Regional integration for sustainable development in Asia and the Pacific:

ESCAP Digital and Sustainable Regional Integration Index and Indicator Framework

DigiSRII 1.0
The Economic and Social Commission for Asia and the Pacific (ESCAP) serves as the United Nations’ regional hub for promoting cooperation among countries to achieve inclusive and sustainable development. The largest regional intergovernmental platform with 53 member States and 9 associate members, ESCAP has emerged as a strong regional think-tank offering countries sound analytical products that shed light on the evolving economic, social and environmental dynamics of the region. The Commission’s strategic focus is to deliver on the 2030 Agenda for Sustainable Development, which it does by reinforcing and deepening regional cooperation and integration to advance connectivity, financial cooperation and market integration. ESCAP’s research and analysis, coupled with its policy advisory services, capacity-building and technical assistance to governments, aims to support the sustainable and inclusive development ambitions of countries.

The report is available at: https://www.unescap.org/resources/escap-digital-and-sustainable-regional-integration-index-digisrii-10

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DigiSRII 1.0
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The report was prepared by Witada Anukoonwattaka and Richard Sean Lobo under the guidance of Yann Duval and the overall supervision of Mia Mikic, all from the Trade, Investment and Innovation Division (TIID) of ESCAP. Ms. Nattabhon Narongkachavana, TIID, ESCAP formatted the report for release.

The authors are grateful to Simon Mevel of the African Trade Policy Centre of the United Nations Economic Commission for Africa and his colleagues for organizing the Expert Group Meeting on Methodologies of Regional Integration Indexes, held on 25 and 26 September 2018 in Addis Ababa, Ethiopia. ¹ The report greatly benefited from the information and insights shared by experts during that meeting.

¹ https://www.unescap.org/events/expert-group-meeting-methodologies-regional-integration-indexes.
Executive summary

The ESCAP Digital and Sustainable Regional Integration Index (DigiSRII), is an attempt to bring together the various dimensions of regional integration while also accounting for the growing importance of digital and sustainable development. Rather than emphasizing methodological issues related to developing the index and aggregating very different indicators, the work focuses on developing a global indicator framework for digital and sustainable regional integration, inspired by the indicator framework established to monitor progress of implementation of the sustainable development goals. The approach of DigiSRII recognizes that policymakers in different economies and regions may prioritize different areas of regional integration. As such, very simple aggregation techniques are adopted in building the index, making it as transparent as possible, and providing a basis for policy analysts and policymakers to develop their own version using the underlying data, as they see fit.

Building on the regional integration indices developed by ECA and ADB, a new 7-by-2 matrix structure is adopted for DigiSRII. The seven core dimensions are: trade and investment integration; financial integration; regional value chains integration; infrastructure integration; the movement of people; regulatory cooperation; and digital-economy integration. In order to mainstream sustainable development through the entire index, each of these dimensions include two components: a set of conventional integration indicators and a set of sustainable development focused indicators. The sustainable development focused indicators emphasize how regional integration is pursued, particularly taking into account the need for inclusivity and environmental protection. This structure enables policymakers to monitor to what extent they are taking into account sustainable development when progressing along each of the seven dimensions.

The results from DigiSRII shows that the Asia-Pacific region’s performance in regional integration varies widely across dimensions. Overall, investment in infrastructure and the proactive FTA strategies of economies in the region have been key drivers of integration in the Asia-Pacific over the past ten years. In contrast, little progress has been made in freeing the movement of people. Trade and investment integration, as well as RVC integration, have also not significantly deepened for the region between 2010-13 and 2014-2017, probably because these conventional forms of economic integration have reached their limits - The digital transformation of trade and investment based on emerging technologies may push these limits, however.

DigiSRII results also vary greatly by country and subregions. They confirm that economies in South-East Asia (SEA) and East and North-East Asia (ENEA) are among the most regionally integrated. These economies have also made the most progress over time. On the other hand, economies in South and South-West Asia (SSWA) and North and Central Asia (NCA) are among the least regionally integrated and have made the least progress. Among other factors, the relatively deeper integration in ENEA and SEA economies is driven by their active participation in regional production networks, with production integration deepening during the past decade. As shown at the dimensional level, economies in these two subregions have been relatively strongly connected in regional trade, investment, value chains, infrastructure and regional cooperation arrangements.

In terms of sustainable regional integration, Japan and the Republic of Korea emerge as regional leaders. The region as a whole appears to be able to manage its financial integration
prudently, and to enable broad and inclusive access to infrastructure. Improvements in inclusive access to infrastructure as well as in the digital economy drove progress in sustainable regional integration in the Asia-Pacific region during 2010-2017. DigiSRII results suggest that more efforts are needed to enable movement of people as well as in developing regulatory cooperation for sustainable development.

In terms of regional digital economy integration, the Asia-Pacific region’s performance varies considerably across the underlying indicators of that dimension. The results highlight the need for improvement in regulatory harmonization in order to support digital trade in the region, trade in ICT goods and utilizing e-commerce platforms. In addition, from the perspective of sustainable integration in the digital economy, the Asia-Pacific region has made immense progress in expanding women’s participation in e-commerce as well as in increasing household access to the Internet. Meanwhile, cybersecurity remains a major stumbling block for deepening sustainable regional integration in the digital economy.
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### Abbreviations and acronyms

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<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AEC</td>
<td>ASEAN Economic Community</td>
</tr>
<tr>
<td>AFTA</td>
<td>ASEAN Free Trade Area</td>
</tr>
<tr>
<td>APRII</td>
<td>APRII Asia-Pacific Regional Integration Index</td>
</tr>
<tr>
<td>ARCI</td>
<td>Asia Pacific Regional Cooperation and Integration Index</td>
</tr>
<tr>
<td>ARII</td>
<td>Africa Regional Integration Index</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
</tr>
<tr>
<td>CLMV</td>
<td>Cambodia, Lao PDR, Myanmar, Viet Nam</td>
</tr>
<tr>
<td>CSNs</td>
<td>countries with special needs</td>
</tr>
<tr>
<td>DigiSRII</td>
<td>Digital and Sustainable Regional Integration Index</td>
</tr>
<tr>
<td>ECA</td>
<td>United Nations Economic Commission for Africa</td>
</tr>
<tr>
<td>EG</td>
<td>environmental goods</td>
</tr>
<tr>
<td>ENEA</td>
<td>East and North-East Asia</td>
</tr>
<tr>
<td>ESCAP</td>
<td>Economic and Social Commission for Asia and the Pacific</td>
</tr>
<tr>
<td>FDI</td>
<td>foreign direct investment</td>
</tr>
<tr>
<td>FTA</td>
<td>Free Trade Agreement</td>
</tr>
<tr>
<td>ICT</td>
<td>information and communications technology</td>
</tr>
<tr>
<td>IIAs</td>
<td>international investment agreements</td>
</tr>
<tr>
<td>LDCs</td>
<td>least developed countries</td>
</tr>
<tr>
<td>LLDCs</td>
<td>land-locked developing countries</td>
</tr>
<tr>
<td>NCA</td>
<td>North and Central Asia</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PCA</td>
<td>Principal Component Analysis</td>
</tr>
<tr>
<td>PIDEs</td>
<td>Pacific Island Developing Economies</td>
</tr>
<tr>
<td>RCEP</td>
<td>Regional Comprehensive Economic Partnership</td>
</tr>
<tr>
<td>RVC</td>
<td>regional value chain</td>
</tr>
<tr>
<td>SDGs</td>
<td>sustainable development goals</td>
</tr>
<tr>
<td>SEA</td>
<td>South-East Asia</td>
</tr>
<tr>
<td>SIDS</td>
<td>Small Island Developing States</td>
</tr>
<tr>
<td>SSWA</td>
<td>South and South-West Asia</td>
</tr>
</tbody>
</table>
Introduction

Regional integration is a complex, multidimensional concept that draws its definition from varied disciplines. It is generally understood to involve the cooperation of a group of economies in economic, social and political activities, in their pursuit of a common objective (ECA, 2019). Regional integration is seen as a key priority for many developing economies in the Asia-Pacific region.

Through the process of increased participation in regional trade, investment, labour movement and flows of information and knowledge, it is often expected that regional integration will bring economic development opportunities (ESCAP, 2017). While regional integration has many benefits, it should also contribute to the promotion of sustainable development objectives through ensuring social cohesion, reducing inequalities, environmental protection, and curbing unsustainable production and consumption. Addressing these challenges while promoting regional integration will support the implementation of the 2030 Agenda for Sustainable Development and its associated sustainable development goals (SDGs). For this reason, it is essential that sustainable development is mainstreamed into national policies towards regional integration.

Moreover, the digital economy performs an essential role in deepening regional integration in the twenty-first century. Digital technology and fast-growing digital trade have changed the ways businesses and individuals participate in trade, cross-border production networks and socially interaction. Electronic data flows underpinning people and economy interactions grew to 150,000 gigabytes per second in 2022, from only 100 gigabytes per day in 1992 (UNCTAD, 2019). Indeed, the importance of ICT infrastructure and supportive regulatory policies for the digital economy have become more important for sustainable development, because digital-economy integration potentially stimulates the development of SMEs through e-commerce and modernizing their business models.

In that context, this report introduces an ESCAP Digital and Sustainable Regional Integration Index (DigiSRII), in an attempt to bring together the various dimensions of regional integration while also emphasizing the growing importance of digital and sustainable development. Rather than emphasizing methodological issues related to developing the index and aggregating very different indicators, the work has focused on developing a global indicator framework for digital and sustainable regional integration, inspired by the indicator framework established to monitor progress of implementation of the SDGs. This approach recognizes that policymakers in different economies and regions may not attach the same importance to the many dimensions of regional integration. It is also worth noting that there is no agreement on what is the optimal level of regional integration, and that being the most regionally integrated economy may not be the most desirable outcome. As such, very simple aggregation techniques are adopted in building the index, making the index as transparent as possible.

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3 See https://unstats.un.org/sdgs/indicators/indicators-list/.
4 To take just one example, the Covid-19 pandemic may have a more negative impact on the most regionally integrated economy. At the same time, an economy where Covid-19 is already spreading may be able to recover faster if it is more regionally integrated, as it may have greater access to relevant medical goods and services.
possible, and providing a basis for policy analysts and policymakers to develop their own version, using the underlying data, as they see fit.\(^5\)

DigiSRII builds on existing work on regional integration indices, notably those by ECA and ADB, to develop a regional integration index that can better integrate the digital and sustainable development dimensions of regional integration policies.\(^6\) Empirical evidence that allows policymakers to have a better understanding of the depth and speed of regional integration in a comprehensive manner remains limited. The Africa Regional Integration Index (ARII) covers five dimensions of regional integration: trade integration; productive integration (regional value chain); infrastructure and connectivity integration; integration in the movement of people; and financial integration. Hu and Park (2018)\(^7\) in the Asia-Pacific Regional Integration Index (APRII), and Park and Claveria (2018)\(^8\) in the Asia-Pacific Regional Cooperation and Integration Index (ARCI),\(^9\) also used these five dimensions, but added a sixth dimension on institutional and social integration. While these indices are rather comprehensive, they do not explicitly incorporate either the digital or the sustainable dimensions of regional integration.

DigiSRII therefore adds a seventh dimension on digital integration and adds sustainability components to all seven dimensions, such that every dimension is made up of a series of conventional regional integration indicators and a series of sustainable regional integration indicators. This enables policymakers to monitor to what extent they are taking into account sustainable development when progressing along each of the seven dimensions. However, this also makes the index more data-intensive.

Considering both data availability and the need to encourage economies to identify and resolve data gaps they face in understanding where they stand in regional integration, a comprehensive version and a simplified version of DigiSRII have been developed. The comprehensive version, which is more data-intensive, covers 13 of the 58 regional ESCAP member and associate member States. The simplified version, which only features a subset of the indicators in the DigiSRII for which data are available, covers 24 economies in Asia and the Pacific. As shown in figure 1, the two versions of DigiSRII provide broadly consistent results, with Singapore, Japan and the Republic of Korea achieving the highest levels of digital and sustainable regional integration.

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\(^5\) Aggregate rankings can easily be manipulated, and what is therefore important is for policymakers to understand where their economy stands in different areas, as a basis for deciding where they may focus future efforts. This includes using principal component analysis or similar data-driven methods to assign weights to indicators, which does not necessarily reflect a sound theoretical framework. See Greco and others, 2019.

\(^6\) This paper is part of a United Nations Development Account Project on measuring regional integration (2018-2021) led by ECA and implemented jointly by three United Nations Regional Commissions, including ESCAP and ESCWA.

\(^7\) This study will henceforth be referred to as ADB (2018a).

\(^8\) This study will henceforth be referred to as ADB (2018b).

\(^9\) APRII and ARCI were developed by ADB.
Following a brief literature review in the next section, this report introduces the structure of DigiSRII and its dimensions and indicators in more detail. A succinct analysis of the results is then presented, focusing in particular on the how the region has made progress towards more sustainable regional integration as well as along the emerging digital economy integration dimension.
Brief literature review of regional integration and related indices

The earliest theoretical approaches towards understanding regional integration equated it with the creation of a free trade area or a customs union. Balassa (1961), formalised the definition of economic integration as the abolition of discrimination between the economic units of different national States. The author proposed that economic integration occurred in stages, starting with a free trade area, to a customs union, common market, economic union and finally total integration. To date, however, there is no universally accepted definition of regional integration.

The challenge with identifying a common definition for regional integration is due to its complex, multidimensional and dynamic nature. The study of regional integration issues draws together several interrelated branches of knowledge such as economics, politics, sociology, governance and international relations. It is therefore no surprise that despite the numerous studies analysing regional integration, a clear definition remains elusive. Broader definitions of regional integration are used by international institutions. For example, ECLAC (2009) indicates, “[r]egional integration is the process by which diverse national economies seek mutual gains by complementing one another more.” The definition does not limit regional integration solely to economic factors but also encompasses political, cultural and social spheres, in addition to others.

<table>
<thead>
<tr>
<th>Integration index study</th>
<th>Objective of study</th>
<th>Regional coverage</th>
<th>Indicators and dimensions</th>
<th>Benefits and limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dennis and Yusof (2003)</td>
<td>Measuring economic integration in ASEAN</td>
<td>10 ASEAN economies</td>
<td>2 indicators, 2 dimensions: 1. Trade 2. Foreign direct investment</td>
<td>Provides coverage of quantity-based measures of trade and FDI but does not account for labour and portfolio capital flows, value chain, financial and macroeconomic integration.</td>
</tr>
</tbody>
</table>
Naeher and Narayanan (2020) measuring regional integration within multiple subregions provides coverage of quantity-based measures of five dimensions for multiple geographic sub-regions but does not provide economy-specific results.

The quantitative measurements of regional integration is based on a broad definition, using composite indices, include five or six dimensions of regional integration,10 ADB (2018a and 2018b) and ECA (2016 and 2019) emerge as the most comprehensive indices of regional integration, capturing multiple dimensions of regional integration including trade and investment, finance, value chains, infrastructure and movement of people. Moreover, the ADB studies also consider the dimension of institutional integration. The ESCAP Digital and Sustainable Regional Integration Index (DigiSRII) is built on the same broad framework as ECA and ADB indices owing to their comprehensiveness, albeit with significant extensions and differences in dimensions and construction. Table 2 compares the framework proposed by ESCAP with the existing studies of ADB (2018a and 2018b) and ECA (2016 and 2019).

Table 2. Existing comprehensive regional integration indices

<table>
<thead>
<tr>
<th>Regional integration index</th>
<th>Normalization and year(s) of coverage</th>
<th>Weighting/aggregation</th>
<th>Sectoral dimensions</th>
<th>Sustainable dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB ARCI (2018b)</td>
<td>Panel max-min (2006-2016)</td>
<td>PCA/Additive using panel PCA generated weights</td>
<td>16 indicators, 5 dimensions: 1. Trade 2. Financial and macroeconomic</td>
<td>N/A</td>
</tr>
<tr>
<td>ECA ARII (2016)</td>
<td>Max-min (2014)</td>
<td>Equal/Additive using equal weights</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>ECA ARIII (2019)</td>
<td>Max-Min (2016)</td>
<td>PCA/Additive using PCA generated weights</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

10 Measuring regional integration is not something new. There are a considerable number of studies that have aimed to measure regional integration in different parts of the world using composite indices. The regional coverage of these studies includes Africa (ECA, 2016; ECA, 2019), Arab States (ESCWA, 2015), Asia-Pacific (Hu and Park, 2017; Park and Claveria, 2018; Chen and Woo, 2010), ASEAN (Dennis and Yusof, 2003), Europe (Dorrucci and others, 2002; Dorrucci and others, 2015; König, 2015), and Latin America (Dorrucci and others, 2002). Furthermore, there are also studies comparing regional integration within multiple geographic sub-regions around the world (Naeher and Narayanan, 2020).
| ESCAP DigiSRII | Panel max-min (2010-2017) | Equal/Additive using equal weights | 53 indicators, 7 dimensions  
1. Trade and investment  
2. Financial  
3. Regional value chain  
4. Infrastructure  
5. Free movement of people  
6. Regulatory cooperation  
7. Digital economy | Yes |

*Source: ESCAP compilation.*
I. DigiSRII: Structure and indicator framework

The structure of DigiSRII and the associated indicator framework is shown in figure 2. In contrast to other existing regional integration indices, it is characterized by a matrix structure including a digital economy and a sustainable integration dimension. While the digital dimension is one of seven distinct sectoral dimensions, the sustainable dimension is mainstreamed through each of the seven sectoral dimensions, with sustainable integration indicators supplementing the conventional integration indicators found in earlier studies. Figure 3 summarises the SDGs covered by the indicators in each of the sustainable dimensions of DigiSRII.

![Figure 2. Structure of ESCAP Digital and Sustainable Regional Integration Index](image)

Source: ESCAP composition.

A. Dimensions and indicators

ESCAP’s approach to evaluate the progress of regional integration in the Asia-Pacific region from 2010 to 2017 covers the following seven dimensions: trade and investment; regional value chain; finance; free movement of people; infrastructure; regulatory cooperation; and digital economy integration. While the first six dimensions are not particularly new, it is the first time an attempt has been made to develop a digital economy dimension.\(^\text{11}\) The level of

\(^{11}\) Several institutions, such as OECD and ECITE (2018), provide composite indices based on quantitative indicators of regulatory openness and policy environment supporting an economy’s participation in digital trade. While these policy restrictiveness indices are useful for global integration, they have limitations in evaluating the integration among regional economies.
Regional digital economic integration is evaluated based on a number of factors, including intraregional intensity of trade in ICT products, security, accessibility and participation in online transactions, and similarity of digital regulations with those of regional partners. In addition, sustainable development is mainstreamed into the index by adding sustainable development focused indicators to conventional indicators in each of the seven dimensions. The sustainable development focused indicators emphasize how regional integration along each dimension is pursued, taking into account the need for inclusivity and environmental protection (figure 3).

