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Digital economy integration in Asia and the Pacific: Insights from DigiSRII 1.0

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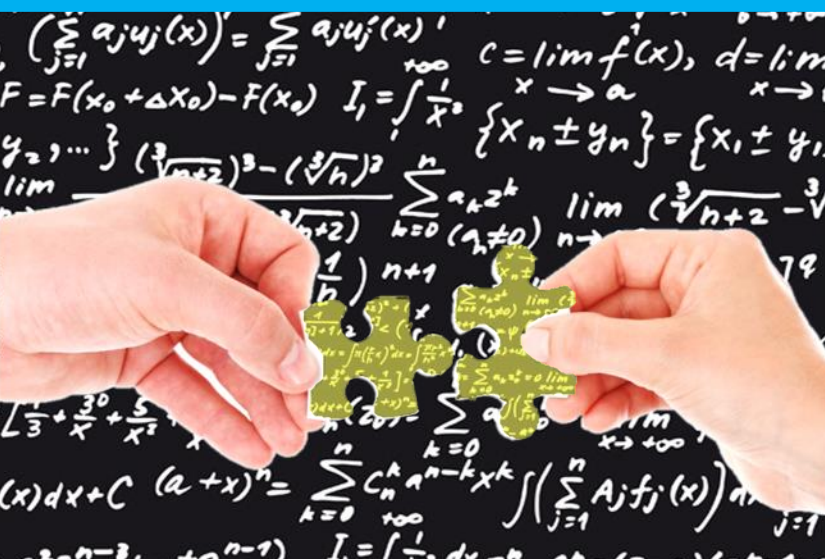
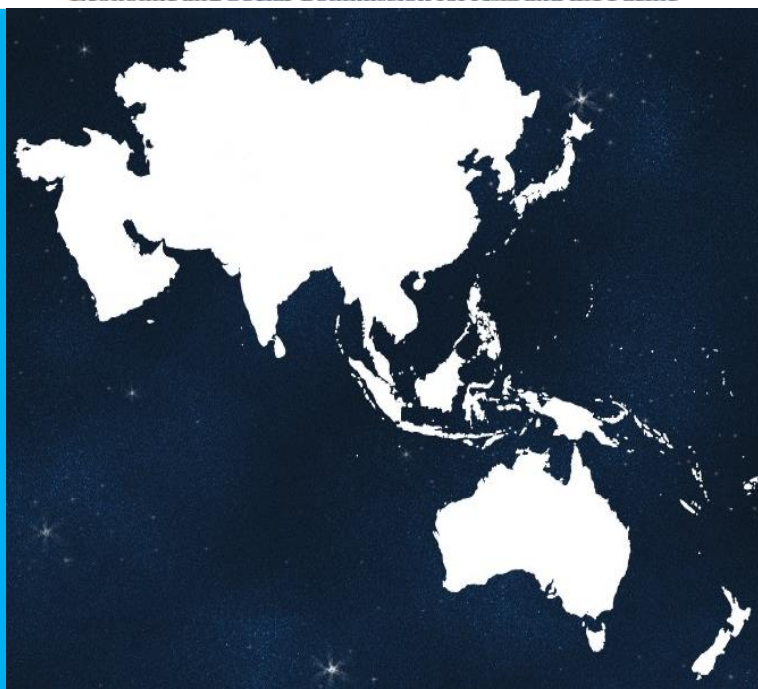
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Digital economy integration in Asia and the Pacific: insights from DigiSRII 1.0



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ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

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Digital economy integration in Asia and the Pacific: insights from DigiSRII 1.0

Witada Anukoonwattaka¹, Pedro Romao, Preety Bhogal, Thomas Bentze, and Richard S. Lobo

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Abstract

In this paper, we utilize ESCAP (2020)'s framework of Digital and Sustainable Regional Integration Index version 1 (*DigiSRII 1.0*) to uncover digital economy integration trends across Asia-Pacific region. The results show that Asia and the Pacific has progressed well on conventional digital economy integration, especially due to significant improvements on digital-economy infrastructure and ICT goods trade liberalization. However, workforce capacitation and infrastructures investments are essential to bridge digitalization gaps between digitalized economies in the region. Moreover, the fairly low regulatory similarity between regional economies further highlights the importance of regional regulatory harmonization in order to foster regional trade in digitally-enabled goods and services. From a sustainable development perspective, inclusivity and equity of access to digitalization and required infrastructure remain key challenges. It is found that while internet penetration in the region has been getting higher, female participation in digital economy is relatively low in general and extremely low in low-income economies. In addition, there is room to enhance cybersecurity in most of Asia-Pacific economies. Regional digital policies should focus on harmonizing data protection protocols and building a safer network of servers that can promote economic activity and sensitive matters to be conducted online. Fostering a more inclusive digital transformation may considerably boost network-effects and accelerate the transition to a competitive and sustainable regional digital economy.

