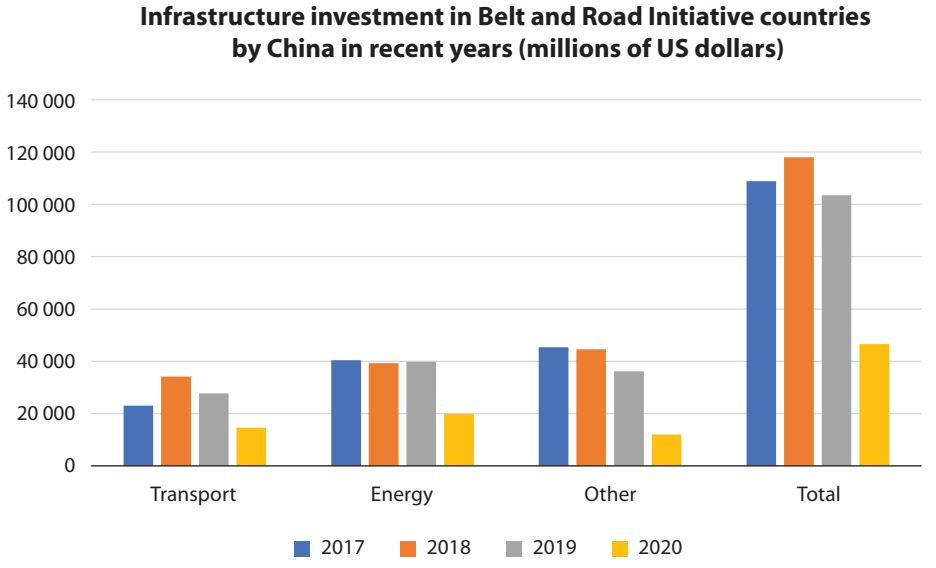
Table 7.2. Investment in recent years by China, 2017-2020 (millions of dollars)

Year	Transport	Energy	Other infra-structure	Total invest-ment
2017	23 040	40 600	45 410	109 050
2018	34 180	39 280	44 520	117 980
2019	27 680	39 700	36 100	103 480
2020	14 640	19 930	11 970	46 540
Total	99 540	139 510	138 000	377 050
Per cent	26.41	36.98	36.61	100.00

Sources: China Global Investment Tracker, American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

Only in a few countries, such as Viet Nam and Thailand, investment in the Belt and Road Initiative increased in 2020 compared to 2019. This decline in investment in 2020 could be due partly to the effects of the COVID-19 pandemic. Other reasons for the decrease could be that the Chinese financing institutions have become more cautious in lending. Nonetheless, the decline in investment is not limited to overseas investments by China. A recent study published by ESCAP analysing foreign direct investment (FDI) flows into the Asia-Pacific region indicates that they declined from about $300 billion in 2019 to approximately $100 billion in the first nine months of 2020.[15] The declining trend in FDI appears to be more general in nature.

Figure 7.2. Infrastructure investment by China, 2017-2020 (millions of US dollars)



Data source: China Global Investment Tracker, The American Enterprise Institute.

[13] For example, in an analysis, the Centre for Policy Dialogue, Bangladesh found an increase of national (upper) poverty rate in Bangladesh to 35.0 per cent in 2020 from 24.3 per cent in 2016 (Khatun and others 2020).
[14] World Bank (2020).
[15] ESCAP (2021).

7.5 Post-COVID-19 world scenario

The impacts of the pandemic on public health, trade, economy, supply chains and other aspects of life will become clearer in the coming years. Such impacts may also affect current national and regional development initiatives in many ways, including the Belt and Road Initiative, At this stage, it is difficult to make any objective analysis of how the Initiative will be affected in the post-pandemic world. This depends on the post-pandemic world economic and political order that may be reshaped by business factors, geopolitical tension between influential countries, new policies on trade and transport regulations, travel and migration and other economic factors.

The present study includes a review of the opinions of leading experts, economists, analysts, practitioners, academics and diplomats[16] on how various factors, such as trade, economy, business and diplomacy may be reshaped in the post-pandemic world. Their opinions were published in recent editions of well-known economic, trade and foreign policy periodicals and journals. This study also includes reviews of reports by development banks, international organizations and multilateral forums on the likely impacts of the pandemic on trade, economy, and other aspects. Three short scenarios on the post-pandemic world are constructed considering the reviewed expert opinions and analyses presented in the recent reports of international and multilateral organizations.

Scenario 1: End of pre-pandemic globalization – a poorer, meaner and smaller post-pandemic world

The COVID-19 pandemic will strengthen the state and reinforce economic nationalism. The flow of people, trade and capital will be slower. Doubts about pre-pandemic global supply chains, the safety of international travel, and concerns about national level self-sufficiency in necessities and resilience are all likely to persist.[17] Consequently, as Shivshankar Menon has put it, "A poorer, meaner, and smaller world" may come to exist.[18]

The pandemic will politicize travel and migration and lead to a push towards self-reliance. Economic nationalism will increasingly lead governments to shut off their own economies from the rest of the world. As Adam Posen has argued that this will not produce complete autarky, or anything close to it, but it will worsen the pre-existing conditions of the world economy.[19] In the words of Stephen Walt: "In short, the COVID-19 pandemic will create a world that is less open, less prosperous, and less free. It did not have to be this way, but the combination of a deadly virus, inadequate planning, and incompetent leadership has placed humanity on a new and worrisome path".[20]

Scenario 2: Globalization survives with some unavoidable change

The pandemic will not bring an end to globalization but some changes will be unavoidable,[21] due to business, economic and other factors, including partial relocation of supply chains away from China to low-cost countries in South-East Asia and South Asia. Economic recovery may take place in two to three years with some adjustments. In a few years, much of the economic, nationalist rhetoric at the height of the outbreak will go into oblivion and the broader objectives of the Belt and Road Initiative should not be significantly affected in the longer term. Adjustments and change in priorities for activities of the Initiative will be unavoidable, however.

Some structural change in the economy will also take place. The share of services in the economy will continue to rise, but the share of in-person services will decline in many sectors – retail, hospitality, travel, education, health care and government, as the drive for digitalization changes the way these services are organized and delivered.[22] Furthermore, allowing more people to work from home would be a positive step towards building a green economy.

Digitalization of the economy will be expedited. As Laura Tyson observed: "The sudden dependence on the ability to work, learn, conduct businesses and provide services remotely reminds us that a significant and inclusive expansion of Wi-Fi, broadband, and other infrastructure will be necessary to enable the accelerating digitalization of economic activity".[23] Such changes in structure of economies would require adjustments in future projects and activities of the Belt and Road Initiative.

[16] Joseph E. Stiglitz, Robert J. Shiller, Gita Gopinath, Carmen M. Reinhart, Adam Posen, Eswar Prasad, Adam Tooze, Laura D'Andrea Tyson, and Kishore Mahbubani FP (2020).
[17] FP (2020).
[18] Ibid.
[19] FP (2020).
[20] FP (2020).
[21] Du and Delis (2020).
[22] FP (2020).
[23] Ibid.

Scenario 3: An Asian century – shift in power and influence

The world economy is increasingly Asia-centric and will be moving even more swiftly in that direction.[24] The pandemic will accelerate the shift in power and influence from West to East.[25] It will accelerate a change that had already begun: a move away from the United States-centric globalization to a more China-centric globalization.[26] A new world order will gradually evolve affecting all spheres of life – economic, social and political.

At this stage, it is difficult to comprehend if this new order were to happen anytime soon, or how this new order might unfold in each sector in the long run and how it might influence future policies of Belt and Road Initiative countries and the Initiative itself.

The likely case

Although the first and third scenarios remain possibilities, most of the expert views reviewed believe the second scenario is the most feasible; that some changes are unavoidable but the pandemic will not bring the end of globalization which would severely affect the Belt and Road Initiative.

In 2019, Baker McKenzie and Silk Road Associates modelled five Belt and Road Initiative scenarios for the 2020s.[27] These scenarios offer distinct outcomes based on various key geopolitical trends. Scenario 2, discussed above, fits more closely with the "Supply Chain Relocation Model" of Baker McKenzie and Silk Road Associates. In this modelled scenario, the Belt and Road Initiative infrastructure projects can mobilize an estimated $1.06 trillion. The trade tensions would lead to the partial relocation of manufacturing away from China, including by Chinese companies, to low-cost countries in South-East Asia and South Asia. In this scenario, the inflow of manufacturing will return to interest in infrastructure investments in these countries to support the production relocation.

According to this modelled scenario, the key investment sectors would be power, railways and manufacturing. However, the pandemic effects can bring some changes to this overall scenario, such as higher investment in the digital economy. In the long-run, economic factors in China will also lead to changes in the nature of project activities as well as policies of the Initiative.

The rest of the discussion in this chapter and in the last chapter are based on the assumption that scenario 2 as outlined above, generally will hold. Also discussed is why scenario 2 would be the likely case.

7.6 Future of global supply chain and the Belt and Road Initiative

The potential for increased volume of trade among member countries is a major driver of the Belt and Road Initiative (see section 4.2). Among other factors, the volume of trade between Initiative countries is linked to a global supply chain involving China. As such, the future of the Initiative is tied to the future of the global supply chain for finished products and intermediate goods originating in China and other Belt and Road Initiative countries.

Doubts about pre-pandemic global supply chains, the safety of international travel, and, at the national level, concerns about self-sufficiency in essentials and resilience of supply are all likely to persist – even after the pandemic is brought under control. The effect of the pandemic also can politicize future travel and migration and push towards self-reliance. Some countries have recognized the need to become more self-sufficient and would like to reduce dependency on other countries for essential supplies and bring everything on-shore or closer to home.

Given the current structure of cross-border production chains, some of the top 20 countries or blocs in Chinese supply chain for intermediate goods in industries that can be affected most by disruptions are India, Indonesia, the Republic of Korea, Malaysia, Pakistan, the Philippines, the Russian Federation, Singapore, Thailand, Turkey, Viet Nam and the European Union. Other countries among the top 20 countries are Bangladesh and Cambodia, however they will be affected to a much lesser degree.[28] The majority of the Belt and Road Initiative countries would be much less affected by any disruption if the Initiative's transport routes were to be made more resilient against any abrupt disruptions – natural or otherwise.

[24] Khanna and Kirkland (2019). Why the future is Asian. McKinsey and Company, 24 May. Available at https://www.mckinsey.com/featured-insights/asia-pacific/why-the-future-is-asian.
[25] FP (2020).
[26] Ibid.
[27] See https://www.bakermckenzie.com/-/media/files/insight/publications/2019/09/bm_bri_infographic_m.pdf?la=en.
[28] UNCTAD (2020a).

China is a global manufacturer of finished products and consumer goods, and intermediate goods. Any disruption in the country's output is expected to have repercussions elsewhere through regional and global value chains. Firms that are part of global supply chains have witnessed the risks inherent in their interdependencies and the losses caused by disruption. These firms would like to rely on supply chains that are less global and more local and robust. The disruption of international trade may also prompt international businesses to diversify their production across several countries.

The arguments against any major changes, however, are resounding. The self-sufficiency proponents ignore the "strength of a robust and geographically diverse global supply chain".[29] Also, as the *Economist* argues, a trading system with an unstable web of national controls cannot be more humane or safer.

Many supply chain analysts, experts and business owners hold the view that production facilities and supply chains are difficult to pull apart in the short term. They may have far greater specificity than may be apparent. Because of the sheer size of its production facilities, China has been able to leverage economies of scale and build a vertically integrated value chain in all sectors.