Figure 3. SDGs reflected in DigiSRII

Table 3 lists all dimensions and indicators included in DigiSRII. Rationale and a brief introduction for each dimension is provided below, with details on definition, data sources and interpretation of individual indicators available in Annex 1. It is worth noting, however, that the indicators are generally constructed following ECA (2016), i.e., by using the ratio of intraregional flows for an economy scaled to the economy’s GDP or population – rather than to total flows, as in ADB (2018a and 2018b). Indeed, although several indicators included in the conventional dimensions of DigiSRII are similar to those of ADB (2018a and 2018b), ESCAP’s indicators differ in terms of the denominators used in order to minimize geographical limitation that could result in misleading values for some landlocked developing countries (LLDCs) and Small Island Developing States (SIDS).12

12 Measuring regional intensity against total flows can be misleading. For example, an economy that does all of its trading with only one or two neighbours would achieve a perfect score in regional trade integration, while the actual extent of that trade could be very small in comparison to its GDP.
## Table 3. DigiSRII dimensions and indicators

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Conventional indicators</th>
<th>Sustainable indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Trade and investment integration</td>
<td>Intraregional goods exports to GDP</td>
<td>Environmental goods exports in intraregional exports</td>
</tr>
<tr>
<td></td>
<td>Intraregional goods imports to GDP</td>
<td>Environmental goods imports in intraregional imports</td>
</tr>
<tr>
<td></td>
<td>Tariff on intraregional imports</td>
<td>Tariff on intraregional imports of environmental goods</td>
</tr>
<tr>
<td></td>
<td>Stock of intraregional FDI inflows to GDP</td>
<td>Employment created by DVA in exports to regional economies</td>
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<td>Stock of intraregional FDI outflows to GDP</td>
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<td>B. Financial integration</td>
<td>Intraregional cross-border portfolio liabilities and assets to GDP</td>
<td>Intraregional real exchange rate volatility</td>
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<td>Pair-wise dispersion of deposit rate averaged regionally</td>
<td>Average intraregional financial development index score</td>
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<td>Pair-wise correlation of share price index averaged regionally*</td>
<td>Volatility weighted pair-wise correlation of share price index averaged regionally*</td>
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<td>C. Regional value chain integration</td>
<td>Regional export complementarity index</td>
<td>Regional environmental good export complementarity index</td>
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<td>RVC participation index</td>
<td>Sustainable RVC participation index</td>
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<td>Intraregional intermediate goods exports to total intraregional goods exports</td>
<td>Intraregional exports of intermediates per unit of CO₂ emissions*</td>
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<td>Intraregional intermediate goods imports to total intraregional goods imports</td>
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<td>D. Infrastructure integration</td>
<td>Intraregional liner shipping connectivity index</td>
<td>Average intraregional rural access to electricity</td>
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<td>Intraregional trade facilitation implementation</td>
<td>Intraregional sustainable trade facilitation implementation</td>
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<td>Average intraregional Internet quality</td>
<td>Average intraregional share of Internet users in population</td>
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<td>Intraregional average trade cost*</td>
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<td>E. Movement of people</td>
<td>Stock of intraregional emigrants per capita</td>
<td>Average outward remittances per regional immigrant</td>
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<td>Stock of intraregional immigrants per capita</td>
<td>Average inward remittances per emigrant</td>
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<td>Intraregional outflow of remittances to GDP</td>
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<td>Intraregional inflow of remittances to GDP</td>
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<td>F. Regulatory cooperation</td>
<td>Number of regional economies that have signed FTAs with the economy</td>
<td>Sustainable regional FTA score</td>
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<td>Number of regional economies that have signed IIAAs with the economy</td>
<td>Sustainable regional IIA score</td>
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<td>Number of economies that have an embassy in the economy</td>
<td>Average intraregional rule of law index score</td>
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<td>Trade regulatory distance from regional partners*</td>
<td>SDG trade regulatory distance from regional partners*</td>
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<td>Share of ICT goods exports in intraregional exports</td>
<td>Average intraregional secure Internet servers</td>
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<td>G. Digital economy integration</td>
<td>Share ICT goods imports in intraregional imports</td>
<td>Average intraregional proportion of households with Internet access</td>
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<td>Average tariff on intraregional imports of ICT goods</td>
<td>Average intraregional share of female population with financial institution or mobile money account*</td>
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<td>Average intraregional share of population with financial institution or mobile money account*</td>
<td>Average intraregional share of female population that use Internet for online purchase*</td>
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<td>Average intraregional share of population that use Internet for online purchase*</td>
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<td>Digital trade regulatory similarity with regional partners*</td>
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* The indicator is only used in the comprehensive index for economies with data availability.

Table A2 in Annex 1 provides a list of all the indicators included in DigiSRII as well as those included in ADB (2018a and 2018b) and ECA (2016 and 2019), in addition to other studies using regional integration indices. The purpose of table 4 is to provide a comparison between the indicators used in DigiSRII and those used in other regional integration index studies. In
comparison to the other major regional integration index studies, i.e., ADB (2018a and 2018b) and ECA (2016 and 2019), DigiSRII has made pioneering innovations in two major areas. While many indicators have been added to cover the digital and sustainable dimensions, improvements have also been made in indicators related to dimensions included in previous studies. For example, an RVC participation indicator has been added in the RVC integration dimension, constructed using input-output data.

1. Trade and investment integration

Deepening integration usually begins with removing (border and non-border) barriers to trade and investment between parties, followed by efforts to regionalize laws and regulations. Because the process aims to facilitate the free flow of goods, services, capital and labour, conventional outcome indicators under this dimension focus on intraregional intensity of both trade and investment flows. Increased intensity of trade and investment between an economy and its regional partners as well as reduced barriers to trade and investment flows between an economy and its regional partners reflects deeper integration. A similar approach has been taken by others such as ADB and ECA.

Sustainable integration from the perspectives of trade and investment entails participation in the regional trading system in a manner that supports long-term domestic and regional economic growth, environmental protection and social development (EIU, 2018). In addition, to help achieve economic SDGs, in particular SDGs 1, 8, 9, removing barriers to regional trade and investment is part of SDG 17 and can be aimed at sectors related to environmental goods (EG) that will support the achievement of environment-related SDGs, such as SDGs 7, 12, 13, 14 and 15. Increased regional trade and investment, if associated with higher domestic value-added and employment, will also create a desirable outcome towards achieving SDG 8 and 9.

2. Financial integration

Financial integration is a phenomenon where financial markets in national and international economies are closely linked together, through cross-border capital flows, participation of foreign investors from the region in the domestic financial markets, and information sharing among financial institutions in the region (Nardo and others, 2017). The process tends to cause a convergence of asset prices and yields across borders. Therefore, indicators under this dimension capture the extent of regional holdings of financial assets as well as how closely the financial market of an economy is linked with intraregional financial markets. The deeper integration would show as increased interregional flows of capital and greater synchronization between financial markets in those economies.

While it is increasingly recognized that trade and investment policies should take into account sustainable development goals (SDGs), studies focused on constructing indices of trade and investment have not included a component for sustainability. A pioneer in this area is the Hinrich Foundation Sustainable Trade Index 2018. The index measures a economy’s capacity to participate in international trade in a manner that supports achieving long-term domestic and global goals of sustainable development (EIU, 2018). In this regard, it is comprised of indicators that reflect the three pillars of sustainability—economic, environmental and social. The index serves its purpose of showing a economy’s specific development characteristics, such as inequality, air pollution, GDP growth, overall exchange rate volatility, FDI, and share of natural resources in total trade among numerous others.

The classification of EGs is based on the OECD combined list of environmental goods (CLEG), which covers 248 HS product codes at the six-digit level.

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Although financial integration potentially supports an economy in achieving higher economic growth, that growth may be not sustainable if the integration brings in higher macroeconomic volatility. The literature has shown that financial integration can be positively associated with more macroeconomic volatility, especially if domestic financial development lies below a threshold level (Yadav and others, 2019). Hence, to ensure that financial integration will bring sustainable economic growth (SDG 8), this study conceptualizes sustainable financial integration as a situation in which openness and regionally interconnected financial markets are not accompanied by excessive volatility while also tending to increase domestic level of financial development (SDG 10).

3. Regional value chain integration

Regional value chains (RVCs) involve the division of roles between regional economies in performing a wide range of activities and services that a product or service must undergo from conception to commercialization, with the overall goal of producing and providing products to consumers while minimizing costs. Participating in RVCs requires deeper integration to facilitate coordination, cooperation and convergence of an economy and its regional partners around projects and industries of common interest. The ability to participate in RVCs increases if the economy has a high degree of trade complementarity with regional economies involved in RVCs. In addition, economies that are increasing their participation in RVCs tend to see increased intraregional flows of information, materials, funds and products through different stages of production.

RVC integration potentially contributes to achieving SDGs 8 and 9. However, this requires management to minimize potential adverse impacts on the environment and to maximize a desirable outcome on employment. Indicators under sustainable RVC participation consider potential impacts on CO₂ emissions (SDG 13), domestic value-added and employment associated with RVC participation (SDGs 8 and 9), and trade complementarity in environmental goods (EG) exports by an economy to regional partners (environmentally-related SDGs such as SDGs 7, 12, 13,14,15).

4. Infrastructure connectivity

Regional integration requires good connectivity through transport and telecommunications networks as well as enabling regulatory conditions. Indicators for transport and telecom infrastructure include a liner shipping index as well as quality of Internet connectivity. The indicator reflecting enabling regulatory conditions is intraregional trade facilitation implementation. In addition, decreased intraregional trade costs represent an overall improvement in intraregional connectivity.

Sustainable infrastructure integration can be defined as the strengthening of domestic and cross-border infrastructure with a focus on inclusive access. It is conceptualised to encompass the areas of inclusive access to electricity and Internet, which are most relevant to SDGs 7 and 9, as well as trade facilitation implementation directed towards small and medium-sized enterprises (SMEs), and agriculture and women (SDG 5). This inclusive coverage and access to hard and soft infrastructure will broadly contribute to achieving SDGs 2, 5, 9, 10 and 11.

15 Adjusted liner shipping indices is used for LLDCs (see Annex 1 for details of indicators).
5. Movement of people

Deeper regional integration is often characterized by freer flows of people within the region, as opposed to simply freer flow of goods. Conventional indicators for movement of people comprise measures that capture the intensity of intraregional movement of physical persons as well as remittances.

Greater movement of people in the region brings about sustainable development outcomes if it leads to better opportunities and working conditions for regional migrants, which is relevant to achieving SDG 8. However, quantifying these social outcomes is not straightforward. In this index, higher income proxied by remittance per intraregional migrant worker is used as an indicator of better job opportunities.

6. Regulatory cooperation

Regulatory cooperation refers to efforts to formulate and utilize common institutional arrangements and harmonize regulatory frameworks to deepen economic integration. For an economy, this translates into greater participation in institutional arrangements and diplomacy, and convergence in the regulatory framework. Therefore, conventional indicators under this dimension capture the extent of institutional arrangements, regulatory similarity and diplomatic relations with regional partners.

The sustainability dimension of regional integration is captured through the level of participation of an economy in regional arrangements with provisions related to (a) labour mobility (SDG 8), (b) intellectual property rights (SDG 16), (c) environment (SDGs 7, 12, 13,14 and 15), (d) sanitary and phytosanitary measures/technical barriers to trade (SDGs 2,3,12,13,14 and 15), and (e) technical co-operation (SDG 17). Furthermore, the quality of domestic legal institutions and the risk of crime (SDG 16) is considered to capture sustainable regulatory cooperation, as stronger institutions are more likely to promote more socially equitable outcomes from regional integration (SDG 10).

7. Digital economy integration

Regional integration also requires policy streamlining in the digital economy. Digital economy integration entails the freer flow of digital goods and services across regional economies as well as ICT products that facilitate this trade. Correspondingly, digital economy integration encompasses trade intensity in ICT products, access to and use of Internet purchases, government policies related to trade in ICT products as well as government regulations on the flow of digital goods and services. Deepening digital economy integration is considered to involve increasing intensity of ICT good trade flows, increasing access to and use of online purchases, lowering barriers and streamline digital trade policies with regional partners (see Box 1), increasing levels of network openness and achieving greater regulatory similarity with regional partners.

Box 1. Regional digital trade policy similarity

In addition to accessibility and affordability of required infrastructure, digital economy integration also requires policy streamlining to build a conductive ecosystem for enhancing digital trade with regional partners. This indicator captures regulatory similarity between the country and its regional partners at the bilateral level in 11 areas of policy regulation that are considered relevant for digital trade integration: (1) trade defence; (2) public procurement;
The overall regulatory similarity of an economy with regional partners is calculated as the simple average of bilateral regulatory similarities that the considered economy has with each of its regional partners, in all of the 11 pillars. The score for this indicator is such that a higher score means the economy has regulatory coherence with other regional economies that have a more open regulatory environment, while the lowest index score means the considered country tends to have more restrictive policies than its regional partner.

The figure below illustrates the overall regional regulatory similarity in 2017 by Asia-Pacific economies for which data are available. The index shows that advanced economies, led by New Zealand, Singapore and Japan, tend to be digitally integrated because of their relatively open and harmonized digital regulatory framework. At the other end of the spectrum, important developing economies – particularly China, India and Viet Nam – tend to have relatively restricted digital-trade policy ecosystem.

Integration in digital economy is considered to bring about sustainable outcomes if security of online transactions together with inclusiveness in access to the digital economy is ensured. Sustainable digital economy integration is therefore conceptualised to encompass a economy’s availability of secure servers (SDG 9), households with Internet access (SDG 11),

16 See Annex 1 for more details. For a full discussion see Anucoonwattaka and others (forthcoming).
and the share of the female population with financial or mobile money accounts and using the Internet to make purchases (SDG5), all of which broadly contribute to SDG 8 and 10.

B. Economy and years covered

The regional set of economies used in constructing DigiSRII and the various indicators consists of 52 regional and associate members of ESCAP, for which sufficient data were available after treatment of missing data – as explained in the methodology section below. However, there are missing observations across indicators for many of these economies, as shown in table 4. As a result, dimensional indices, which comprise of various sets of indicators, cannot be computed for all 52 economies, and the number of countries for which a particular dimensional index is available vary. At the most aggregate level, the simplified DigiSRII is available for 24 Asia-Pacific region economies that have data available across all 42 indicators. Similarly, the comprehensive DigiSRII is available for 13 Asia-Pacific region economies that have data available across all 53 indicators. The dimensional indices that constitute DigiSRII include a large number of Asia-Pacific region economies as they are compiled using a subset of indicators. The sample period chosen for constructing DigiSRII is 2010-2017.
### Table 4. Data availability, by economy and dimension, for DigiSRII

<table>
<thead>
<tr>
<th>Country</th>
<th>Trade and investment</th>
<th>Finance</th>
<th>Regional value chain</th>
<th>Infrastructure</th>
<th>Movement of people</th>
<th>Regulatory cooperation</th>
<th>Digital economy</th>
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**Legend:**
- Con.: Complete
- Sus.: Suspect
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Note: Con. refers to conventional and Sus. refers to sustainable.

Data available for comprehensive version of DigiSRII.
Data available for simplified version of DigiSRII.
Data unavailable.
C. Methodological considerations

This section provides an overview of methods applied to build the composite index of Digital and Sustainable Regional Integration. More details on normalization and aggregation are provided in Annex 1.

1. Normalization of indicators: Panel normalization

Similar to ADB and ECA, ESCAP utilizes min-max normalization of indicators prior to aggregating them into the composite index. However, ADB (2018a) and ECA (2016) only construct their indices for one year. Correspondingly, normalization is only applied across economies, without considering the time component. On the other hand, ADB (2018b) constructed an index for 2006-2016. As a result, they utilize a panel normalization approach, i.e., across all economies and time periods, thereby facilitating comparison of index values across economies and years. However, this approach comes with the caveat of requiring normalization of all indicators each time new data become available (OECD, 2008). Nonetheless, panel normalization is the appropriate approach to be used when dealing with a sample that spans multiple time periods, and that method is therefore used in computing DigiSRI.

Therefore, the minimum and maximum values for each indicator are calculated across economies and time. After min-max normalization, all indicator values range from 0 to 1, with higher values indicating a higher level of integration. For indicators that have a negative direction of change, i.e., higher values indicating a lower level of integration (for example, average tariffs for regional partners), the normalized indicator is taken additive inverse to have indicator having higher value indicating higher integration.

2. Aggregating indicators: Equal weighting

Regarding weighting schemes, there is no unique best practice. Most commonly used approaches are equal weighting and PCA weighting, which pose different strengths and weaknesses. Equal weighting is used in ECA (2016), while PCA is used in ADB (2018a and 2018b) and ECA (2019). PCA has the benefit of accounting for highly correlated indicators that would introduce double counting in the composite index. However, PCA also suffers from many shortcomings. Most notably, PCA weights are inconsistent over time and space, with the addition of new observations. This makes comparisons across multiple years, with growing samples, very challenging as weights and correspondingly the relative importance of indicators (and dimensions) are not consistent (Greco and others, 2019). In addition, weights derived using PCA are sensitive to outliers and small sample sizes, and provide incorrect estimations when correlation coefficients between indicators are low (OECD, 2008). Furthermore, in relation to data-driven weighting approaches such as PCA, Decancq and Lugo (2013) highlighted the risk of deriving the importance (weight) of a concept (indicator or dimension) based on what the data considers to be a fact. This is because weights assigned endogenously through PCA do not necessarily correspond to statistical linkages between indicators (Saisana and Tarantola, 2002).

In contrast to PCA, equal weighting does not give higher weight to an area which might (or not) be more relevant than others. It tends to be a preferred approach when there is an inadequate theoretical or statistical basis for giving different weights to different indicators or dimensions (Greco and others, 2019). Interpreting and tracking performance overtime is also more straightforward with equal weighing. However, it can potentially overweight a
dimension with higher number of indicators than others unless dimensional-average scores are taken before aggregating into a total index score. As a result, DigiSRII is calculated using equal weights for every indicator and every dimension. To minimize the statistical issues of equal weighting, the following procedures have been taken: (a) indicators were pre-screened to avoid including highly correlated indicators in the dimensional indices; (b) average scores are calculated at each node (see figure 2), from the most disaggregated level of index construction; and (c) robustness checks using PCA generated weighting were performed, which showed negligible differences between PCA and equal weighting.