Keywords: international trade, regional integration, digitalization, digital economy

JEL Codes: F15, O24, O53

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1. Introduction

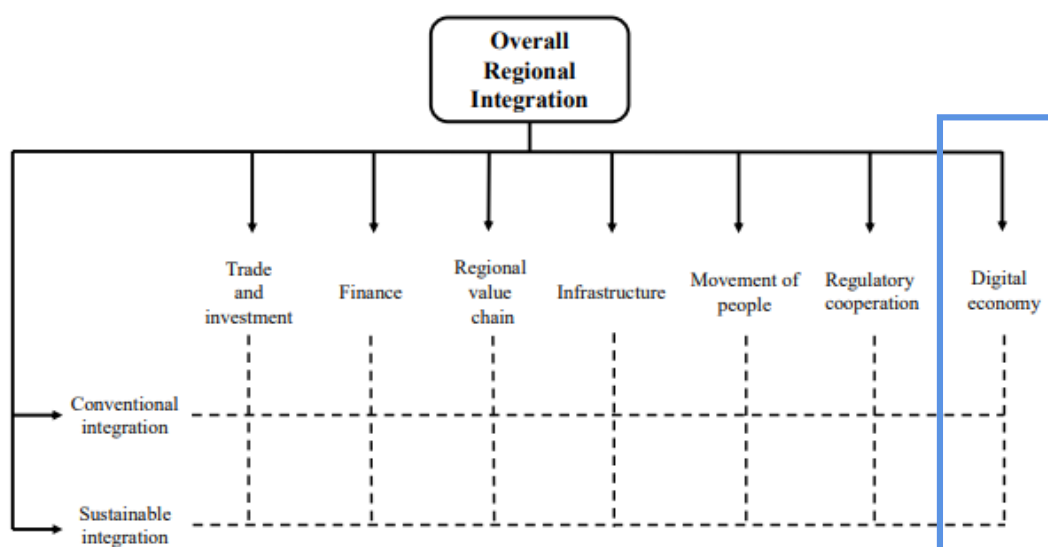
Increased participation in regional trade, investment, labor movement and information flows is expected to bring significant economic development opportunities for regional economies, while improving cooperation on a wide array of global issues (ESCAP, 2017). Concomitantly, the rise of the digital economy over the past few decades and its enhanced role during the COVID-19 pandemic have highlighted digitalization as not only one of the world's most powerful engines for growth and innovation, but also as a key part of resilient and sustainable 21st century economies (ESCAP, 2017; OECD, 2017; ECIPE, 2018).

For that reason, the freer flow of digital goods, services and ICT products is seen as one of the fastest ways of narrowing digital capacity gaps between economies (ESCAP, 2020). This is not only because developing economies can significantly streamline their digital capacity by exchanging knowledge with more advanced nations, but also because regional integration aligns incentives by creating economic opportunities for both developing and developed economies.

For that reason, in 2020, ESCAP rolled out its *Digital and Sustainable Regional Integration Index (DigiSRII 1.0)* (2020), looking at regional integration in Asia-Pacific from 2010 to 2017 across seven core dimensions (figure 1). Compared to other indices of regional integration, such as the ADB's (2018a and 2018b) or ECA's (2016 and 2019), ESCAP's (2020) included for the first-time indicators on digital economy integration as well as a special index focused solely on assessing *sustainable* regional integration. In DigiSRII conventional and sustainable regional integration are looked at separately, where conventional integration is understood to comprise of all indicators usually used in regional integration indices, whereas sustainable integration is focused on understanding regional integration's contribution to the SDGs, covering environmental, safety and inclusivity concerns on each of the dimensions pursued.

In this paper, we will focus on analyzing the results of the digital economy integration index of DigiSRII – covering both the conventional and sustainable integration perspectives – in order to uncover digital economy integration trends across Asia-Pacific and outline policy recommendations and opportunities to improve the region's digital connectivity. The rest of the paper is organized as follows.

Figure 1. Structure of ESCAP Digital and Sustainable Regional Integration Index



Source: Author's, based on ESCAP (2020).

In section 2 we start by exploring important conceptual considerations on regional integration and the digital economy. In section 3 we concisely describe the methodology behind the construction of regional integration indices. In section 4, we dive into the results, exploring different perspectives across indicators, dimensions, economies, and sub-regions, while section 5 concludes with main policy recommendations and insights.

2. Conceptual framework²

2.1. Theoretical background – regional integration and the digital economy

Regional integration is a complex, multidimensional concept that draws its definition from varied disciplines. International organizations usually resort to broad definitions of this concept in order to measure integration through a framework of engagement, cooperation and entanglement among economies across many different dimensions. For instance, ECLAC's (2009) definition states that "[r]egional integration is the process by which diverse national economies seek mutual gains by complementing one another more".

² For an in-depth technical description of all indicators and indices please refer to ESCAP (2020), available at https://www.unescap.org/sites/default/d8files/knowledge-products/TIID_DigiSRII%2B%2B%20.pdf. This paper utilize the same framework while attempting to be more comprehensive by utilizing a larger data set encompassing more economies and years was used.

