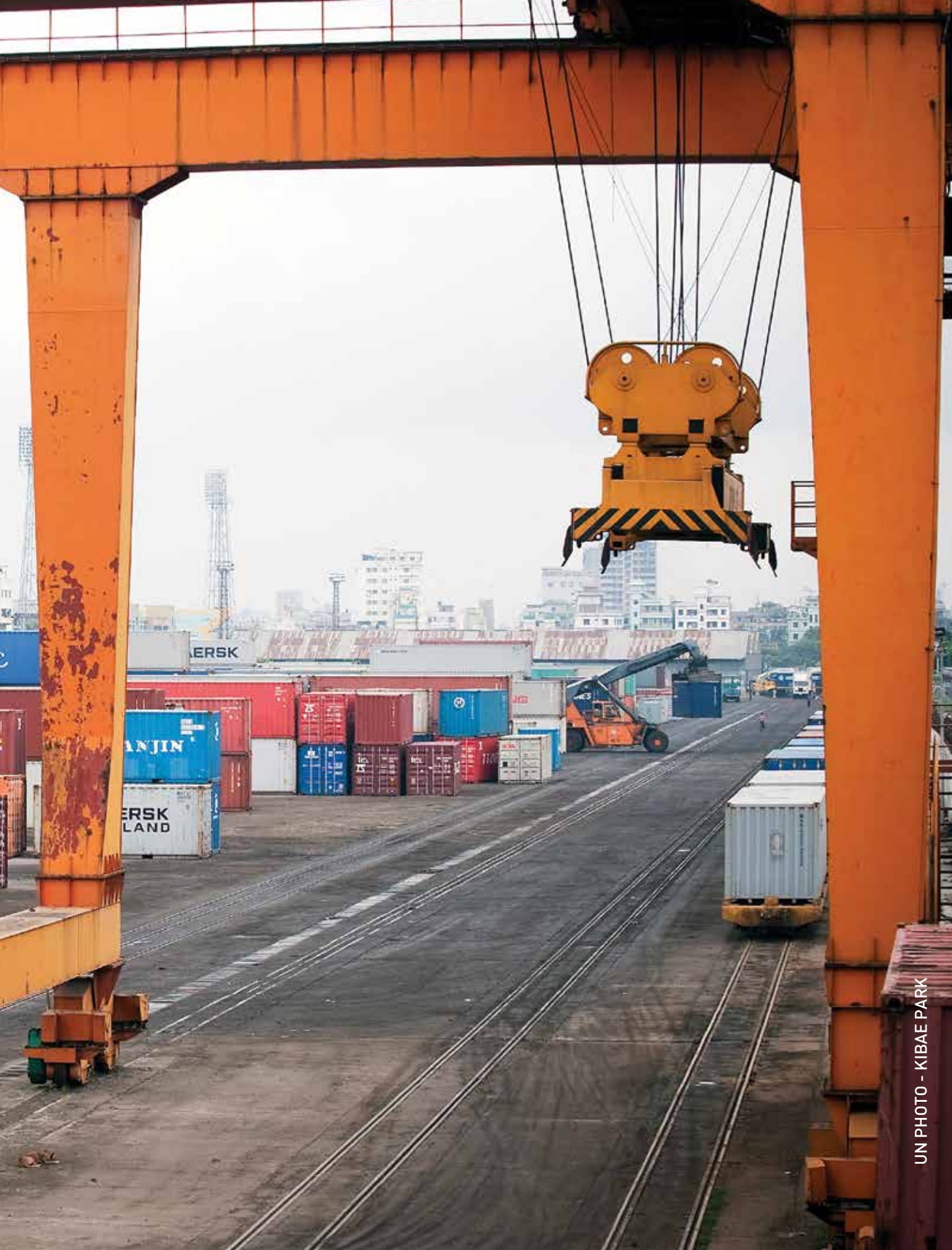


# PART II

## REGIONAL CONNECTIVITY FOR SHARED PROSPERITY



## REGIONAL CONNECTIVITY FOR SHARED PROSPERITY

# 4

**T**he Asia and the Pacific region has grown rapidly, with the intensification of its networks of trade, production and people. However, these networks are denser and more productive in some parts of the region than in others. Over the coming decades, countries across Asia and the Pacific will be looking for ways to expand connectivity and to ensure that the region's growing prosperity is more widely shared.

## INTRODUCTION

Asia and the Pacific is the world's most dynamic region. Over the past 50 years it has experienced unprecedented economic growth, much of which has been export driven, initially among the newly industrialized economies, but more recently also in China and in India. This growth, along with better standards of education and health, has contributed to dramatic falls in poverty. The region's achievement in poverty reduction has been remarkable: despite an overall population increase of about 900 million people, the population living below \$1.25 per day dropped from about 1.6 billion in 1990 to under 750 million in 2011.<sup>1</sup>

However, as noted by the Asian Development Bank, ESCAP and the United Nations Development Programme in the publication entitled *Asia-Pacific Aspirations: Perspectives for a Post-2015 Development Agenda*, the region still has unacceptable levels of poverty.<sup>2</sup> According to this report, almost two thirds of the world's poor, as measured by the \$1.25 poverty line, live in this region. Indeed, reflecting the large populations of China, India, Indonesia and Pakistan, there are currently more poor people living in middle-income countries than in low-income countries. There are also large numbers of people living just above the extreme poverty line, or in "near poverty": if \$2 per day is used as a benchmark, the number of poor people doubles from 743 million to 1.64 billion. In other words, about 40% of the region's population subsists on less than \$2 a day.<sup>3</sup>

Furthermore, the region's growing prosperity has not been shared equally, and there are clear signs of rising inequality, both within and between countries. As discussed in part I of the *Economic and Social Survey of Asia and the Pacific 2014*, inequality has declined in some countries since the early 1990s, but has increased in some larger economies, including China, India and Indonesia. Just as significant is the extent of inequality between countries. A recent study concluded that, in Asia, "the gap between advanced economies and the least developed is the largest of any region of the world".<sup>4</sup>

## Connecting countries creates new opportunities for development

One of the most important contributors to the region's economic growth has been infrastructure development – particularly in the transport, energy and telecommunications sectors.<sup>5</sup> At the national level, public investment has been shown to have a direct impact on GDP growth, with some analyses suggesting that, on average, a 1% increase in the stock of infrastructure lifts GDP by 0.08%.<sup>6</sup> These critical infrastructure networks have stimulated growth by providing domestic enterprises with access to a greater pool of resources and markets, thereby enabling them to scale up their production and reach a broader consumer base. Recent research also shows that improved telecommunications have enhanced the access of rural communities to information and financial services.<sup>7</sup>

At the regional level, progress has been made in forging linkages between countries through the development of regional infrastructure networks, thereby opening up both physical and virtual access to regional and global markets. Today, most countries in continental Asia are connected through the Asian Highway and Trans-Asian Railway networks, while coastal countries and small island developing States are linked through maritime services. Moreover, in most of the region's capitals and major cities, it is now possible to connect to broadband Internet.

These linkages have driven the region's economic success by facilitating international trade, foreign direct investment (FDI) flows, and the establishment of global and regional production networks and global value chains. These new systems for manufacturing, distribution and consumption have helped many countries in the region to diversify their economies, reducing their dependence on traditional sectors, such as agriculture and natural resource extraction, and creating new jobs, particularly in labour-intensive sectors, such as garments and electronics.

Emerging economies in particular have benefited from regional and global value chains. In China, for

example, the income derived from trade flows within global value chains, measured as “export of domestic value added,” increased six-fold between 1995 and 2009, and the number of jobs generated by export of value added increased from 89 million in 1995 to 146 million in 2008.<sup>8</sup> However, not all countries in the ESCAP region have been as successful in terms of expanding trade and attracting more investment to their economies.

It is therefore timely that the Commission selected the theme of “Regional connectivity for shared prosperity” for its seventieth session, held in 2014. On one hand, it is evident that countries and people in the ESCAP region are becoming more and more connected in a variety of ways. On the other, it is less evident how this increasing connectivity has shaped the region’s recent development, and what kinds of connectivity will be needed to help to reduce poverty and to achieve more balanced and inclusive growth across the region. This year’s Theme Study, which constitutes part II of the *Economic and Social Survey of Asia and the Pacific 2014*, explores these questions and presents a set of regional strategies for strengthening regional connectivity in Asia and the Pacific.

### Understanding “regional connectivity”

In recent years, the concept of “connectivity” has broadened and entered into mainstream development discourse. A good example is the Master Plan on ASEAN Connectivity, which was one of the first comprehensive strategic policy frameworks to explicitly address the issue of connectivity in various sectors. ESCAP has also promoted connectivity as a necessary and integral aspect of regional integration and has identified a number of key regional networks at the core of regional connectivity, namely trade and transport, information and communications technology (ICT), energy infrastructure and people-to-people networks.<sup>9</sup> These regional networks reinforce each other and as such their simultaneous development is critical in achieving effective regional connectivity and in maximizing its benefits.

It is becoming evident that regional connectivity will offer best results if it enhances the effectiveness of regional networks to facilitate flows of goods, services, people and knowledge. It is therefore necessary to look beyond traditional analyses of connectivity, which were focused on the physical dimensions of networks, to consider also their qualitative aspects. Given that the effectiveness of each network is increasingly dependent on the connectivity of other networks, the multisectoral nature of these networks also needs to be considered.

The present chapter begins with a discussion of recent drivers of economic growth in the ESCAP region. It traces the evolution of international trade and FDI and the role of trade and transport connectivity in supporting these flows. It then contains a discussion of future drivers of growth that have the potential to transform the spatial pattern of the region’s economic and social development, and the types of connectivity that will be needed in order to benefit from these drivers.

## THE ROLE OF REGIONAL CONNECTIVITY IN SUPPORTING GROWTH AND DEVELOPMENT

Various factors have shaped the pace and pattern of the region’s economic and social development. Some are related to geography – in terms of location and topography, as well as natural factor endowments and population densities. Other factors are related to domestic government policies or the occurrence of wars or natural disasters. However, numerous studies suggest that the main drivers behind the region’s economic success have been international trade, FDI and the establishment of global and regional production networks and global value chains.<sup>10</sup>

### Regional integration efforts drive initial trade growth

Trade in the ESCAP region has expanded as a result of a combination of converging and mutually

enhancing factors. One of the most significant has been the acceleration of regional integration, driven primarily by government efforts to liberalize trade. The 1997/98 Asian financial crisis served as a catalyst for countries in the ESCAP region to pay greater attention to the benefits of regional economic integration and to make stronger political commitments to trade liberalization.<sup>11</sup> For example, the Association of Southeast Asian Nations (ASEAN) began formalizing ties with China, Japan and the Republic of Korea, resulting in the first annual ASEAN Plus Three Summit in 1998. At about the same time, member States of the South Asian Association for Regional Cooperation (SAARC) started developing the Agreement on South Asian Free Trade Area (SAFTA), which came into force in 2006.