3. Treatment of missing data

Certain indicators included in DigiSRII suffer from missing data. This missing data for certain indicators is due to two main reasons: (a) data not being reported annually; and (b) data not being reported for certain economies. In relation to the former reason, i.e., data not being reported annually, linear interpolation is used to fill in missing observations for periods during which data were not reported. This approach requires data to be available at the beginning and end of the period being interpolated. Missing observations at the beginning or the end the sample period, i.e., 2010-2017, are filled in with the closest available observation. More specifically, this involves carrying forward the last non-missing observation when data are missing at the end of the period, or conversely carrying backward the most recent non-missing observation when data are missing at the beginning of the period. In relation to the latter, i.e., data not being reported for certain economies, mirror data are used to fill in missing values when bilateral data is available. Following the implementation of the above-mentioned approaches to filling in missing data, economies that still have missing data for particular indicators are dropped from the corresponding dimensional index calculations, and concurrently from the overall composite integration index.
II. DigiSRII: Results and interpretation

The Asia-Pacific region made progress in regional integration, both sustainable and conventional, during 2010-2017. However, examining the structure of this performance reveals that integration across the seven dimensions as well as across sustainable and conventional measures, varies considerably (figure 4). Financial and infrastructure integration were the biggest contributors towards the region’s overall level of integration. This finding also applies to sustainable integration. However, infrastructure integration and regulatory cooperation were the main contributors towards the region’s level of conventional integration. In terms of change over time, infrastructure and digital economy integration, together with regulatory cooperation, were the main drivers of the region’s progress in overall integration between 2010 and 2017. Although differing in relative importance, the same three dimensions were the key drivers of both conventional and sustainable regional integration.

Figure 4. Structure of Asia-Pacific region performance in DigiSRII

Based on the simplified index framework and the 24 economies for which complete indicator data is available, Asia-Pacific became more integrated during 2010-2017 (figure 5). The average score of regional integration for 2014-2017 (vertical blue dotted line) increased to 0.403 from 0.359 during 2010-2013 (vertical red-dotted line). However, the extent of this progress varies widely across economies. The colours applied to names of economy correspond to their regional integration rankings for the latter period, i.e., 2014-2017. Economies in green correspond to the top quartile in the region (75th percentile and above) while economies in red are in the bottom quartile (25th percentile and below). Economies in orange performed close to the regional average (26th to 74th percentile).
Singapore emerges as the most regionally integrated, followed by Japan. Both economies have also made significant progress in deepening their regional integration over time. They are joined by the Republic of Korea, Malaysia, China and Australia in the group of top performers in regional integration. On the other hand, Pakistan, Kyrgyzstan, Cambodia, Fiji, Bangladesh and Bhutan fall into the group of least regionally integrated economies. Vietnam, Lao PDR and Cambodia stand out in terms of how fast they deepened their level of regional integration between 2010 and 2017. However, in terms of level, Vietnam ranked among the eight most integrated economies in the region, while the Lao PDR and Cambodia ranked among the eight least integrated.

The economy ranking reveals that economies in South-East Asia (SEA) and East and North-East Asia (ENEA) are among the most regionally integrated. These economies also have made the most progress over time. On the other hand, economies in South and South-West Asia (SSWA) and North and Central Asia (NCA) are among the least regionally integrated and have made the least progress. Among other factors, the relatively deeper integration in ENEA and SEA economies is driven by their active participation in regional production networks, with production integration deepening over the past decade. As shown in later sections of this report, economies in these two subregions have been relatively strongly connected in regional trade, investment, value chains, infrastructure and regional cooperation arrangements.
A. Conventional vs. sustainable regional integration in Asia and the Pacific

As noted above, DigiSRII includes both conventional and sustainable regional integration components. Aggregating these components into separate sub-indices enables a comparative analysis of the progress made in conventional versus sustainable regional integration.17 Singapore clearly leads in terms of conventional regional integration. It is the top performer in the region, followed by Malaysia and the Republic of Korea (figure 6a). Viet Nam made the fastest progress in deepening conventional regional integration over time, enabling it to move from below the regional average in 2010-2013 to above it in 2014-2017. Turkey, Lao PDR, the Russian Federation and Pakistan fall into the group of least integrated economies according to conventional indicators.

Turning to sustainable regional integration (figure 6b), Japan became the most successful case of regional integration in the region – from just being an average performer when only conventional regional integration is considered. Singapore and the Republic of Korea remain among the top performers in the region, highlighting their stellar performance in ensuring sustainable development as part of their regional integration strategies. China and the Philippines performed considerably better in sustainable integration in comparison to conventional regional integration, as did Australia, the Russian Federation and Turkey. In contrast, Malaysia, India, Indonesia and Viet Nam, show low levels of sustainable regional integration. However, Viet Nam together with China, Japan and Thailand made the most progress between 2010-2013 and 2014-2017 in advancing sustainable regional integration.

17 The analysis here is based on the comprehensive index framework, for which 13 economies have data available for all indicators included across all dimensions.
Figure 6a. Conventional regional integration, Asia-Pacific region (comprehensive DigiSRII sub-index)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.

Figure 6b. Sustainable regional integration, Asia-Pacific region (comprehensive DigiSRII sub-index)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
B. Drivers of regional integration in Asia and the Pacific

The Asia-Pacific region’s performance in regional integration varies widely across the seven dimensions of conventional and sustainable integration. On average, ‘Infrastructure’ and ‘Regulatory cooperation’ are found to be the most important factors for conventional integration in the Asia-Pacific region (figure 7a). Because of investment in infrastructure and proactive FTA strategies of economies in the region, the same two dimensions are found to be the most important in terms of change, driving progress in regional integration during 2010-2017. In contrast, the Asia-Pacific region’s performance in the movement of people remains underwhelming, with a low score and static during the sample period. The result indicates that people movement is the most restricted dimension of economic integration in this region.

In terms of sustainable regional integration, the region seems to be able to manage its financial integration prudently, and to enable broad and inclusive access to infrastructure. ‘Sustainable finance’ and ‘Sustainable infrastructure’ are the biggest contributors towards the region’s overall level of sustainable regional integration (figure 7b). In terms of change, improvement in inclusive access to infrastructure as well as the digital economy has driven progress in sustainable regional integration in Asia and the Pacific during 2010-2017. In contrast, trade and investment integration as well as RVC integration did not significantly deepen for the region during 2010-2013 and 2014-2017, both from the conventional and sustainable perspectives.
Figure 7a. Conventional regional integration by dimension, Asia-Pacific region (comprehensive DigiSRII sub-index)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.

Figure 7b. Sustainable regional integration by dimension, Asia-Pacific region (comprehensive DigiSRII sub-index)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
C. Digital economy integration in Asia and the Pacific

The Asia-Pacific region’s performance in digital economy integration varies considerably across the underlying indicators of that dimension. The results indicate that, on average, low ‘ICT tariffs’ and access to a ‘Mobile account’ are the most import factors for conventional digital economy integration (figure 8a). The increase in the share of a population with a financial or mobile money account was the most important driver of the region’s overall progress in digital economy integration during 2010-2017. On the other hand, it is clear that there is room for improvement in regulatory harmonization to support digital trade in the region as well as trade in ICT goods and utilizing ecommerce platforms. The results suggest that these areas require the most attention in increasing regional integration in the digital economy.

From the perspective of sustainable integration in the digital economy, the Asia-Pacific region has made immense progress in expanding women’s access to financial or mobile money accounts as well as in increasing household access to the Internet. This can be surmised from its stellar performance in ‘Mobile account female’ and ‘Household Internet’. These indicators emerge as the most important contributors for sustainable regional digital economy integration in terms of both level and change, driving progress over the sample period (figure 8b). In contrast, access to secure Internet servers remains a major stumbling block for deepening sustainable regional integration in the digital economy.
Figure 8a. Conventional digital economy integration, by indicator, Asia-Pacific region (comprehensive DigiSRII sub-index)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
Note: The data on digital regulatory similarity are available only for 2017.

Figure 8b. Sustainable digital economy integration, by indicator, Asia-Pacific region (comprehensive DigiSRII sub-index)

Source: ESCAP calculation based on the comprehensive version of DigiSRII
D. Economy-specific progress in regional integration: An example\textsuperscript{18}

The regional level results shown above provide important insights, in particular in terms of dimensions that could benefit from more regional cooperation. However, performance differs across countries and an economy-level analysis is needed to understand economy-specific progress and factors driving it. Figure 9a illustrates the case of Viet Nam. Across dimensions, the comparatively better infrastructure integration and regulatory cooperation with the regional economy are the most important ‘conventional’ factors for Viet Nam’s overall performance in regional integration, reflecting the overall Asia-Pacific region’s trend. However, a distinct difference in dimensional contribution by Viet Nam compared to the Asia-Pacific region’s average is for trade and investment. Viet Nam performs considerably better in this dimension compared to the Asia-Pacific region, reflecting Viet Nam’s position as a top performer in this dimension. In terms of progress, the improvement in regulatory coordination and financial integration at the regional level has driven the economy’s progress in regional integration during 2010-2017. While Viet Nam made significant progress in most dimensions of conventional integration, the score on the movement of people remained very small and static. This trend of limited and stagnant integration in the movement of people is general across the Asia-Pacific region, as shown in the preceding figures.

Turning to sustainable regional integration in Viet Nam (figure 9b), ‘Sustainable finance’ and ‘Sustainable infrastructure’ are the most important dimensions for that country, contributing the most towards its overall level of sustainable integration, similar to the overall Asia-Pacific region trend. This implies that sustainable financial as well as infrastructure integration with regional economies have been the major contributors towards Viet Nam’s overall level of sustainable regional integration. However, Viet Nam is considerably worse than the Asia-Pacific region average in sustainable value chain integration, placing it as one of the bottom performers in the region for this dimension. In terms of change, ‘Sustainable regulatory coordination’ and ‘Sustainable infrastructure’ are the most important dimensions. This indicates that sustainable integration in regulatory coordination and infrastructure played a major role in increasing Viet Nam’s sustainable regional integration during 2010-2017. Comparing this to the trend seen in the Asia-Pacific region as a whole indicates that Viet Nam made above-average progress in increasing its sustainable regulatory cooperation between 2010 and 2017.

\textsuperscript{18}To make full use of the index and indicator framework, policy analysts need to understand the different dimensions of DigiSRII, and how to interpret the underlying indicators and conventional and sustainable regional integration sub-indices. A first version of a user guide for policy analysts is provided in Annex 2.
Figure 9a. Conventional regional integration dimensions, Viet Nam (comprehensive DigiSRII sub-index)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.

Figure 9b. Sustainable regional integration dimensions, Viet Nam (comprehensive DigiSRII sub-index)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
As shown in the previous figures, digital economy integration remains one of the most important weaknesses in the regional integration of Viet Nam. Looking closer into this dimension reveals that ‘Online purchases’ remained limited as of 2017, and the digital-trade regulatory environment was dissimilar from those of the more digitally open economies of the region (figure 10a). With regard to sustainable digital-economy integration, Viet Nam’s scores are relatively low for most indicators, and particularly for ‘Secure server’ (figure 10b). These results indicate that policy priorities to enhance the digital integration of Viet Nam should be in removing obstacles in digital trade. Although investment in hard infrastructure may help, enabling regulatory environment is where the focus of reform should be placed. Reducing digital trade restrictions and harmonizing digital trade rules and regulations with major regional partners will allow the country to integrate better. Among others, regulations related to online sales, intermediate liability and foreign investment restrictions in digital economy-related sectors are the most important bottlenecks for Viet Nam (figure 10c). In addition, security and inclusive accessibility to digital trade infrastructure is a priority for unlocking potential and ensuring a sustainable development outcome from digital economy integration in Viet Nam.

![Figure 10a. Conventional digital economy integration, by indicator, Viet Nam (comprehensive DigiSRII sub-index)](image)

Source: ESCAP calculation.
Note: The data on digital regulatory similarity are available only for 2017.
Figure 10b. Sustainable digital economy integration, by indicator, Viet Nam (comprehensive DigiSRII sub-index)

Source: ESCAP calculation.

Figure 10c. Regional digital-trade regulatory similarity of Viet Nam, 2017

Source: ESCAP calculation.
Regional integration is well-recognized as an important driver of economic development, enabling efficient allocation of resources across countries and facilitating the sharing of knowledge and economic opportunities. Regional integration is a multidimensional endeavour and it is important to ensure that it takes places in a way that is consistent with the sustainable development goals. The rapid growth of the digital economy also adds a new and important digital dimension to regional integration. Accordingly, this study introduces a first version of a Digital and Sustainable Regional Integration Index (DigiSRII) for the ESCAP region. The development of the index and underlying indicator framework is part of a joint effort of the United Nations Regional Commissions, initiated by the Economic Commission for Africa in 2017, to provide new and improved tools for policymakers and researchers to evaluate the performance of economies while also facilitating cross-economy comparisons.

DigiSRII 1.0 is a composite index of 53 indicators, assembled into 14 equally-weighted indices of conventional and sustainable regional integration and covering seven different dimensions of regional integration, including a new digital economy integration dimension. The analysis of the results highlights wide differences among economies of the region across the various dimensions as well as in terms of progress towards more sustainable regional integration. For example, while Singapore leads in terms of overall and conventional regional integration efforts, Japan is the top performer in terms of sustainable regional integration. In addition, while regulatory cooperation and sustainable financial integration contribute greatly to regional integration in Asia and the Pacific, the region does not perform well in terms of enabling movement of people, which is found to be the region’s weakest link in regional integration.

Overall, DigiSRII can help individual economies to better understand their strengths and weaknesses along the various dimensions of regional integration that it covers. However, a lack of data remains a serious impediment. Even the simplified version of DigiSRII (based on 42 instead of 53 indicators) covers only 24 countries, or slightly less than half of ESCAP members because of missing data. While individual indicators and some of the sub-indices cover more countries, all countries should take steps to collect and make more data available, as the basis for sound evidence-based policymaking and benchmarking. This is particularly urgent when it comes to digital and sustainable regional integration indicators.

Looking ahead, efforts may focus increasingly on developing a global regional integration indicator framework, building the capacity of countries to tap into the framework to easily generate composite regional integration indices that meet their needs and objectives better. New and alternative data sources should be continuously explored in order to support the further development of DigiSRII and this regional integration indicator framework.
References


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Annex 1. Definition and data sources for DigiSRII indicators

This annex provides insight into the construction of indicators used in the DigiSRII. Details of the indicators and their respective data sources are provided, following which the construction, i.e., normalization, weighting and aggregation, of the indices are described.

A. Indicator definitions and data sources

1. Trade and investment integration

(a) Conventional trade and investment integration

Indicators under this dimension include the following:

(i) Intraregional goods exports to GDP

This indicator is the sum of an economy’s total merchandise exports to regional economies divided by its GDP. It is a measure of the intensity of regional export flows relative to the size of the economy. It provides an indication of the relative importance of regional trade for the economy from a production perspective. An economy with a higher intraregional goods exports to GDP is considered to be more regionally integrated in trade and vice-versa. This indicator has also been used by ECA (2016 and 2019). Refer to table A2 for a comparison between all DigiSRII indicators and those of ADB (2018a and 2018b), ECA (2016 and 2019) and other regional integration index studies. It is calculated as:

\[ \text{Reg}_\text{exp}_i = \frac{\sum_{j=1}^{n} X_{ij}}{\text{GDP}_i} \]

where \( X_{ij} \) is exports of economy \( i \) to regional partner \( j \), \( (j=1, 2, \ldots, n) \). \( \text{GDP}_i \) is the gross domestic product of economy \( i \).

Data sources: The export data were obtained from the UN Comtrade database, accessed through WITS. The GDP data were taken from the World Bank’s world development indicators (WDI), and are expressed in current United States dollars.

(ii) Intraregional goods imports to GDP

This indicator is the sum of an economy’s total merchandise imports from regional economies, divided by its GDP. It is a measure of the intensity of regional import flows relative to the size of the economy. It provides an indication of the relative importance of regional trade for the economy, for final consumption and/or to meet demand for intermediate inputs used in production. An economy with a higher intraregional goods imports to GDP is considered to be more regionally integrated in trade. This indicator has also been used by ECA (2016 and 2019). It is calculated as:

\[ \text{Reg}_\text{imp}_i = \frac{\sum_{j=1}^{n} M_{ij}}{\text{GDP}_i} \]

where \( M_{ij} \) are imports of economy \( i \) from regional partner \( j \), \( (j=1, 2, \ldots, n) \). \( \text{GDP}_i \) is the gross domestic product of economy \( i \).
Data sources: The import data were obtained from the UN Comtrade database, accessed through WITS. The GDP data were taken from the World Bank’s WDI, and are expressed in current United States dollars.

**(iii) Average tariff on intraregional imports**

The simple average of tariffs effectively applied on imports from regional economies indicates barriers to trade with the selected partners. Tariffs increase the price of imports, thereby serving as an impediment to trade integration. Therefore, lower average tariff on intraregional imports are associated with economies that are more regionally integrated in trade. This indicator has also been used in ECA (2019). It is calculated as:

\[
\text{Avg}\_\text{tariff}_i = \frac{\sum_{j=1}^{n} \bar{t}_{ij}}{n}
\]

where \(\bar{t}_{ij}\) is economy \(i\)’s average applied tariffs on regional partner \(j\) \((j=1,2,...,n)\).

Data sources: Data on applied tariffs were obtained from the UNCTAD Trade Analysis Information System (TRAiNS).

**(iv) Stock of intraregional FDI inflows to GDP**

The indicator is the sum of the economy’s stock of inward FDI from regional economies divided by its GDP. It is a measure of the regional intensity of inward FDI relative to the size of the economy. An economy with a higher stock of intraregional FDI inflows to GDP is considered more regionally integrated in investment. This indicator is similar to an indicator used in ADB (2018a and 2018b), but is scaled using the approach of ECA (2016 and 2019), i.e., to GDP instead of to total flows. It is calculated as:

\[
\text{Reg}\_\text{FDI} \_\text{inflow}_i = \frac{\sum_{j=1}^{n} FDI\_\text{instoc}_{kj}}{\text{GDP}_i}
\]

where \(FDI\_\text{instoc}_{kj}\) is economy \(i\)’s stock of inward FDI from regional partner \(j\), \((j=1,2,...,n)\). \(\text{GDP}_i\) is the gross domestic product of economy \(i\).