This view is also echoed in a web post of the World Economic Forum. Global supply chains are extremely complex, and follow the principle of efficiency. Businesses source the best possible inputs to meet their production needs at the lowest cost – wherever those inputs come from. The Forum argues "while efficiency remains the main target, businesses will continue to shop globally".[30]

In addition, there are several other reasons. An efficient supply chain also requires quality transport and logistics services. China offers integrated infrastructure, such as large ports and highways, top quality labour and sophisticated logistics, all of which are critical factors to meet the strict deadlines set for the operations of international companies. The logistics performance and liner shipping connectivity of China compared with its potential competitors suggest that China has a clear advantage over them (see figures 3.16 and 3.17 in chapter 3).

China is also a member of major trade blocs. For example, China is a member of the new Regional Comprehensive Economic Partnership of 15 countries, which, when it comes into force, will form the largest trading bloc in the world; China has already ratified the agreement.[31] Recently China and the European Union have finalized the Comprehensive Agreement on Investment (CAI).[32] These agreements, after coming into force, will further strengthen the trade and investment relationship between member countries of the Initiative and China. As one analyst has pointed out "being connected in trade agreements institutionally is as important as offering competitive prices".[33] In addition, it should be noted that China itself is a huge market for investors.

The majority of the Belt and Road Initiative countries are neighbours or near neighbours of China. The Initiative's land transport routes serve many of these countries, which do not have serious economic or political issues that could undermine the future of the Belt and Road Initiative. Moreover, many of them are landlocked countries and are heavily dependent on trade and transit with China and other nearby coastal countries through the Initiative's land routes. The land routes also provide an alternative to sea and air transport between Asia and Europe. As mentioned earlier, a record 12,400 China-Europe freight train trips were made in 2020 to maintain essential supplies, which shows that the Belt and Road transport corridors have established a firm trading relationship between some major countries or blocs.

Concerns about overreliance on complex global value chains are justified in the case of products related to national security, such as medical supplies. Many countries can now produce such goods without relying on imports. Alternative sources of supply will also emerge. For example, Bangladesh did not produce personal protective equipment, masks and ventilators before the outbreak of the pandemic. Now it is exporting these products, including to the United States.[34] It may be noted this was not necessarily attributed to a shift in a supply chain from another country to Bangladesh but instead, the result of product diversification by local companies.

It is not possible to predict when the next pandemic may erupt. Therefore, shifting a production facility or

[29] Sur (2020).
[30] Boo, David and Simpfendorfer (2020).
[31] Kunyi (2021).
[32] Moak (2021).
[33] Inamdar (2020).
[34] The Daily Star (2020).

supply chain from one country to another may not make them any more resilient. As the Economist argues: "The way to make supply chains more resilient is not to domesticate them, which concentrates risk and forfeits economies of scale, but to diversify them. Moreover, a fractured world will make solving global problems harder, including finding a vaccine and securing an economic recovery".[35]

7.7 Pandemic implications for the Belt and Road Initiative

As a whole, the Initiative may not be affected much in the long term, but some changes are inevitable in the short term, for example, investment priorities between different sectors and even within the same sector. In the transport sector, for example, the priority could be to make the transport corridors resilient against any abrupt disruption rather than in new infrastructure. Because of business and other factors, there can also be a change in investment priorities among the Initiative's corridors. Some businesses may be relocated from China mostly to some other country of the Initiative. Such relocations are also expected to take place over a longer term due mainly to economic factors in China.

The pandemic has encouraged many multinational corporations to shift production to Viet Nam and other ASEAN countries, a trend that is likely to continue as these countries are members of multiple Free Trade Agreements, such as the ASEAN Comprehensive Investment Agreement, ASEAN Trade in Goods Agreement, and the recently signed Regional Comprehensive Economic Partnership. Consequently, the trading pattern and investments in corridors may change. However, as a trade analyst has observed these new production hubs do not mean the entire industrial chain will have shifted to ASEAN, rather they would become an extension of the industrial chain in China. Many of these factories still will require raw materials, equipment, expertise and technology from China.[36]

Some inevitable impacts on the ongoing projects in the short term may be expected because of the absence of migrant Chinese workers and local lockdown effects in host countries. The International Economic Affairs Division of the Ministry of Foreign Affairs of China conducted a survey to assess the impact of the pandemic on the progress of ongoing projects. Table 7.3 shows the nature of such effects on the ongoing projects.

Table 7.3. Percentage of projects affected by the pandemic

Degree of affect	Per cent of projects affected
Somewhat affected	30-40
Adversely affected	40
Seriously affected	20

Source: Reuters (2020).

Investment in the Belt and Road Initiative may be affected in the short term because of reduced availability of Chinese capital, as a large majority of the projects are funded from Chinese sources (see chapter 5). Many lower-priority projects could be put on hold, delayed, scaled down or even cancelled. An analysis by the World Economic Forum suggests that the need for resources to fix the post-coronavirus domestic problems of China will likely divert attention and resources away from the Initiative for a short period of one to two years. This may reduce investments into smaller, less critical markets in which there are limited opportunities to connect such investments to global supply chains. Accordingly, Central Asia, sub-Saharan Africa and Eastern Europe may experience a short-term decline in the Belt and Road Initiative-related activity, relative to South-East Asia.[37]

The demand for transport in a corridor is linked to volume of trade between countries in that corridor. UNCTAD estimates that the volume of international maritime trade will decline by 4.1 per cent in 2020.[38] Despite the disruptive effects of the pandemic, trade of China with the Belt and Road Initiative countries, was not much affected in 2020. In fact, the volume of trade increased with some countries and subregional group of countries (table 7.4). For example, the ASEAN bloc has become the largest trading partner of China in 2020.[39] There has been a sharp increase of trade, especially with Indonesia and Viet Nam. Another noticeable change in international trading is that China has become the largest trading partner of the European Union in 2020.[40] Trading of China with most other major

[35] Economist (2020).
[36] Medina (2020).
[37] Boo, David and Simpfendorfer (2020).
[38] UNCTAD (2020b).
[39] Medina (2020).
[40] XINHUANET (2021b).

Table 7.4. Bilateral trade with top trading partners of China, 2020 (billions of dollars)

Country/block	Trade volume 2020	Increase over 2019 (per cent)
ASEAN countries	684.60	6.7
European Union	649.53	4.9
United States	586.72	8.3
Japan	317.54	0.8
Republic of Korea	285.26	0.3

Source: Global Times (based on data released by the General Administration of Customs, China).

Belt and Road Initiative countries is expected to remain either unaffected or even increase in the future.

In the view of the current trend and ongoing trade and political tension between some countries, many analysts believe that in the post-pandemic period, greater focus will be directed to greater regional trade integration among ASEAN, China and North Asian countries. Since 2018, Chinese companies have been boosting their investments in South-East Asia due to their strong supply chain linkages with China. As a growing number of Chinese and North Asian countries seek to build capacity across South-East Asia and protect against the risks of supply chain disruption, investments in transport and other infrastructure in the subregion Asia will benefit from these increased trade flows within the subregion.

Table 7.5 shows infrastructure investment in selected ASEAN countries by China. Despite an overall reduction in investment by China in 2020, investments in some ASEAN countries (Viet Nam, Lao People's Democratic Republic and Thailand) have increased. For the same set of countries, figure 7.3 shows investment in the transport sector by subsector. In addition to investment by China, ASEAN countries are also receiving considerable investment flows from other bilateral donors and development banks. A separate list of some of the projects financed from other external and internal sources are provided in table annex 2.2 in the annex.

The current trend of development and pandemic effects suggest increased activity in the China – Indochina Peninsular Transport Corridor; the corridor (involving the land routes) may transform into an economic corridor. The China – Pakistan Transport Corridor should also become an economic corridor over time. Except for the Bangladesh – China – India – Myanmar Corridor, the other three corridors are expected to operate mostly as transport and transit corridors linking China and Central Asian countries with the Russian Federation, Western Europe and West Asia. It is difficult to indicate how activities in the BCIM corridor may unfold. The China – Myanmar part of the corridor, however, may operate as a transport corridor with moderate flows of activity.

An assessment noted in a World Economic Forum web posting indicates that generally the quality of activities of the Belt and Road Initiative would improve in the longer term, owing to greater participation of the private sector and foreign companies, and the Initiative's closer alignment with global supply chains. The assessment also suggests potential for accelerated digital activity, and the private sector's more active participation in the Initiative.[41] Business factors and trade tensions could lead to the partial relocation of some manufacturing

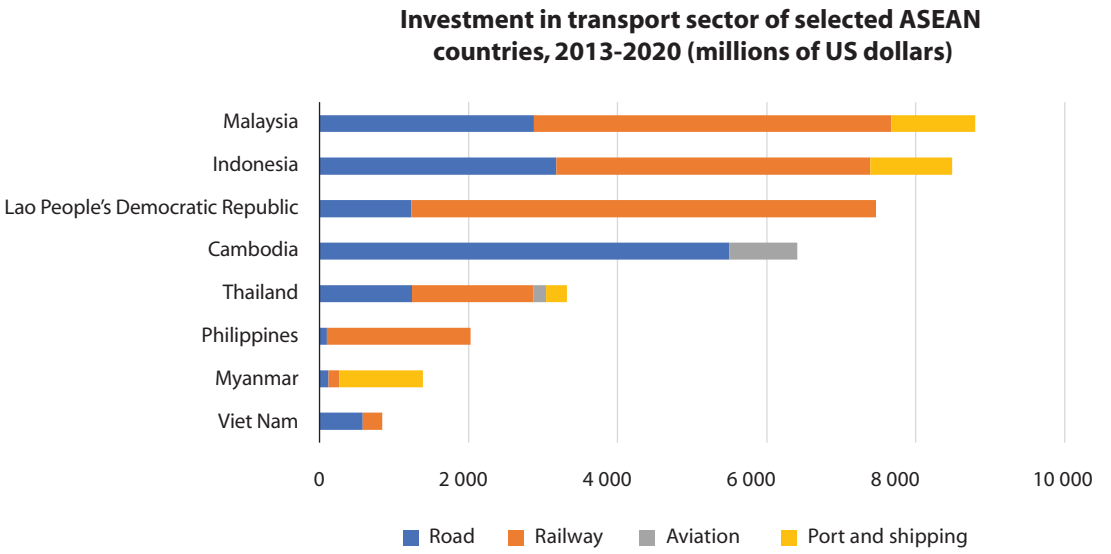
Table7.5. Infrastructure investment in selected ASEAN countries by China (millions of dollars)

Country	Total, 2013-2020	Recent years			
		2017	2018	2019	2020
Viet Nam	13 000	1 500	1 010	1 350	4 170
Thailand	7 940	590	1 320	710	1 640
Indonesia	36 950	3 590	5 550	7 280	3 750
Philippines	10 430	1 780	1 200	3 320	1 450
Malaysia	32 670	5 790	1 770	1 530	140
Lao People's Democratic Republic	21 890	1 110	7 420	350	1 340
Cambodia	12 260	1 170	3 100	4 300	1 580
Myanmar	5 700	130	1 610	360	280

Source: China Global Investment Tracker, American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

[41] Boo, David and Simpfendorfer (2020).

Figure 7.3. Investment in transport sector of selected ASEAN countries, 2013-2020



Source: China Global Investment Tracker, American Enterprise Institute (https://www.aei.org/china-global-investment-tracker/).

away from China to low-cost countries in South-East Asia and South Asia.[42] Nevertheless, the Belt and Road Initiative objectives should not be significantly affected over the longer term. Most importantly, the political commitment of China to the Belt and Road Initiative has remained unchanged.[43]

7.8 Lessons learned

Freight distribution is an important issue during pandemic or other emergency situations. Even during the peak of a pandemic, there is a need to ensure that that the food and medical supply chains and humanitarian logistics functions effectively. The production and delivery of medical supplies, including vaccines, also closely depend on the state of the global and regional supply chains and freight logistics.