Countries that recognize the potential gains from regional connectivity typically start by reducing border trade barriers. Since the mid-1990s, many countries have also been actively negotiating trade or broader economic partnership agreements on a bilateral basis. Today, there are 149 preferential trade agreements, bilateral and plurilateral, in force in the Asian and Pacific region (see figure 4.1). Another 73 agreements are at various stages of negotiation. Further liberalization is expected following the ongoing negotiation of several “mega-bloc agreements,” such as the Trans-Pacific Partnership Agreement,

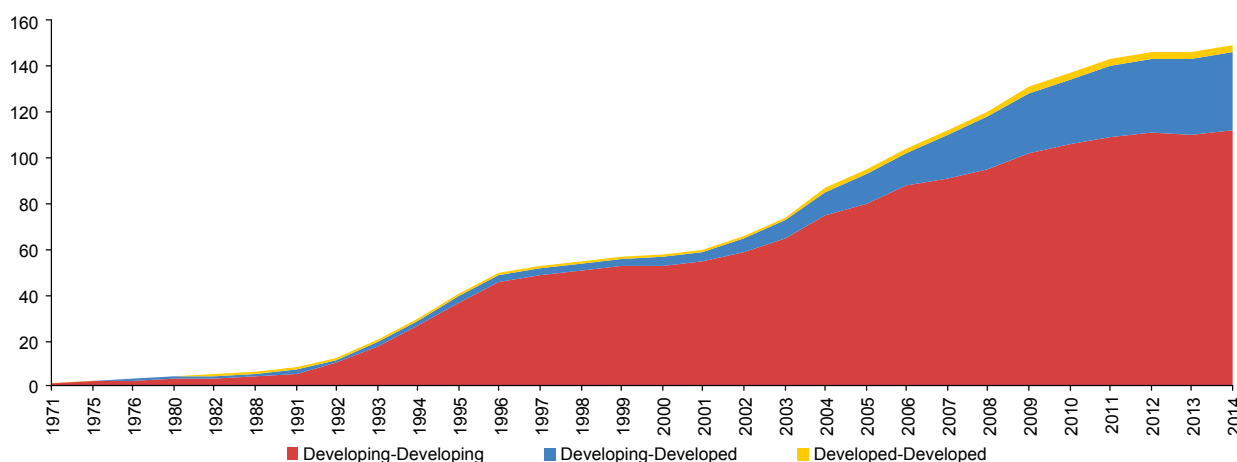
led by the United States of America, and the Regional Comprehensive Economic Partnership, led by ASEAN and six of its major partners: Australia, China, India, Japan, New Zealand and the Republic of Korea.

ESCAP has estimated that the welfare gains associated with region-wide liberalization through the expansion of existing trade agreements or the implementation of new ESCAP-wide agreements may amount to as much as \$140 billion.<sup>12</sup> While a detailed discussion of trade policy and preferential trade agreements is beyond the scope of this publication, it is important to keep in mind that they provide the institutional foundation on which regional connectivity may be achieved.<sup>13</sup>

### Emergence of regional production networks and value chains

Progress in trade liberalization contributed to the rise and the reach of FDI flows, which, together with technological changes in manufacturing processes and the diffusion of ICT, created conducive conditions for regional production networks.<sup>14</sup> Industries were able to divide their value chains into portable components and relocate parts of those industries in other countries – leading to the emergence of “global production sharing”.<sup>15</sup> This process

Figure 4.1. Trade agreements in Asia and the Pacific



Source: ESCAP calculations, based on data from the ESCAP Asia-Pacific Preferential Trade and Investment Agreements Database.

is essentially a reflection of “efficiency-seeking industrial restructuring”, or the spatial fragmentation of industry across borders to exploit economies of scale, specialization and savings in labour and material costs.<sup>16</sup>

Thus, starting in the 1980s, businesses from Europe, Japan, North America and the Republic of Korea began relocating their industrial production first to Hong Kong, China; Singapore; and Taiwan Province of China, and then in the late 1990s and 2000s to China and South-East Asia, particularly Indonesia, Malaysia, the Philippines and Thailand. As production costs rose in these economies, investors began turning to Viet Nam and other ASEAN member States as potential destinations. As a result, in 2012, ASEAN members comprised the only area in the ESCAP region to experience positive growth in FDI inflows.<sup>17</sup>

The changing spatial distribution of regional production networks partly explains why, since

2009, intraregional trade has been growing faster than trade with the region’s more traditional trading partners in Europe and North America – and also why in 2012, East and North-East Asia and South-East Asia accounted for about 75% of total intraregional trade (see table 4.1). This growth in intraregional trade reflects the increase in the trade of intermediate goods. The emergence of these networks also explains why intraregional FDI flows, mostly originating in East Asian countries but also increasingly from within ASEAN, have increased significantly in the last 10 years.

Clearly China has played a pivotal role, emerging as a critical link in the assembly of products coming from East Asia and South-East Asia and consumed in global markets. In 2011, nearly 50% of China’s imports of intermediate goods were from developing Asian and Pacific economies and Japan.<sup>18</sup> This explains why East Asia has the deepest degree of trade integration of all subregions, as measured by intra-subregional trade. This is followed by South-East

**Table 4.1. Trends in intraregional merchandise trade of developing Asia and Pacific countries (2000, 2008 and 2012)**

*Share of intraregional exports by destination (percentage of intraregional exports)*

Exports to	East and North-East Asia			South-East Asia				South and South-West Asia				North and Central Asia		Pacific	
	Total	China	Rest	Total	Singapore	ASEAN5	Rest	Total	India	SAFTA excl. India	Rest	Total	Russian Federation	Rest	
2000	46.0	13.8	32.2	40.2	13.8	25.0	1.4	9.1	3.1	3.0	3.0	4.2	2.4	1.8	0.5
2008	45.9	16.2	29.7	31.4	8.4	21.8	1.1	13.4	5.8	3.0	4.7	8.5	4.4	4.0	0.8
2012	46.6	12.5	34.0	32.3	7.1	23.5	1.7	13.3	5.6	3.4	4.3	7.2	3.8	3.4	0.7
Change from 2011 (percentage points)	-2.0	-5.3	3.3	1.0	0.0	0.7	0.2	0.0	-0.8	0.7	0.1	1.5	0.3	1.1	-0.4

*Share of intraregional imports by source (percentage of intraregional imports)*

Imports from	East and North-East Asia			South-East Asia				South and South-West Asia				North and Central Asia		Pacific	
	Total	China	Rest	Total	Singapore	ASEAN5	Rest	Total	India	SAFTA excl. India	Rest	Total	Russian Federation	Rest	
2000	50.4	31.4	18.9	37.0	11.1	25.3	0.6	6.2	2.7	0.8	2.7	6.2	4.5	1.7	0.2
2008	48.7	31.9	16.8	32.8	8.8	23.1	0.8	10.0	4.4	0.6	5.0	8.4	6.5	1.9	0.2
2012	49.4	30.8	18.6	32.9	8.0	24.2	0.8	8.7	3.9	0.7	4.1	8.9	6.2	2.7	0.2
Change from 2011 (percentage points)	-0.4	-1.0	0.6	-0.9	-0.3	-0.7	0.1	-0.7	-0.6	0.0	0.0	1.6	1.0	0.6	0.0

Source: ESCAP calculations, based on data from the United Nations Commodity Trade Statistics Database (2013).

Notes: ASEAN5: Indonesia, Malaysia, Philippines, Thailand and Viet Nam. SAFTA: Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Rest: rest of the world.

Asia, where countries such as Malaysia and Thailand have become important players in electronics and automobile production networks.

### Explaining differences in subregional performance

In contrast, other subregions have participated much less in intraregional trade and investment. As table 4.1 shows, in 2012, South and South-West Asia accounted for only 13% of exports and 8.7% of imports, while North and Central Asia had even smaller shares at 7.2% and 8.9% of exports and imports, respectively. Intraregional FDI followed similar patterns. Meanwhile, intra-subregional trade and investment flows in these subregions have been dominated by two large countries, namely India in South and South-West Asia, and the Russian Federation in North and Central Asia.

Almost all countries in the ESCAP region have taken significant measures to liberalize their markets. The differences in subregional trade performance are therefore only partly explained by preferential and

regional trade and investment agreements. Other factors, particularly trade costs, significantly influence business decisions on where to invest and trade. This result is confirmed by the ESCAP-World Bank Trade Cost Database (see table 4.2).<sup>19</sup> This database provides a comprehensive aggregate measure of all costs involved in trading goods internationally with another partner (that is, bilaterally) relative to those involved in trading goods domestically. It therefore captures not only international transport costs and tariffs but also other trade costs, such as the direct and indirect costs associated with cumbersome import or export procedures and inefficient logistics or payment services, as well as differences in currencies and languages.

According to the above-mentioned ESCAP-World Bank database, comprehensive trade costs between South Asian economies (SAARC-4: Bangladesh, India, Pakistan and Sri Lanka) and South-East Asian economies (ASEAN-4: Indonesia, Malaysia, Philippines and Thailand) are higher than those between either subregion and the European Union or the United States. Meanwhile, the data also suggest

**Table 4.2. Intraregional and extraregional comprehensive trade costs (excluding tariff costs) in the Asian and Pacific region, 2006-2011**

Region	ASEAN-4	East Asia-3	North and Central Asia	Pacific Islands Developing Economies	SAARC-4	Australia-New Zealand	EU-3
ASEAN-4	77 (10)						
East Asia-3	77 (8)	52 (-8)					
North and Central Asia	387 (6)	220 (-11)	141 (0)				
Pacific Islands Developing Economies	263 (31)	268 (36)	308 (17)	107 (-31)			
SAARC-4	124 (2)	124 (2)	270 (-10)	342 (13)	107 (4)		
Australia and New Zealand	99 (2)	91 (-2)	323 (-5)	137 (48)	144 (5)	54 (4)	
EU-3	111 (8)	86 (-4)	166 (-3)	327 (38)	114 (7)	110 (1)	46 (0)
USA	84 (13)	63 (-1)	189 (2)	228 (19)	107 (8)	97 (2)	67 (1)

Source: ESCAP-World Bank (2014).