Data sources: The bilateral data on FDI were obtained from UNCTAD FDI Statistics. GDP data were obtained from WDI and are expressed in current US dollars.

**(v) Stock of intraregional FDI outflows to GDP**

The indicator is the sum of the economy’s stock of outward FDI to regional economies divided by its GDP. It is a measure of the intensity of regional FDI outflows relative to the size of the economy. An economy with a higher stock of intraregional FDI outflows to GDP is considered more regionally integrated in investment. This indicator is similar to an indicator used in ADB (2018a and 2018b), but is scaled using the approach of ECA (2016 and 2019), i.e., to GDP, instead of to total flows. It is calculated as:

\[
\text{Reg}\_\text{FDI} \_\text{outflow}_i = \frac{\sum_{j=1}^{n} FDI\_\text{outstoc}_{ij}}{\text{GDP}_i}
\]
where \( FDI_{\text{outstock}}_{ij} \) is economy \( i \)'s stock of outward FDI to regional partner \( j \), \((j=1,2,...n)\). \( GDP_i \) is the gross domestic product of economy \( i \).

Data sources: The bilateral data on FDI were obtained from UNCTAD FDI Statistics. GDP data were obtained from WDI and is expressed in current US dollars.

(b) Sustainable trade and investment integration

Indicators under this dimension include the following:

(i) **Share of EG exports in intraregional exports**

The more intraregional trade increases towards trade in environmentally friendly products, the more sustainable are the outcomes from regional trade integration. Exports of environmental goods can contribute to improved environmental conditions of other regional economies. An economy with a higher share of EG exports in intraregional exports is considered more sustainably integrated. This is a newly introduced indicator developed by ESCAP and is calculated as:

\[
Reg_{EG_{\text{exp}}} = \frac{\sum_{j=1}^{n} X_{EG_{ij}}}{\sum_{j=1}^{n} X_{ij}}
\]

where \( X_{EG_{ij}} \) are EG exports of economy \( i \) to regional partner \( j \) \((j=1,2,...,n)\) and \( X_{ij} \) are total exports of economy \( i \) to regional partner \( j \).

Data source: The EG export data were obtained from the UN Comtrade database, accessed through WITS.

(ii) **Share of environmental good (EG) imports in intraregional imports**

Imports of environmental-related products can contribute to improved environmental conditions in the importing economy. An economy with a higher share of EG imports in intraregional imports is considered more sustainably integrated. This is a newly introduced indicator developed by ESCAP and is calculated as:

\[
Reg_{EG_{\text{imp}}} = \frac{\sum_{j=1}^{n} M_{EG_{ij}}}{\sum_{j=1}^{n} M_{ij}}
\]

where \( M_{EG_{ij}} \) are EG imports of economy \( i \) from regional partner \( j \) \((j=1,2,...,n)\) and \( M_{ij} \) are total imports of economy \( i \) from regional partner \( j \).

Data source: The import data were obtained from the UN Comtrade database, accessed through WITS.

(iii) **Average tariff on intraregional imports of EGs**

The indicator is the simple average of effectively applied tariffs on intraregional imports of EGs. It represents barriers for intraregional trade in EGs. Lower tariffs represent better performance in terms of enabling sustainable development outcomes from regional integration. This is a newly introduced indicator developed by ESCAP and is calculated as:
\[\text{Avg}_E \text{G}_\text{tariff}_i = \frac{\sum_{j=1}^{n} \text{EG}_t_{ij}}{n}\]

where \(\text{EG}_t_{ij}\) is economy \(i\)'s average applied tariffs on EGs, on regional partner \(j\) \((j=1,2,\ldots,n)\).

Data source: Data on applied tariffs were obtained from the UNCTAD Trade Analysis Information System (TRAINS).

(iv) Employment created by domestic value-added (DVA) exports to regional economies relative to gross intraregional exports

Potential positive impacts of intraregional exports on social development depend on the extent to which domestic value-added (DVA) is embedded in intraregional exports and jobs created by those DVA exports. The indicator estimated as the share of DVA in intraregional exports of all sectors weighted by sectoral employment share. This is a newly introduced indicator developed by ESCAP. It is calculated as:

\[DVA\_employment_i = \frac{\sum_{j=1}^{n} \sum_{k=1}^{3} [(\text{VAX}_{ij} + \text{RDV}_{ij}) \times \text{emp}_{ik}]}{\sum_{j=1}^{n} \text{gross}_\text{exp}_{ij}}\]

where \(\text{VAX}_{ij}\) is the total DVA in economy \(i\)'s exports to regional partner \(j\) \((j=1,2,\ldots,n)\) absorbed abroad, \(\text{RDV}_{ij}\) is the total DVA in economy \(i\)'s exports to \(j\) that returns home and is absorbed domestically, \(\text{emp}_{ik}\) is the employment share of sector \(k\) \((k=1,2,3)\) in total employment in economy \(i\), and \(\text{gross}_\text{exp}_{ij}\) is the value of economy \(i\)'s gross exports to \(j\).

Data source: The data on trade in value-added was obtained from the ADB MRIO database. Data on sectoral employment shares was obtained from WDI.

2. Financial integration

(a) Conventional financial integration

Indicators under this dimension include the following:

(i) Intraregional cross-border portfolio liabilities and assets to GDP

This indicator captures the intensity of intraregional portfolio capital inflows and outflows relative to the size of the economy. It is calculated as the sum of the economy’s equity and bond liabilities and assets with regional economies divided by its GDP. An economy with higher intraregional cross-border portfolio liabilities and assets is considered more regionally integrated in finance. This indicator is similar to an indicator used in ADB (2018a and 2018b), but is scaled using the approach of ECA (2016 and 2019), i.e., to GDP instead of to total flows. It is calculated as:

\[\text{Cb\_liabasset}_i = \frac{\sum_{j=1}^{n} \text{Portfolio}_{ij}}{\text{GDP}_i}\]

where \(\text{Portfolio}_{ij}\) is the value of economy \(i\)'s equity and bond liabilities and assets with regional partner \(j\) \((j=1,2,\ldots,n)\). \(\text{GDP}_i\) is the gross domestic product of economy \(i\).
Data sources: The bilateral data on cross-border equity and bond liabilities and assets were taken from IMF’s Coordinated Portfolio Investment Survey (CPIS). GDP data were obtained from WDI and is expressed in current US dollars.

(ii) Pair-wise dispersion of deposit rates averaged regionally

This indicator captures the divergence of deposit-rate movements in a considered economy from other regional economies. An economy with lower pair-wise dispersion of deposit rates with regional economies is considered more financially integrated with the rest of the region. This indicator is similar to an indicator used in ADB (2018a and 2018b), but does not compare regional to global integration. It is calculated as:

\[ \text{Dep\_disp}_i = \frac{\sum_{j=1}^{n} d_{ij}}{n} \]

where dispersion \( d_{ij} = \frac{\sigma_{ij}}{\bar{x}_{ij}} \), \( \sigma_{ij} \) is the standard deviation of the absolute difference between economy i’s monthly deposit rates and those of regional partner j \( (j=1,2,...,n) \) and \( \bar{x}_{ij} \) is the mean of the absolute difference between economy i’s monthly deposit rates and those of j.

Data sources: The data on deposit rates were taken from IMF International Financial Statistics (IFS) and CEIC.

(iii) Pair-wise correlation of share price indices averaged regionally

The average correlation between share price indices of a considered economy and regional economies captures the extent of business-cycle synchronisation between the economy and regional economies. A economy with a higher pair-wise correlation of share price indices averaged regionally is considered more financially integrated. This is a newly introduced indicator developed by ESCAP. It is calculated as:

\[ \text{Sp\_corr}_i = \frac{\sum_{j=1}^{n} \rho_{ij}}{n} \]

where \( \rho_{ij} \) is the correlation coefficient of monthly share price indices between economy i and regional partner j \( (j=1,2,...,n) \).

Data source: The data on share price indices was taken from IMF IFS and CEIC.

(b) Sustainable financial integration

Indicators under this dimension include the following:

(i) Pair-wise correlation of share price indices averaged regionally, weighted by volatility of domestic share price indices

The indicator is calculated as the average correlation of share price indices between the economy and regional economies divided by the normalized coefficient of dispersion of the economy’s domestic share price index. The higher pair-wise correlation of share price indices indicates the greater financially integration between a considered economy and its partner,
while the coefficient of dispersion of the economy’s share price index accounts for the associated volatility. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
Sus_{\text{sp cor}}_i = \frac{\sum_{j=1}^{n} \rho_{ij}}{D_i}
\]

where \( \rho_{ij} \) is the correlation coefficient of monthly share price indices between economy \( i \) and regional partner \( j \) \((j=1,2,\ldots,n)\). \( D_i = \frac{\sqrt{n-d_i}}{\sqrt{n}} \) is the normalized coefficient of dispersion of monthly share price indices in economy \( i \), where \( n \) is the number of observations and \( d_i = \frac{\sigma_i}{x_i} \) is the coefficient of dispersion of monthly share price indices in economy \( i \).

Normalizing the coefficient of dispersion \( (d_i) \) is based on the theoretical maximum value of coefficient of dispersion being less than equal to the square root of the number of observations, i.e. \( \frac{\sigma_i}{x_i} \leq \sqrt{n} \).

Data source: The data on share price indices were taken from IMF IFS and CEIC.

(ii) Intraregional real exchange rate volatility

The indicator is calculated as the average coefficient of dispersion of the bilateral real exchange rate between the economy and regional economies. Financial integration causing greater flows of capital may cause higher volatility of real exchange rates, which is a comparative measure of the value of currencies, accounting for inflation differentials. An economy with lower volatility in the real exchange rate with regional partners is considered to be financially integrated more sustainably. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
Real_{\text{ex vol}}_i = \frac{\sum_{j=1}^{n} d_{ij}}{n}
\]

where \( d_{ij} = \frac{\sigma_{ij}}{x_{ij}} \) is the coefficient of dispersion of the monthly bilateral real exchange rate between economy \( i \) and regional partner \( j \) \((j=1,2,\ldots,n)\). \( \sigma_{ij} \) is the standard deviation of the monthly bilateral real exchange rate between economy \( i \) and \( j \), and \( x_{ij} \) is the average monthly bilateral real exchange rate between economy \( i \) and \( j \). Finally, \( x_{ij} = \frac{E_{ij} \times p_j}{p_i} \) is the bilateral real exchange rate between economy \( i \) and \( j \), where \( E_{ij} \) is the nominal exchange rate ratio between economy \( i \) and \( j \), \( p_i \) is economy \( i \)'s price index and \( p_j \) is economy \( j \)'s price index.

Data sources: The data on nominal exchange rates and consumer price indices were obtained from IMF IFS.

(iii) Average intraregional financial development index score

The indicator is calculated as an economy’s financial development index score averaged across regional economies. It shows the economy’s performance in terms of strong financial institutions and markets, accounting for the equivalent strength of financial institutions and
markets in other regional economies. The indicator is developed by IMF and evaluates the depth, accessibility and efficiency of the economy’s financial market. An increase in the indicator score indicates improved performance in terms of financial sector development. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[ f_{\text{index}}_i = \frac{\sum_{j=1}^{n} f_{\text{index}}_{ij}}{n} \]

where \( f_{\text{index}}_{ij} \) is the average value of financial development index between economy \( i \) and regional partner \( j (j=1,2,...,n) \).

Data source: The data on financial development index scores were obtained from the IMF Financial Development Index database.

3. Regional value chain (RVC) integration

(a) Conventional RVC integration

Indicators included in this dimension are:

(i) Regional export complementarity index

The indicator is the export complementarity between the economy and the rest of the Asia-Pacific region. The export complementarity index measures the degree to which the export pattern of a considered economy matches the import pattern of the region. An economy with higher regional export complementarity index is considered more integrated in regional value chains. This indicator has also been used by ECA (2016 and 2019). It is calculated as:

\[ \text{Exp}_i = \left( 1 - \left[ \frac{\sum_{w} m_{kwj} \left( \frac{\sum_{w} M_{wj}}{\sum_{w} X_{iw}} \right)}{\sum_{w} X_{iw}} \right] \right) \]

where \( i \) is the exporting economy of interest, \( j \) is the group of importing regional partners, \( w \) is the set of all economies in the world, \( k \) is the set of all HS six-digit products, \( x \) is the commodity export flow, \( X \) is the total export flow, \( m \) is the commodity import flow and \( M \) is the total import flow.

Data source: The import and export data used to construct the export complementarity indices were obtained from the UN Comtrade database, accessed through WITS.

(ii) RVC participation index

The indicator is the ratio of total backward and forward value-chain linkages to gross exports, with regional partners. Backward value chain linkages refer to the foreign value-added in the economy’s exports, while forward value chain linkages refer to the economy’s value-added in other economies’ exports. It measures the degree to which an economy is involved in cross-economy production networks with other regional economies. An economy with a higher RVC participation index is considered more integrated in regional value chains. This is a newly introduced indicator developed by ESCAP that is calculated as:
\[ RVC_{\text{part}}_i = \frac{\sum_{j=1}^{n} (FVA\_INT_{ij} + FVA\_FIN_{ij} + DVA\_INT\_rex_{ij})}{\sum_{j=1}^{n} (\text{gross}\_\text{exp}_{ij})} \]

where \( FVA\_INT_{ij} \) is the foreign value-added in economy \( i \)'s intermediate exports to regional partner \( j (j=1,2,...,n) \), \( FVA\_FIN_{ij} \) is the foreign value added in economy \( i \)'s final exports to \( j \) (backward participation) and \( DVA\_INT\_rex_{ij} \) is economy \( i \)'s domestic value-added in exports to \( j \), used by \( j \) in its own production of exports (forward participation). \( \text{gross}\_\text{exp}_{ij} \) is the value of gross exports from economy \( i \) to \( j \).

Data source: The data on trade in value-added used to construct the RVC participation indices were obtained from the ADB MRIO database.

(iii) Intraregional intermediate goods exports to total intraregional goods exports

The indicator is an economy’s total intermediate merchandise exports to regional economies divided by its total merchandise exports to regional economies. Intermediate merchandise exports are used as a proxy for upstream participation in regional value chains. An economy with higher intraregional intermediate goods exports in total intraregional goods exports is considered more integrated in regional value chains. This indicator has also been used by ECA (2016 and 2019). It is calculated as:

\[ \text{Reg}\_\text{INT}\_\text{exp}_i = \frac{\sum_{j=1}^{n} X\_INT_{ij}}{\sum_{j=1}^{n} X_{ij}} \]

where \( X\_INT_{ij} \) is the value of economy \( i \)'s intermediate exports to regional partner \( j (j=1,2,...,n) \) and \( X_{ij} \) is the value of economy \( i \)'s total exports to \( j \).

Data source: The export data was obtained from the UN Comtrade database, accessed through WITS. UNCTAD classification was used to determine intermediate goods at the HS six-digit level.

(iv) Intraregional intermediate goods imports to total intraregional goods imports

The indicator is an economy’s total intermediate merchandise imports from regional economies divided by its total merchandise imports from regional economies. Intermediate merchandise imports are used as a proxy for downstream participation in regional value chains. An economy with higher intraregional intermediate goods imports in total intraregional goods imports is considered more integrated in regional value chains. This indicator has also been used by ECA (2016 and 2019). It is calculated as:

\[ \text{Reg}\_\text{INT}\_\text{imp}_i = \frac{\sum_{j=1}^{n} M\_INT_{ij}}{\sum_{j=1}^{n} M_{ij}} \]

where \( M\_INT_{ij} \) is economy \( i \)'s intermediate imports from regional partner \( j (j=1,2,...,n) \) and \( M_{ij} \) is economy \( i \)'s total imports from regional partner \( j \).
Data source: The import data were obtained from the UN Comtrade database, accessed through WITS. UNCTAD classification was used to determine intermediate goods at the HS six-digit level.

(b) Sustainable RVC integration

Indicators included in this dimension are:

(i) Regional environmental good (EG) export complementarity index

The indicator is calculated as the average complementarity index of EG exports by the economy to regional trade partners. It indicates the degree to which the EG export pattern of the economy matches the EG import pattern of the region. An economy with higher EG export complementarity intraregionally has a higher potential to participate in regional trade and regional value chains in the EG sector of the region. This is a newly introduced indicator developed by ESCAP that is calculated as:

$$\text{EG}_{\text{exp}\_\text{comple}} = \left(1 - \frac{1}{\sum_k \left[ \frac{\sum_w m_{kwj}}{\sum_w M_{wj}} - \frac{\sum_w x_{kwj}}{\sum_w X_{iw}} \right]} \right) + 2$$

where $i$ is the exporting economy of interest, $j$ is the group of importing regional partners, $w$ is the set of all economies in the world, $k$ is the set of all EGs, $x$ is the commodity export flow, $X$ is the total export flow of EGs, $m$ is the commodity import flow, and $M$ is the total import flow of EGs.

Data source: The import and export data used to construct the complementarity indices were obtained from the UN Comtrade database, accessed through WITS.

(ii) Sustainable RVC participation index

The indicator is calculated as the employment weighted forward value chain participation index, with regional economies. It measures the gains captured by the economy from upstream participation in cross-economy production networks with other regional economies, accounting for the share of employment associated with these gains. An economy with a higher sustainable RVC participation index is considered more sustainably integrated in regional value chains. This is a newly introduced indicator developed by ESCAP that is calculated as:

$$\text{Sus}_{\text{RVC}}_{\text{part}} = \frac{\sum_{j=1}^{n} \sum_{k=1}^{3} (\text{DVA}_{\text{INT}}\text{rex}_{ij} \times \text{emp}_{ik})}{\sum_{j=1}^{n} \text{gross}\_\text{exp}_{ij}}$$

where $\text{DVA}_{\text{INT}}\text{rex}_{ij}$ is economy $i$’s domestic value-added in exports to regional partner $j$ ($j=1,2,...,n$) used by $j$ in its own production of exports, i.e., $i$’s forward RVC participation, $\text{emp}_{ik}$ is the employment share of sector $k$ ($k=1,2,3$) in total employment in economy $i$, and $\text{gross}\_\text{exp}_{ij}$ is the value of economy $i$’s gross exports to $j$.