Several lessons can be learned from the pandemic and response of the countries to grapple with the pandemic effects. These lessons are important for considering future activities of ESCAP involving the Belt and Road Initiative and reshaping the Initiative by its stakeholders in the public and private sectors.

Uncoordinated actions taken by countries suggest the need to put in place cooperation mechanisms to deal with coordinated emergency responses and minimize disruption in supplies. The transport systems need to be more resilient to moderate the risks of any disruptions caused by pandemic or any other natural or manmade disasters. Standard protocols across corridor countries need to be set in the event of any emergency so that regular flows of freight traffic and emergency supplies can be maintained quickly and as smoothly as possible. Countries have taken various steps for this purpose. These steps may be reviewed, assessed, standardized and then adopted by the countries. Shared controls and protocols, common contingency plans to deal with emergencies, norms, and treaties must be pursued to moderate risks of disruptions.

Digitalization can vastly improve the trade and transport facilitation processes at borders both in normal and emergency situations. The digitalization drive needs to be continued for further improvement of the cross-border processes.

Land transport systems, in addition to its role in normal times, can offer a viable alternative to the usual transport services by sea and air. Rail transport services in the Belt and Road Initiative corridors have been found to be more resilient than road transport and accordingly, rail transport development should be prioritized.

[42] See https://www.bakermckenzie.com/-/media/files/insight/publications/2019/09/bm_bri_infographic_m.pdf?la=en.

[43] Chinese Foreign Minister Wang Yi on Sunday (24 May 2020) assured the international community that the impact of COVID-19 on the Belt and Road Initiative is temporary and limited. He noted that the pandemic will only strengthen and re-energize Initiative-related cooperation and open up new possibilities (People's Daily (online),2020) (http://en.people.cn/n3/2020/0524/c90000-9693875.html).

7.9 Implications related to future transport development in the region

This section entails a discussion of the pandemic implications for the future work in the transport sector involving the Belt and Road Initiative.

- A major focus of this study is the Belt and Road Initiative land transport routes along the six corridors (chapter 3). Except for the routes in China – Indochina Peninsular Corridor, activities in the other five corridors are expected to remain similar with the exception of some effects in the short term. Any potential shift of some production facilities from China may affect minimally the activities in the five other corridors.

  However, as mentioned earlier, some in manufacturing and supply chains are shifting away from China to other countries in South-East Asia. The pandemic impacts and other trade-related factors may accelerate such shifts. This implies that the demand for transport services in this corridor are likely to increase. Consequently, investments in transport and other infrastructure projects across South-East Asia, especially where these projects are aligned with Chinese investment in manufacturing, can become a priority.
- Transport systems accelerated the spread the pandemic. However, it is also true that transport connectivity is indispensable in dealing with the crisis and post-crisis recovery. Due to the absence of any cross-border cooperation mechanism, the pandemic outbreak has led to uncoordinated boarder closures, and controls and restrictions on international freight transport operations. To ensure emergency supplies of food and other essential items, borders need to remain open in times of disruption with adequate health and safety control as may be warranted.

  Uncoordinated actions taken by countries suggest the need for cooperation mechanisms to deal with coordinated emergency responses, minimize any disruption in supplies and ensure that borders are open to allow trade and transport as smoothly as possible during a pandemic or other similar cross-border emergencies. Regional cooperation mechanisms can help with coordinated and timely responses to disruptions and with large-scale disruptive events of any nature, including climate related disasters.

  The cross-border cooperation mechanisms can be considered in two ways. The current cross-border facilitation agreements may be amended to include uniform protocols to ensure smooth flow of trade and transport across borders and in transit countries during cross-border emergencies. It is understood that a joint project is being implemented by the five regional commissions of the United Nations and UNCTAD. The objective of this project is to develop uniform protocols and suggest other measures to avoid abrupt disruptions and ensure the smooth flow of cross-border traffic.

  One suggestion in this study is to consider formal governance structures for the Belt and Road (and other transport) corridors for smooth operation of trade and transport in a corridor (see chapter 5). Such corridor governance authorities may also be empowered to deal with any emergency situation to ensure smooth flow of food and emergency supplies. It should be easier for a formal corridor governance authority to develop and implement shared controls and protocols, common contingency plans, norms, and treaties to reduce the risks of disruptions in supply chains in a corridor.
- To date, Chinese funds have played a major role in financing Belt and Road Initiative projects. In the near term, the availability of such financing can be limited and uncertain; greater emphasis should be placed on domestic financing of projects and financing from multilateral development banks and other sources of ODA. If the Initiative countries adopt a policy of closer alignment between Belt and Road Initiative goals and “green development”, for example, it is likely that multilateral financing for projects would have a greater share in the future. Discussions on this matter are presented in chapter 6.
- The COVID-19 pandemic provides a new opportunity for promoting sustainable transport development. This may be realized in three ways. First, the crisis provides an opportunity to revisit and reset the international freight transport operations towards a more sustainable path. A major trend during the crisis is the remarkable increase in the number of freight trains between China and Europe.

  While other modes of freight transport have been adversely affected, the increase in rail freight operations is not unexpected, owing to its distinct features that work to its advantage in a pandemic situation. Rail transport uses less manpower over long distances and accordingly there are fewer quarantine checks, unlike in road transport where congestion at border crossings

causes more frequent human interactions. In addition, traffic at a typical railway border crossing can be managed much more effectively as compared with road border crossings.

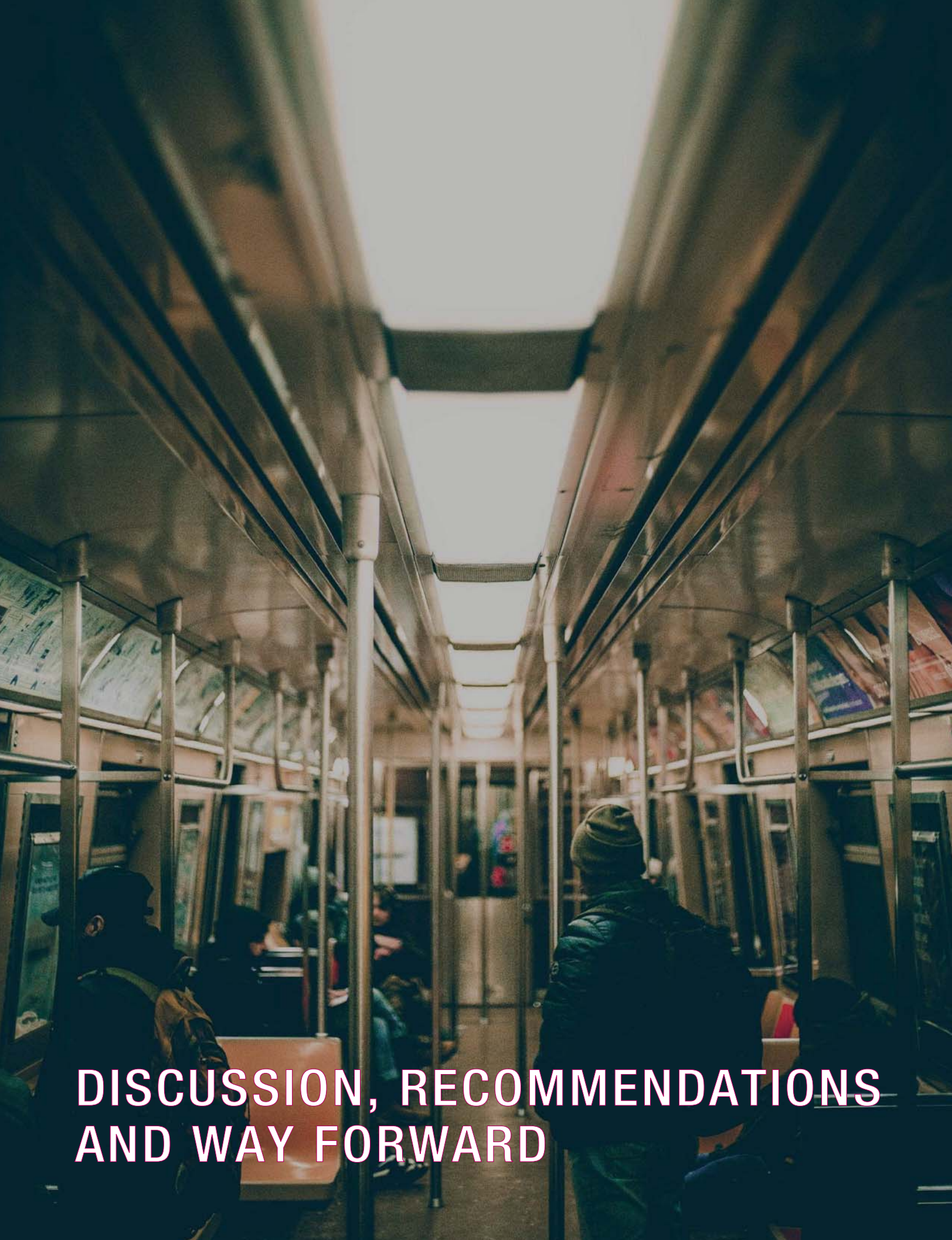
Second, countries can seize upon the opportunity that the current pandemic provides for a decisive shift towards digitizing the processes involved in exchange of information to complete operational and regulatory transport controls along the Belt and Road Initiative and other transport corridors.

The digitization process can be leveraged in a far broader way, however. Unanticipated digitization because of the pandemic have changed how people work, and services are organized and delivered. In-person services will decline in retail, hospitality, travel, education, health care, and government as digitalization changes the way these services are organized and delivered. The business processes and employee behaviour could be leveraged after the pandemic for two major collateral benefits: to reduce unnecessary travel and transport demand, which will reduce energy consumption, congestion and air pollution; and to enhance the resilience of the region to cope with future pandemics.

Third, IEA expects global industrial greenhouse gas emissions to be approximately 8 per cent lower in 2020 than they were in 2019, the largest annual drop since World War II.[44] The air quality in many parts of the world has increased significantly. The current low energy prices make it easier to cut subsidies for fossil fuels and to introduce a tax on carbon. Carbon pricing can be used to tap the power of the market to incentivize consumers and firms to cut their emissions. It should help to cut the demand for transport services through the reduction of avoidable trips, increase motivation to use more carbon-efficient transport modes and lead to the replacement of in-person services by e-services.

These implications and the lessons learned from the pandemic effects on transport systems discussed earlier may be considered to developing future activities concerning the Belt and Road Initiative and redesigning its current activities, if necessary. Some of the possibilities are indicated in the last chapter.

[44] IEA (2020).



DISCUSSION, RECOMMENDATIONS AND WAY FORWARD

8

DISCUSSION, RECOMMENDATIONS AND WAY FORWARD

8.1 Discussion

It is abundantly evident from the results of multiple studies that the estimated potential gains of the Belt and Road Initiative are extensive. Annual global welfare gains are projected to be approximately 1.6 trillion in 2030, accounting for about 1.3 per cent of the global GDP; gains to Belt and Road Initiative countries' GDP and welfare are projected to be even higher,[1] approximately 3.4 per cent of GDP for Belt and Road Initiative countries as compared to 2.61 per cent for non-Belt and Road Initiative countries. In addition, the Initiative has the potential to contribute towards lifting 7.6 million people from extreme poverty and another 32 million people from moderate poverty, mostly in corridor countries. The results of the studies also show that the outcomes or impacts of the Belt and Road Initiative infrastructure development are generally positive with regard to the economy, income, poverty reduction, employment, equity and inclusion.