Notes: Trade costs may be interpreted as tariff equivalents. Percentage changes in trade costs between 2000-2005 and 2006-2011 are in parentheses. ASEAN-4: Indonesia, Malaysia, Philippines and Thailand. East Asia-3: China, Japan and Republic of Korea. EU-3: France, Germany and United Kingdom of Great Britain and Northern Ireland. SAARC-4: Bangladesh, India, Pakistan and Sri Lanka. Pacific island developing economies: Fiji, Papua New Guinea, Tonga and Vanuatu. North and Central Asia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan and Russian Federation.



that trade costs between Pacific island developing economies and all other subregions are significantly higher than those between other subregions, while trade costs between ASEAN-4 economies and North and Central Asia are also relatively high.

The analysis shows that trade costs within several of these subregions are also high. For example, trade costs within North and Central Asia, Pacific island developing economies and SAARC-4 economies are more than double the trade costs between China, Japan and the Republic of Korea. Bringing these costs down within subregions is therefore as important as addressing costs between subregions.

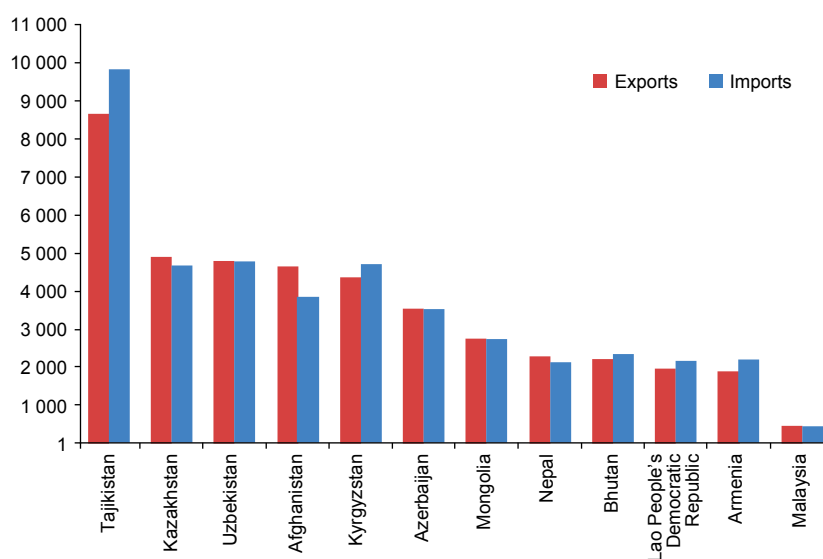
### The role of trade and transport connectivity

Given that over 80% of global merchandise trade by volume is carried by sea transport, access to maritime shipping services has been an important factor in facilitating countries' participation in global and regional production networks. For example, China's participation in the global economy depended on reaching international markets, particularly in North

America, Europe and Japan. The Government's policies were strategically geared to supporting industries in the country's special economic zones, located first in coastal areas and then extended to other major cities and regions. Government investment in maritime and other transport infrastructures positively reinforced these policies, as they made it cheaper and faster to transport imports and exports between China's maritime ports and major production centres.<sup>20</sup>

Conversely, landlocked developing countries remain at a competitive disadvantage. This is due to the extra costs and time goods spend in transit and at border crossings before reaching their nearest ports. Studies have found that international investors are discouraged from investing in landlocked developing countries because of the high costs and poor quality of transport services.<sup>21</sup> For transport operators, long travel times imply fewer turnovers for a given vehicle over a given period, while cabotage restrictions and other domestic regulations result in most vehicles returning empty, thereby adding to transport costs. Thus, as figure 4.2 shows, in 2013 the average

Figure 4.2. Average cost of importing and exporting containers: comparison of ESCAP landlocked developing countries and Malaysia



Source: World Bank, *Doing Business 2014* (Washington, D.C., World Bank, 2014).

Notes: Cost in United States dollars of getting one container of exports or imports to or from the nearest port, excluding tariffs. Based on business surveys in each country's largest business centre.

cost of exporting goods from a landlocked country in the region was 8.5 times higher than it was from Malaysia, a country with one of the lowest trade costs, while the average cost of importation was 9.2 times higher.<sup>22</sup>

Meanwhile, numerous studies have also identified the poor quality of transport infrastructure as a major barrier to trade in the region.<sup>23</sup> In South Asia, for example, the poor quality of roads, as well as missing sections and limited capacity near border crossings, reduces the connectivity of countries.<sup>24</sup> Thus, the quality of infrastructure, as well as availability, has been an important determinant of trade and transport connectivity.

### **Economies of scale in transport, competition and non-physical barriers to trade<sup>25</sup>**

The export-oriented growth of East and South-East Asian economies coincided with the rise of containerized transport. Containers revolutionized the way goods were packed and shipped. Not only did they reduce the costs of transporting goods and

make it economically viable to spread production and assembly activities across borders, they also enabled different modes of transport to be integrated into seamless systems by simplifying the transfer of freight between modes (see box 4.1).

Containerization also allowed the volume of freight to be expanded. The competitiveness of maritime transport is based on the principle of economies of scale: ships can carry more volume than other transport modes at lower costs per unit. As container ships grew in size, the average price of container transport fell, offsetting the increase in fuel prices.<sup>26</sup> The principle of economies of scale also partly explains the configuration of shipping liner services, which are typically based on hub-and-spoke systems: feeder ships from small ports carry goods to larger hub ports for consolidation, before large liner ships carry the freight to major consumption centres.

Thus, by investing in the development of container ports and shipping facilities, economies in East Asia and South-East Asia were able to take advantage of cheaper and more efficient modes of transport. This is reflected in the remarkable growth of container

#### **Box 4.1. Containerization and the growth of international trade**

The history of containerization holds several important lessons for the region's connectivity agenda. Improved interoperability between transport modes transformed the economic geography of manufacturing, as low shipping costs made it economically feasible to manufacture many more goods in one country and consume them in another. Combined with ICT connectivity, this also led to the evolution of just-in-time manufacturing processes, with further savings in logistics costs.

The impact of containers was rooted in the fundamental principle of standardization. As early as 1961, the International Organization for Standardization set standard sizes for all containers, which enabled the shipping industry to develop and invest in new types of ships, containers and port facilities, and to expand into such new businesses as logistics. A recent study which looked at the effects of containerization on international trade found that containerization accounted for a 790% rise in bilateral trade between 22 industrialized countries over a period of 20 years, leading *The Economist* magazine to conclude that "the container has been more of a driver of globalization than all trade agreements in the past 50 years taken together."

Thus, containers had far-reaching impacts on the evolution of international trade, manufacturing and logistics practices, demonstrating that relatively simple innovations can make a great difference to connectivity if all the relevant stakeholders agree to adopt them.

*Source:* "The humble hero," *Economist* (May 2013).

throughput in Asia's maritime ports: the container ports of China (including Hong Kong, China), Taiwan Province of China, Japan, the Republic of Korea (Busan) and Singapore between them accounted for more than 40% of the global total in 2012, while other ports in the region also experienced significant growth in container throughput between 2008 and 2012 (see figure 4.3).

This explains why it is difficult for shipping operators to offer regular shipping services for small countries such as small island developing States. Despite being linked to international maritime shipping routes, the small scale of operations, remoteness and geographic spread of islands, as well as various institutional and organizational constraints, contribute to the high cost of transport for these countries. For small island developing States in the Pacific, these issues are compounded by imbalanced cargo flows, low unit values for exports, irregular traffic volumes and low port capacity.<sup>27</sup>

Finally, the experience of East Asia and South-East Asia also shows that the simplification and harmonization of documents involved in international

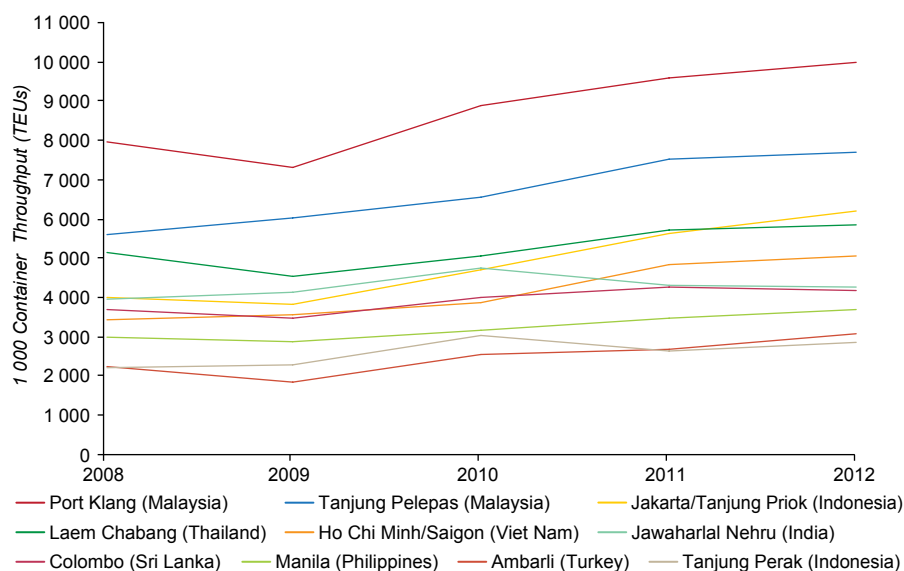
trade and transport helped businesses in these subregions to engage with each other. In fact, research done by ESCAP has found that many types of trade costs can be addressed through appropriate policy and regulatory reforms. For example, research suggests that 60-90% of trade costs are now derived from policy-related non-tariff costs, including costs at borders, the regulatory environment, maritime connectivity and services, trade procedures and currency fluctuations.<sup>28</sup> In other words, in addition to tariffs and "natural" trade costs derived from geographical and cultural factors, there are many other types of policy interventions that can help to bring down the costs of trade.

## NEW DRIVERS OF GROWTH SHAPING DEVELOPMENT PATTERNS INTO THE FUTURE

### Trade and transport connectivity remains a priority

The recent economic slowdown has exposed the region's vulnerability to fluctuations in the global

Figure 4.3. Growth in container throughput, selected ports in Asia



Source: Containerisation International, *The Containerisation International Yearbook*, various years (London, Informa plc). See *Containerisation International Yearbook 2013* for the most recent year.

Note: TEU: twenty-foot equivalent unit.

economy, in particular to spending and investment policies of the United States and of European countries.<sup>29</sup> Thus, attention is shifting to the development of domestic and regional markets as a means of stimulating growth and raising living standards, while creating new trade opportunities for the region's poorer and smaller countries.