Data source: The data on trade in value-added were obtained from the ADB MRIO database. Data on sectoral employment shares was obtained from WDI.
(iii) Intraregional exports of intermediates per unit of CO2 emissions

The indicator is calculated as the sum of gross exports of intermediates to regional economies divided by the domestic CO2 emissions embodied in those exports. It provides a measure of the degree of environmental sustainability associated with export production for regional economies. An economy with higher gross exports of intermediate goods per unit of CO2 emissions is considered more sustainably integrated in regional value chains. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
Exp_{\text{per CO2}_i} = \frac{\sum_{j=1}^{n} Gross_{\text{INT}_X_{ij}}}{\sum_{j=1}^{n} CO2_{\text{INT}_{ij}}}
\]

where \( Gross_{\text{INT}_X_{ij}} \) is the value of economy \( i \)'s gross intermediate exports to regional partner \( j \) \((j=1,2,...,n)\), and \( CO2_{\text{INT}_{ij}} \) is economy \( i \)'s domestic CO2 emissions embodied in gross intermediate exports to \( j \).

Data source: The data on gross exports of intermediate goods were obtained from the OECD Trade in Value-Added (TiVA) database. The data on CO2 emissions embodied in gross exports were obtained from OECD Trade in Embodied CO2 database.

4. Infrastructure integration

(a) Conventional infrastructure integration

Indicators included in this dimension are:

(i) Intraregional liner shipping connectivity index (LSCI)

The indicator is calculated as the simple average of an economy’s bilateral LSCI with regional economies. It indicates the quality of the economy’s regional maritime transport infrastructure. An economy with a higher bilateral LSCI averaged regionally is considered more regionally integrated from the perspective of transport infrastructure. This indicator is similar to an indicator used by ADB (2018a and 2018b), but does not compare regional to global integration. It is calculated as:

\[
Reg_{LSCI}_i = \frac{\sum_{j=1}^{n} LSCI_{ij}}{n}
\]

where \( LSCI_{ij} \) is the bilateral LSCI between economy \( i \) and regional partner \( j \) \((j=1,2,...,n)\).

Data source: The data on bilateral LSCI were obtained from UNCTAD.

(ii) Intraregional trade facilitation implementation

The indicator is calculated as the economy’s distance from the regional maximum trade facilitation implementation score for the year, as a percentage of its own score, averaged across regional partners. It shows how far the economy is below the regional best practices of trade facilitation implementation, while accounting for trade facilitation implementation in other regional economies. Correspondingly, an economy with less distance from the regional frontier is considered to be more regionally integrated in infrastructure. This is a newly introduced indicator developed by ESCAP that is calculated as:
\[
\text{trade}_i = \sum_{j=1}^{n} \frac{tf_i}{j}
\]

where \(tf_i\) is the average value of trade facilitation implementation between economy \(i\) and regional partner \(j\) \((j=1,2,...,n)\), calculated based on \(tf_i = \frac{tf_{\text{max}} - tf^t_i}{tf^t_i}\) where \(tf_{\text{max}}\) is the maximum trade facilitation score for year \(t\) and \(tf^t_i\) is economy \(i\)'s trade facilitation score for year \(t\).

Data source: The data on trade facilitation scores for regional economies were obtained from the United Nations Global Survey on Trade Facilitation and Paperless Trade Implementation.

(iii) Average intra-regional internet quality

The indicator is calculated as the economy’s international internet bandwidth per user, averaged across regional economies. It provides a measure of the quality of an economy’s internet infrastructure while accounting for equivalent infrastructure in other regional economies. An economy with higher average intraregional internet quality is considered more regionally integrated in infrastructure. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
\text{internet}_{band_i} = \frac{\sum_{j=1}^{n} \text{internet}_{band_{ij}}}{n}
\]

where \(\text{internet}_{band_{ij}}\) is the average internet bandwidth per user between economy \(i\) and regional partner \(j\) \((j=1,2,...,n)\).

Data source: The data on international internet bandwidth per user were obtained from the International Telecommunications Union (ITU).

(iv) Intra-regional average trade cost

The indicator is calculated as the economy’s average trade cost across major regional economies. It provides a measure of the quality of cross-border transport infrastructure that supports intraregional trade. An economy with lower intraregional average trade cost is considered more regionally integrated in infrastructure. This indicator is similar to an indicator used by ADB (2018a and 2018b), but does not compare regional to global integration. It is calculated as:

\[
\text{Reg}_t\text{cost}_{i} = \frac{\sum_{j=1}^{n} tcost_{ij}}{n}
\]

Where \(tcost_{ij}\) is the bilateral trade cost between economy \(i\) and regional partner \(j\) \((j=1,2,...,n)\). It must be noted that partners \(j\) only include the top trading economies (those that cumulatively account for 80% of total Asia-Pacific trade).
Data source: The data on bilateral trade cost were obtained from the ESCAP Trade Costs database.

(b) Sustainable infrastructure integration
Indicators included in this dimension are:

(i) Average intra-regional rural access to electricity

The indicator is calculated as the percentage of a county’s rural population with access to electricity, averaged across regional economies. It provides a measure of an economy’s inclusiveness in access to electricity infrastructure, accounting for equivalent provisions in other regional economies. An economy with a higher indicator value is considered more sustainably integrated in infrastructure. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
rural\_elec_i = \frac{\sum_{j=1}^{n} rural\_elec_{ij}}{n}
\]

where \( rural\_elec_{ij} \) is the average percentage of rural population with access to electricity between economy \( i \) and regional partner \( j \) \((j=1,2,\ldots,n)\).

Data source: Data on rural access to electricity were obtained from the World Bank WDI.

(ii) Intraregional sustainable trade facilitation implementation

The indicator is calculated as a economy’s sustainable trade facilitation implementation score averaged across regional economies. It provides a measure of an economy’s inclusiveness in providing trade facilitation measures for SMEs, agriculture sector and women, accounting for equivalent provisions in other regional economies. An economy with a higher intraregional sustainable trade facilitation score is considered more sustainably integrated in infrastructure. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
Sus\_tf_{i} = \frac{\sum_{j=1}^{n} Sus\_tf_{ij}}{n}
\]

where \( Sus\_tf_{ij} \) is the average of sustainable trade facilitation implementation score between economy \( i \) and regional partner \( j \) \((j=1,2,\ldots,n)\).

Data source: The data on sustainable trade facilitation scores for regional economies were obtained from the United Nations Global Survey on Trade Facilitation and Paperless Trade Implementation.

(iii) Average intra-regional share of internet users in population

The indicator is calculated as the percentage of an economy’s population that has used the internet in the preceding three months, averaged across regional economies. It provides a measure of an economy’s inclusiveness in access to internet infrastructure, accounting for equivalent provisions in other regional economies. An economy with a higher indicator value
is considered more sustainably integrated in infrastructure. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
internet\_users_i = \frac{\sum_{j=1}^{n} internet\_users_{ij}}{n}
\]

where \(internet\_users_{ij}\) is the average percentage of internet users between economy \(i\) and regional partner \(j\) \((j=1,2,...,n)\).

Data source: Data on share of population using the internet were obtained from the World Bank WDI.

5. Movement of people

(a) Conventional movement of people

Indicators included in this dimension are:

(i) Stock of intraregional emigrants per capita:

The indicator is calculated as the sum of an economy’s stock of emigrants going to regional economies, divided by the economy’s total population. It gives an indication of how much the economy is linked with other regional economies through the outflow of people. An economy with higher intraregional emigrants in the total population is considered more integrated from the perspective of movement of people. This indicator is similar to an indicator used by ADB (2018a and 2018b), but does not compare regional to global integration. It is calculated as:

\[
Reg\_mig\_out_i = \frac{\sum_{j=1}^{n} Mig\_outstock_{ij}}{population_i}
\]

where \(Mig\_outstock_{ij}\) is economy \(i\)’s stock of out-migrants in regional economy \(j\) \((j=1,2,...,n)\). \(population_i\) is the total population of economy \(i\).

Data source: The data on out-stock of migrants were obtained from the United Nations Department of Economic and Social Affairs (DESA), Population Division. The population data were obtained from the World Bank WDI.

(ii) Stock of intraregional immigrants per capita

The indicator is calculated as the sum of an economy’s stock of immigrants coming from regional economies, divided by the economy’s total population. It gives an indication of the economy’s openness to the inflow of people from other economies the region, adjusted by the size of its population. An economy with a higher share of intraregional immigrants in total population is considered more integrated from the perspective of the movement of people. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
Reg\_mig\_in_i = \frac{\sum_{j=1}^{n} Mig\_instock_{ij}}{population_i}
\]
where $M_{i \text{instock}}_{ij}$ is economy $i$'s stock of in-migrants from regional economy $j$ ($j=1,2,...,n$). $population_{i}$ is the total population of economy $i$.

Data source: The data on in-stock of migrants were obtained from UN DESA, Population Division. The population data were obtained from the World Bank WDI.

(iii) Intra-regional outflow of remittances to GDP

An economy’s total outward remittances to regional economies, divided by its GDP proxies an economy’s reliance on workers from other regional economies. A higher ratio indicates that the economy is more integrated from the perspective of other regional economies being more dependent on it. This indicator is similar to an indicator used by ADB (2018a and 2018b), but does not compare regional to global integration. It is calculated as:

$$Reg_{remit\_outi} = \sum_{j=1}^{n} Remit\_outflows_{ij} \over GDP_{i}$$

where $Remit\_outflows_{ij}$ is the value of remittance outflows from economy $i$ to regional partner $j$ ($j=1,2,...,n$). $GDP_{i}$ is the gross domestic product of economy $i$.

Data source: The data on remittance outflows were obtained from the World Bank Migration and Remittances database. GDP data were obtained from WDI and are expressed in current US dollars.

(iv) Intra-regional inflow of remittances to GDP

An economy’s total inward remittances from regional economies, divided by its GDP, proxies the economy’s dependence on remittances from regional economies. A higher ratio indicates that the economy is more integrated from the perspective of higher dependence on other regional economies. This indicator is similar to an indicator used by ADB (2018a and 2018b), but does not compare regional to global integration. It is calculated as:

$$Reg_{remit\_in_i} = \sum_{j=1}^{n} Remit\_inflows_{ij} \over GDP_{i}$$

where $Remit\_inflows_{ij}$ is the value of remittance inflows of economy $i$ from regional partner $j$ ($j=1,2,...,n$). $GDP_{i}$ is the gross domestic product of economy $i$.

Data source: The data on remittance outflows were obtained from the World Bank Migration and Remittances database. GDP data were obtained from WDI and are expressed in current US dollars.

(b) Sustainable movement of people

Indicators included in this dimension are:

(i) Average outward remittances per regional immigrant

The indicator is calculated as the sum of the economy’s outward remittances to regional economies divided by the economy’s total stock of intraregional immigrants. It provides a measure of the average income level of intraregional immigrants in the economy. An
economy with higher outward remittances per regional immigrant is considered more sustainably integrated in the free movement of people. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[ \text{Outremit}_{\text{inmig}} = \frac{\sum_{j=1}^{n} \text{Remit}_{\text{outflows}}_{ij}}{\sum_{j=1}^{n} \text{Mig}_{\text{instock}}_{ij}} \]

Data source: The data on in-stock of migrants were obtained from UN DESA, Population Division. The data on remittance outflows was obtained from the World Bank Migration and Remittances database.

(ii) Average inward remittances per regional out-migrant

The indicator is calculated as the sum of an economy’s inward remittances from regional economies divided by the economy’s total stock of emigrants in regional economies. It provides a measure of the average income level of the economy’s citizens in regional economies. An economy with higher inward remittances per regional emigrant is considered more sustainably integrated in the free movement of people. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[ \text{Inremit}_{\text{outmig}} = \frac{\sum_{j=1}^{n} \text{Remit}_{\text{inflows}}_{ij}}{\sum_{j=1}^{n} \text{Mig}_{\text{outstock}}_{ij}} \]

Data source: The data on out-stock of migrants were obtained from UN DESA, Population Division. The data on remittance inflows was obtained from the World Bank Migration and Remittances database.

6. Regulatory cooperation

(a) Conventional regulatory cooperation

Indicators included in this dimension are:

(i) Number of regional economies that have signed free trade agreements (FTAs) with the economy

Being a party to trade agreements involves, to some extent, accepting a common value and harmonizing trade rules with the agreement partners. Having more regional partners signing FTAs gives an indication of increasing integration with economies in the region. This indicator is similar to an indicator used by ADB (2018a and 2018b). It is calculated as:

\[ \text{FTA}_\text{part}_i = \sum_{j=1}^{n} fta_{ij} \]

where \( fta_{ij} \) is a binary variable for whether or not economy \( i \) has signed an FTA with regional partner \( j \) \((j=1,2,\ldots,n)\).

Data source: The data on FTA partners were obtained from the ESCAP Asia-Pacific Trade and Investment Agreement Database (APTIAD).
(ii) Number of regional economies that have signed international investment agreements (IIAs) with the economy

Being a party to IIAs with regional partners is a proxy of institutional arrangements with regional economies. Having more regional partners signing IIAs gives an indication of increasing integration with economies in the region. This indicator is similar to an indicator used by ADB (2018a and 2018b). It is calculated as:

\[ IIA_{\text{part}}_i = \sum_{j=1}^{n} ii_{ij} \]

where \( ii_{ij} \) is a binary variable for whether or not economy \( i \) has signed an IIA with regional partner \( j \) (\( j=1,2,\ldots,n \)).

Data source: The data on IIA partners were obtained from the UNCTAD Investment Policy Hub.

(iii) Number of regional economies that have an embassy in the economy

The number of regional economies that have an embassy in the economy is a proxy of diplomatic relations the economy has with regional economies. A higher number of embassies of other regional economies is an indication of a better coverage of diplomacy linkages with regional economies. This indicator is similar to an indicator used by ADB (2018a and 2018b). It is calculated as:

\[ Embassy_{\text{part}}_i = \sum_{j=1}^{n} embassy_{ij} \]

where \( embassy_{ij} \) is a binary variable for whether or not regional partner \( j \) (\( j=1,2,\ldots,n \)), has an embassy in economy \( i \).

Data source: The data on embassies in regional economies were obtained from Europa World online.

(iv) Trade-regulatory distance from regional partners

This indicator is a simple average of the economy’s bilateral non-tariff measures (NTM) regulatory distance from regional partners. Bilateral NTM regulatory distance is a proxy for trade-regulatory divergence between two economies. An economy with lower regulatory distance from regional partners is considered more regionally integrated. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[ \text{NTM Distance}_i = \frac{1}{n} \sum_{j=1}^{n} \text{NTM Distance}_{ij} \]

19 Please refer to ESCAP (2019a) for a detailed description of the approach used in calculating NTM regulatory distance.
\[ NTM_{regdist_i} = \frac{\sum_{j=1}^{n} ntm\_dist_{ij}}{n} \]

where \( ntm\_dist_{ij} \) is the bilateral NTM regulatory distance between economy \( i \) and regional partner \( j \) \((j=1,2,\ldots,n)\).

Data source: The data on bilateral NTM regulatory distance were obtained from ESCAP.

(b) Sustainable regulatory cooperation

(i) Sustainable regional FTA score

The indicator value is calculated as the product of the economy’s cumulative number of regional FTA partners and the economy’s cumulative number of sustainable FTA provisions. This report considers the following ‘sustainable FTA provisions’: (a) labour mobility; (b) intellectual property rights (IPR); (c) environment; (d) sanitary and phytosanitary measures (SPS)/technical barriers to trade (TBT); and (e) technical co-operation. It provides an indication of the economy’s interest in negotiating FTAs with consideration for economic, social and environmental development. An economy with a higher sustainable regional FTA score is considered more sustainably integrated. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[ \text{Sus}_\_\text{FTA}_i = \sum_{j=1}^{n} fta_{ij} \times \sum_{k=1}^{m} (lab_{ik} + ipr_{ik} + env_{ik} + sps_{ik} + tech_{ik}) \]

where, \( fta_{ij} \) is a binary variable for whether or not economy \( i \) has signed an FTA with regional partner \( j \) \((j=1,2,\ldots,n)\). \( lab_{ik} \) is a binary variable for whether economy \( i \)’s \( k^{th} \) \((k=1,2,\ldots,m)\) FTA has a provision for labour mobility, \( ipr_{ik} \) for IPR, \( env_{ik} \) for environmental protection, \( sps_{ik} \) for SPS/TBT, and \( tech_{ik} \) for technical cooperation.

Data source: The data on FTA partners and provisions were obtained from the ESCAP Asia-Pacific Trade and Investment Agreement Database (APTIAD).

(ii) Sustainable regional IIA score:

The indicator value is calculated as the product of the economy’s cumulative number of regional IIA partners and the economy’s cumulative number of sustainable IIA provisions. This report considers 23 ‘sustainable’ provisions in IIAs that cover environmental, economic and social dimensions of sustainable development (table A1), based on the framework of ESCAP (2019b). It provides an indication of an economy’s interest in negotiating IIAs, with consideration for sustainable development. A higher sustainable regional IIA score is associated with economies that are more sustainably integrated in institutions. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[ IIA\_\text{part}_i = \sum_{j=1}^{n} ii\text{a}_{ij} \times \sum_{k=1}^{m} (pro\text{v}_{ik}) \]
where \( iia_{ij} \) is a binary variable for whether or not economy \( i \) has signed an IIA with regional partner \( j \) \((j=1,2,...,n)\) and \( prov_{ik} \) is a variable that takes values between 0 and 23; 1 for each sustainable IIA provisions contained in economy \( i \)'s \( k^{th} \) \((k=1,2,...,m)\) IIA.

Data source: The data on IIA partners and provisions were obtained from the UNCTAD Investment Policy Hub.