Nevertheless, there may be important trade-offs between the economy and welfare and impacts on environmental quality. The trade-offs may be between economic growth and poverty in some situations. In addition, the distribution of impacts of transport development can be uneven at all levels and between different groups in society; the gains to some countries may not justify the costs of new infrastructure development. To ensure more sustainable and inclusive development, the potential gains to the economy and welfare must be balanced against the potential adverse impacts, and the gains should be more equitably distributed. In addition, sustainable development of the corridors depends on a number of important challenges that also need to be effectively addressed.

One of the major objectives of the Initiative is to develop seamless connectivity among the countries in the six main Belt and Road Initiative corridors. ESCAP can play an important role to achieving this important objective.

The Economic and Social Commission for Asia and the Pacific is promoting the development of an international integrated intermodal (often commonly referred to as a multi-modal system) transport and logistics system through the development of the Asian Highway, Trans-Asian Railway networks and the development and operation of a network of dry ports. The Asian Highway and the Trans-Asian Railway networks form a large part of the potential transport routes along the six Belt and Road Initiative corridors. The Regional Action Programme for Sustainable Transport Connectivity in Asia and the Pacific, adopted by member States in 2016, has established model agreements on transport facilitation, the international road transport and the Model Multilateral Permit for International Road Transport. These model agreements can support harmonization of legal and regulatory frameworks to operationalize the Belt and Road Initiative corridors. As such, in many ways the current and future work of ESCAP under the Regional Programme can support the transport connectivity initiatives under the Initiative and contribute towards the sustainable development of the corridors.

The COVID-19 pandemic adds a new dimension to such support for the Belt and Road Initiative network that ESCAP can provide. The ramifications of the pandemic should not overshadow the potential benefits of the Initiative. Some important lessons learned relating to resilience of cross-border land routes can be considered by ESCAP for its current

[1] See section 4.1 of the present study.

programme to support the development of more resilient and sustainable Belt and Road Initiative transport corridors.

The pandemic has exposed the vulnerability of global supply chains because of the abrupt closure and/or limited availability of transport services. The domestic and international transport systems, especially air transport and ports, have remained paralysed or shut down for a prolonged time; land transport borders between some countries have also remained closed for many months. As a consequence of these effects, the supply chains, including for essential medical, food and other supplies, have been badly disrupted.

To recover from the pandemic induced economic downturn, countries are likely to change their short- and medium-term development priorities, possibly at the expense of previously planned Belt and Road Initiative programmes and projects. Similarly, businesses affected by the disruptions in production and supply chains may consider various options to avoid or minimize such disruptions in the future. The change in national policies and priorities and business practices can affect Belt and Road Initiative activities. Priority for development between Belt and Road Initiative corridors and priority between projects can also change.

Not everything is despairing, however. New opportunities for the digital economy have been created; many positive changes that reduced demand for transport services and led to increased use of rail transport services should be retained. The pandemic has also demonstrated that the Belt and Road Initiative land routes can be a viable alternative to sea and air transport to ensure the supply chain for essential items. The majority of Belt and Road Initiative countries would be much less affected by any disruption if the transport routes can be made more resilient against any abrupt disruptions in the future. However, all such changes require modest recalibration of the Initiative-related activities in the short and medium term. In fact, some analyses have found that such changes can foster an improvement in the quality of Belt and Road Initiative activities in the longer term.

Except in some Belt and Road Initiative routes and sections, the current status of connectivity – physical and operational – are not of standards to achieve seamless connectivity. Although in recent years, corridor countries have made considerable progress to increase transport infrastructure capacities within their territories and strived to improve cross-border flow procedures, and many new infrastructure projects are planned (see, table annexes 2.1 and 2.2 in annex 2), more time and efforts are required to attain seamless connectivity as a whole. Missing links in networks, under capacity of infrastructures, and lack of interoperability and harmonization of rules and procedures remain major barriers to seamless connectivity. These barriers need to be addressed in a sustainable way.

Investment in dry ports and other intermodal facilities and greater use of them can increase the modal share of more resource-efficient transport modes, such as railways and inland waterways. This shift would help to reduce the demand for road transport and thereby reduce the need to expand the capacity of existing highways and to build new ones. The COVID-19 pandemic provides an opportunity to revisit and reset international freight transport operations towards a more sustainable path. Greater use of railways, as demonstrated during the crisis, and inland waterways would help to reduce the cost of freight transport, increase efficiency in the overall supply and distribution chain, and reduce the environmental burdens of freight transport.

The potential benefits of the Initiative are extensive, but they are contingent on many actions, including massive investment in transport and other infrastructure, complementary policy reforms (trade, transport, facilitation, investment) and other corridor or locality specific interventions (interventions in other sectors, human resource development), effective reversal of adverse impacts on the environment and welfare, and tackling other issues pertaining to green and sustainable development. Some of these contingent factors within the scope of this study are discussed here.

To realize the potential benefits of the Belt and Road Initiative, the massive investment needs must be realized. Available funding from different sources can meet a part of the investment needs. As a result, large investment gaps exist for infrastructure development. In most countries, to date, a large part of the investment in Initiative-related projects have come from external sources – especially Chinese financial institutions. However, investments from Chinese sources have declined in the recent years, including in 2020. This decline could be due partly to the Covid-19 pandemic effects, but they are also more general in nature in line with the global trend of declining FDI flows. In the near term, the availability of financing from Chinese sources may remain limited and uncertain; alternative sources need to be explored.

To date, investments in Initiative projects from multilateral development banks have been limited. If the

Initiative countries adopt a policy of closer alignment between Belt and Road Initiative goals and "green development", it is likely that multilateral financing for projects would have a greater share in the future. The Green Task Force, a special new investment group, was launched by green funding experts for the promotion of green financing and investment in the Belt and Road Initiative projects. The group developed the Green Investment Principle for green investment in the Initiative projects. The Green Investment Principle has a membership of more than 26 banks and financial institutions. The Initiative countries may explore investments from these alternative sources. These sources, in addition to providing more funding for the Belt and Road Initiative projects, can ensure green and more sustainable infrastructure development.

In addition to external funding, for sustainable funding of Initiative projects, more effort must also be directed towards mobilizing financing from domestic sources through various innovative financing measures. Some of these measures are securitization of existing assets, land value capture, tolling, levy on fuel used by transport vehicles and financing by the private sector. Although several countries have successfully used these measures for financing transport and other infrastructure projects, except tolling, the implementation of them in most Belt and Road Initiative countries is not common. To date, countries have relied mostly on limited budgetary resources and overseas development assistance. This trend needs to change to meet the investment needs.

There is strong complementarity between Belt and Road Initiative transport infrastructure projects and other policy interventions, including cross-border facilitation arrangements. Transport and other infrastructure development are necessary, but they may not be sufficient to generate wider economic benefits. It is also important to mention that transport investment and complementary policies should be based on a better understanding of the underlying mechanisms and the initial conditions in a corridor; as such, there is no general prescription that may be equally applicable in all cases. Without complementary interventions, there is a risk that transport investment may not produce the expected outcomes, especially the wider economic benefits.

Improvement of cross-border facilitation arrangements is equally important. Although some progress has been made in this area, much greater work in this area is required to enhance the region-wide operational connectivity along the corridors. Often on the surface these may look like technical and regulatory issues, but they may be rooted to lack of political trust between neighbouring countries or by a low level of political commitment, and lack of convergence of political interests among the countries or territories to be connected.[2]

Uncoordinated actions taken by countries at the beginning of the pandemic suggest the need to put in place cooperation mechanisms to deal with coordinated emergency responses and minimize disruption in supplies. To date, the policy responses of countries have been reactive – consideration should be made to designing agreed response measures within a broader framework to moderate the risks of disruption during a disaster.

It is often assumed that transport projects have negative effects on environmental quality outcomes. This is not necessarily the case. There is currently a knowledge gap; available studies do not provide insight into the trade-offs between economic and social impact outcomes and environmental quality. In addition, the transport sector is not only a major contributor to climate change, but it is also set to be one of the hardest-hit sectors from climate change impacts. Accordingly, the development of a resilient transport sector that takes into account that its part of the problem as well as part of the solution would be the most desirable outcome.

Multiple government departments from different sectors and from different tiers of government, institutions and agencies along with private and civil society entities play a role along transport corridors and at border crossings. A structurally organized institutional framework together with streamlined procedures can be very helpful in making corridor operations more efficient and productive. Additionally, it can reduce delays and uncertainties at all stages of corridor development and operation, redress operational and other issues without delay and facilitate investment in infrastructure, technology and other facilities, as needed. An institutional framework would be helpful to monitor corridor performance and deal with negative externalities. Streamlined procedures and removal of uncertainties would encourage greater private sector participation in infrastructure investment and smart operation of transport corridors.

A formal corridor governance structure could also be helpful in designing and implementing coordinated and

[2] Arvis, Smith and Carruthers (2011).

uniform response measures to keep border posts open for essential supplies during a pandemic crisis or other emergencies.

Some of the externalities of cross-border transport development, such as human trafficking and trading of illicit goods, are deeply rooted in the problem of widespread poverty, especially in remote border areas. Along with direct intervention and mitigation measures, other measures to reduce poverty in the border regions are also necessary. Apart from trafficking and the spread of diseases, other social issues also need to be addressed, including, among them, displacement and marginalization of local communities, including indigenous people, resulting from land appropriation and grabbing.[3] To date, these social issues have received little attention but they should be included in the corridor development programme. Effective remedial measures are needed to address their negative impacts on the welfare of local people.

The Belt and Road Initiative corridors and transport networks can create agglomeration effects in some locations. Businesses gain more from being in areas that offer agglomeration economies. Public infrastructure investments in other locations are likely to attract fewer private investors. Because of the agglomeration benefits in established main centres, investment only in transport infrastructure has limitations in attracting businesses to secondary centres outside the established main centres. Other intervention measures, such as public investment and policies, may be needed to induce growth in less attractive secondary centres or regions.

Many safe road demonstration corridor projects are being implemented in a number of states of India, Bangladesh and other Belt and Road Initiative countries. The results from a preliminary analysis of some of these safety improvement projects are impressive. For example, the Kadapa to Renigunta safety demonstration corridor project implemented under the Andhra Pradesh and Telangana Road Sector Project in India shows significant safety improvements. In locations where curves and junctions were improved, road crashes declined by 53 per cent and fatalities decreased by 42 per cent.[4]

Another preliminary analysis of a recent highway improvement project in Karnataka, India under the Karnataka State Highways Improvement Project also indicate similar impressive results. Following a safety audit, the project successfully implemented improvement measures, such as realignment of intersections, raising pedestrian crossings and installing safety barriers, which led to a 50 per cent reduction in the number of road deaths on that highway stretch. Similar results have been observed in Bangladesh after improvement of blackspots along many highways stretches in the country.[5] These results show that significant improvement in road safety can be achieved through the upgrading of highways and safer road infrastructure design.

Many types of transport infrastructure, operations and vehicle technologies, and transport-related ICT and intelligent transport system technologies are available, but they are not widely used in the Asia-Pacific region. These technologies can significantly increase transport efficiency and reduce the adverse impacts of transport on the environment. The COVID-19 pandemic has prompted the acceleration of innovation and digitalized facilitation of transport processes. Several countries have accelerated customs procedures for essential goods, started accepting electronic documents and piloted new automated and digital technologies. These positive experiences show that digitalization can vastly improve the trade and transport facilitation processes at borders in normal and in emergency situations. These positive digitalization processes need to be expanded to all Belt and Road Innovation corridor border points.