Nevertheless, the spreading of growth opportunities from the region's more dynamic middle-income countries to their smaller and poorer neighbours cannot be taken for granted. Despite significant investment in transport infrastructure at the national level, cross-border and regional land-transport infrastructure networks remain underutilized for international trade. In many countries, the poor quality of infrastructure, lack of maintenance and unregulated use of roads by heavy vehicles also add to costs and reduce the efficiency of these networks.

At the same time, thanks to technological advances, trade and investment are now determined less by geographical distance and more by other factors, such as competitiveness, timeliness and security. This has led to a growing interest in improving "soft" infrastructure underpinning trade and transport, as well as other means of reducing logistics costs. Both ASEAN and the Asia-Pacific Economic Cooperation, for example, focus on trade and transport facilitation as part of their "institutional connectivity" agendas, while the Ninth World Trade Organization Ministerial Conference, held in Bali, Indonesia, from 3 to 6 December 2013, attempted to address the issue through its Agreement on Trade Facilitation.<sup>30</sup>

Thus, one of the region's main priorities should be to enhance trade and transport connectivity. For this purpose, countries can capitalize on various technological advances. At the same time, trade and transport connectivity can be pursued only in conjunction with efforts to enhance other types of regional connectivity. As the region attempts to consolidate its position in the global economy, as well as to lessen the development gaps between countries, Governments need to consider ways to harness new drivers of growth.

## ICT connectivity as an enabler and driver of growth

Continuous advances in ICT, in the form of mobile telecommunications and the Internet, are accelerating regional economic integration in Asia and the Pacific. ICT is both a new engine of economic growth in its own right and a valuable source of innovation across all economic sectors. Access to the Internet is transforming the conduct of business and the delivery of social services. Instant communications are becoming increasingly important in determining the efficiency of trade and services, including financial services, information and data management services, and transport and logistics services.

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*New forms of ICT connectivity are opening doors to knowledge generation and sharing*

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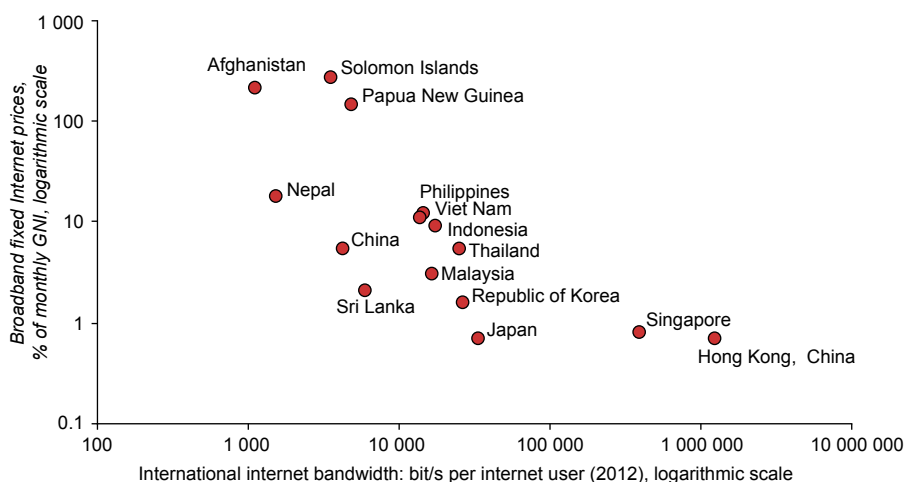
Meanwhile, the foremost tool for people-to-people connectivity across cities, countries and regions is the Internet. New forms of ICT connectivity are opening doors to knowledge generation and sharing: distance learning and broadband-enabled classrooms are increasing educational opportunities, bringing digital textbooks and teachers to remote cities and villages. Nowhere has this been more evident than in the Pacific, where islanders now have new opportunities to participate in tertiary education through distance learning courses (see box 5.8 in the next chapter). Through the Internet, knowledge networks and communities of practice are emerging in every field, ranging from scientific research platforms to disaster management networks to cultural interest groups.

However, Asia and the Pacific remains the most digitally divided region in the world. The high cost of international bandwidth has made Internet access unaffordable for much of the region. It is estimated that roughly 30% of people in Asia and the Pacific use the Internet, while only 7.4% are believed to have access to high-speed fixed broadband.<sup>31</sup> Paradoxically, low levels of international bandwidth correlate with the high prices of basic monthly

broadband Internet packages in most developing economies in Asia and the Pacific (see figure 4.4). Particularly disadvantaged are least developed markets, such as Myanmar and the Lao People's Democratic Republic, where domestic user prices are more than 10 times higher than those of Singapore.

In 2014, ESCAP undertook a study to assess the contribution of broadband to economic growth and found that broadband penetration had a positive impact on growth in GDP per capita (see box 4.2). On average, a 10% growth in broadband penetration was found to be associated with a 1.34 percentage

Figure 4.4. Broadband indicators, selected Asian and Pacific economies, 2012



Sources: International Telecommunication Union, *Measuring the Information Society* (Geneva, ITU, 2013). International Internet bandwidth for Nepal: World Bank and International Telecommunication Union, *The Little Data Book on Information and Communication Technology 2013* (Washington, D.C., World Bank and ITU, 2013).

#### Box 4.2. Measuring the contribution of broadband to economic growth

In 2014, using the World Bank's methodology, ESCAP assessed the contribution of broadband to economic growth by replicating the cross-country growth model and data for 35 developing economies in Asia and the Pacific, from 1997 to 2012 (see annex I). Both growth models are based on the endogenous growth theory.

The results for the developing economies in the ESCAP region show that broadband penetration has a positive impact on growth in GDP per capita. On average in ESCAP developing countries, a 10% growth in broadband penetration was found to be associated with a 1.34 percentage point increase in GDP per capita growth. The estimated impact is strong for some countries, notably Kazakhstan, which experienced an increase of \$162.40 in per capita GDP, while for Turkey and Malaysia the corresponding figures are \$142.90 and \$139.80 respectively. Even such small island developing States as Maldives and Tonga experienced increases of \$88 and \$60.20, respectively.

Moreover, beyond certain thresholds of a critical mass in broadband penetration, the positive impacts of broadband access increase progressively, probably due to network externalities and productivity gains across various sectors of the economy.

Source: ESCAP calculations, based on C.Z-W. Qiang, C. Rossotto and K. Kimura, "Economic impacts of broadband", in *Information and Communications for Development 2009: Extending Reach and Increasing Impact* (Washington D.C., World Bank, 2009).

Notes: Results were statistically robust with a positive and significant coefficient at a 1% level. The R-squared was 0.4349, while the coefficient of broadband penetration impact on GDP growth between 1997 and 2012 was positive at 0.134.

point increase in GDP per capita growth for ESCAP developing countries, amounting to an average of \$49.60 in GDP per capita. ESCAP further estimated that a sizeable impact on GDP per capita can be achieved by increasing Internet access, as measured by target 4 of the Broadband Commission for Digital Development which states: “By 2015, Internet user penetration should reach 60% worldwide, 50% in developing countries and 15% in LDCs”.<sup>32</sup>

Businesses and markets are driven and rewarded by the uptake of new technology and the speed at which information can be accessed. Similarly, individuals who can access broadband Internet are increasingly at an advantage over those who cannot. Thus, the “digital divide” is translating into new types of inequality that cut across geography, gender, age groups and levels of income and education. For example, even among the new “digital natives,” or those young adults who have interacted with digital technologies throughout their lives, there are enormous disparities between countries: in the Republic of Korea, 99.6% of young people have been active on the Internet for at least 5 years, while in Timor-Leste this figure is less than 1%.<sup>33</sup> This stark divide – young people in the region living in two vastly different digital worlds – has enormous implications for the future. The key challenge for countries in the region will be to develop physical infrastructure to strengthen ICT connectivity, as well as to make the Internet accessible for all.

### Expanding the region’s trade in services

During the recent period of global and regional recovery, global trade in goods has been outpaced by global trade in services, particularly in developing economies. Since the early 2000s, the Asian and Pacific region has been performing better than the rest of the world. Between 2002 and 2012, its share of global exports of services rose from 23% to 28%, while its share of imports of services also rose, from 27% to 31%.<sup>34</sup>

In particular, the region is becoming an increasingly important player in commercial services exports,

broadly categorized as transportation, travel and other commercial services. Notably, the export growth of the region’s developing economies is faster than that of the region’s developed economies.<sup>35</sup> Today, China; Hong Kong, China; India; the Republic of Korea; and Singapore are the region’s leading exporters of commercial services, while some non-traditional services exporters, such as Azerbaijan; Georgia; Kyrgyzstan; Macao, China; and Mongolia have increased their share in total Asian services exports.<sup>36</sup>

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*The region’s most dynamic commercial services sector is travel, with growth driven by intraregional demand*

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Services, in particular so-called infrastructural services, have wide-reaching effects on other sectors. Recent research has led to changes in the way that services are estimated (in value added terms) and to a recalculation of the role of services in global trade, including in the production of goods.<sup>37</sup> This research suggests that services that support better connectivity, namely transport, logistics, communications, finance, and business and professional services facilitate the expansion of trade in goods, as well as travel and international tourism.<sup>38</sup>

Meanwhile, the region’s most dynamic commercial services sector is travel, with growth driven by intraregional demand. In 2013, the Asian and Pacific region captured close to 23% of total global international tourist arrivals, with South-East Asia and South Asia leading the way in increasing their market share (see table 4.3). Improved air connectivity has supported this growth. According to statistics on airport passenger numbers, in 2012 the region registered nearly 1.69 billion passengers, an increase of 8% from that of the previous year. This number exceeds the total number of passengers arriving and leaving airports in Europe and North America, excluding transit passengers.<sup>39</sup>

For many least developed countries, landlocked developing countries and small island developing

Table 4.3. International tourism trends, 1990-2012

	International tourist arrivals (millions)							Market share (per cent)	Average annual growth
	1990	1995	2000	2005	2010	2011	2012	2012	2005-2012
World	436	529	677	807	949	995	1 035	100	3.6
Asia & the Pacific	5.8	82.0	110.1	153.6	205.1	218.2	233.6	22.6	6.2
North-East Asia	26.4	41.3	58.3	85.9	111.5	115.8	122.8	11.9	5.2
South-East Asia	21.2	28.4	36.1	48.5	70.0	77.3	84.6	8.2	8.3
Oceania	5.2	8.1	9.6	11.0	11.6	11.7	12.1	1.2	1.4
South Asia	3.1	4.2	6.1	8.1	12.0	13.5	14.1	1.4	8.2

Source: World Tourism Organization, *Tourism Highlights: 2013 Edition* (Madrid, UNWTO, 2013).