In this spirit, DigiSRII built on previous indices, such as the ADB's (2018a and 2018b)³ or ECA's (2016 and 2019), to define regional integration across seven key dimensions – (1) trade and investment, (2) finance, (3) regional value chains, (4) infrastructure, (5) movement of people, (6) regulatory cooperation, and (7) digital economy. In particular, the digital economy integration dimension of the index – in review in this paper – is understood to entail the freer flow of digital goods and services across regional economies as well as ICT products that facilitate this trade (ESCAP, 2020).

While there is no universally accepted definition of the 'digital economy' most agree that it encompasses (1) all digital transactions of goods and services (both domestic and cross-border), (2) the infrastructure required to access computer networks, such as software and telecommunications equipment, and (3) all digital media – i.e., the content created and accessed through digital devices, as well as all data flows (Barefoot et al., 2018). Naturally, given the ubiquity of platforms and electronic equipment such as mobile phones and computers, a considerable part of current economic activity is already encompassed within the digital economy. For that reason, judging economies' conventional regional digital integration requires considerations on economies' differing levels of digital capability – looking at infrastructures, financial inclusion etc., – as well as on their engagement and cooperation with other regional players – i.e., assessing existing trade flows and regulation.

However, as digital economy integration *per se* does not guarantee an equitable or efficient distribution of “digital dividends” – i.e., the benefits accruing from digitalization (World Bank, 2016) –, it is necessary to consider further dimensions to understand digitalization's impact in promoting the SDGs. In this regard, two major concerns are inclusiveness and security.

An inclusive digital economy is a key characteristic of a sustainable digital transition. Indeed, as poorer and rural communities often record considerably lower internet access rates, the “*yawning gap between the under-connected and the hyper-digitalized*” has the potential to further accentuate existing inequalities (UNCTAD, 2019). In particular, women tend to be especially vulnerable to digital exclusion as income disparities, educational differences and social norms tend to penalize this specific demographic: in 2017, 250 million more men were estimated to be online than women (OECD, 2018).

On the other hand, digitalization has created additional security and privacy risks that might put at risk its overall benefits. For instance, in 2020, data breaches cost

³ In this report, Huh and Park (2018) and Park and Claveria (2018) are referred to as ADB (2018a) and ADB (2018b), respectively.

companies an average of US\$3.9 million per breach, having become increasingly common over the past decade (IBM, 2020). Furthermore, tech-giants' continuous abusive use power over users' personal information has significantly eroded public trust in the digital economy. Lastly, security concerns regarding the deployment of 5G networks around the globe have considerably slowed this process with potentially elevated costs.

2.2. Indicators – measuring regional digital integration

Each of the indicators comprising of the conventional and sustainable indices of digital integration can be found in Table 1. Furthermore, due to scarce data availability, and in line with the approach in ESCAP (2020) (full DigiSRII report), two different indices for each of the conventional and sustainable components of integration were calculated: (1) a 'comprehensive' index, comprising of all the indicators, but including only a few economies for which data is available for all indicators and years⁴, and (2) a 'simplified' index encompassing a reduced number of indicators, but covering more economies⁵. In table 1 indicators highlighted in blue are only considered in the comprehensive index, whereas indicators in white are considered both in the simplified and comprehensive indices.

Table 1. Components of the conventional and sustainable digital integration indices

Index	Description
Conventional digital integration index	1. Share of ICT goods exports in intra-regional exports.
	2. Share of ICT goods imports in intra-regional imports.
	3. Average tariff on intra-regional imports of ICT goods.
	4. Average share of the population with a financial institution or mobile money account.
	5. Average share of the population that uses internet for online purchases.
	6. Digital trade regulatory similarity with regional partners.
Sustainable digital integration index	7. Average proportion of households with internet access.
	8. Average number of secure internet servers per million of population.
	9. Average share of females with a financial institution or mobile money account.
	10. Average share of females that use internet for online purchases.

Source: ESCAP (2020)

⁴ Only 19 and 32 economies are included in the comprehensive indices of conventional and sustainable digital integration, respectively.

⁵ 46 and 43 economies are encompassed in the simplified indices of conventional and sustainable digital integration, respectively.

Note: Indicators in blue cells are only considered in the comprehensive index, in addition to the ones in white cells which are considered in both the simplified and comprehensive indices.

The *conventional* regional digital integration index is composed of the share of ICT goods in intraregional (1.) exports and (2.) imports, (3.) the average tariff on intra-regional imports of ICT goods, (4.) the average share of the population with a financial institution or mobile money account, (5.) the average share of the population that uses internet for online purchases and (6.) the digital trade regulatory similarity between regional partners. Each of these indicators represents a different sphere of participation in the regional digital economy.