Table A1. Sustainable IIA provisions

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Sustainable provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Right to regulate (in preamble)</td>
</tr>
<tr>
<td>2</td>
<td>Sustainable development (in preamble)</td>
</tr>
<tr>
<td>3</td>
<td>Social investment aspects (in preamble)</td>
</tr>
<tr>
<td>4</td>
<td>Environmental aspects (in preamble)</td>
</tr>
<tr>
<td>5</td>
<td>Transparency directed at States (in operative part)</td>
</tr>
<tr>
<td>6</td>
<td>Health and environment (in operative part)</td>
</tr>
<tr>
<td>7</td>
<td>Labour standards (in operative part)</td>
</tr>
<tr>
<td>8</td>
<td>Right to regulate (in operative part)</td>
</tr>
<tr>
<td>9</td>
<td>Corporate social responsibility (in operative part)</td>
</tr>
<tr>
<td>10</td>
<td>Not lowering of standards (in operative part)</td>
</tr>
<tr>
<td>11</td>
<td>Investment promotion (in operative part)</td>
</tr>
<tr>
<td>12</td>
<td>Essential security exception included (in operative part)</td>
</tr>
<tr>
<td>13</td>
<td>Essential security exception defined (in operative part)</td>
</tr>
<tr>
<td>14</td>
<td>Public policy exception - health and environment (in operative part)</td>
</tr>
<tr>
<td>15</td>
<td>Other public policy exceptions (in operative part)</td>
</tr>
<tr>
<td>16</td>
<td>UNCITRAL as the forum of ISDS (in operative part)</td>
</tr>
<tr>
<td>17</td>
<td>Transparency requires documents to be made publicly available (in operative part)</td>
</tr>
<tr>
<td>18</td>
<td>Transparency requires hearings to be open to the public (in operative part)</td>
</tr>
<tr>
<td>19</td>
<td>Transparency regulates submissions by third parties (in operative part)</td>
</tr>
<tr>
<td>20</td>
<td>Investor-State dispute settlement (in operative part)</td>
</tr>
<tr>
<td>21</td>
<td>Mechanism for consultations between State parties (in operative part)</td>
</tr>
<tr>
<td>22</td>
<td>Institutional framework committee (in operative part)</td>
</tr>
<tr>
<td>23</td>
<td>Technical cooperation/capacity-building (in operative part)</td>
</tr>
</tbody>
</table>

(iii) Rule of law index score

The indicator is calculated an economy’s rule of law index score averaged across regional economies. This indicator describes the economy’s performance in terms of good governance, accounting for the equivalent quality of governance in other regional economies. The index is based on the evaluation by the World Bank. The score captures the quality of contract enforcement, property rights, the police, and the courts as well as the likelihood of crime and violence. While the performance in governance cannot directly reflect performance in regional integration, an economy with a higher score is likely to have an institutional environment that would support better economic, environmental and social outcomes from regional integration. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[
Law_i = \frac{\sum_{j=1}^{n} Law_{ij}}{n}
\]

where \( Law_{ij} \) is the average rule of law index score between economy \( i \) and regional partner \( j \) \((j=1,2,...,n)\).

Data source: The data on rule of law index were obtained from the World Bank WGI.
(iv) **Average SDG trade regulatory distance from regional partners**

The indicator is calculated as the average bilateral SDG NTM regulatory distance from regional economies. It measures the degree to which sustainable regulations of the same type are applied by two economies on internationally traded products that are identified to play a role in the achievement of the SDGs. An economy with a lower average sustainable NTM regulatory distance with regional economies is considered more sustainably integrated. This is a newly introduced indicator developed by ESCAP that is calculated as:

$$Sus_{NTM\_regdist_i} = \frac{\sum_{j=1}^{n}sdg_{ntm\_distij}}{n}$$

where $sdg_{ntm\_distij}$ is the bilateral SDG NTM regulatory distance between economy $i$ and regional partner $j$ ($j=1,2,\ldots,n$).

Data source: The data on bilateral SDG NTM regulatory distance were obtained from ESCAP.

7. Digital economy integration

(a) Conventional digital economy integration

(i) **Share of ICT good exports in intraregional exports**

The more intraregional trade increases toward trade in ICT products, the more regional economies are capable of participating in the digital economy. Exports of ICT goods can contribute to improved capacity of other regional economies to participate in digital trade. An economy with a higher share of ICT exports in intraregional exports is considered more integrated in digital trade. This is a newly introduced indicator developed by ESCAP that is calculated as:

$$Reg_{\_ICT\_exp_i} = \frac{\sum_{j=1}^{n}X_{\_ICTij}}{\sum_{j=1}^{n}X_{ij}}$$

where $X_{\_ICTij}$ are ICT exports of economy $i$ to regional partner $j$ ($j=1,2,\ldots,n$) and $X_{ij}$ are total exports of economy $i$ to regional partner $j$.

Data source: The export data was obtained from the UN Comtrade database, accessed through WITS.

(ii) **Share of ICT good imports in intra-regional imports**

Imports of ICT products can contribute to improved capacity in the importing economy to participate in digital trade. An economy with a higher share of ICT imports in intraregional...
imports is considered more integrated in digital trade. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[ \text{Reg}_\text{ICT}_\text{imp}_i = \frac{\sum_{j=1}^{n} M_{ICT_{ij}}}{\sum_{j=1}^{n} M_{ij}} \]

where \( M_{ICT_{ij}} \) are ICT imports of economy \( i \) from regional partner \( j \) \((j=1,2,...,n)\) and \( M_{ij} \) is total imports of economy \( i \) from regional partner \( j \).

Data source: The import data were obtained from the UN Comtrade database, accessed through WITS.

(iii) Average tariff on intra-regional imports of ICT goods

The indicator is the simple average of effectively applied tariffs on intraregional imports of ICT goods. It represents barriers for intraregional trade in ICT goods. Lower tariffs represent better performance in terms of enabling digital trade integration. This is a newly introduced indicator developed by ESCAP that is calculated as:

\[ \text{Avg}_\text{ICT}_\text{tariff}_i = \frac{\sum_{j=1}^{n} ICT_{tij}}{n} \]

where \( ICT_{tij} \) is economy \( i \)'s average applied tariffs on ICT goods of regional partner \( j \) \((j=1,2,...,n)\).

Data source: Data on applied tariffs were obtained from the UNCTAD Trade Analysis Information System (TRAINS).

(iv) Average intra-regional share of population with financial institution or mobile money account

The indicator is calculated as the percentage of a economy’s population above the age of 15 that has an account with a bank, other type of financial institution or has used a mobile money service, averaged across regional economies. It provides a measure of the share of a economy’s population that have access to the financial services required to participate in the digital economy, accounting for access to equivalent services in other regional economies. Correspondingly, a economy with a higher indicator value is considered more regionally integrated in digital trade. This is a newly introduced indicator developed by ESCAP. It is calculated as:

\[ \text{account}_i = \frac{\sum_{j=1}^{n} \text{account}_{ij}}{n} \]

where \( \text{account}_{ij} \) is the average share of population with a financial institution or mobile money account between economy \( i \) and regional partner \( j \) \((j=1,2,...,n)\).

Data source: The data on share of population with a financial institution or mobile money account was obtained from World Bank Global Findex database.
(v) Average intra-regional share of population that use internet for online purchase

The indicator is calculated as the percentage of population above the age of 15 that used the internet to purchase something online, averaged across regional economies. It provides a measure of the share of a country’s population that utilise the digital economy, accounting for equivalent use of the digital economy in other regional economies. Correspondingly, a country with a higher indicator value is considered more regionally integrated in digital trade. This is a newly introduced indicator developed by ESCAP. It is calculated as:

$$\text{online}_i \text{purchase} = \frac{\sum_{j=1}^{n} \text{online}_i \text{purchase}_{ij}}{n}$$

where $\text{online}_i \text{purchase}_{ij}$ is the average share of population that use the internet for online purchases between economy $i$ and regional partner $j$ ($j=1,2,\ldots,n$).

Data source: The data on share of population that use the internet for online purchases was obtained from World Bank Global Findex database.

(vi) Digital trade regulatory similarity with regional partners

This subdimension capturing regulatory similarity between the country and its regional partners at a bilateral level in 11 areas of policy regulation that are considered relevant for digital trade integration: 1.) trade and tariff defence 2.) public procurement 3.) foreign direct investment 4.) intellectual property rights 5.) telecom infrastructure and competition 6.) cross border data policies 7.) domestic data policies 8.) intermediary liability and content access 9.) quantitative trade restrictions 10.) standards 11.) online sales and transactions. This is a newly introduced indicator developed by ESCAP.

The overall regulatory similarity of country $a$ from regional partners is calculated as:

$$\text{Overall regulatory similarity of } a = 1 - \frac{\sum_{i=1}^{11} \left( \sum_{b=1}^{N} \frac{\text{DTR}_a - \text{DTR}_b}{N} \right)}{11}$$

where $i$ represents regulatory pillars and $N$ is the number of regional partners. DTR is the Digital Trade Restrictiveness score which summarises the economies’ restricted policy environment in each pillar. DTR$_a$ denotes the digital trade policy regulatory score for economy $a$, in regulatory pillar $i$ ($i=1, 2, \ldots, 11$) and DTR$_b$ denotes the digital trade regulatory score for economy $b$ ($b=1,2,\ldots,N$) in regulatory pillar $i$. The ratio of regional regulatory distance of economy $a$, $\frac{\sum_{i=1}^{11} \sum_{b=1}^{N} \frac{\text{DTR}_a - \text{DTR}_b}{N}}{11}$, is the total regulatory difference that the considered economy has with all regional partners, averaged across all 11 regulatory pillars. Min-max normalization is taken to arrange the score to be within the range of zero and 1. Finally, the additive inverse is taken to ensure that score of overall regulatory similarity reflects regulatory coherence and policy openness. The higher index score means that the economy has regulatory coherence with regional economies that has relatively opened regulatory environment, while the lowest index score means the considered country is taking opposite policy stance and also tend to have more restricted policies than its regional partner.
Data source: The data on bilateral digital trade policy regulatory distance was obtained from ESCAP.

(b) Sustainable digital economy integration

(i) Average intra-regional secure internet servers:

The indicator is calculated as a economy’s number of secure internet servers per 1 million people, averaged across regional economies. It provides a measure of the availability of secure internet servers in a economy relative to the size of its population, accounting for equivalent provisions in other regional economies. A economy with a higher indicator value is considered more sustainably integrated in digital trade. This is a newly introduced indicator developed by ESCAP. It is calculated as:

\[
internet\_servers_i = \frac{\sum_{j=1}^{n} internet\_servers_{ij}}{n}
\]

where \(internet\_servers_{ij}\) is the average number of secure internet servers per 1 million people between economy \(i\) and regional partner \(j\) \((j=1,2,\ldots,n)\).

Data source: The data on share of population that use the internet for online purchases was obtained from World Bank WDI.

(ii) Average intra-regional proportion of household with access to internet:

The indicator is calculated as a economy’s share of household with internet access at home available at all times, averaged across other regional economies. It provides a measure of the inclusiveness in access to internet facilities required to participate in the digital economy, accounting for equivalent provisions in other regional economies. A economy with a higher indicator value is considered more sustainably integrated in digital trade. This is a newly introduced indicator developed by ESCAP. It is calculated as:

\[
hh\_internet_i = \frac{\sum_{j=1}^{n} hh\_internet_{ij}}{n}
\]

where \(hh\_internet_{ij}\) is the average share of households with internet access at home at all times between economy \(i\) and regional partner \(j\) \((j=1,2,\ldots,n)\).

Data source: The data on share of households with internet access at home was obtained from International Telecommunications Union (ITU).

(iii) Average intra-regional share of female population with financial institution or mobile money account:

The indicator is calculated as the percentage of a economy’s female population above the age of 15 that has an account with a bank, other type of financial institution or has used a mobile money service, averaged across regional economies. It provides a measure of the share of a economy’s female population that have access to the financial services required to participate in the digital economy, accounting for access to equivalent services in other regional economies. Correspondingly, a economy with a higher indicator value is considered more
sustainably integrated in digital trade. This is a newly introduced indicator developed by ESCAP. It is calculated as:

\[
account_{fi} = \frac{1}{n} \sum_{j=1}^{n} account_{fij}
\]

where \(account_{fij}\) is the average share of female population with a financial institution or mobile money account between economy \(i\) and regional partner \(j\) \((j=1,2,\ldots,n)\).

Data source: The data on share of female population with a financial institution or mobile money account was obtained from World Bank Global Findex database.

(iv) Average intra-regional share of female population that use internet for online purchase:

The indicator is calculated as the percentage of a economy’s female population above the age of 15 that used the internet to purchase something online, averaged across regional economies. It provides a measure of the share of a economy’s female population that utilise the digital economy, accounting for equivalent use of the digital economy in other regional economies. Correspondingly, a economy with a higher indicator value is considered more sustainably integrated in digital trade. This is a newly introduced indicator developed by ESCAP. It is calculated as:

\[
online_{purchase_{fi}} = \frac{1}{n} \sum_{j=1}^{n} online_{purchase_{fij}}
\]

where \(online_{purchase_{fij}}\) is the average share of female population that use the internet for online purchases between economy \(i\) and regional partner \(j\) \((j=1,2,\ldots,n)\).

Data source: The data on share of female population that use the internet for online purchases was obtained from World Bank Global Findex database.

<p>| Table A2. Comparing DigiSRII indicators with other studies |
|----------------------------------|-----------------|------------------------|-----------------|
| <strong>ESCAP DigiSRII (2020) indicators</strong> | <strong>ECA ARII (2016, 2019) indicators</strong> | <strong>ADB APRII (2018a), ARCI (2018b) indicators</strong> | <strong>Other studies’ indicators</strong> |
| Stock of intraregional FDI inflows to GDP | Share of intraregional trade in total trade (2016, 2019) | Proportion of intraregional FDI inflows to total FDI inflows (2017, 2018) | Absolute deviation of real GDP per capita (Chen and Woo, 2010) |
| Stock of intraregional FDI outflows to GDP | Ratification of the African Continental Free Trade Area | Proportion of intraregional FDI inflows plus outflows to | Non-agriculture sectoral share to GDP (Chen and |</p>
<table>
<thead>
<tr>
<th>Financial integration</th>
<th>Regional value chain integration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intraregional cross-border portfolio liabilities and assets to GDP</strong></td>
<td><strong>Regional export complementarity index</strong></td>
</tr>
<tr>
<td><strong>Pair-wise dispersion of deposit rate averaged regionally</strong></td>
<td>Ratio between the averaged trade complementarity index over regional trading partners and the averaged trade complementarity index over all trading partners (2017, 2018)</td>
</tr>
<tr>
<td>Regional inflation differential (2016, 2019)</td>
<td><strong>RVC participation index</strong></td>
</tr>
<tr>
<td><strong>Pair-wise correlation of share price index averaged regionally</strong>*</td>
<td>Ratio between the averaged trade concentration index over regional trading partners and the averaged trade concentration index over all trading partners (2017, 2018)</td>
</tr>
<tr>
<td>Number of bilateral investment treaties in force (2019)</td>
<td><strong>Intraregional inward and outward stocks of FDI as % of GDP (König, 2015)</strong></td>
</tr>
<tr>
<td><strong>Intraregional real exchange rate volatility</strong></td>
<td><strong>Intraregional inward and outward stocks of FDI as % of total FDI (König, 2015)</strong></td>
</tr>
<tr>
<td>Average intraregional financial development index score</td>
<td><strong>Intraregional employees as % of foreign employees (König, 2015)</strong></td>
</tr>
<tr>
<td>Volatility weighted pair-wise correlation of share price index averaged regionally*</td>
<td></td>
</tr>
</tbody>
</table>


Woo, 2010)

Urban resident ratio (Chen and Woo, 2010)

Life expectancy (Chen and Woo, 2010)

Education expense share to GNI (Chen and Woo, 2010)

Regional imports and exports share to GDP (Chen and Woo, 2010)

Intraregional FDI interflow share to gross capital formation (Chen and Woo, 2010)

Intraregional tourist inflow (Chen and Woo, 2010)

Intraregional goods trade as % of GDP (König, 2015)

Intraregional services trade as % of GDP (König, 2015)

Intraregional goods trade as % of total goods trade (König, 2015)
<table>
<thead>
<tr>
<th>Category</th>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trade Concentration Index</strong></td>
<td>trade concentration index over all trading partners (2017, 2018)</td>
<td>Real GDP per capita in relation to regional average (König, 2015)</td>
</tr>
<tr>
<td>Regional environmental good export complementarity index</td>
<td>Real GDP per capita in relation to regional average (König, 2015)</td>
<td>Labour costs in relation to regional average (König, 2015)</td>
</tr>
<tr>
<td>Sustainable RVC participation index</td>
<td>Real GDP per capita in relation to regional average (König, 2015)</td>
<td>Long term interest rates in relation to regional average (König, 2015)</td>
</tr>
<tr>
<td>Intraregional exports of intermediates per unit of CO₂ emissions*</td>
<td>Real GDP per capita in relation to regional average (König, 2015)</td>
<td>Gross government debt as % of GDP in relation to regional average (König, 2015)</td>
</tr>
<tr>
<td><strong>Infrastructure Integration</strong></td>
<td></td>
<td>Implicit tax rate on capital in relation to regional average (König, 2015)</td>
</tr>
<tr>
<td>Intraregional liner shipping connectivity index</td>
<td>AfDB infrastructure development index (2016, 2019)</td>
<td>Ratio between the averaged trade cost over regional trading partners and the averaged trade cost over all trading partners (2017, 2018)</td>
</tr>
<tr>
<td>Infraregional trade facilitation implementation</td>
<td>Proportion of intraregional intermediates imports (2016, 2019)</td>
<td>Ratio between the averaged liner shipping connectivity index over regional trading partners and the averaged liner shipping connectivity index over all trading partners (2017, 2018)</td>
</tr>
<tr>
<td>Average intraregional rural access to electricity</td>
<td></td>
<td></td>
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<tr>
<td>Intraregional sustainable trade facilitation implementation</td>
<td></td>
<td></td>
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<tr>
<td>Average intraregional share of Internet users in population</td>
<td></td>
<td></td>
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<tr>
<td>Movement of people</td>
<td>Regulatory cooperation</td>
<td></td>
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<td>--------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Stock of intraregional emigrants per capita</strong></td>
<td>Protocol on the free movement of persons (Kigali, 2019)</td>
<td>Proportion of intraregional outbound migration to total outbound migration (2017, 2018)</td>
</tr>
<tr>
<td><strong>Stock of intraregional immigrants per capita</strong></td>
<td>Ratification of REC protocol on free movement of people (2016)</td>
<td>Proportion of intraregional tourists to total tourists (inbound plus outbound) (2017, 2018)</td>
</tr>
<tr>
<td><strong>Intraregional outflow of remittances to GDP</strong></td>
<td>Number of countries that require a visa (2019)</td>
<td>Proportion of intraregional remittances to total remittances (2017, 2018)</td>
</tr>
<tr>
<td><strong>Intraregional inflow of remittances to GDP</strong></td>
<td>Proportion of REC member countries whose nationals do not require a visa for entry (2016)</td>
<td>Proportion of other Asian countries that do not require an entry visa (2017, 2018)</td>
</tr>
<tr>
<td><strong>Average outward remittances per regional immigrant</strong></td>
<td>Number of countries that are granted visa on arrival (2019)</td>
<td></td>
</tr>
<tr>
<td><strong>Average inward remittances per emigrant</strong></td>
<td>Proportion of REC member countries whose nationals may obtain a visa on arrival (2016)</td>
<td></td>
</tr>
<tr>
<td><strong>Number of regional economies that have signed FTAs with the economy</strong></td>
<td></td>
<td>Proportion of other Asian countries that have signed FTAs (2017, 2018)</td>
</tr>
<tr>
<td><strong>Number of regional economies that have signed IIAs with the economy</strong></td>
<td></td>
<td>Proportion of other Asian countries that have an embassy (2017, 2018)</td>
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<tr>
<td><strong>Number of economies that have an embassy in the economy</strong></td>
<td></td>
<td>Proportion of other Asian countries that have signed business investment treaties (2017, 2018)</td>
</tr>
<tr>
<td><strong>Trade regulatory distance from regional partners</strong></td>
<td></td>
<td>Proportion of other Asian countries that have signed double taxation treaties (2017, 2018)</td>
</tr>
<tr>
<td><strong>Sustainable regional FTA score</strong></td>
<td></td>
<td>Cultural proximity with other Asian countries relative to that with all other countries (2017, 2018)</td>
</tr>
<tr>
<td><strong>Sustainable regional IIA score</strong></td>
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<tr>
<td><strong>Average intraregional rule of law index score</strong></td>
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<td>Digital economy integration</td>
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<tr>
<td>SDG trade regulatory distance from regional partners*</td>
<td></td>
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<tr>
<td>Share of ICT goods exports in intraregional exports</td>
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<td>Share ICT goods imports in intraregional imports</td>
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<tr>
<td>Average tariff on intraregional imports of ICT goods</td>
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<tr>
<td>Average intraregional share of population with financial institution or mobile money account*</td>
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<tr>
<td>Average intraregional share of population that use Internet for online purchase*</td>
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<tr>
<td>Digital trade regulatory similarity with regional partners*</td>
<td></td>
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<tr>
<td>Average intraregional secure Internet servers</td>
<td></td>
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<tr>
<td>Average intraregional proportion of households with Internet access</td>
<td></td>
<td></td>
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<tr>
<td>Average intraregional share of female population with financial institution or mobile money account*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average intraregional share of female population that use Internet for online purchase*</td>
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</table>

* The indicator is only used in the comprehensive index for economies with data availability. Light blue shading reflects conventional indicators, dark blue shading represents sustainable indicators and yellow shading represents indicators used in other studies.