States, tourism is a significant and growing source of foreign exchange. The formation of the proposed ASEAN Economic Community in 2015 is expected to provide the ASEAN region with an additional boost in tourism, especially in Cambodia, the Lao People's Democratic Republic, Myanmar and Viet Nam, the so-called CLMV economies. Tourism can also be seen as a form of cultural exchange that contributes to greater respect and understanding among the region's diverse peoples.

In the future, these service sectors will offer alternative sources of growth for countries that are distant from major regional production and consumption centres, including landlocked developing countries and small island developing States. However, as services increasingly rely on fast and reliable Internet and telecommunications systems, their growth will depend on the availability of broadband connectivity.

### Energy connectivity and security

Asia and the Pacific remains heavily dependent on fossil fuels. In 2011, the region accounted for about 40% of global oil and gas consumption, and 70% of global coal consumption.<sup>40</sup> The situation is unlikely to change as the region's economic growth and rising affluence is resulting in a growing demand for energy resources. For example, the Asian Development Bank has estimated that, by 2035,<sup>41</sup> the region will consume more than half of the world's supply of energy, with electricity consumption more than doubling between now and 2035. Because the region is heavily reliant on fossil fuels, its energy

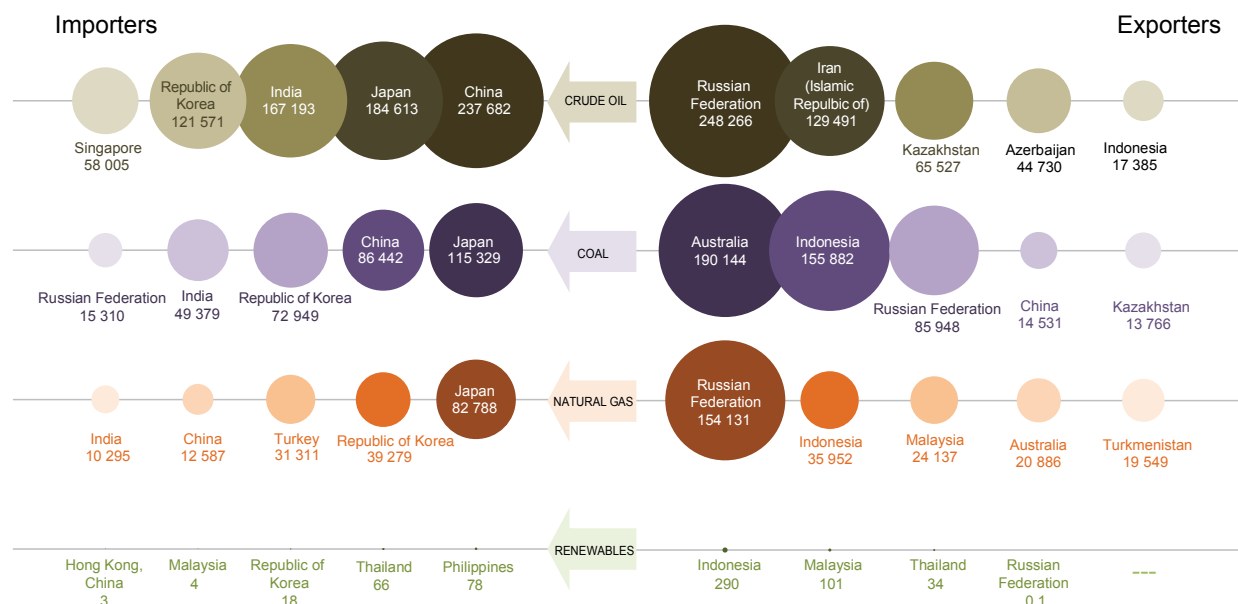
use is contributing to climate change, with its share of global carbon dioxide emissions increasing from 38% in 1990 to about 50% in 2008.<sup>42</sup>

While several countries in the region are net exporters of energy, only a few countries satisfy their energy needs from their own resources (see figure 4.5). The region as a whole is a net importer of primary energy. Notably, some countries are both major importers and exporters of energy, suggesting that even energy-rich countries are dependent on others for energy security. Meanwhile, other countries, particularly in the Pacific, are heavily dependent on imports of fossil fuels for their energy needs. The uneven distribution of energy supplies results in significant differences in power generation costs.

Meanwhile, access to energy varies widely from country to country, and even within countries. As of 2010, there were still 628 million people in the region without access to electricity and 1.8 billion people using traditional biomass – a distinctive characteristic of poverty.<sup>43</sup> Populations with low electricity access are concentrated in South Asia and in the Pacific, where more than 70% of their populations still lack access to on-grid electricity.<sup>44</sup>

Sustainable human development depends on adequate, reliable and affordable supplies of energy, that is, energy security. Without energy security, the region will miss significant growth opportunities, and the impact will be on both energy-poor and energy-rich countries. It is therefore critical to optimize the region's available resources.

Figure 4.5. Top five importers and exporters by energy resource in Asia and the Pacific, 2010 (ktoe)



Source: ESCAP, *Statistical Perspectives: Focus Areas for Realizing Enhanced Energy Security* (2013)

In this regard, many countries in the region, particularly those that have grown rapidly in recent years, are involved in cross-border initiatives to secure energy from other countries (see box 4.3). These initiatives can be divided into three main groups: infrastructural projects of inter-subregional

or subregional significance; infrastructural projects of bilateral significance; and maritime energy trade projects. Previous ESCAP studies have described the status of these initiatives, as well as longer-term plans for subregional and multi-country cooperation in energy.<sup>45</sup>

### Box 4.3. Growing energy demand fuels China's regional energy connectivity efforts

China's rapid economic growth is reflected in the country's swift expansion of energy production and consumption. In 2010, China's energy production (solid, liquid, gas and primary electricity) was estimated to account for about 36% of the region's total production, while its share of total regional consumption was estimated to account for about 41%. Although total energy imports into China amount to only approximately 4% of its total energy demand, the country depends on imports for approximately 50% of its liquid fuel (oil and petroleum products) and 10% of its gaseous fuel.

The Government has therefore followed a variety of strategies to improve energy connectivity. Starting with neighbouring countries, such as the Russian Federation, it has expanded its trade in energy to the Democratic People's Republic of Korea, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam. On 21 May 2014, Gazprom in the Russian Federation and the China National Petroleum Corporation signed a 30-year contract on Russian natural gas supplies to China via the eastern route worth a total of \$400 billion. The deal involves the supply of 38 billion cubic metres of natural gas to China annually. A number of power trade agreements with Kazakhstan and Mongolia are under negotiation.



**Box 4.3. (continued)**

Meanwhile, the Government has also invested in the region's physical infrastructure, such as pipelines and power grids. For example, the surge in imported gaseous fuel in China is the result of the completion of the gas pipeline from Turkmenistan to China through Uzbekistan and Kazakhstan in 2009. Unlike oil and gas, power grid connection has also provided opportunities for China to export its electricity to other countries. For instance, Viet Nam has signed a power purchase agreement with China Southern Power Grid to purchase 200 million Kwh annually, while Thailand is negotiating with China to have joint investment in hydropower projects in Yunnan and expects to buy electricity from China. Like other rapidly growing economies, China has become one of the major drivers of the region's energy integration and interdependence.

*Source:*

United Nations Economic and Social Commission for Asia and the Pacific, *Statistical Perspectives: Focus Areas for Realizing Enhanced Energy Security*. Available from [www.unescap.org/resources/statistical-perspectives-focus-areas-realizing-enhanced-energy-security](http://www.unescap.org/resources/statistical-perspectives-focus-areas-realizing-enhanced-energy-security)

International Energy Agency, IEA World Energy Statistics and Balances database (2013). Available from [www.oecd-ilibrary.org/energy/data/iea-world-energy-statistics-and-balances\\_enestats-data-en](http://www.oecd-ilibrary.org/energy/data/iea-world-energy-statistics-and-balances_enestats-data-en).

Financial Times, *China and Russia to sign \$400bn gas deal*. (21. May 2014) Available from [www.ft.com/intl/cms/s/0/d9a8b800-e09a-11e3-9534-00144feabdc0.html](http://www.ft.com/intl/cms/s/0/d9a8b800-e09a-11e3-9534-00144feabdc0.html)

Xinhua New Net, "The National Report on Economic Cooperation between China and GMS" (in Chinese). (September 2013). Available from [baike.baidu.com/view/7109510.htm](http://baike.baidu.com/view/7109510.htm)

What is needed now is greater energy connectivity at the regional level, along with measures to improve energy efficiency and to adopt greener options. This would reduce the gaps between supply and demand. One important measure would be to transfer power from energy-rich or lower-cost power countries to energy-poor or high-cost power countries, which would help to bridge the growing energy divide and to ensure energy security for the region as a whole.

### Responding to population dynamics

A defining feature of the Asian and Pacific region is its demographic heterogeneity. The population is changing on a scale and at a pace never before witnessed in human history: between 1950 and 2013, the region's population nearly tripled, from 1.5 billion to 4.3 billion people.<sup>46</sup> This unprecedented growth in the population is a manifestation of the demographic transition, where countries move from a regime of high mortality and high fertility to first low mortality and then low fertility.

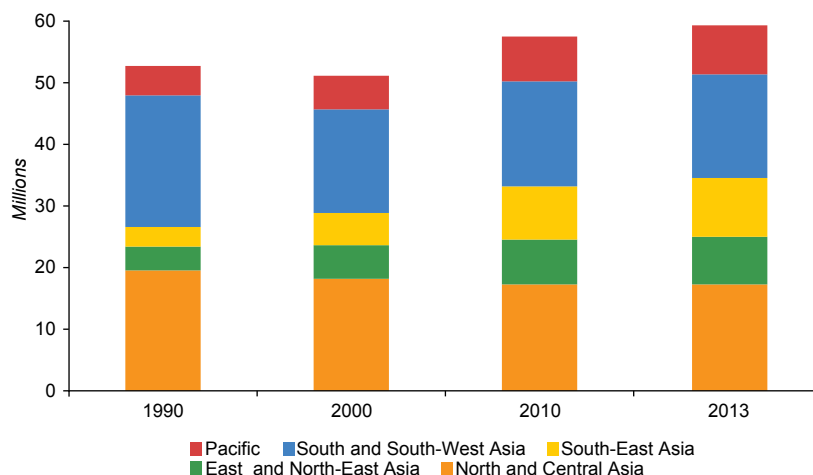
Since the 1970s, one implication of the demographic transition has been the increase in the proportion

of the population of working ages (ranging from 15 to 59 years in most countries but from 15 to 64 years in a few countries).<sup>47</sup> The number of young people in Asia and the Pacific recently peaked and is projected to decline to 717 million in 2014, with almost half (47%) living in South and South-West Asia.<sup>48</sup> At the same time, irrespective of their stage in the demographic transition, the populations of all countries in the region are currently ageing.