Indicators (1.) and (2.), the ICT goods exports and imports intensity⁶ in intra-regional trade, respectively, is a direct measurement of economies' regional integration through trade in hardware that is considered relevant for digital infrastructure and digital transactions. These metrics gauge a country's digital capacity by measuring their ability to produce ICT exports, as well as their involvement in ICT GVCs via ICT goods imports. Furthermore, higher ICT imports are also associated with higher infrastructural necessities and increased digital activity supported with goods purchased from abroad. Accordingly, the higher the ICT trade intensity in both exports and imports, the higher economies are ranked for regional integration.

Next, indicators (4.) and (5.) – the shares of the population using digital financial services and using the internet for online purchases, respectively – are aimed at measuring each country's population participation in digitally-enabled transaction, as well as the physical and digital economies' degree of entanglement. These indicators are both considered to contribute to a higher regional integration as these entail a greater level of digital capacity and penetration. Indeed, the more people participate in online purchases, the higher a country's digital capacity is deemed to be. Likewise, the more people have access to online financial services, the more individuals and businesses can conduct transactions online. In addition, as disadvantaged communities are often excluded from conventional financial services, digital financial inclusion – i.e., accessing financial services and products online – is regarded as an effective tool in deepening digital economy integration (World Bank, 2017). Moreover, as Jack and Suri (2014) highlight, this can actually contribute to these communities' economic wellbeing by allowing them to engage in better financial planning, access credit lines and government subsidies or widen their ability to receive payments instantly and securely anywhere.

⁶ Trade intensity, in this case in ICT goods, refers to the share of ICT trade to total trade. A high ICT trade intensity signifies a high share of ICT goods traded to total trade and *vice-versa*. The terms are applied equivalently when referring solely to exports or imports.

Lastly, (3.) the average tariff on ICT goods imports and (6) the digital trade regulatory similarity (looking at convergence and openness in 11 digital trade-relevant regulatory areas)⁷ directly measure economies' economic integration by assessing regulatory barriers that might discriminate economic activities between nations. As the digital economy has brought new kinds of tradable goods and services, popularized cross-border trade in small value products and transformed our understanding on the separation of goods and services – a key distinction often underpinning regional trade agreements – these issues are of particular importance to enhance digital integration across the region. Lower tariffs on ICT goods and higher digital trade regulatory similarity contribute for a higher integration score.

The *sustainable* regional digital integration index includes (7.) the average proportion of households with internet access, (8.) the average number of secure internet servers per million of population, (9.) the average share of females with a financial account or mobile money account and (10) the average share of females that use the internet for purchases. As it is possible to identify, many of the indicators selected above are the sustainable counterparts of indicators already included in the conventional index.

Both indicators (9.) and (10.) – the average share of females with a financial account or mobile money account and that use the internet for purchases, respectively – look at digital integration from the same dimensions as their conventional index counterparts do – (4.) and (5.), respectively –, but from the perspective of female inclusion, which, as explained above, regularly trails behind men. Furthermore, indicator (7.) the average proportion of households with internet access – rather than simply population – adds to this inclusivity effort by providing a more realistic approach to a country's overall internet penetration. Accordingly, a higher inclusiveness via both female participation in the digital economy or due to a higher internet penetration is considered to increase economies sustainable digital integration.

Finally, indicator (8.) the average number of secure internet servers per million of the population considers each country's internet safety, as accessibility to secure servers determines the overall security consistency of the whole network. More secure serves are considered to contribute to a higher sustainable digital integration index score.

⁷ The 11 digital trade-relevant regulatory areas encompassed in indicator (6.) are trade defence, public procurement, foreign direct investment, intellectual property rights, telecom infrastructure and competition, cross border data policies, domestic data policies, intermediary liability and content access, quantitative trade restrictions, standards, and online sales and transactions.

3. Methodology⁸

In order to aggregate indicators expressed in different units of measurements into a single composite index, we first follow a min-max panel normalization methodology – i.e., across all available economies and years – according to the following transformation:

$$I_i^t(x_q) = \frac{x_{q,i}^t - \min(x_q)}{\max(x_q) - \min(x_q)} \quad (1),$$

where $x_{q,i}^t$ is a general indicator x_q for country i in year t and $I_i^t(x_q)$ is the normalized indicator of $x_{q,i}^t$ (varying from 0 to 1) for country i in year t ; $\min(x_q)$ and $\max(x_q)$ are the overall minimum and maximum values across all years and all economies for indicator x_q , respectively. For indicators that have a negative direction of change, i.e., higher values indicating a lower level of integration (for instance, the average tariff on intra-regional imports of ICT goods), the additive inverse of the normalized indicator is taken – i.e., $[1 - I_i^t(x_q)]$ – to make sure that all indicators correlate positively with the integration index.

By normalizing all indicators, comparing progress across dimensions, time and economies becomes possible. However, this approach comes with the caveat that as new data points become available – potentially setting a new minimum or maximum value – all indicators must be normalized once again utilizing the updated sample.