In addition, the use of ICT and intelligent transport system technologies can help road freight service providers and operators reduce the proportion of empty back-haulage and increase the load factor of their trucks.[6] Similarly, highway operators in developing countries may consider greater use of appropriate intelligent transport system applications to improve efficiency in highway operation and traffic management, and better utilization of existing road infrastructure. They can make road transport safer, faster, less polluting, more energy efficient and cheaper. It is also expected that advances in technology will continue, thereby further increasing efficiency and reducing the environmental impacts of the sector.

Improvement in network connectivity can enhance the attractiveness of some strategically located major cities in the Belt and Road Initiative corridors. As their growth

[3] Quium (2019).

[4] Gupta (2018).

[5] Shamsul Haque, former Director, Accident Research and Investigation Centre at Bangladesh University of Engineering. and Technology, Dhaka, 1 February 2020.

[6] Many studies show that the proportion of empty haulage can be as high as -50 per cent. Approximately 79 per cent of trailer trucks and 62.4 per cent of three-axle trucks entering Metro Manila are empty (ESCAP 2019, p. 86).

dynamics are accelerated by agglomeration effects, these cities will grow more rapidly than other cities and can play a pivotal role to stimulate economic growth in the corridor region. Managing a sustainable path to development for these pivotal cities is a major challenge. New strategies are needed for their sustainable development.

Most major cities in the region already are confronted with chronic traffic congestion and air pollution problems. It is, therefore, important for these cities and other pivotal cities in the Belt and Road Initiative corridors to consider congestion and air pollution countermeasures to minimize welfare losses. As each city is different, it is difficult to suggest measures that may be equally applicable to all cities. However, there are recognized measures that may reduce the burden of adverse impacts stemming from congestion and air pollution, which include, among others, improvement of public transport systems, intelligent transport system applications for better management of traffic flow, improvement of city logistics, and, where possible, provision of special urban freight transport corridors.

The COVID-19 pandemic has brought some positive changes in daily lives, which have reduced the demand for transport services, especially for personal travel. Some examples are working from home, and substitution of in-person education and use of retail and other services by e-services. These positive changes should be promoted and retained as much as possible.

The COVID-19 pandemic is not expected to bring an end to globalization or severely affect the Belt and Road Initiative activities, but some changes and adjustments will be unavoidable, especially in the short term. Business, economic and some other factors could lead to the partial relocation of manufacturing away from China to low-cost countries in South-East Asia and South Asia. The effects of the pandemic may expedite this process, but, as already noted, the broader objectives of the Initiative should not be significantly affected over the longer term. Most importantly, the political commitment of China to the Initiative has remained unchanged.[7] It is important to note that even in the face of the pandemic, the commitment of China to the Initiative remains strong and that it will remain a priority for the country. The role of China in the Initiative is pivotal, but so is the interest of Belt and Road Initiative countries.

8.2 Recommendations and way forward

Belt and Road Initiative corridors present an unprecedented opportunity to the corridor countries to develop sustainable connectivity among countries in the region. The enhanced connectivity among countries will stimulate wider socioeconomic development in the corridor regions triggered by increased intra- and interregional trade.

Physical connectivity is a prerequisite, but operational and functional connectivity is what matters. The success of a corridor also depends on a few other factors. Considering the experiences related to corridor development in other countries of the region and elsewhere, this study presents a set of suggestions, for consideration of ESCAP, international organizations and Governments of member States in the region, as may be applicable. These suggestions include the following identified areas:

- Corridor governance, and harmonized institutional development;
- Emergency response to avoid disruption in supply chain during pandemic or other hazards;
- Development of indicators on connectivity (hard and soft) for benchmarking and monitor the progress in connectivity in a corridor;
- Green and sustainable infrastructure development;
- Collaboration between research organizations in corridor countries and knowledge-sharing;
- Development of new tools for ex-ante project appraisal to study the likely distributional impacts across geographic regions and between different groups;
- Detail studies and planning at the project level to ensure sustainable development. (It may be noted that conditions can vary by corridors even within the same country.);
- Capacity development for green and sustainable infrastructure project development, especially for large multisectoral projects in smaller countries.

These suggestions are elaborated below.

Corridor governance

The overall efficiency of a complex system, such as a transport system, depends a lot on the integration of shared responsibility between layers of government and

[7] Chinese Foreign Minister Wang Yi on Sunday (24 May 2020) assured the international community that the impact of the COVID-19 pandemic on the Belt and Road Initiative (BRI) is temporary and limited. He noted that the pandemic will only strengthen and re-energize Belt and Road Initiative BRI cooperation and open up new possibilities (People's Daily Online, 2020).

coordinated action by multiple agencies under different layers of government. An integrated approach to transport planning is a positive way to influence the planning and provision of transport systems towards more sustainable patterns.

In support of operational connectivity, the Belt and Road Initiative corridor countries may also need to consider the establishment of transnational governance structures or mechanisms at the policymaking and operational levels for policy guidelines and managing the day-to-day operational issues in transport corridors.[8] One of the most important elements of a successful corridor is to establish appropriate arrangements to promote and facilitate coordination of activities undertaken by multiple public and private sector stakeholders involved in corridor development, management and operation. Some progress was made in this respect; several countries have considered establishing a national authority or multi-country joint cooperation committee or similar structures. However, the establishment of a formal multilayer management structure is preferable, as it can be effective in addressing the following issues:

- Build consensus among stakeholders on institutional issues and transboundary projects;
- Develop and implement harmonized corridor governance institutions, rules and procedures;
- Develop emergency response measures to keep borders open for essential supplies to avoid any disruption caused by pandemic or other hazards;
- Coordinate activities undertaken by multiple public and private sector stakeholders involved in corridor development, management and operation;
- Develop and promote viable projects;
- Harness and coordinate public and private investment to improve infrastructure and transport services;
- Manage the day-to-day operational issues along the corridor routes;
- Develop benchmarks and monitor corridor performance;
- Promote private investment and other complementary actions to generate wider socioeconomic development in the corridor region.

Relevant matters should be discussed at some appropriate regional meetings to make further progress.

Emergency response to avoid disruption in supply chain

Uncoordinated actions taken by countries during the COVID-19 pandemic suggest the need to set up cooperation mechanisms to deal with coordinated emergency responses and minimize disruptions in supplies. Shared controls, protocols and common contingency plans to deal with emergencies, norms and treaties must be pursued as a means of moderating risks of abrupt disruptions in supply chains. The development of shared controls, protocols, a framework for contingency plans and other measures that may be adopted by Belt and Road Initiative corridor countries should be considered to keep the transport systems functioning, especially to keep the land borders open, to ensure the smooth flow of food and all emergency supplies during a crisis.

Corridor performance indicators

A set of appropriate indicators is essential to establish benchmarks and assessments of corridor performance. Such indicators can be corridor-specific to account for its unique characteristics or more general that may be applicable to any corridor with some changes or modifications, as may be required.

Important work has already been undertaken by different organizations. ESCAP has developed a corridor performance method that provides information on the relative importance and variability of time and cost at each interface point in a corridor. The method was used to analyse the performance of trade corridors in East and Central Asia and cost details for transport modes and transit time at each border post in the corridors. ESCAP has also developed the Sustainable Urban Transport Indicators[9] and is considering the development of some indicators for the assessment of one Belt and Road Investment corridor, which may be available sometime in 2021.

Additional work is needed to assess the currently available indicators and conduct a more comprehensive study to develop performance indicators for the Belt and Road Initiative corridors, and possibly other domestic and cross-border transport corridors.

[8] The World Bank and ADB have produced documents on corridor management, which include: The *Transport and Trade Corridor Management Toolkit* (Kanuka and Carruthers, 2014); "Best practices in corridor management" (Arnold, 2006); and "Regional corridors development in regional cooperation" (Srivastava (2011).

[9] Available at http://www.unescap.org/publications/monograph-series-sustainable-and-inclusive-transport-assessment-urban-transport-systems.

Promotion of a corridor transport observatory, which is primarily an analytical tool that analyses corridor performance in multiple dimensions should also be considered. The main activities of such an observatory would normally include the collection, processing and dissemination of relevant information on infrastructure and operations along the corridor, and the monitoring of its performance. The observatory could be developed as a permanent mechanism assigned to a corridor management authority, or specialized agencies or national or regional institutions for regular monitoring of corridor performance.[10]

Green and sustainable infrastructure development

The success of the Belt and Road Initiative to increase welfare gains of the people is contingent on many actions including green and sustainable infrastructure development. The Initiative projects can have serious environmental risks and adverse impact on welfare of people if implemented without sufficient regard for sustainability and climate impacts. The Sustainable Development Goals are at the forefront of the current development agenda. The Belt and Road Initiative in transport development is linked to many Sustainable Development Goals and can be used as a policy intervention tool to achieve some of them. ESCAP, in collaboration with other Green Development Coalition partners, can support the member States to meet their targets under the 2030 Agenda, especially those relating to transport development.

The Economic and Social Commission for Asia and the Pacific, in collaboration with other United Nations organizations and relevant bodies, can support the Coalition's broad goal to integrate sustainable development, in particular environmental sustainability, international standards and best practices across the priorities of the Belt and Road Initiative. It can also carry out policy advocacy to make legal and regulatory framework ensuring infrastructure is compliant with international sustainability standards. Other possible areas of collaboration are discussed below.

Collaboration among research organizations in corridor countries and knowledge-sharing

International development organizations, with support of China and other Belt and Road Initiative countries, and donor agencies, can facilitate the establishment and promotion of networks of national research organizations and universities to conduct collaborative research, joint studies and other activities to address different technical, environmental and social and economic issues. Such networks can also be linked to corridor management authorities, as proposed earlier, as well as to other relevant authorities of national governments. Further details on possible activities of such networks are provided in section 5.1.3 of this study. International development organizations, including ESCAP, have extensive experience in promoting similar networks in many areas, such as trade and urban development,[11] which may be examined when considering an institutional structure for the networks.

The Belt and Road Initiative International Green Development Coalition has established a number of thematic partnerships among its partners who can undertake research studies on specific issues relating to green development to support the Coalition's work. Development organizations, in line with their own programme of work, can join such partnerships for collaboration. For example, in collaboration with other Green Development Coalition partners, they can support the member States to meet the targets under the 2030 Agenda for, especially those relating to transport development (see chapter 2).

Development of new tools for ex-ante project appraisal to study the likely distributional impacts

The distribution of impacts of corridor development can be uneven. However, the widely used cost benefit analysis for project appraisal has important limitations. This analysis is neutral to distributional effects and does not estimate wider economic benefits. These important limitations of project appraisal by cost-benefit analysis need to be addressed through the development of new assessment and analytical tools.

International development organizations, in collaboration with other donor agencies and the proposed network discussed above, may support research studies to develop new project appraisal tools, and assess the effectiveness and suitability of the currently available analytical tools and models to understand the distributional impacts of regional and national transport projects and networks at the subnational level.[12] Research is also needed to examine how such tools and models can be adapted for policy analysis and policy formulation, including designing

[10] Hartmann (2013).

[11] For example, ARTNet of the Trade Division and LoGoTRI of the Environment Division of ESCAP.

[12] Currently researchers use a variety of models and methodologies to study the impacts of transport development, including CGE-based simulation studies, multi-regional input-output model, and difference-in-difference and other statistical and econometric models.

of complementary intervention measures. Often, availability of the required data is an issue. The suggested research may also examine how this problem can be overcome.

Research studies may also be considered on identification and estimation of wider economic benefits and how these values may be included in the project appraisal framework.