Today, the Asian and Pacific region is host to 59 million migrants – or one quarter of the world's total stock.<sup>49</sup> Figure 4.6 shows the distribution of migrants across ESCAP subregions, with the largest increases taking place in South-East Asia and the Pacific. In 2013, the largest number of migrants lived in the Russian Federation, followed by Australia, India, Pakistan and Thailand. Furthermore, international migrants now constitute more than one third of the population in economies such as Macao, China (59%); Brunei Darussalam (49%); Hong Kong, China (39%); and Singapore (43%).<sup>50</sup>

The implications of these demographic trends are significant for the future economic and social development of the region, and point to the urgent need for

Figure 4.6. Stock of international migrants in the ESCAP region, selected years



Source: United Nations Department of Economic and Social Affairs, "Total international migrant stock" (New York, 2014). Available from <http://esa.un.org/unmigration/TIMSA2013/migrantstocks2013.htm?mtotals>.

effective policy responses. For example, countries in the earlier stages of the demographic transition need to expand education and employment opportunities for their growing numbers of young people, while countries that are rapidly ageing need seriously to consider ways to tap into the region's labour supply.

As the region's economies develop and integrate, it is also likely that the demand for migrants will become more diversified. An increasingly important global challenge will be to manage international labour migration in ways that protect migrants, while contributing to sustainable development in countries of origin as well as in host countries.<sup>51</sup>

### Transitioning to knowledge-based economies

Global economies are increasingly based more on knowledge and information and less on physical inputs or natural resources. Knowledge is now recognized as one of the main sources of growth, driving the emergence of knowledge-intensive industries and increasing productivity across sectors. As the region becomes more connected, people in Asia and the Pacific should be able to access a wide variety of educational, training and income-

earning opportunities, thereby benefiting from the region's growing knowledge base.

With the continuing diversification of economic activities in countries in the region, the demand for more highly skilled workers is likely to increase. At the national level, this will require more investment in education, including professional and vocational training. The Asian and Pacific region is already home to many leading research institutions and universities, but countries can also take advantage of the new opportunities for tertiary education, as well as knowledge generation and sharing that are emerging from improved transport and ICT connectivity.

These forms of connectivity are also facilitating the sharing of knowledge and research between universities, researchers and industry. Some countries have successfully replicated the "Silicon Valley" model of firms with close links to universities, enabling them to benefit from knowledge spillovers generated by the universities. This is contributing to the development of high-tech clusters in some industries, such as computer software development. By strengthening regional knowledge-sharing networks, more countries could participate in different types of clusters.

## REGIONAL STRATEGIES FOR STRENGTHENING CONNECTIVITY IN THE ESCAP REGION

Regional connectivity is thus multifaceted: the connectivity of one sector influences the connectivity of others. The experience of East Asian economies suggests that trade and transport connectivity are intricately intertwined, while ICT connectivity is becoming an integral part of all networks. This highlights the need for greater coordination, not only across borders but also across sectors. At the same time, there will be new opportunities for enhancing the quality of these networks by combining the various elements in different ways.

Developing regional networks in a coordinated way can help to spread the benefits from increasing regional connectivity more evenly across countries, particularly to the least developed countries, landlocked developing countries and small island developing States. Given the unique spatial contexts in which they are located, these countries need to draw on their current endowments and focus on the specific aspects of connectivity that are expected to become important in the future.

With this in mind, the next chapter describes the current status of the connectivity of trade and transport, ICT, energy and people-to-people networks, and outlines regional strategies for strengthening these critical networks. Chapter 6 emphasizes the importance of strengthening institutional coordination and cooperation to address the multifaceted and cross-sectoral nature of regional connectivity, and recommends ways of enhancing regional connectivity for shared prosperity. Chapter 7 concludes the present publication with a summary of key recommendations.

### Annex I. Measuring the impact of broadband infrastructure on economic growth

Studies on the contribution of broadband infrastructure to economic growth and income have mostly focused

on developed countries, and even then due to the newness of the technology, the timespan of the data and research is not sufficient to refine methodologies and results. Notwithstanding this, the pervasiveness of these technologies and their ever growing potential for wealth creation and transformative development, has given rise to a flurry of studies seeking to better understand the contributions.

In 2009, the World Bank published a study which examined the economic impact of broadband, through a cross-country regression analysis based on the endogenous growth theory. The World Bank model reviewed 120 developing and developed countries. The oft quoted results show a positive impact of broadband penetration on GDP per capita growth rates, with “a 1.38 percentage point increase [in per capita GDP growth] for each 10% increase in [broadband] penetration”, in developing countries.<sup>52</sup>

Additionally, other studies have shown that unless countries strive to dramatically increase their broadband deployment, the impacts will remain below their potential. One study shows that with low broadband access (under 20%) an increase of 10% in broadband penetration contributes 0.08% to GDP growth.<sup>53</sup> For countries with medium broadband access (20-30%), GDP increases by 0.14% and with broadband access higher than 30%, the effect 0.23%.

In 2014, ESCAP undertook a study using the World Bank’s methodology to assess the contribution of broadband on per capita GDP growth. ESCAP replicated the World Bank’s cross-country regression analysis for 35 developing economies of its region, using updated data i.e. data from 1997 - the year when ITU started collecting data on broadband penetration - up to 2012, the latest available. The equation used is as follows:

$$\text{GDP9712} = \text{B0} + \text{B1} \cdot \text{GDP97} + \text{B2} \cdot \text{Literacy97} + \text{B3} \cdot \text{TELPEN} + \text{B4} \cdot \text{IY9712} + \mu$$

Definition of Variables

<b>Dependent Variable</b>	<b>GDP9712</b>	Average growth rate of real GDP per capita in US\$ over 1997-2012
<b>Control Variable 1</b>	<b>GDP97</b>	Level of real GDP per capita in 1997
<b>Control Variable 2</b>	<b>Literacy97</b>	Literacy rate in 1997
<b>Control Variable 3</b>	<b>TELPEN</b> - BBND_MOB - BBND_FIX	Average penetration of broadband between 1997 to 2012
<b>Control Variable 4</b>	<b>IY9712</b>	Average share of investment in GDP from 1997-2012

Source: ESCAP

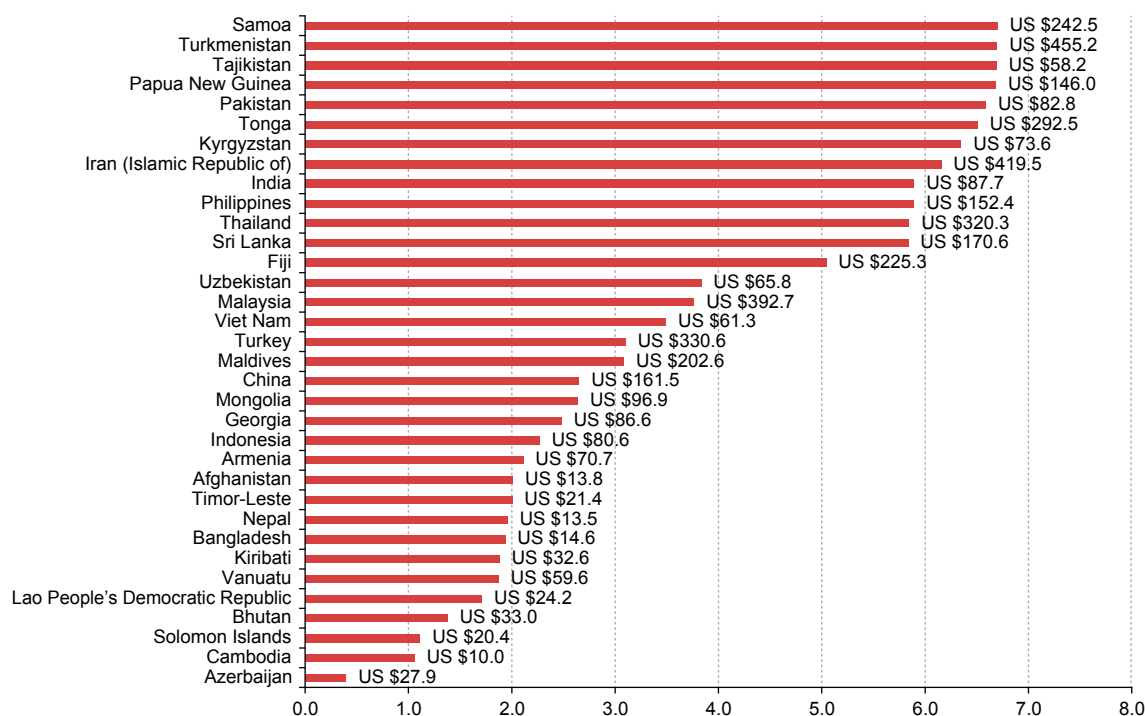
Findings

1. The results for developing countries of the ESCAP region show that broadband penetration has a positive impact on growth in GDP per capita. On average, a 10% increase in broadband penetration is associated with a 1.34 percentage point increase in per capita GDP growth, which amounts to an additional \$49.6 in per capita GDP, on average, for ESCAP developing countries. The impact is strong for some countries, notably

Kazakhstan which experiences an increase of \$162.4 in per capita GDP, while for Turkey and Malaysia the corresponding figures are \$142.9 and \$ 139.8 respectively. Even small island developing economies such as the Maldives and Tonga experience increases of \$88.0 and \$60.2 respectively.

2. Reaching the Broadband Commission target 4 on “Getting people online – by 2015” would translate in an even more sizeable impact on GDP per capita. For ESCAP developing countries

Impact of attaining Broadband Commission Target 4



Source: ESCAP staff calculations.

Note: Horizontal axis shows the gains in per capita GDP growth, associated with reaching Target 4 of the Broadband Commission, as percentage points. The figures next to the bars show the equivalent US\$.

on average, attaining the Broadband Commission Target 4 would yield an increase in per capita GDP of \$133.7 while, as shown in the figure, the impact is even larger for some countries such as Samoa and Turkmenistan. Even in a country such as Azerbaijan that already has a relatively high broadband penetration of 47%, reaching the target would add \$27.9 to per capita GDP. China, which has a penetration rate of 30% would experience an increase in per capita GDP of \$161.5. Fiji, India, the Islamic Republic of Iran, Kyrgyzstan, Pakistan, Papua New Guinea, Philippines, Samoa, Sri Lanka, Tajikistan, Thailand, Tonga, and Turkmenistan would see per capita GDP growth rates increase by more than 5 percentage points.