Next, in order to aggregate all normalized indicators onto a single country-wide integration index, a simple average of all indicators is taken, as per the transformation below:

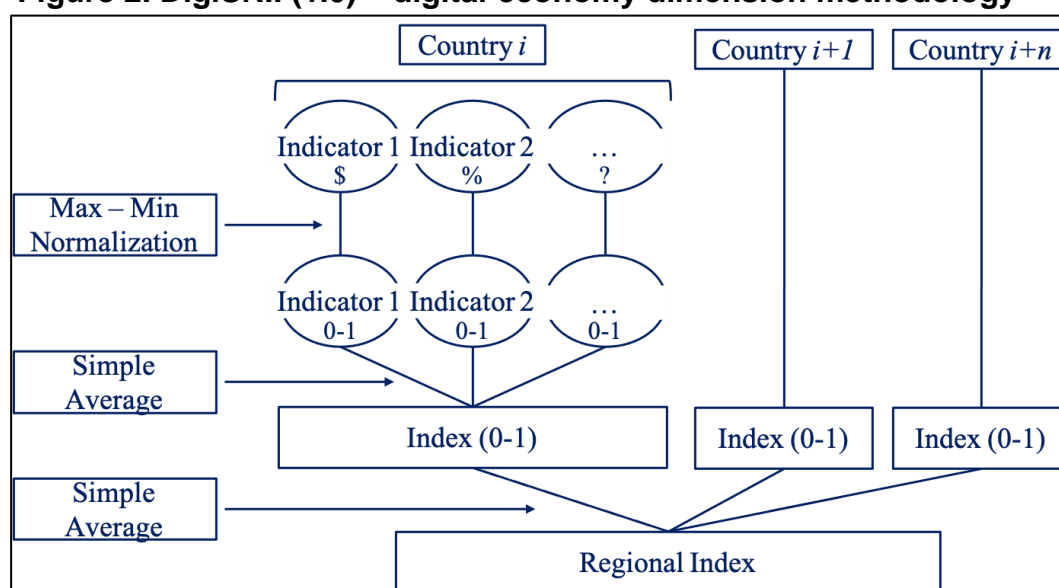
$$Index_i^t = \frac{\sum_q I_i^t(x_q)}{m} \quad (2)$$

where $Index_i^t$ is the desired index (simplified or comprehensive; conventional or sustainable) for country i in period t given by the equal-weighted average of all indicators x_q , where $q = 1, \dots, m$. While there are many different methodologies available to aggregate individual indicators onto a single composite index (PCA, weighted average etc.), equal weighting was deemed the most appropriate. Accordingly, this method was applied herein for every indicator and every dimension. Furthermore, equal weighting was also applied in order to further aggregate country

⁸ For an in-depth technical description of all indicators and indices please refer to ESCAP (2020), available at https://www.unescap.org/sites/default/d8files/knowledge-products/TIID_DigiSRII%2B%2B%20.pdf.

indexes into regional, sub-regional or any other desired cluster indices. Figure 2 illustrates graphically the methodology explained above.

Figure 2. DigiSRII (1.0) – digital-economy dimension methodology



Source: Author's based on DigiSRII version 1 (ESCAP, 2020)

4. Results⁹

4.1. Conventional index of regional digital integration

4.1.1. Simplified index of conventional regional digital integration

Comparing the average index levels from 2010-13 with 2014-17, Asia and the Pacific's simplified conventional regional digital integration index (including all economies), registered only a mild improvement throughout the 2010-17 periods (figure 3a.). Cambodia, Lao P.D.R., Republic of Korea, Vanuatu and Viet Nam were the most progressive economies of all. Brunei Darussalam, China, Hong Kong; China, India, the Russian Federation and Singapore also fared better than most other economies. Conversely, Macao; China was the significant regressive-performing economy of all, while Timor-Leste and Tuvalu also experienced declines.

Across Asia and the Pacific, digital integration's geographical distribution is highly uneven (color coding in figure 3). For instance, South-East Asia (SEA) – in light blue – and East and North-East Asia (ENEA) – dark blue – completely dominate digital integration, with the top 10 most integrated economies all belonging to either of these

⁹ Discrepancies between the original paper's results and the ones presented herein are tied with a differing data set. As our methodology calculates regional integration as a cross-country comparison, including a more comprehensive data set means that all index values have to be recomputed.

sub-regions. Conversely, Least-Developed Economies (LDCs) – written in red – concentrated in the Pacific (PAC) – in yellow – and in South and South-West Asia (SSWA) – in orange – are among the least integrated economies in the region.

In particular, low intraregional tariffs on ICT products are a uniform characteristic among well-integrated nations (figure 3c). This reflects these economies' priority in fostering a fairly liberalized ICT trade environment, with international trade agreements playing a vital role in it. Furthermore, ICT goods play a key role in these nations' economies (figure 3a and 3b): in 2017, East and North-East Asia captured an estimated 70% of the world's value added in ICT manufacturing (UNCTAD, 2019); for Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam ICT goods represent 4% of their combined exports value, with this figure expected to rise to over 8% in 2025 (Google, 2019).