Capacity constraints in designing and developing successful transport corridors

The major challenges in developing successful sustainable corridors are discussed in section 5.2. Many developing countries in Belt and Road Initiative corridors do not have adequate capacity in the public and private sector to tackle the multi-faceted challenges in corridor development. International development organizations, in collaboration with other agencies and members of the proposed network of research organizations, can consider developing capacity-building and training programmes according to the assessed needs of the member countries. Such areas may include green and sustainable transport infrastructure project development, data analytics and application of intelligent transport systems, private sector's involvement, assessment of externalities and social costs of cross-border infrastructure and facilitation issues.

In addition to activities under the current and a new regional action programme, ESCAP can forge collaboration with Initiative-related research organizations in China[13] and other countries and reorient its analytical, capacity-building and intergovernmental support to assist the implementation of the Belt and Road Initiative, including digitalization of cross-border transport and trade processes and establishment of emergency response systems to make the Initiative land transport routes resilient against any future abrupt disruption.

[13] For example, International Institute of Green Finance, CUFE.

ANNEXES

Annex 1: Geographical coverage of the Belt and Road Initiative

Table Annex 1.1. Geographical coverage of the Belt and Road Initiative by region

Region	Belt and Road Initiative economies (besides China)	Number of economies
Central and Western Asia	Armenia, Azerbaijan, Georgia, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan	10
East Asia and the Pacific	Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Timor-Leste, Thailand, Viet Nam	12
South Asia	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka	8
Central and East Europe	Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Macedonia, North Macedonia, Moldova, Montenegro, Poland, Russian Federation, Serbia, Slovakia, Slovenia, Ukraine	21
Middle East and North Africa	Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, West Bank and Gaza, Yemen, Djibouti, Egypt	16
Sub-Saharan Africa	Kenya, United Republic of Tanzania	2

Source: de Soyres (2018).
Note: An updated list of 140 countries that have joined the Belt and Road Initiative by signing a Memorandum of Understanding with China is available at https://green-bri.org/countries-of-the-belt-and-road-initiative-bri/.

Annex 2: Projects in the Belt and Road Initiative corridors

The number of transport infrastructure projects discussed, planned or ongoing under the Belt and Road Initiative mentioned in various publications is overwhelming and not always easy to attribute to a particular corridor. For instance, the progress overview of the Initiative up to 2018 presented by the Leading Group for the Belt and Road Initiative mentions infrastructure projects, such as bridges, roads and railways not lying exactly on the Belt and Road Initiative routes. Some of projects and facilitation agreements were being implemented before the Belt and Road Initiative was launched.

A list of projects, recently completed, ongoing or planned in the Belt and Rural Initiative corridors is presented in table annex 2.1. As explained above, these include projects relevant to Belt and Road Initiative corridors, irrespective of the initiative (Belt and Road Initiative or non-Belt and Road Initiative) or the dates when they were launched. Table annex 2.2 provides a separate list of important projects in ASEAN countries included in the GMS Regional Infrastructure Framework 2022.

Table Annex 2.1. Projects in the Belt and Road Initiative corridors

Corridor	Country/Countries	Project	Status, cost, comments (as information available)
China – Mongolia – Russian Federation Corridor (CMR)	Mongolia, Russian Federation	Ulan-Ude – Erenhot road (AH3)	Operational
	Mongolia, China	Erenhot – Jining road (AH3) upgrade	Operational
	China, Mongolia, Russian Federation	Urumqi – Khovd – Novosibirsk road (AH4)	Operational (some parts of construction ongoing)
		Study of electrification and double-tracking of Ulan-Ude – Ulaanbaatar – Tianjin Railway corridor	Planned
	Mongolia, Russian Federation	Ulan – Ude – Ulaanbaatar – Erenhot Rail upgrade	Operational
	Mongolia, China	Erenhot – Beijing-Tianjin Rail upgrade	Operational
		Arts Suur – Urumqi New railway line	Proposed
	Mongolia	Choibalsan – Arixan, New railway line	Operational
		Western Regional Road Corridor: Yarant – Hovd road section of AH4	Completed in 2018[1]
		Western Regional Road Corridor: Khovd and Ulaanbaishint road section of AH4	Ongioing[2]
	China, Russian Federation	Harbin-Ussuriysk, Rail upgrade	
		Tongjiang – Nizhneleninskoye Railway Bridge	Ongioing[3]
		Heihe – Blagoveshchensk Road Bridge	Completed in 2019[4]

[1] *Mongolia: Western Regional Road Corridor Development Project, Phase 1* (Asian Development Bank, November 2019) (https://www.adb.org/sites/default/files/project-documents/39265/39265-022-pcr-en.pdf).

[2] Asian Development Bank, Mongolia: Western Regional Road Corridor Investment Program – Tranche 2. Project Data Sheet (Project 41193-019) (https://www.adb.org/projects/41193-019/main#project-pds).

[3] INTERFAX.RU, 'Сроки Сдачи Моста Из ЕАО в Китай Перенесли На Полгода (Bridge from Jewish Autonomous Oblast to China to Be Commissioned Half a Year Later) (Https://www.interfax.ru/russia/688085) .

[4] RBC, 'На Дальнем Востоке Достроили Первый Автомобильный Мост Из России в Китай (First Road Bridge from Russian Federation to China Is completed at the Far East), 2019 (https://www.rbc.ru/society/29/11/2019/5de023799a7947f61537f48a).

Table Annex 2.1. *(continued)*

Corridor	Country/Countries	Project	Status, cost, comments (as information available)
	Russian Federation	Ussuriysk – China border, road construction	
		Vladivostok – Nakhodka, new divided road	Operational
		Vostochny port, new seaport	Operational
		Zarubino – China border, new railway line	
		Zarubino – China border, new road	
		Zarubino Port	$3 billion, operational
New Eurasian Land Bridge Corridor (NELB)	Russian Federation	Saint – Petersburg – Moscow – Kazan – Orenburg – Russian Federation/Kazakhstan border section	Ongoing[5]
	China	Urumq – Khorgos, new railway line	Operational
		Urumqi – Khorgos, new divided road	Operational
		Khogos Dry port	
	China, Kazakhstan	Khorgos – Almaty, new divided road	Operational
		Khorgos – Zhetygen, new railway line	Under construction; part of Khorgos – Aktau Railway project; will allow transport of cargo along the Caspian Sea and the Caucasus to Europe, and through the Islamic Republic of Iran to the Persian Gulf
	Kazakhstan	JezKazgan – Saksaulsky, new railway line	
		Beyneu – Shalkar, new railway line	
		Aktau Port, new seaport	
		Almaty – Shymkent, Road upgrade	Operational
		Astana – Pavlodar, Road upgrade	Operational
		Astana – Karaganda, Road upgrade	Operational, but work under construction
	Kazakhstan, Uzbekistan	Shymkent –Tashkent (A2), Road upgrade	Operational
		Shymkent-Tashkent (M32), Road upgrade	Operational
China – Central Asia – West Asia Corridor (CAWA)	China, Kyrgyzstan, Uzbekistan	Kashgar – Tashkent Railway line (Kashgar-Andijan section)	Proposed
	China, Kyrgyzstan, Tajikistan	Kashgar – Dushanbe Railway line	Proposed
	Tajikistan	Dushanbe – Kolkhozabad Railway upgrade	Proposed
	Uzbekistan, Afghanistan	Sher Khan – Herat Railway Line	Under construction, some section operational
	Uzbekistan, Turkmenistan, Islamic Republic of Iran	Samarkand – Mashhad Railway Line upgrading	Operational
	Islamic Republic of Iran	Tehran – Mashad Railway Upgrading	Electrification under construction
	Islamic Republic of Iran	Tehran – Isfahan High Speed Railway	Under construction
	Azerbaijan, Georgia	Baku – Tbilisi Railway line upgrade	Operational
	Georgia, Turkey	Tbilisi – Kars railway line	Operational

[5] Ministry of Transport of the Russian Federation, 'Международный Транспортный Маршрут «Европа – Западный Китай» (=International Transport Route "Europe – West China" (https://www.mintrans.ru/activities/215/217/25/28).]

Table Annex 2.1. *(continued)*

Corridor	Country/Countries	Project	Status, cost, comments (as information available)
	Georgia, Turkey	Anaklia – Istanbul New sealink	Operational
	Georgia	Anaklia – Port, new port	Operational
China – Pakistan – Economic Corridor (CPEC)[6]	Pakistan	Peshawar – Karachi Motorway (Multan-Sukkur section)	$2.9 billion
		Khuzdar – Basima Road N-30 (110 km)	
		Upgradation of D.I. Khan (Yarik) – Zhob, N-50 Phase-I (210 km) Road	
		KKH Thakot – Raikot N35 remaining portion (136 km) – Road	
		KKH Phase II (Thakot – Havelian Section) – Road	$1.315 million
		Expansion and reconstruction of existing Line ML-1 (Karachi – Lahore – Peshawar Rail project)	$8.172 million
		Havelian Dry port (capacity 450 million Twenty-Foot Equivalent Units)	$65 million, under construction
		Havelian – Larkana – Hyderabad Rail upgrade	Under construction
		Gwadar East – Bay Expressway	Under construction
		New Gwadar International Airport	Under construction
		Karachi – Gwadar new railway line	Proposed
		KKH Raikot-Shinkiar – Brhan, road upgrade	Under construction
		KKH Kashgar – Khunjerab road	Under construction
	China	Tashkurgan – Yarkant, New road	Proposed
		Raikot – Khunjerab Karakoram Highway (upgrade)	$491 million, completed
	China, Pakistan	Kashgar – Khnjerab-Taxila, New railway line	Proposed, feasibility study planned
Bangladesh – China – India – Myanmar (BCIM)	Bangladesh	Padma Bridge (road and rail)	Under construction, enhance connectivity between Bangladesh and India
		Dhaka – Padma Bridge new railway line	Under construction
		Chittagong – Cox's Bazar railway line	Under construction
		Upgrading of AH1 and AH2 (from 2-lane to 4-lane dual carriageway)	Under implementation in phases
		Improvement of Sylhet – Tamabil Highway and border crossing facilities	$404 million, loan approved[7]
	China, Myanmar	Dali – Ruili – Lashio New railway	Under construction
	Myanmar, India	Kalay – Tamu – Jibiram, New railway line	Under construction

[6] Unless otherwise specified the information is based on the CPEC Authority (http://cpec.gov.pk/infrastructure).
[7] Asian Infrastructure Investment Bank (2020).

Table Annex 2.1. *(continued)*

Corridor	Country/Countries	Project	Status, cost, comments (as information available)
	Myanmar	Kyaukpyu – Ann New railway line	Planning
		Kyaukpyu – Mandalay road upgrade	Planning
		Kyaukpyu new seaport	Planning; $1.3 billion
		Adani Yangon International Terminal – an Indian company, a new terminal at Yangon port	$290 million under a 50-year BOT contract with the government
		Yangon – Mandalay expressway improvement	Ongoing[8]
	China, Nepal	China – Nepal Cross-Border Railway (Kathmandu – Geelong (Kerung)	Planned[9]
		Kathmandu – Pokhara – Lumbini Railway (Nepal)	Planned[10]
China-Indochina Peninsular Corridor (CIP)	Thailand, Lao People's Democratic Republic	Bangkok – Vientiane Railway line	Operational
	China, Lao People's Democratic Republic	Kunming – Vientiane New railway line	Under construction, some parts in China operational (connection to Viet Nam and Myanmar to be completed in 2021)
	Thailand, Myanmar	Nam Tok – Thanbyuzayat, New railway line	Planned
	Thailand	New terminal at Laem Cha Bang port	In bidding process
	Malaysia	Gemas – Johor, Rail upgrade	Under construction
	Thailand, Malaysia	Bangkok – Kuala Lumpur High Speed Rail	Proposed
	Viet Nam	Hanoi – Ho Chi Minh City High Speed Rail, rail upgrade	Proposed
		Viet Nam – Cambodia New railway line	Proposed
	Cambodia	Phnom Penh – Sihanoukville, new railway line	Under construction
		New terminal at Sihanoukville port	Planned; Japan expected to finance
		Phnom Penh – Sihanoukville, New road	Under construction
		Sihanoukville port	Operational
	Indonesia	Jakarta – Bandung High Speed Railway	Under construction
	Sri Lanka	Hambantota Deep Seaport Phase I	Operational
		Hambantota Deep Seaport Phase II	Operational
		A new terminal at Colombo port (West Container Terminal)	Agreement signed with India and Japan
		Matara – Kataragama Railway Expansion Project	Under construction

Source: Unless mentioned, compiled from different official and other reliable sources, such as development banks and the Center for Strategic and International Studies.