3. The above results could have a downward bias, due to the relatively low current penetration levels of broadband. Nevertheless, they suggest that broadband penetration has growth benefits. It should also be noted that because demand for broadband increases with wealth, penetration rates are potentially endogenous, possibly overestimating the results.

### Policy implications

Beyond certain thresholds of a critical mass in broadband penetration, the positive impacts of broadband access increase progressively, due to network externalities, productivity gains and increases in human knowledge and skills that leave no sector of the economy untouched. Consequently, this should encourage policymakers to prioritize investments in broadband infrastructure deployment at the national and regional levels, and make a big push towards the attainment of the targets set out by the Broadband Commission. In unserved or underserved areas, public-private partnerships would enhance the sustainability of investments and ensure that the goal of affordable and reliable connectivity available to all, at all times, is attained.

Deeper assessment of the linkage between ICT and variables such as market structure, competition and prices together with other measurable aspects

of prosperity (income, employment, cost of living) would require more data, including longer time series, that would allow the establishment of multiple data points for each economy in an endogenous growth regression. The Partnership on Measuring ICT for Development, of which ESCAP is a member, would need stepped up support so that it is in a position to continue leading the global efforts in producing more and better data on ICT.

### Endnotes

- <sup>1</sup> It should be noted that China accounted for the vast majority of this reduction: between 1990 and 2009, the percentage of China's population living on less than \$1.25 per day fell from 60.2% to 11.8%. See United Nations Economic and Social Commission for Asia and the Pacific, *Statistical Yearbook for Asia and the Pacific 2013*. (United Nations Publication, Sales No. E.13.II.F.1.).
- <sup>2</sup> Asian Development Bank, United Nations Economic and Social Commission for Asia and the Pacific, and United Nations Development Programme. *Asia-Pacific Aspirations: Perspectives for a Post-2015 Development Agenda – Asia-Pacific Regional MDGs Report 2012/13* (Bangkok, ADB, ESCAP and UNDP, 2013). Available from [www.adb.org/sites/default/files/pub/2013/asia-pacific-regional-mdgs-report.pdf](http://www.adb.org/sites/default/files/pub/2013/asia-pacific-regional-mdgs-report.pdf).
- <sup>3</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Statistical Yearbook for Asia and the Pacific 2013*. (United Nations Publication, Sales No. E.13.II.F.1.).
- <sup>4</sup> Asian Development Bank, *Asia 2050: Realizing the Asian Century* (Mandaluyong City, Philippines, ADB, 2011). Available from [www.adb.org/publications/asia-2050-realizing-asian-century](http://www.adb.org/publications/asia-2050-realizing-asian-century).
- <sup>5</sup> Asian Development Bank and Asian Development Bank Institute, *Infrastructure for a Seamless Asia* (Tokyo, ADB and ADBI, 2009). Available from [www.adbi.org/files/2009.08.31.book.infrastructure.seamless.asia.pdf](http://www.adbi.org/files/2009.08.31.book.infrastructure.seamless.asia.pdf); and United Nations Economic and Social Commission for Asia and the Pacific, *Growing Together: Economic Integration for an Inclusive and Sustainable Asia-Pacific Century*. ST/ESCAP/2629.
- <sup>6</sup> P. Bom and J. Lighthart, "How productive is public capital? A meta-analysis", International Studies Program Working Paper No. 09-12 (Atlanta, Georgia, Andrew

- Young School of Policy Studies, Georgia State University, 2009). Results vary depending on the region as well as the type of infrastructure.
- <sup>7</sup> There are many recent studies on the impact of ICT on rural producers. See for example the case of banking services in Papua New Guinea, which have helped farmers reduce risk through better market information and prompt payments. International Finance Corporation, "In Papua New Guinea, mobile banking brings savings and safety to farmers", 23 September 2013. Available from [www.ifc.org/wps/wcm/connect/region\\_\\_ext\\_content/regions/east+asia+and+the+pacific/news/mobile+banking+saves+farmers+money](http://www.ifc.org/wps/wcm/connect/region__ext_content/regions/east+asia+and+the+pacific/news/mobile+banking+saves+farmers+money).
- <sup>8</sup> Organisation for Economic Co-operation and Development, World Trade Organization, and United Nations Conference on Trade and Development, "Implications of global value chains for trade, investment, development and jobs: prepared for the G-20 Leaders Summit, Saint Petersburg, Russian Federation, September 2013", 6 August 2013. Available from [www.oecd.org/trade/G20-Global-Value-Chains-2013.pdf](http://www.oecd.org/trade/G20-Global-Value-Chains-2013.pdf).
- <sup>9</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Growing Together: Economic Integration for an Inclusive and Sustainable Asia-Pacific Century*. ST/ESCAP/2629.
- <sup>10</sup> J. Weiss, "Export growth and industrial policy: lessons from the East Asian miracle experience", ADB Institute Discussion Paper No. 26 (ADB, 2005). Available from [www.adbi.org/files/2005.02.dp26.eastasia.govt.policy.pdf](http://www.adbi.org/files/2005.02.dp26.eastasia.govt.policy.pdf); J. Lin, "From flying geese to leading dragons: new opportunities and strategies for structural transformation in developing countries", *Global Policy*, vol. 3, No. 4 (November 2012), pp. 397-409; and M. Ando and F. Kimura, "The formation of international production and distribution networks in East Asia", NBER Working Paper No. W10167 (Cambridge, Massachusetts, National Bureau of Economic Research, 2003). Available from <http://ssrn.com/abstract=478677>.
- <sup>11</sup> N. Kumar, "Regional economic integration, foreign direct investment and efficiency-seeking industrial restructuring in Asia: the case of India", RIS Discussion Paper No. 123 (New Delhi, Research and Information System for Developing Countries, 2007). Available from [www.eaber.org/sites/default/files/documents/RIS\\_Kumar\\_2007\\_02.pdf](http://www.eaber.org/sites/default/files/documents/RIS_Kumar_2007_02.pdf).
- <sup>12</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Growing Together: Economic Integration for an Inclusive and Sustainable Asia-Pacific Century*. ST/ESCAP/2629.
- <sup>13</sup> For more on this, see United Nations Economic and Social Commission for Asia and the Pacific, *Growing Together: Economic Integration for an Inclusive and Sustainable Asia-Pacific Century*. ST/ESCAP/2629.; United Nations Economic and Social Commission for Asia and the Pacific, *Asia-Pacific Trade and Investment Report 2011: Post-crisis Trade and Investment Opportunities* (United Nations publication, Sales No. E.11.II.F.8). Available from [www.unescap.org/sites/default/files/0%20-%20Full%20Report\\_21.pdf](http://www.unescap.org/sites/default/files/0%20-%20Full%20Report_21.pdf).; and United Nations Economic and Social Commission for Asia and the Pacific, *Asia-Pacific Trade and Investment Report 2013: Turning the Tide – Towards Inclusive Trade and Development* (United Nations publication, Sales No. E.14.II.F.2). Available from [www.unescap.org/sites/default/files/Full%20Report.pdf](http://www.unescap.org/sites/default/files/Full%20Report.pdf).
- <sup>14</sup> See for example D. te Velde and D. Bezemer, "Regional integration and foreign direct investment in developing countries", *Transnational Corporations*, vol. 15, No. 2 (August 2006), pp. 41-70; E. Yeyati, E. Stein and C. Daude, "Regional integration and the location of FDI", background paper for the seminar Looking Beyond Our Borders: Opportunities and Challenges of the New Regionalism, Inter-American Development Bank, Fortaleza, Brazil, 11 March 2002. Available from [www.iadb.org/intal/intalcdi/PE/2009/03494a02.pdf](http://www.iadb.org/intal/intalcdi/PE/2009/03494a02.pdf); D. Medvedev, "Beyond trade: the impact of preferential trade agreements on foreign direct investment inflows", Policy Research Working Paper No. 4065 (Washington, D.C., World Bank, 2006). Available from <http://elibrary.worldbank.org/content/workingpaper/10.1596/1813-9450-4065>; and G. De Monie, J.P. Rodrigue and T. Notteboom, "Economic cycles in maritime shipping and ports: the path to the crisis of 2008", in *Integrating Seaports and Trade Corridors*, P. Hall and others, eds. (Ashgate Publishing, 2010).
- <sup>15</sup> P. Athukorala, "Production networks and trade patterns in East Asia: regionalization or globalization?", Working Paper Series on Regional Economic Integration No. 56 (Mandaluyong City, Philippines, ADB, 2010). The author refers to "global production sharing" as distributing production processes across different countries.
- <sup>16</sup> N. Kumar, "Regional economic integration, foreign direct investment and efficiency-seeking industrial restructuring in Asia: the case of India", RIS Discussion Paper No. 123 (New Delhi, Research and Information System for Developing Countries, 2007). Available from [www.eaber.org/sites/default/files/documents/RIS\\_Kumar\\_2007\\_02.pdf](http://www.eaber.org/sites/default/files/documents/RIS_Kumar_2007_02.pdf).