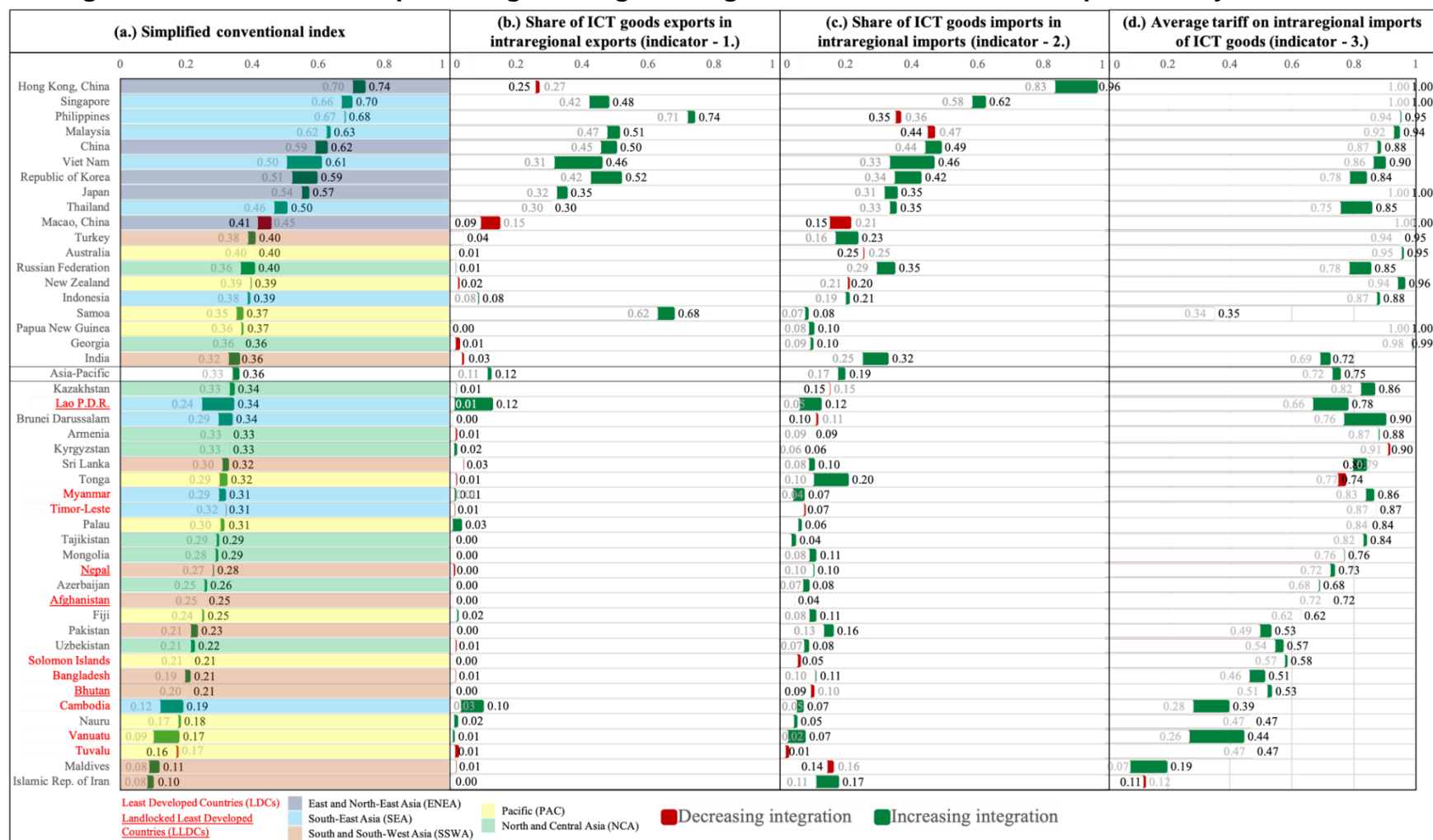
In contrast, poorly integrated economies – often times LDCs and LLDCs – are characterized by a lack of digital infrastructure and a restrictive digital trading environment. Indeed, tariffs on imported ICT goods in these economies are among the highest in the region, while both ICT trade intensity indicators are also sitting at the very end of the spectrum. Naturally, by raising the associated costs with importing ICT goods and by underproviding vital ICT infrastructure, domestic businesses in low digitally integrated economies face considerable barriers to digitalize and reap the benefits of connectivity and higher productivity. Moreover, this environment makes it considerably harder for economies to attract foreign investment opportunities in ICT-related industries, which are key in accelerating economies' digitalization processes. Further looking at each of the individual indicators in figure 3, Asia and the Pacific is by far the most integrated in terms of tariffs on ICT imports (indicator 3). This pattern reflects the region's relatively liberalized trade environment in ICT goods, highlighting the many implemented regional initiatives aimed at fostering international cooperation and trade.