B. Normalisation

Normalisation is required prior to any data aggregation as the indicators in a data set often have different measurement units (OECD, 2008). We follow the same approach used by ADB (2018b) in normalising the indicators of the composite indices, i.e. panel normalisation. This approach involves normalising indicators based on all years and economies included in the sample. It is chosen owing to its suitability for comparing progress across economies and over time. However, this approach comes with the caveat that when new data points become available, all indicators must be normalised again using the updated sample.

Each individual indicator $x^c_{qt}$, of type $q$, for economy $c$ and time $t$, is normalised based on the following transformation:

62
\[
I_{qc}^t = \frac{x_{qc}^t - \min_{t \in T} \min_c (x_q^t)}{\max_{t \in T} \max_c (x_q^t) - \min_{t \in T} \min_c (x_q^t)}
\]

The minimum and maximum values for each indicator are calculated across economies and time. The values of \(I_{qc}^t\) range from 0 to 1, with higher values indicating a higher level of integration. For indicators that have a negative direction of change, i.e. higher values indicating a lower level of integration (for example, average tariffs on regional partners), the following transformation is used:

\[
I_{qc}^t = 1 - \frac{x_{qc}^t - \min_{t \in T} \min_c (x_q^t)}{\max_{t \in T} \max_c (x_q^t) - \min_{t \in T} \min_c (x_q^t)}
\]

C. Weighting and aggregation

Construction of the composite indices involves first aggregating the normalised dimensional indicators into dimensional indices, and then aggregating these dimensional indices into the composite index. Our approach towards constructing the composite indices uses equal weighting of indicators and dimensions. Therefore, for economy \(c\), at time \(t\), its \(k\)th \((k=1,2,…,6)\) dimensional index (DI) can be calculated as the arithmetic mean of the normalised indicators \(I_{qc}^t\) of dimension \(k\). This is calculated as:

\[
DI_{kc}^t = \frac{1}{m} \sum_{q=1}^{m} I_{qc}^t
\]

Following this, the composite indices are calculated considering equal weighting of all dimensions. Therefore, for economy \(c\), at time \(t\), its composite index (CI) can be calculated as the arithmetic mean of its dimensional indices \(DI_{kc}^t\). This is calculated as:

\[
CI_c^t = \frac{1}{6} \sum_{k=1}^{6} DI_{kc}^t
\]
Annex 2. DigiSRII User Guide on understanding regional integration by dimension

To illustrate how DigiSRII and the underlying database can be used to perform an in-depth analysis at the economy level, this document discusses the results at the level of individual economies for each of the seven dimensions of integration covered in DigiSRII, including their conventional and sustainable regional integration components.

The purpose of this user guide is to describe how to use the database for policy analysis. Hence, for each dimension, this document: (a) describes the performance of all economies in the overall dimensional index being considered; (b) compares performance of all economies in terms of conventional vs sustainable regional integration; (c) discusses the performance of a selected economy based on every indicator included in the dimensional index under consideration; and (d) evaluates the performance of the selected economy against other regional economies based on selected indicator. A different economy is covered for each of the seven dimensions, showing how the indices and indicators can easily be applied to gain in-depth insights into the drivers of conventional or sustainable regional integration for any of the economies for which data are available.

A. Intraregional trade and investment integration

The user guide begins by providing a brief description of the overall performance of Asia-Pacific economies in regional trade and investment integration, accounting for performance in both conventional and sustainable trade and investment integration (figure A1). The results can be considered from two perspectives, i.e., level (index value) and change (adjustment in index value between the two periods). The findings highlight Singapore as the most integrated economy in intraregional trade and investment, followed by fellow ASEAN economies Malaysia, Thailand and Viet Nam. Furthermore, ENEA economies such as Japan, Mongolia and the Republic of Korea also appear to be highly integrated in intraregional trade and investment. In addition, several economies – most notably Lao PDR and Cambodia – increased their regional integration considerably during 2010-2017. On the other hand, SSWA economies display the lowest degree of intraregional trade and investment integration. However, as these results combine both sustainable and conventional approaches towards measuring regional trade and investment integration, further analysis is required to uncover the relative contributions of conventional and sustainable integration.
1. Regional level

The next step is describing and comparing the performance of Asia-Pacific economies separately in conventional and sustainable trade and investment integration. The Asia-Pacific region, on average, did not make a significant increase in its degree of conventional trade and investment integration between 2010 and 2017 (figure A2a). This can be seen from the marginal difference between the regional average scores for 2010-2013 and 2014-2017. One possible reason is that a large number of economies in the region had already reached a high level of trade and investment integration in 2010, which is the starting point of the evaluation period. However, considerable differences exist at the economy level.

Singapore, followed by neighbour Malaysia, is most integrated in intraregional trade and investment. Most of the economies that are highly integrated in regional trade and investment tend to be highly open, small economies with high dependence on trade and investment with regional partners. In addition, several economies, and ASEAN CLMV in particular, are dynamic performers that have increasingly integrated in regional trade and investment substantially during the past eight years.

Large economies in the region, such as China and developed Asia-Pacific economies, are comparatively less reliant on intraregional trade and investment. This is because these large economies have large domestic markets as well as diversified trade and investment partners, making them less dependent on intraregional trade and investment. In general, NCA and SSWA economies tend to be less reliant on intraregional trade and investment because of a number of factors including geography, trade patterns and trade preference granted by developed economies outside the region.

From the sustainable development perspective, the good news is that most regional economies have made substantial progress over time (figure A2b). Japan and China as well as Hong Kong, China, the Republic of Korea, Thailand and Kazakhstan performed relatively
better than others in the region in terms of participating in regional trade and investment that focused on environmental goods and employment creation. None in the group of highly integrated, best performers keep its position when sustainable development is considered.

The scores of sustainable regional trade and investment integration reveals that there is room to mainstream sustainable development in regional integration strategies of economies that are highly open and reliant on intraregional trade and investment. This is particularly the case for graduating least developed countries (LDCs). Many of them have rapidly integrated in intraregional trade and investment, but not in the sectors that will create jobs or enable environmental protection. Among others, Bangladesh and Nepal are particularly worrying due to their regression in sustainable integration.

**Figure A2a. Conventional trade and investment integration, Asia-Pacific region**
2. Economy level

To illustrate how an economy analysis can be performed in the dimension of regional trade and investment integration, Lao PDR data are used as an example. The overall dimensional score and its change overtime shows that the Lao PDR is among the economies that are highly integrated in intraregional trade and investment, while it has made substantial progress in sustainable trade and investment integration with regional economies. Looking more closely at the Lao PDR economy’s performance at the indicator level provides insightful information. Lowering tariffs on intraregional imports tends to be an important factor contributing to its progress in integration into intraregional trade and investment, both from conventional (figure A3a) and sustainable (figure A3b) points of view. This is because it gets the highest scores relative to other indicators for the Lao PDR. Notably, the economy has significantly reduced its tariffs on intraregional imports since 2010, which may reflect its implementation of tariff reduction commitments as part of associating in multilateral and regional arrangements, and the ASEAN Free Trade Area (AFTA), succeeded by the ASEAN Economic Community (AEC) in particular.

However, in terms of progress, the increase of inward FDI from regional partners is the most important factor that has driven the increase in intraregional integration, while the role of intraregional exports and imports has declined. For sustainable integration, more employment associated with intraregional exports has been the most dynamic contributor to its substantial progress in sustainable trade and investment integration within the Asia-Pacific region. In contrast, the Lao PDR economy has room to more effectively utilize trade as a means of helping to protect the environment and manage natural resources.
After understanding the important factors driving the progress of a selected economy in regional trade and investment integration, the next step is to compare the performance of the selected economy against all economies in the Asia-Pacific region. The indicator on intraregional tariffs provides an example of how a comparative analysis can be made. The economy’s position in terms of average intraregional tariff remains below the regional average during both periods (figure A4a). The fact that the Lao PDR did not perform above the regional average in this indicator suggests that other factors also have contributed to the relatively good position of the Lao PDR in the dimension of integration to regional trade and investment. The sizable intraregional trade to GDP, especially imports, and inward FDI
relative to GDP are also keys to the country’s integration into regional trade and investment. Therefore, while the Lao PDR scored lower in other indicators relative to intraregional import tariffs, its performance in these indicators was well above average compared with other regional economies. This is what has enabled it to achieve above average scores in trade and investment integration. This finding highlights an important lesson in interpreting drivers of integration – comparing the contribution of different dimensional indicators within an economy is a useful step in uncovering important drivers and hurdles in integration; however, it is not sufficient enough unless the performance in each of these indicators is also compared to that of all other regional economies.

Figure A4a. Average tariffs, Asia-Pacific region
With regard to sustainable trade integration, when ‘intraregional EG tariffs’ are considered (figure A4b), the Lao PDR is an average, although dynamic, performer in the region. Its score is above the regional average for both periods, and significantly improved over time. The Lao PDR is among the four economies (the others are Brunei Darussalam, Thailand, and Maldives) with the most significant reduction of tariffs on intraregional EG imports between the two periods.

**B. Financial integration**

The results of evaluating the performance of the Asia-Pacific economies in overall regional financial integration (figure A5) place Hong Kong, China and Singapore as the two most regionally integrated economies in finance. They are followed by certain advanced economies in the region, including Australia, the Republic of Korea and Japan, plus Thailand. Moreover, a number of economies, most notably Viet Nam and Indonesia, made impressive progress in advancing regional financial integration during the past eight years. While figure A5 provides a comprehensive measure of overall regional financial integration, it is necessary to evaluate economy-wise performance in conventional and sustainable integration separately in order to understand the drivers and obstacles in regional financial integration across the Asia-Pacific economies.
1. Regional level

The majority of Asia-Pacific economies made progress during the sample period, indicated by their respective increases in index values from 2010-2013 to 2014-2017 (figure A6a). Hong Kong, China, followed by Singapore are the two economies most financially integrated with regional partners. The results reflect the unique position of these two economies as regional financial hubs. Nonetheless, dynamic performers Viet Nam, Thailand, Indonesia and Mongolia made the most progress in integration into regional financial markets.

When considering sustainable financial integration, the results show that most of the region’s economies made progress between 2010 and 2017 (figure A6b). The Republic of Korea emerged as the top performer in terms of its level of sustainable financial integration, and made modest progress in terms of change over time. This is significantly different to its average performance in conventional financial integration. Australia, Singapore, Thailand and Hong Kong, China managed to maintain their position in the group of top performers in the region, indicating that their high levels of conventional financial integration were accompanied by low volatility, and strong financial institutions and markets. China and Japan performed much better in terms of sustainability compared to conventional financial integration. On the other hand, India and Turkey achieved only moderate levels of sustainable financial integration in contrast to their strong performance in conventional financial integration.

Source: ESCAP’s calculation based on the comprehensive version of DigiSRII.
2. Economy level

The economy under consideration here is Thailand, which is in the group of economies most integrated into regional financial markets, both from the conventional and the sustainable development perspectives. As indicated by the ‘Share price’ and ‘Deposit rate’ indicators, the economy’s deep integration into regional financial markets is reflected in the co-movements between local and regional markets, both in terms equity and financial markets.
The same two indicators stand out as the most important in terms of change, indicating that they played the biggest role in increasing Thailand’s conventional regional integration in finance between 2010 and 2017. In contrast, as ‘Portfolio assetliab’ indicates, the volume of intraregional portfolio and liabilities compared to GDP did not contribute much to the progress of the economy over time (figure A7a).

Similarly, the performance of Thailand is evaluated in each of the indicators that comprise the sustainable trade and investment dimensional index (figure A7b). In terms of level, ‘Exchange rate’ and ‘Sustainable share price’ are the most important, contributing the most towards Thailand’s overall level of sustainable financial integration. In addition, all indicator scores – especially ‘Sustainable share price’ and ‘Financial development index’ – improved over time. These results suggest that Thailand has increasingly integrated into regional financial markets with relatively good management in order to prevent excessive volatility and enhance the development of local financial markets.

**Figure A7a. Conventional financial indicators, Thailand**
Figure A7b. Sustainable financial indicators, Thailand

Next, the performance of Thailand is compared to all economies in the region for a selected indicator. For example, ‘Share price’ appears to be an important indicator in driving the dimensional score of Thailand, as shown in the previous figure. Figure A8a illustrates how Thailand performed compared with the rest of the region in this indicator. It shows that Thailand is among the region’s best performers and that it has progressed substantially over time. These findings highlight the important role played by share price correlation with regional partners in driving Thailand’s high level of conventional regional financial integration as well as its improvement during the sample period. Similarly, the score based on volatility-adjusted share price correlation, i.e., ‘Sustainable share price’, confirms that Thailand and Indonesia are among the best regional performers making significant progress in the context of integration with regional equity markets (figure A8b).
C. Regional value chain integration

The Asia-Pacific economies have recorded considerably varied performances in overall RVC integration (figure A9). The results place Japan as the most regionally integrated economy in RVCs, followed by the Republic of Korea, Hong Kong; China and Singapore. More generally, the results show a distinct trend of ENEA and SEA economies being the most regionally integrated economies in RVCs, reflecting the well-established cross-border

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
production networks that have been developed within these two subregions. In addition, the progress made by China and Cambodia in RVC integration during 2010-2017 is notable, although the latter country is still one of the least RVC integrated economies.

Figure A9. Overall RVC integration, Asia-Pacific region

<table>
<thead>
<tr>
<th>Index Change: 2010–13 vs 2014–17</th>
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<tbody>
<tr>
<td>Japan</td>
</tr>
<tr>
<td>Republic of Korea</td>
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<tr>
<td>Hong Kong, China</td>
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<tr>
<td>Singapore</td>
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<td>Philippines</td>
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<tr>
<td>Malaysia</td>
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<td>Indonesia</td>
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<td>Thailand</td>
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Source: ESCAP calculation based on the comprehensive version of DigiSRII.

1. Regional level

In this dimension, economies in the region show diverse performances. On the one hand, many economies in the region have decreased scores for the two periods, based on the conventional index of RVC integration (figure A10a). This group includes Bhutan, Pakistan, Thailand, Russian Federation, Australia, Nepal, Hong Kong; China, the Lao PDR, India, the Philippines, Fiji, the Republic of Korea, Kyrgyzstan and Viet Nam. On the other hand, the regional economies that increased their scores between the two periods include Cambodia, Turkey, Singapore, Brunei Darussalam, China, Japan, Bangladesh, Malaysia, Indonesia, Mongolia and Sri Lanka. Different factors appear to have been driving the progress of different economies in the RVC dimension. Therefore, an economy-specific analysis would need to be undertaken to uncover the factors for each of the economies.

Generally, the dimensional scores confirm that economies in ENEA and SEA have become relatively well-integrated into RVCs. The Republic of Korea, followed by Singapore, are the best performers under the conventional measurement. India is the only economy outside the two subregions that is in the group of top performers. India’s score on RVC integration, based on conventional measurement, is much higher than the scores of China and Japan. Deeper inspection of the data reveals that one of the factors driving India’s score is that trade in intermediates has a greater influence on India’s trade structure than it does in many of the other regional economies.

Next, sustainable RVC integration of Asia-Pacific economies (figure A10b) is considered. Japan was the best performer in the region when environment and social linkages are taken into consideration, although the economy was not in the top quartile in conventional
measurement. Similar to Japan, Australia moved from below the regional average to become one of the region’s best performers, behind Japan, the Republic of Korea and Hong Kong, China.

China’s performance places it in the group of average performers, based both on conventional and sustainable measurements, but it is the most dynamic economy in sustainable RVC integration. The economy’s sustainable RVC integration score improved from below the regional average in 2010-2013 to above it in 2014-2017. Cambodia was the second-most dynamic performer, although it remained well below the regional average for both periods. On the other hand, India and Viet Nam, which were among the top performers in conventional RVC integration, fall into the group of relatively poor performance when their RVC integration is adjusted to take into account potential employment and environmental impacts. Malaysia and Thailand also displayed similar trends between their conventional and sustainable RVC integration.