- <sup>17</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Asia-Pacific Trade and Investment Report 2013: Turning the Tide – Towards Inclusive Trade and Development* (United Nations publication, Sales No. E.14.II.F.2). Available from [www.unescap.org/sites/default/files/Full%20Report.pdf](http://www.unescap.org/sites/default/files/Full%20Report.pdf).
- <sup>18</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Asia-Pacific Trade and Investment Report 2012: Recent Trends and Developments*. ST/ESCAP/2650., figure 1.4, p. 19.
- <sup>19</sup> The ESCAP-World Bank Trade Cost Database is available from <http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=escap-world-bank:-international-trade-costs>.
- <sup>20</sup> K. Cullinane, W.T. Fei and S. Cullinane, “Container terminal development in mainland China and its impact on the competitiveness of the port of Hong Kong”, *Transport Reviews*, vol. 24, No.1 (2004), pp. 33-56.
- <sup>21</sup> United Nations Conference on Trade and Development, *Review of Maritime Transport 2013* (United Nations publication, Sales No. E.13.II.D.9).
- <sup>22</sup> World Bank’s *Doing Business* reports, based on an average of the 11 landlocked countries in the region for which there are data (Afghanistan, Armenia, Azerbaijan, Bhutan, Kazakhstan, Kyrgyzstan, Lao People’s Democratic Republic, Mongolia, Nepal, Tajikistan and Uzbekistan).
- <sup>23</sup> See among others Asian Development Bank and Asian Development Bank Institute, *Infrastructure for a Seamless Asia* (Tokyo, ADB and ADBI, 2009). Available from [www.adbi.org/files/2009.08.31.book.infrastructure.seamless.asia.pdf](http://www.adbi.org/files/2009.08.31.book.infrastructure.seamless.asia.pdf); and United Nations Economic and Social Commission for Asia and the Pacific, *Review of Developments in Transport in Asia and the Pacific*. ST/ESCAP/2627.
- <sup>24</sup> L. Andres, D. Biller and M. Dappe, *Reducing Poverty by Closing South Asia’s Infrastructure Gap* (World Bank and Australian Aid, 2013). Available from [documents.worldbank.org/curated/en/2013/12/19330904/reducing-poverty-closing-south-asias-infrastructure-gap](http://documents.worldbank.org/curated/en/2013/12/19330904/reducing-poverty-closing-south-asias-infrastructure-gap).
- <sup>25</sup> The literature on trade facilitation sometimes refers to non-physical barriers as “man-made” barriers, given that many are the result of government policies.
- <sup>26</sup> T. Notteboom, “Container shipping and ports: an overview”, *Review of Network Economics*, Vol 3, No. 2 (June 2004), pp. 86-106.
- <sup>27</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Review of Developments in Transport in Asia and the Pacific*. ST/ESCAP/2627.
- <sup>28</sup> See Y. Duval and C. Utoktham, “Trade costs in Asia and the Pacific: improved and sectoral estimates”, ESCAP Trade and Investment Division Staff Working Paper No. 05/11 (Bangkok, ESCAP, 2010). Available from [www.unescap.org/sites/default/files/TIDwp05\\_11.pdf](http://www.unescap.org/sites/default/files/TIDwp05_11.pdf); and, more recently, J.F. Arvis and others, “Trade costs in the developing world: 1995-2010”, Policy Research Working Paper No. 6309 (Washington, D.C., World Bank, 2013). Available from <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-6309>.
- <sup>29</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Asia-Pacific Trade and Investment Report 2013: Turning the Tide – Towards Inclusive Trade and Development* (United Nations publication, Sales No. E.14.II.F.2). Available from [www.unescap.org/sites/default/files/Full%20Report.pdf](http://www.unescap.org/sites/default/files/Full%20Report.pdf).
- <sup>30</sup> Contained in the Bali Ministerial Declaration, under Ministerial Decision WT/MIN(13)/36 - WT/L/911. The Bali Ministerial Declaration and decisions are available from [http://wto.org/english/thewto\\_e/minist\\_e/mc9\\_e/tempdocs\\_e.htm](http://wto.org/english/thewto_e/minist_e/mc9_e/tempdocs_e.htm).
- <sup>31</sup> International Telecommunication Union, World Telecommunication/ICT Indicators Database 2012.
- <sup>32</sup> The Broadband Commission for Digital Development was established by the International Telecommunication Union and the United Nations Educational, Scientific and Cultural Organization in response to Secretary-General Ban Ki-Moon’s call to step up efforts by the United Nations to meet the Millennium Development Goals. The Broadband Targets for 2015 are available from [www.broadbandcommission.org/Documents/publications/Broadband\\_Targets.pdf](http://www.broadbandcommission.org/Documents/publications/Broadband_Targets.pdf).
- <sup>33</sup> International Telecommunication Union, *Measuring the Information Society 2013* (Geneva, ITU, 2013), p. 143. Available from [www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2013.aspx](http://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2013.aspx).
- <sup>34</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Asia-Pacific Trade and Investment Report 2013: Turning the Tide – Towards Inclusive Trade and Development* (United Nations publication, Sales No. E.14.II.F.2). Available from [www.unescap.org/sites/default/files/Full%20Report.pdf](http://www.unescap.org/sites/default/files/Full%20Report.pdf).
- <sup>35</sup> Ibid.

- <sup>36</sup> Ibid. While intraregional trade in services as a percentage of total trade is perceived to be relatively low, given the lack of data it is difficult to estimate its overall size and dynamics.
- <sup>37</sup> Organisation for Economic Co-operation and Development and World Trade Organization, OECD-WTO Trade in Value Added (TiVA) database (2014). Available from [www.oecd.org/industry/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm](http://www.oecd.org/industry/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm).
- <sup>38</sup> Noting the integral role of services in production fragmentation and global value chains, it is suggested in the *Asia-Pacific Trade and Investment Report 2013* that "...the rise of [Global Value Chains] was built on reduced costs of service links, inter alia. None of these chains can exist without efficient services such as transport, logistics, communication, finance, and business and professional services." See United Nations Economic and Social Commission for Asia and the Pacific, *Asia-Pacific Trade and Investment Report 2013: Turning the Tide – Towards Inclusive Trade and Development* (United Nations publication, Sales No. E.14.II.F.2). Available from [www.unescap.org/sites/default/files/Full%20Report.pdf](http://www.unescap.org/sites/default/files/Full%20Report.pdf).
- <sup>39</sup> Airports Council International, "ACI releases its 2012 *World Airport Traffic Report*," Media Release, 3 September 2013. Available from [www.aci.aero/media/bc5239b4-07ac-4d1f-8cbb-db8f1b093d80/News/Releases/2013/PR\\_2013\\_08\\_28\\_WATR\\_Release\\_pdf](http://www.aci.aero/media/bc5239b4-07ac-4d1f-8cbb-db8f1b093d80/News/Releases/2013/PR_2013_08_28_WATR_Release_pdf).
- <sup>40</sup> International Energy Agency, IEA World Energy Statistics and Balances database (2013). Available from [www.oecd-ilibrary.org/energy/data/iea-world-energy-statistics-and-balances\\_ene-stats-data-en](http://www.oecd-ilibrary.org/energy/data/iea-world-energy-statistics-and-balances_ene-stats-data-en).
- <sup>41</sup> Asian Development Bank, *Asian Development Outlook 2013: Asia's Energy Challenge*. (Mandaluyong City, Philippines, ADB, 2013). Available from [www.adb.org/sites/default/files/pub/2013/ado2013.pdf](http://www.adb.org/sites/default/files/pub/2013/ado2013.pdf).
- <sup>42</sup> United Nations Economic and Social Commission for Asia and the Pacific, *Economic and Social Survey of Asia and the Pacific 2011: Sustaining Dynamism and Inclusive Development – Connectivity in the Region and Productive Capacity in Least Developed Countries* (United Nations publication, Sales No. E.11.II.F.2).
- <sup>43</sup> International Energy Agency, *World Energy Outlook 2012* (Paris, OECD/IEA, 2012). Available from [www.iea.org/publications/freepublications/publication/WEO2012\\_free.pdf](http://www.iea.org/publications/freepublications/publication/WEO2012_free.pdf).
- <sup>44</sup> Asian Development Bank, United Nations Economic and Social Commission for Asia and the Pacific, and United Nations Development Programme. *Asia-Pacific Aspirations: Perspectives for a Post-2015 Development Agenda – Asia-Pacific Regional MDGs Report 2012/13* (Bangkok, ADB, ESCAP and UNDP, 2013). Available from [www.adb.org/sites/default/files/pub/2013/asia-pacific-regional-mdgs-report.pdf](http://www.adb.org/sites/default/files/pub/2013/asia-pacific-regional-mdgs-report.pdf).
- <sup>45</sup> See for example United Nations Economic and Social Commission for Asia and the Pacific, *Growing Together: Economic Integration for an Inclusive and Sustainable Asia-Pacific Century*. ST/ESCAP/2629.
- <sup>46</sup> Figures for 1950 are from K.S. Seetharam, "Twenty-five years of transition in Asia's population and development: a review of progress and potential", *Asia-Pacific Population Journal*, vol. 27, No. 1 (June 2012), pp. 13-32. Figures for 2013 are from United Nations Economic and Social Commission for Asia and the Pacific, 2013 ESCAP Population Data Sheet. Available from [www.unescapsdd.org/files/documents/PUB\\_Datasheet-2013.pdf](http://www.unescapsdd.org/files/documents/PUB_Datasheet-2013.pdf).
- <sup>47</sup> K.S. Seetharam, "Twenty-five years of transition in Asia's population and development: a review of progress and potential", *Asia-Pacific Population Journal*, vol. 27, No. 1 (June 2012), pp. 13-32.
- <sup>48</sup> United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision*. (New York). Available from [esa.un.org/wpp/](http://esa.un.org/wpp/).
- <sup>49</sup> United Nations Department of Economic and Social Affairs, Population Division, *Trends in International Migrant Stock: the 2013 Revision*. (New York). Available from [esa.un.org/unmigration/TIMSO2013/migrantstocks2013.htm](http://esa.un.org/unmigration/TIMSO2013/migrantstocks2013.htm). Measuring international migration is difficult because each country has its own definitions of who qualifies as a migrant. Migrant stocks consist of people who have resided in a country for at least one year, but were either born in, or remain nationals of, another country. Figures on migrant stock therefore can include long-term residents and their family members, as well as temporary labour migrants and refugees.
- <sup>50</sup> United Nations Department of Economic and Social Affairs, Population Division, Total International Migrant Stock (accessed 6 February 2014). Available from <http://esa.un.org/unmigration/TIMSA2013/migrantstocks2013.htm?mtotals>.
- <sup>51</sup> P. Martin, "Labour migration development indicators in the post-2015 global development framework", in *Migration and the United Nations Post-2015 Development Agenda* (Geneva, International Organization for



Migration, 2013). Available from [www.iom.int/files/live/sites/iom/files/What-We-Do/docs/Labour-Migration-and-Development-Indicators-in-the-Post-2015-Global-Development-Framework.pdf](http://www.iom.int/files/live/sites/iom/files/What-We-Do/docs/Labour-Migration-and-Development-Indicators-in-the-Post-2015-Global-Development-Framework.pdf).

<sup>52</sup> C.Z-W. Qiang, C. Rossotto and K. Kimura, “Economic impacts of broadband”, in *Information and Communications for Development 2009: Extending Reach and Increasing Impact* (Washington D.C., World Bank, 2009).

<sup>53</sup> P. Koutroumpis, “The Economic Impact of Broadband on Growth: A simultaneous approach”, in *Journal of Telecommunications Policy*. Vol. 33, No. 9., pp. 471-485 (Pergamon Press, New York, 2009).