For instance, ASEAN was among the earliest initiatives in the world taking concrete steps in regulating e-commerce and harmonizing regulatory frameworks (UNCTAD, 2013). This initiative successfully reduced tariffs (on all products) among South-East Asian nations, from around 13% in 1993 to 0.2% in 2015 (Bain, 2020), with tariffs on ICT products following concomitantly. Furthermore, the Information Technology Agreement (ITA) was another landmark initiative launched in 1996 with the aim of abolishing tariffs on high technology products such as computers, telecommunication equipment, semiconductors and software. Today there are 81 signatories, many of which are in the Asia-Pacific region, and the agreement remains open to the further adherence of interested nations (WTO, 2020).¹⁰

¹⁰ Asia and the Pacific signatories of the ITA are: Australia, China, Georgia, Hong Kong; China, India, Indonesia, Japan, Republic of Korea, Kyrgyz Republic, Macao; China, Malaysia, New Zealand, Philippines, Taiwan; Province of China, Singapore, Thailand, Turkey and Viet Nam.

Looking at the 2010-17 period in particular, the indicator on ICT imports tariffs also progressed the most. In particular, Brunei Darussalam, Cambodia, Lao P.D.R., Maldives, Republic of Korea, Russian Federation, Thailand and Vanuatu registered the highest increases (i.e. largest decline on ICT tariffs). The indicator's performance reflects these economies' continued efforts in further liberalizing trade in ICT goods. For instance, in 2015, 53 signatories of the above-mentioned ITA concluded negotiations to considerably expand the range of products encompassed by this agreement (WTO, 2020). China, Hong Kong; China, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore and Thailand were among the Asia-Pacific economies having participated on it. Also in 2015, the creation of the Eurasian Economic Union (EAEU), a single market between Armenia, Belarus, Kazakhstan, Kyrgyz.

Figure 3. Conventional simplified regional digital integration index and indicators per country – 2010-2017



Source: Author's calculations based on data obtained from ESCAP DigiSRII database and methodology (ESCAP, 2020).

Note: Figures may diverge from the original paper as a different sample size was used. Economies are ordered according to their 2017 scores in panel (a.).

Republic and the Russian Federation, also contributed to lower intraregional tariffs on ICT goods, with the Russian Federation benefiting the most. Furthermore, more recently, the EAEU has announced plans to implement a Digital Agenda by 2025 in order to harmonize legislation, facilitate digital trade and digitalization in a positive move towards higher regional digital integration (World Bank, 2017). Lastly, other noteworthy Preferential Trade Agreements (PTAs) covering ICT goods that entered into force between 2014-17 and that are expected to have eased tariffs on ICT goods were the bilateral agreements between: Australia-China, -Japan and -Republic of Korea; Republic of Korea-Canada, -Colombia, -China, and -New Zealand; and, finally, Viet Nam-Chile, and -EAEU (APTAD, 2020).¹¹

Conversely, the intraregional export intensity in ICT goods (indicator 1) is both the region's lowest integrated dimensions and where the least progress has been achieved. This indicator is particularly marked by a stark contrast between exporters and non-exporters of ICT products, where out of 56 nations only 9 recorded a significant level of ICT goods exports (score above 0.3 in figure 3b.). These were China, Japan, Malaysia, Philippines, Republic of Korea, Samoa, Singapore, Thailand and Viet Nam. All other economies registered either marginal or no ICT goods exports whatsoever. Naturally, this dynamic reflects economies' socio-economic structures, whereby digitalized economies have an enormous comparative advantage over their less developed counterparts. As mentioned above, this is particularly the case for well digitally integrated economies in ENEA and in SEA (UNCTAD, 2019).

In general, economies already exporting a lot of ICT goods progressed considerably well in this area, capitalizing on the growing global demand for this type of products. The only two exceptions of major ICT exporters recording drops in indicator 1. are Macao; China and Hong Kong, China. On the contrary, economies producing very little or no ICT goods at all barely registered any improvements in their export capacities, highlighting the need for government policies to reverse this trend and incentivize foreign and domestic investment in digital-related areas. Exceptions to these trends are the SEA economies of Cambodia and Lao P.D.R., who have successfully grown their ICT export intensity from close to non-existent in 2010. As ASEAN members, these economies progressed significantly in lowering trade barriers on ICT goods. As a result, this has facilitated foreign investment in labor-intensive ICT exports such as communication equipment and consumer electronic equipment (together representing 65% and 92% of Cambodia's and Lao P.D.R.'s ICT exports, respectively), which have mostly spilled-over from other locations previously offering similar wage conditions.