Figure A10a. Conventional RVC integration, Asia-Pacific region
2. Economy level

China is a good example when considering the economy-level performance under the RVC dimension. As shown above, China was among the group of moderately RVC integrated economies in the region, but it improved significantly from the sustainable development perspective. Looking more closely into the performance of China in conventional RVC integration reveals that ‘Export complementarity’ followed by ‘Intermediate imports’ are the most important contributors to the China’s score (figure A11a). This means that the export portfolio of China complements the import demand in the region relatively well. In addition, China relies on the region as a source of intermediate inputs for its production. In contrast, China’s total exports are large and diversified across regions and products. As a result, China’s scores related to ‘RVC participation’ and ‘Intermediate exports’ do not show its exports concentration with regional partners and RVCs.

Similarly, the performance of China is evaluated in each of the indicators that comprise the sustainable RVC dimensional index (figure A11b). ‘EG export complementarity’ and ‘Employment RVC participation’ dominate the total scores, meaning that they are the two most relevant factors in China’s progress in sustainable RVC integration. This result means that China has a high potential to supply goods, including parts and components, to other regional partners in the environmental goods sector. In addition, the economy’s participation may be concentrated in relatively labour-intensive tasks in RVCs.
Next, the performance of China is compared to all economies in the region for the indicator. ‘Export complementarity’ is the indicator that contributes the most towards the overall dimensional score of China. In terms of level, China is placed among the top performers in the region, although making only modest progress in terms of change over time (figure A12a). Similarly, China’s performance in a particular indicator of sustainable RVC integration, ‘EG export complementarity’ is evaluated (figure A12b). China was among the best performers in the region, and progressed faster than other economies over time. These
results highlight the importance of regional export complementarity in driving China’s integration in RVCs.

**Figure A12a. Export complementarity, Asia-Pacific region**

Source: ESCAP calculation based on the comprehensive version of DigiSRII.

**Figure A12b. EG export complementarity, Asia-Pacific region**

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
D. Infrastructure integration

The Asia-Pacific economies made good progress in overall infrastructure integration over the past eight years (figure A13). Singapore is the most regionally integrated economy in infrastructure. It is followed by its neighbour, Malaysia as well as China and the advanced economies in the region, including Australia, the Republic of Korea, Japan and New Zealand. Despite impressive progress across almost all regional economies, the Lao PDR and Cambodia stand out for their dynamic performance during the sample period, greatly improving their regional infrastructure integration between 2010 and 2017. Nonetheless, these economies remain among the least integrated in infrastructure.

Figure A13. Overall infrastructure integration, Asia-Pacific region

Source: ESCAP calculation based on the comprehensive version of DigiSRII.

1. Regional level

In general, the whole Asia-Pacific region improved connectivity during 2010-2017, indicated by their respective increases in index values between 2010-2013 and 2014-2017 (figure A14a). Singapore was the best performer in the region in terms of infrastructure integration. Singapore’s performance far exceeds that of other Asia-Pacific economies, thus highlighting its position as the major regional hub for transport and efficient trade facilitation. Notably, the Lao PDR was the most dynamic performer in the region during the periods studied, although the economy still has room to improve further in order to reach the regional average level.

From a subregional perspective, ENEA and SEA, together with the developed economies in the region achieved the highest level of conventional integration in infrastructure. This tends to be associated with their successful integration with RVCs, which is driven by, and calls for, better infrastructure and connectivity to support cross-border production networks. In contrast, landlocked developing economies (LLDCs) in SSWA and NCA as well as Pacific Island Developing Economies (PIDEs) are the least regionally integrated in infrastructure.
This highlights the major obstacle that geographical location creates by stifling conventional regional integration for these economies.

With regard to sustainable infrastructure integration (figure A14b), the results show a very similar trend to those of conventional infrastructure integration, highlighting the fact that conventional regional infrastructure integration was accompanied by inclusive access to infrastructure domestically. While many economies performed fairly consistently in terms of both conventional and sustainable regional infrastructure integration, there were a number that performed considerably better in terms of sustainability. Most notable among these were Armenia, Turkey, the Russian Federation, Brunei Darussalam, Kazakhstan, Kyrgyzstan, Samoa and Nepal. This indicates that these economies performed considerably better in achieving more inclusive access to infrastructure, relative to their general performance in quality of hard and soft infrastructure. However, a number of economies performed considerably worse when sustainable infrastructure connectivity is considered. These include the Lao PDR, Bangladesh, Cambodia and Myanmar. This finding reflects a trend of LDCs lagging behind in making their infrastructure development render inclusive benefits.

**Figure A14a. Conventional infrastructure integration, Asia-Pacific region**

Index Change: 2010–13 vs 2014–17

Index value

Direction of change between periods
- Decrease
- Increase
- years_2010_13
- years_2014_17

Index 2010–13 average

Index 2014–17 average

- Singapore
- China
- Republic of Korea
- Japan
- Malaysia
- Thailand
- Australia
- Viet Nam
- New Zealand
- India
- Indonesia
- Philippines
- Russian Federation
- Turkey
- Sri Lanka
- Pakistan
- Cambodia
- Lao PDR
- Fiji
- Brunei Darussalam
- Bangladesh
- Myanmar
- Maldives
- Mongolia
- Nepal
- Kazakhstan
- Azerbaijan
- Armenia
- Kyrgyzstan
- Samoa

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2. Economy level

In this dimension, a closer look is taken at the progress of Bangladesh. Based on conventional measurement, the economy is in the lower-middle performer in terms of infrastructure integration, but made moderate improvement in its infrastructure between 2010 and 2017. For a better understanding of the economy’s performance, a look is taken at the indicator scores of Bangladesh in the infrastructure dimension and their changes over time. The results show that ‘Trade cost’, followed by ‘Trade facilitation’, are the two most important indicators underlying the performance of Bangladesh in conventional measurement (figure A15a). This means that lower trade costs together with improved trade facilitation implementation were the two areas where Bangladesh stood quite well relative to other areas. However, as no progress is shown over time, more is needed to be done to reduce trade costs.

Similarly, the performance of Bangladesh in each of the indicators that comprise the sustainable infrastructure integration dimensional index is evaluated (figure A15b). In terms of level, ‘Rural electricity’ and ‘Internet users’ are the most important, contributing the most towards the economy’s overall level of sustainable infrastructure integration, with the former being distinctly the key driver. This indicates that primarily, rural access to electricity together with Internet access contributed the most to Bangladesh’s level of sustainable infrastructure integration. The same two indicators stand out as the most important in terms of change, indicating that they played the biggest role in increasing Bangladesh’s sustainable infrastructure integration during 2010-2017.
Next, the performance of Bangladesh is compared to all economies in the region for a selected indicator. In the conventional case, ‘Trade cost’ is considered as the score is higher than for other indicators. In general, the economy performed close to the regional average in its key driving indicator and made limited progress over time. This result partly explains Bangladesh’s average performance in infrastructure integration (figure A16a).
Similarly, the performance of Bangladesh is evaluated for an indicator of sustainable infrastructure integration, ‘Rural electricity’, which proxies for inclusive access to the basic infrastructure of the economy (figure A16b). In terms of level, Bangladesh performed relatively poorly compared to most regional economies, but it made notable progress between 2010 and 2017. There is room to improve further, because the economy remains substantially below the regional average.

**Figure A16a. Trade cost, Asia-Pacific region**

**Figure A16b. Rural electricity, Asia-Pacific region**

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
E. Movement of people

The Asia-Pacific economies show significant variation in their performance of regional integration in overall free movement of people (figure A17). The results place Sri Lanka as the most integrated economy in the free movement of people. In addition, Japan’s progress during the eight-year period is impressive, thus enabling it to move from an average performer in 2010-2013 to being the second-most integrated economy in 2014-2017. The results indicate no discernible trend from a subregional perspective, with economies from all five Asia-Pacific subregions achieving high levels of integration.

Figure A17. Overall movement of people, Asia-Pacific region

Source: ESCAP calculation based on the comprehensive version of DigiSRII.

1. Regional level

The region as a whole has made no progress in this dimension since 2010. This is indicated by the lack of change in the regional average scores during the two periods (figure A18a). However, performance varies widely across economies. Macao, China is the best performer in the region in terms of intraregional movement of people, but it does not perform dynamically. In fact, many economies tend to have less movement of people within economies in the same region. However, this does not include Tuvalu and Vanuatu, the two most dynamic performers in the region during the period under study.

However, the sustainable movement of people considering wage-adjusted flows of people reveals that the majority of economies made progress in this dimension between 2010 and 2017 (figure A18b). The regional average score increased between 2010-2013 and 2014-2017. Japan shows much better performance when wages associated with inward and outward flows of people are considered. The economy emerged as the best performer in the region, both in its level and improvement in terms of wage-adjusted flows of people. The same trend appears in several ENEA and SEA economies such as the Republic of Korea, Mongolia, the Philippines and Viet Nam. In contrast, a number of small developing islands such as Fiji, Palau, Samoa, Tuvalu and Tonga did significantly worse in terms of
sustainability, compared to their performance in conventional integration in the movement of people.

Figure A18a. Conventional free movement of people integration, Asia-Pacific region

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
2. Economy level

In this dimension, a closer look is taken at the progress of Nepal, one of the economies heavily dependent on remittance. As shown above, Nepal is in the group of upper-average performers, based on conventional measurement, but the economy’s average score decreased during the two periods. The indicator scores reveal that large outflows of remittances to regional economies contributed the most to its overall level of conventional integration in the free movement of people (figure A19a). A large number of Indian workers living in Nepal and sending their income back home may have contributed to this trend. It should be noted that although Nepal tends to export more workers than it imports, the majority of the exported workers emigrate to economies outside the region, most notably Qatar, Saudi Arabia, the United Arab Emirates and Kuwait. Therefore, the economy does not show a high degree of intraregional integration based on inflows of remittance from regional economies. For the wage-adjusted indicators, the score of ‘In-remittances per out-migrant’ is greater than ‘Out-remittance per in-migrant’, but the gap was decreasing during the two periods (figure A19b). In addition, the difference is quite small (0.175 and 0.1, respectively), meaning the roles of the two indicators are nearly equal in the dimensional outcome.

Figure A19a. Conventional free movement of people indicators, Nepal
Next, a comparison is made between the performance of Nepal with all economies in the region for a selected indicator. In the conventional case, ‘Remittance outflows’ is reviewed, for which the economy’s score is higher than other indicators, although the score decreased during the study periods (figure A20a). The result indicates Nepal sent sizable amount of remittances relatively to its economic size.

A similar evaluation is made of the performance of Nepal in its most important indicator of sustainable movement of people, ‘In-remittance per out-migrant’ (figure A20b). With regard to wage-adjusted remittance inflows, Nepal performed close to the regional average. However, the economy is increasingly lagging behind the region on average. Although the region improved in terms of income per exported worker, this was not the case with Nepal.
F. Regulatory cooperation

The Asia-Pacific economies progressed steadily in overall regulatory cooperation during 2010-2017, although the extent of this progress varies noticeably across economies (figure A21). The results highlight Singapore as being the most regionally integrated economy in regulatory cooperation, followed by the advanced ENEA economies of Japan and the Republic of Korea as well as ASEAN economies Malaysia, Thailand and Viet Nam, and

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
Turkey. More generally, the results suggest a trend of ENEA and SEA economies being the most integrated in regulatory cooperation. On the other hand, LLDCs in SSWA and NCA were the least regionally integrated economies in regulatory cooperation.

Figure A21. Overall regulatory cooperation, Asia-Pacific region

![Figure A21. Overall regulatory cooperation, Asia-Pacific region](image)

*Source: ESCAP calculation based on the comprehensive version of DigiSRII.*

1. Regional level

The Asia-Pacific region has made substantial progress in this dimension. Almost all economies in the region increased their dimensional scores during 2010-2017, indicated by their respective increases in index values between 2010-2013 and 2014-2017 as well as by the increase in regional average values between both periods (figure A22a). Malaysia got the highest score and showed significant improvement over time, and was joined by Japan, Indonesia, the Republic of Korea, Thailand, Singapore and India in the group of top performers. In addition, Australia, Viet Nam, New Zealand and Brunei Darussalam also made notable progress in terms of change between 2010 and 2017. Markedly, all of these regional best performers were parties to the Regional Comprehensive Economic Partnership (RCEP) during those years. This also includes India which left the group in 2019. In addition to RCEP, all these economies have been involved in a number of other trade and investment agreements.

When sustainable development is considered, some differences emerge (figure A22b). India, China, Myanmar and Cambodia performed significantly worse in terms of sustainability, indicating the fact that consideration for sustainable development did not accompany their conventional regional cooperation objectives. On the other hand, Turkey and New Zealand performed considerably better in terms of sustainability, relative to their performance in conventional regulatory cooperation. These economies moved from being average performers in conventional regulatory cooperation to being among the top performers in terms of sustainability; this highlights their consideration of economic, social and environmental outcomes in meeting their regulatory cooperation objectives. However, relatively advanced economies tend to be able to mainstream sustainable development in their regional
cooperation strategies. Singapore, Japan, the Republic of Korea and Malaysia maintained evaluating their good positions both in conventional and sustainable measurements.

Figure A22a. Conventional regulatory cooperation, Asia-Pacific region

![Figure A22a](image)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.

Figure A22b. Sustainable regulatory cooperation, Asia-Pacific region

![Figure A22b](image)

Source: ESCAP calculation based on the comprehensive version of DigiSRII.

2. Economy level

Australia is the selected economy for evaluation in this dimension. The economy is among the region’s most dynamic performers, especially in the conventional measurement. For
Australia, the increased linkages with regional partners through FTAs and IIAs tended to drive its dynamic performance during the study period, while other indicators remained static (figure A23a). Similarly, the increases of ‘Sustainable FTA score’ and ‘Sustainable IIA score’ were the most important factors in the progress of Australia in sustainable regulatory cooperation. However, its performance in ‘Rule of Law’ was static, although it was its highest scoring indicator (figure A23b). This means that the economy has increasingly incorporated provisions potentially contributing to sustainable development when pursuing new FTAs and IIAs.

Figure A23a. Conventional regulatory cooperation indicators, Australia

Figure A23b. Sustainable regulatory cooperation indicators, Australia

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
Next, we show the performance of Australia relative to others in the region for the indicator of interest, i.e. ‘FTA’ (figure A24a). In terms of level, Australia was among the top performers in the region. Furthermore, it also made the most progress in terms of change over time. This highlights the key role played by FTAs with regional partners in driving Australia’s conventional regulatory cooperation.

Similarly, the performance of Australia in an indicator of sustainable regulatory cooperation, ‘Rule of law’, is evaluated (figure A24b). In terms of level, Australia was among the top performers, although it only made limited progress in terms of change over time. This finding highlights the key role played by the quality of contract enforcement, property rights, police and courts, together with the low likelihood of crime and violence in determining Australia’s overall performance in sustainable regulatory cooperation.

Figure A24a. FTA, Asia-Pacific region
G. Digital economy integration

The Asia-Pacific economies exhibited a consistent trend of improvement in overall digital economy integration during the sample periods (figure A25). The results place Singapore as the most regionally integrated in the digital economy, followed closely by the Republic of Korea, New Zealand and Australia. More generally, the results highlight the fact that advanced economies in ENEA, SEA and the Pacific are among the most regionally integrated in the digital economy. On the other hand, ASEAN CLM economies together with SSWA economies are the least integrated economies.
1. Regional level

All economies in the Asia-Pacific region have made considerable progress in this dimension. This can be inferred from the increasing index values for all economies between 2010-2013 and 2014-2017 (figure A26a). Again, Singapore was the best performer, followed closely by Hong Kong, China, together with the Republic of Korea and Japan. Viet Nam improved rapidly, emerging as the most dynamic performer in the region. However, in terms of level, it remained below the regional average during both periods. More generally, the results indicate that advanced ENEA and SEA economies were among the most integrated in conventional digital economy. On the other hand, SSWA economies, together with LDCs in SEA, were among the least integrated economies in conventional digital economy.

When inclusivity and security of digital trade economy are taken into account, Australia was the best performer in the region (figure A26b), followed closely by New Zealand, the Republic of Korea and Singapore. In this regard, New Zealand’s performance is noteworthy, as it moved from being in the group of average performers in terms of conventional integration, to become the second most sustainably integrated economy in the digital economy. Malaysia, China and the Russian Federation also performed considerably better in terms of sustainability.

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
2. Economy level

The Russian Federation’s conventional indicator scores are presented in figure A27a. In terms of level, ‘ICT tariffs’, followed by ‘Mobile account’ are the most important, highlighting that these two indicators contributed the most towards that economy’s overall

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
level of conventional digital economy integration in 2014-2017. This means that low tariffs on imports of ICT goods from regional partners, together with a high share of the population with a financial account, contributed the most towards the Russian Federation’s level of conventional digital economy integration. The same two indicators stand out as the most important in terms of change, indicating that they played the biggest role in increasing the Russian Federation’s conventional digital economy integration during the sample period. In contrast, other indicators are static and scored low. This is particularly the case with ‘Digital regulatory distance’ and ‘ICT exports’, suggesting a lack of digital regulatory synchronisation with regional economies as well as low ICT exports to regional partners.

Similarly, an evaluation is made of the performance of the Russian Federation in each of the indicators that comprise the dimensional index for sustainable digital economy integration (figure A27b). In terms of level, ‘Household Internet’ and ‘Mobile account female’ are the most important, contributing the most towards the overall level of sustainable digital economy integration. This implies that a higher proportion of households with access to the Internet, together with a higher share of women holding financial institution or mobile money accounts, contributed the most towards the Russian Federation’s level of sustainable digital economy integration. The same two indicators stand out as the most important in terms of change, indicating that they played the biggest role in increasing the Russian Federation’s sustainable digital economy integration between 2010 and 2017.

Figure A27a. Conventional digital economy indicators, Russian Federation

![Graph showing indicator values](image_url)
Next, the performance of the Russian Federation is compared to other regional economies, based on its most important indicator of the dimension. In terms of ‘ICT tariffs’, the Russian Federation was at the bottom of the group of average performers, making only modest progress in terms of change over time (figure A28a). It fell below the regional average during 2010-2013 and 2014-2017. This finding elucidates the Russian Federation’s average conventional digital economy integration, as its performance in its key driving indicator is at the bottom end of average in comparison to other regional economies.

Similarly, evaluation is made of the performance of the Russian Federation in the most important indicator of sustainable digital economy integration, ‘Household Internet’ (figure A28b). The economy made considerable improvement in this indicator of inclusive access to the digital economy infrastructure. The significant progress made in inclusive access plays an important role in explaining why the economy tended to perform better when evaluated based on the sustainable development perspective relative to conventional measurement.
Figure A28a. ICT tariffs, Asia-Pacific region

Source: ESCAP calculation based on the comprehensive version of DigiSRII.
Note