[8] Asian Development Bank, 'Myanmar: Greater Mekong Subregion Highway Modernization Project' (https://www.adb.org/projects/47087-003/main#project-pds) [accessed 6 March 2020].
[9] Xinhua (2019).
[10] Giri (2020).

Table Annex 2.2. Projects in the Greater Mekong Subregion

Country	Corridor	Project description with financing source	Comments
Cambodia	CIPC	Rehabilitation 6.5 km of the GMS Rail Link1: Kunming – Ha Noi – Ho Chi Minh City – Phnom Penh – Bangkok (Singapore – Kunming Rail Link; $6.5 million; Cambodia government financed.	Completed 2018
	CIPC	190 km expressway; BOT model, 50-year concession; will provide a high-capacity road link between Phnom Penh and Sihanoukville, GMS Southern Coastal Corridor; $2,000 million; China private sector.	Expected to be completed in 2022
China/Myanmar connectivity	BCIM	Dali – Ruili Railway; 330 km railway from Dali to Ruili, connects Guangtong – Dali Railway; section of Singapore – Kunming Rail Link; Class I electrified; cost $3,434 million; financing by China.	To be completed by 2023
China/Lao People's Democratic Republic connectivity	CIPC	Yuxi – Mohan Railway; 508.5 km railway from Yuxi to Mohan via Xishuangbanna, linking Kunming – Yuxi Railway; once connected to the railway under construction in Lao People's Democratic Republic, this route will be one of the most direct from China to ASEAN countries. Class I electrified; cost $7,812 million; financing by China.	To be completed by 2021
China/Lao People's Democratic Republic connectivity	CPIC	Rehabilitation of Ninger – Jiangcheng – Longfu road; 228 km road along the border between China and Viet Nam; a renovation from class 4 to class 3 standard; important route connecting southern Yunnan to Lao People's Democratic Republic and Viet Nam; cost $286 million; ADB $200 million, China $86 million.	To be completed by 2021
China/Myanmar connectivity		Jinghong – Daluo Expressway; 103 km, 4 lanes; and the border control point at Menghai in China; connects Daluo in China, Tachilek, in Myanmar and Chiang Rai, Thailand; cost $2,695 million; China.	First part to be completed by 2021
Lao People's Democratic Republic	CIPC	414 km Vientiane – Boten standard gauge electrified railway Project; form part of the Singapore – Kunming Rail Link; cost $5,800 million, China – 70 per cent, Lao People's Democratic Republic, 30 per cent.	To be completed in 2021
	CIPC	Vientiane to Vang Vieng section of Vientiane to Mohan port (China) 113 km highway project; cost $1,301 million, China.	Vientiane to Vang Vieng section completed in 2020
	CIPC	Vientiane – Ha Noi Expressway Project, 335 km; estimated cost $4,250 million.	Proposed
Myanmar		Ruili (China) – Kyaukpyu (Myanmar) Highway; cost $2,154 million; China private sector.	MOU signed; expected to be completed 2028
		Daluo (China) – Tachilek (Myanmar) Highway; improvement of existing road; cost $93 million; BOT project.	Ongoing
		Highway modernization project; includes improving 99 km of GMS highways, and safety improvement of Yangon – Mandalay Expressway; cost $202.1 million, ADB $194.7 million, Myanmar $7.4 million.	Ongoing
Myanmar		Bago – Kyaikto Road; 62 km new arterial highway; cost $483.8 million; ADB expected to finance.	
Thailand		Tak – Mae Sot Highway Improvement Project; upgrading of 86 km road from 2 to 4 lanes; cost $100 million, Thailand.	Completed
		Bang Yai – Kanchanaburi Intercity Motorway Project (part of Laem Chabang – Bangkok – Dawei, Myanmar Corridor); 96 km motorway; cost $1,600, Thailand.	Ongoing

Table Annex 2.2. *(continued)*

Country	Corridor	Project description with financing source	Comments
		Chiang Rai – Chiang Khong Highway Improvement Project; upgrading of 109 km road from 2 to 4 lanes; cost $90 million, Thailand.	Ongoing
	GMS EWEC	Lomsak – Phetchabun Highway Improvement Project; improvement of 92 km from 2 to 4 lanes; part of East-West Corridor; cost $220 million, Thailand.	Ongoing
	GMS EWEC	Kalasin – Nakrai – Kamcha Highway Improvement Project; improvement of 108 km road from 2 to 4 lanes; cost $170 million.	Ongoing
	CIPC	Laem Chabang Port Development Project, Phase 3 (Terminal F); cost $3,000 million, PPP, private sector.	In bidding process; expected to complete 2023
	GMS EWEC and GMS NSEC	Double tracking and upgrading of 2,476 km of a railway including elimination of at-grade level crossing; cost $12,192.3 million, Thailand.	Ongoing; expected to be completed in 2023
Viet Nam	GMS Southern Economic Corridor (SEC)	Construction of 57.1 km expressway between Ben Luc and Long Thanh, south of Ho Chi Minh City (HCMC); ADB – $635.7 million, JICA – $634.8 million, Government of Viet Nam – $336.9 million.	Ongoing
	GMS NSEC	Ha Noi – Lang Son Expressway Project (Huu Nghi – Chi Lang (border with China) Section); 156.6 km expressway; cost $1,400 million, private sector.	Ongoing
	GMS NSEC	Ho Chi Minh City Third Ring Road (BenLucNH22); cost $877.7 million; PPP, Private Investor – $436.1 million, ADB – $299.1 million, Australia – $6.0 million Government of Viet Nam – $136.5 million.	Proposed
	GMS NSEC	Ho Chi Minh City – Loc Ninh (Cambodia Border) Railway; part of the Singapore – Kunming Rail Link; will construct a new railway section of 128 km from HCMC to Loc Ninh; $900 million.	Proposed

Data source: Compiled from official presentations made at the GMS Subregional Transport Forum (STF-24) (21 January, 2021; held virtual).

Annex 3: Facilitation agreements, international agreements

Table Annex 3.1. Coverage of countries by international and regional conventions and agreements

Country	Convention on Facilitation of International Maritime Traffic (FAL 1965) (1998 edition)	Convention on Road Traffic (Vienna, 8 November 1968)	Convention on Road Signs and Signals (Vienna, 8 November 1968)	Customs Convention on the International Transport of Goods under Cover of TIR Carnets (TIR Convention) (Geneva, 14 November 1975)	Customs Convention on the Temporary Importation of Commercial Road Vehicles (Geneva, 18 May 1956)	Customs Convention on Containers (Geneva, 2 December 1972)	International Convention on the Harmonization of Frontier Controls of Goods (Geneva, 21 October 1982)	Convention on the Contract for the International Carriage of Goods by Road (CMR) (Geneva, 19 May 1956)	Intergovernmental Agreement on the Asian Highway Network	Intergovernmental Agreement on the Trans-Asian Railway Network	Intergovernmental Agreement on Dry Ports	Convention concerning International Carriage by Rail (COTIF)	Uniform Rules concerning the Contract of International Carriage of Passengers by Rail (CIV)	Uniform Rules concerning the Contract of International Carriage of Goods by Rail (CIM)	Agreement on International Goods Transport by Rail (SMGS Agreement)	Agreement on International Passenger Transport by Rail (SMPS Agreement)
Afghanistan				X	X				X		X				X	
Azerbaijan	X	X	X	X	X	X	X	X	X	S		X	X	X	X	X
Bangladesh	X								X	X	X					
Cambodia					X				X	X	S					
China	X	S[a]	S[a]	X		X			X	X	X					X
Georgia	X	X	X	X		X	X	X	X	X		X	X	X	X	X
India	X		X						X	X	X					
Iran (Islamic Republic of)	X	X	X	X			X	X	X	X	S	X	X	X	X	
Kazakhstan		X	X	X		X	X	X	X	S	X				X	X
Kyrgyzstan		X	X	X	X	X	X	X	X						X	X
Lao People's Democratic Republic							X		X	X	S					
Malaysia									S							
Mongolia		X	X	X			X	X	X	X	X				X	X
Myanmar									X		S					
Pakistan		X	X	X					X	X		X		X		
Russian Federation	X	X	X	X		X	X	X	X	X	X	X		X		X
Singapore	X				X											
Tajikistan		X	X	X			X	X	X	X	X				X	X
Thailand	X	S	S						X	X	X					
Turkey	X	X		X	X	X	X	X	X	S	S	X	X	X		
Turkmenistan		X	X	X				X							X	X
Uzbekistan		X	X	X	X	X	X	X	X	X					X	X
Viet Nam	X	X	X						X	X	X				X	X

Note: [a] = Done by the Former Republic of China, X = Ratification, accession, definite signature, S = Signature. Turkmenistan joined the agreements on the Asian Highway Network, Trans-Asian Railway Network, and Dry Ports as well as the International Convention on the Harmonization of Frontier Controls of Goods, on November 27, 2016.
Source: ESCAP (2017b).

(a) China – Mongolia – Russian Federation Economic Corridor

Multilateral agreements/arrangements

Intergovernmental Agreement on International Road Transport along the Asian Highway Network, Moscow, 2016. This agreement covers AH3 and AH4 in China, Mongolia and the Russian Federation. To facilitate the road transport along these sections, the countries issued and distributed among themselves the first 600 trilateral permits (200 per country) in 2019.[11]

Agreement between the Federal Customs Service (Russian Federation), General Administration of Customs of the People's Republic of China and Customs General Administration of Mongolia on Mutual Recognition of the Results of Customs Control on Selected Goods, Tashkent, 2016.[12]

Program of Creation of China – Mongolia – Russia Economic Corridor, Tashkent, 2016. The Program covers development of transport infrastructure, connectivity, improvement of trade and transport conditions, improvements at the border crossings and of the customs control, financial cooperation, investments, protection of environment, energy, agriculture and tourism, border and regional cooperation. It is supplemented by more than 30 cooperation projects of which more than 50 per cent of them are in the area of trade and transport facilitation and transport infrastructure.[13] In 2018, a working group was created to implementation of the Program.[14]

Memorandum of understanding between People's Republic of China, Mongolia and the Russian Federation on Development of the Program of Creation of China – Mongolia – Russia Economic Corridor, Ufa, 2015.[15]

Bilateral agreements

An agreement on international road transport between the Government of the People's Republic of China and the Government of the Russian Federation, Beijing, 8 June 2018. The agreement removed restrictions on routes to be used by the international bilateral road transport within their territories, requested that the vehicles be equipped with GLONASS or Beidou navigation devices. However, the road permit system has remained.[16]

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[11] First Meeting of the Joint Commission for the Intergovernmental Agreement on International Road Transport along the Asian Highway Network. China-Russia Meeting on Bilateral Transport of Dangerous Cargoes. (Первое Заседание Совместной Комиссии. По Межправительственному Соглашению о Международных Автомобильных Перевозках По Сети Азиатских Автомобильных Дорог. Заседание Экспертов России и Китая По Вопросу Двусторонних Перевозок Опасных Грузов.) ', ASMAP, 2019 (https://asmap.info/detail-news/pervoe-zasedanie-sovmestnoy-komissii-po-mezhpravitelstvennomu-soglasheniyu-o-mezhdunarodnykh-avtomob).

[12] 'Соглашение Между Федеральной Таможенной Службой (Российская Федерация) и Главным Таможенным Управлением Китайской Народной Республики и Главным Таможенно-Налоговым Управлением Монголии о Взаимном Признании Результатов Таможенного Контроля в Отношении Отдельных Видов Товаров, Ташкентб 2016 (=Agreement between the Federal Customs Service (Russian Federation), General Administration of Customs of the People's Republic of China and Customs General Administration of Mongolia on Mutual Recognition of the Results of Customs Control on Selected Goods, Tashkent, 2016)' (http://customs.ru/storage/document/document_info/2019-03/18/%D0%9A%D0%B8%D1%82%D0%B0%D0%B9%20%D0%9C%D0%BE%D0%BD%D0%B3%D0%BE%D0%BB%D0%B8%D1%8F%202016%20%D0%B2%D0%B7%D0%B0%D0%B8%D0%BC%D0%BD%D0%BE%D0%B5%20%D0%BF%D1%80%D0%B8%D0%B7%D0%BD%D0%B0%D0%BD%D0%B8%D0%B5.pdf).

[13] Программа Создания Экономического Коридора Китай – Монголия – Россия (=Program of Creation of the Economic Corridor China - Mongolia - Russia), Government of Buryat Republic, http://minpromtorg.govrb.ru/rus-ch-mn.pdf.

[14] Ministry of Economic Development of the Russian Federation, Россия, Монголия и Китай Создадут Рабочую Группу По Реализации Программы Экономического Коридора (=Russia, Mongolia and China to Establish Working Group on Implementation of the Program on the Economic Corridor)' (https://www.economy.gov.ru/material/news/rossiya_mongoliya_i_kitay_sozdadut_rabochuyu_gruppu_po_realizacii_programmy_ekonomicheskogo_koridora_.html).

[15] Меморандум о Взаимопонимании Между Российской Федерацией, Китайской Народной Республикой и Монголией О Разработке Программы Создания Экономического Коридора Китай – Монголия – Россия (Memorandum of Understanding between People's Republic of China, Mongolia and the Russian Federation on Development of the Program of Creation of China – Mongolia – Russia Economic Corridor), http://old.economy.gov.ru/wps/wcm/connect/ad4238a1-6792-43be-a0b0-ca2c2c0934ed/%D0%9C%D0%B5%D0%BC%D0%BE%D1%80%D0%B0%D0%BD%D0%B4%D1%83%D0%BC+%D0%BE+%D0%B2%D0%B7%D0%B0%D0%B8%D0%BC%D0%BE%D0%BF%D0%BE%D0%BD%D0%B8%D0%BC%D0%B0%D0%BD%D0%B8%D0%B8.pdf?MOD=AJPERES&CACHEID=ad4238a1-6792-43be-a0b0-ca2c2c0934ed.

[16] Соглашение Между Правительством Российской Федерации и Правительством Китайской Народной Республики о Международном Автомобильном Сообщении От 8 Июня 2018 Года (Agreement on International Road Transport between the Government of the People's Republic of China and the Government of the Russian Federation, Beijing, 8 June 2018), http://publication.pravo.gov.ru/Document/View/0001201809170010

An agreement between the Government of Mongolia and the Government of the Russian Federation on transit of cargos by rail transport, Ulaanbaatar, 2018. The agreement prescribes principles for setting tariffs on railway transit.[17] The other agreements are the following:

- Agreement between the Government of the Russian Federation and the Government of Democratic People's Republic of Korea on International Road Transport, Moscow, 2015.
- Agreement between the Government of China and the Government of Mongolia on International Road Transport, 2011
- New Eurasian Land Bridge Economic Corridor

Multilateral agreements and arrangements

Agreement on Economic and Trade Cooperation between the Eurasian Economic Union and Its Member States, of the One Part, and the People's Republic of China, of the Other Part, Astana, 2018. Among other issues, the Agreement requires parties to simplify and streamline procedures for customs control, limit documentations and procedures needed, implement risk management technics, to mutually recognize appropriate documents, accept electronic documentation, develop and use single window services, and negotiate establishment and mutual recognition of authorized economic operators.[18]

Agreement on Facilitation of International Road Transport of the Shanghai Cooperation Organization, 2014, Tajikistan. The SCO member countries agreed to harmonization and simplification of the requirements, documentations and procedures for international road transport between the countries; mutually recognize vehicle and driver's documents and to joint efforts to develop transport infrastructure. Single round trip permit is required for operations. The number of actual road sections covered is limited by the provisions in appendix I.[19]

Bilateral agreements

Agreement on International Road Transport between the Government of the People's Republic of China and the Government of the Russian Federation, Beijing, 8 June 2018.

New agreement on international road transport between Governments of the Russian Federation and of the Republic of Kazakhstan, finalized in 2019; its signing is expected.[20]

(b) China – Central Asia – West Asia Economic Corridor

Multilateral agreements and arrangements

Trilateral Agreement among Islamic Republic of Iran, India, Afghanistan on Transit of Goods via Chabahar, Tehran, 2018.

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Agreement between the Government of the People's Republic of China and the Government of the Republic of Turkey on international road transport of goods and passengers, Beijing, 2017.

Agreement between the Government of the Republic of Kazakhstan and the Government of the Republic of Azerbaijan on International Road Transport, Baku, 2017.

Agreement between the Government of the Republic of Armenia and the Government of the Russian Federation, Yerevan, 2017.

Agreement between Islamic Republic of Afghanistan and Republic of Turkmenistan on International Road Transport, Ashgabat, 2017.

Agreement between the Government of the Republic of Uzbekistan and the Government of the People's Republic of China on international road transport, Beijing, 2017.

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Memorandum of Understanding on Aligning the Belt and Road Initiative and the Middle Corridor Initiative between Government of the People's Republic of China and Government of the Republic of Turkey, Antalya, Turkey, 2015.[23]

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Bangladesh – Bhutan – India – Nepal Motor Vehicles Agreement (not yet enforced).

Bilateral agreements

Implementation protocol to the Nepal – China Transit Transport Agreement, Beijing, 2019.

Memorandum of Understanding between the Ministry of Physical Infrastructure and Transport of Nepal and Ministry of Transport of China on cooperation in railway projects, June 2018, Beijing.

Land Border Crossing Agreement between India and Myanmar, 2018. The Agreement regulates the movement of people living in border areas of the two countries, opens bilateral road links.[24]

Nepal – China memorandum of understanding on bilateral cooperation under the framework of the Belt and Road Initiative, Beijing, May, 2017.

Nepal – China Transit Transport Agreement, Beijing, 2016.

(e) China – Indochina Peninsula Economic Corridor

Multilateral agreements and arrangements

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ASEAN Agreement on the Recognition of Domestic Driving Licences Issued by ASEAN Countries (Kuala Lumpur, 1985).

GMS Cross-border Transport Facilitation Agreement (Vientiane, 1999).

Bilateral agreements

Agreement between the Government of the People's Republic of China and the Government of the Lao People's Democratic Republic on international road transport, Beijing, 2019.

[24] Business Standard (2018).

Table Annex 3.3. Bilateral road facilitation agreements in the Asia-Pacific Region

	Afghanistan	Armenia	Azerbaijan	Bangladesh	Bhutan	Brunei Darussalam	Cambodia	China	Democratic People's Republic of Korea	Georgia	India	Indonesia	Iran (Islamic Republic of)	Japan	Kazakhstan	Kyrgyzstan	Lao People's Democratic Republic	Malaysia	Mongolia	Myanmar	Nepal	Pakistan	Philippines (the)	Republic of Korea	Russian Federation	Singapore	Sri Lanka	Tajikistan	Thailand	Turkey	Turkmenistan	Uzbekistan	Viet Nam
Afghanistan		–	–	–	–	–	–	–	–	–	–	–	2005*	–	–	–	–	–	–	–	–	2010*	–	–	–	–	–	2005	–	2005	2017	2004*	–
Armenia			–	–	–	–	–	–	–	2006	–	–	1992	–	2006	1997	–	–	–	–	–	–	–	–	2017	–	–	–	–	–	1995	1992	–
Azerbaijan				–	–	–	–	–	–	1993	–	–	2002	–	2017	1993*	–	–	–	–	–	–	–	–	2001	–	–	2007	–	1992	2008	1996	–
Bangladesh					–	–	–	–	–	–	1999*	–	–	–	–	–	–	–	–	–	1976	–	–	–	–	–	–	–	–	–	–	–	–
Bhutan						–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Brunei Darussalam							–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cambodia								–	–	–	–	–	–	–	–	–	1999	–	–	–	–	–	–	–	–	–	–	–	2008*	–	–	–	1998
China									–	–	–	–	–	–	1992	1994	2019	–	2011	–	2016	1993	–	–	2018	–	–	2008	–	2017	–	2017	1994
Democratic People's Republic of Korea										–	–	–	–	–	–	–	–	–	1996	–	–	–	–	–	2015	–	–	–	–	–	–	–	–
Georgia											–	–	1993	–	2007	1997	–	–	–	–	–	–	–	–	1994	–	–	–	–	1992	1993	1995	–
India												–	–	–	–	–	–	–	–	–	1999	2005*	–	–	–	–	–	–	–	–	–	–	–
Indonesia													–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Iran (Islamic Republic of)														–	1993	1993	–	–	–	–	–	2007	–	–	1992	–	–	1994	–	1980	1993	1993	–
Japan															–	–	–	–	–	–	–		–	–	–	–	–	–	–	–	–	–	–
Kazakhstan																2003	–	–	1993	–	–	1995	–	–	2003	–	–	2006	–	1995	1997	2006	–
Kyrgyzstan																	–	–	2004	–	–	1994	–	–	2002	–	–	2013	–	1991	1995	1996	–
Lao People's Democratic Republic																		–	–	–	–	–	–	–	–	–	–	–	1999	–	–	–	2001
Malaysia																			–	–	–	–	–	–	–	–	–	–	1979*	–	–	–	–
Mongolia																				–	–	–	–	–	1996	–	–	–	–	2002	–	–	–
Myanmar																					–	–	–	–	–	–	–	–	–	–	–	–	–
Nepal																						–	–	–	–	–	–	–	–	–	–	–	–
Pakistan																							–	–	–	–	–	–	–	2003	1996	2007*	–
Philippines																								–	–	–	–	–	–	–	–	–	–
Republic of Korea																									–	–	–	–	–	–	–	–	–
Russian Federation																										–	–	2001	–	1988	1995	2000	–
Singapore																											–	–	–	–	–	–	–
Sri Lanka																												–	–	–	–	–	–
Tajikistan																													–	1996	2007	2018	–
Thailand																														–	–	–	–
Turkey																															1992	1992*	–
Turkmenistan																																1996	–
Uzbekistan																																	–
Viet Nam																																	

Source: Compiled based on the open sources.
Note: * Document covers are relevant to the road transport, but it is not purely a road transport agreement.

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