¹¹ Please refer to ESCAP's Asia and the Pacific Trade and Investment Agreements Database for a comprehensive look at agreements being signed where there is at least one ESCAP member. Available at <https://www.unescap.org/content/aptiad/>. Yearly, ESCAP also publishes the Asia and the Pacific Trade and Investment Trends, where a specific report on Preferential Trade Agreements reviews the most important developments in this topic. All reports available at <https://www.unescap.org/knowledge-products-series/APTIT>.

Finally, looking at the remaining indicator – 2. country's ICT imports exports share – it is possible to identify that the ubiquity of digital technologies is rising everywhere. This indicator is also the one registering the least amount of variability, albeit not by a large margin, as all economies move towards digitalization. Despite considerable differences between the top performers and the rest of Asia and the Pacific, increases in the share of ICT imports have been more generalized than in their export production. China, Hong Kong, China, India, Islamic Republic of Iran, Lao P.D.R., Republic of Korea, Russian Federation, Tonga, Turkey, Vanuatu and Viet Nam are among the economies who registered the sharpest increases. These are good signs for integration in these economies as a higher ICT import intensity is associated with a shift towards digitization and infrastructural investments. Interestingly, increases in the ICT import intensity are strongly and positively correlated with increases in the ICT export intensity, highlighting the need for low integrated economies to kickstart the digitalization process via key infrastructural investments. Macao; China, Malaysia, Maldives, and the Philippines registered the largest drops in their share of ICT imports.

4.1.2. Comprehensive index of conventional regional digital integration

A first look at Asia and the Pacific's comprehensive digital integration index (comprising of 3 additional indicators), seems to depict a more integrated and better improving region than explored above.¹² However, since both indices do not share the same sample size (19 compared to 46 economies for the comprehensive and simplified indices, respectively), a direct comparison between both is not correct.¹³ A better suited same-sample comparison between the 19 economies present in both indices deems that regional integration is actually quite similar across indices.¹⁴ This means that, while country-level integration indices and relative rankings do change quite substantially with the addition of new dimensions, the simplified index produces unbiased results at the regional level. Moreover, as dimensions like internet penetration, financial inclusion and regulatory distance are considered, the simplified index's over-emphasizing of ICT trade intensity (2 out of 3 indicators) becomes evident.

In particular, developed and highly digitalized economies that are not exceedingly involved in the production of ICT goods such as Australia and New Zealand saw the largest gains when compared with the simplified index of integration. In fact, New

¹² In 2014-17, the regional comprehensive index was set at 0.49, having increased by 0.05 points since 2010-13 (figure 4). This would be compared with the simplified index's 0.36 score and 0.03 growth during the same period.

¹³ In fact, due to the comprehensive index's inherent bias towards high integration performers – since this where data collection and availability tends to be more abundant – it is expectable that this index will yield higher overall integration results than its simplified counterpart when considering full sample sizes.

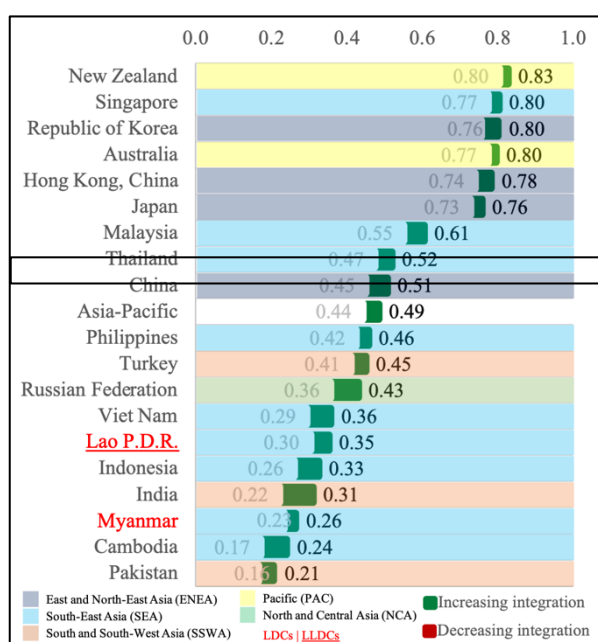
¹⁴ The simplified index's regional score in 2010-13 and 2014-17 for the 19 economies considered in the comprehensive index was of 0.44 and 0.48, respectively. This represents only a slight 0.01 increase when compared to the regions' comprehensive index in 2014-2017.

Zealand went from being a moderately integrated economy to the most digitally integrated one in the whole of Asia and the Pacific. Moreover, other advanced economies such as Japan, Republic of Korea and Singapore that enjoy fairly high levels of internet penetration and strong regulatory frameworks also saw their integration scores and ranking grow considerably.

On the contrary, economies like China, India, Indonesia, Philippines and Viet Nam saw the largest negative changes in their integration scores. This is due to the fact that while these economies are highly involved in the production and export of ICT goods, they have yet to fully digitalize and democratize digital access to all. Indeed, the mentioned economies fared relatively poorly across all newly considered spheres, highlighting the need for complimentary policies to accompany these economies' successful business environment digitalization.

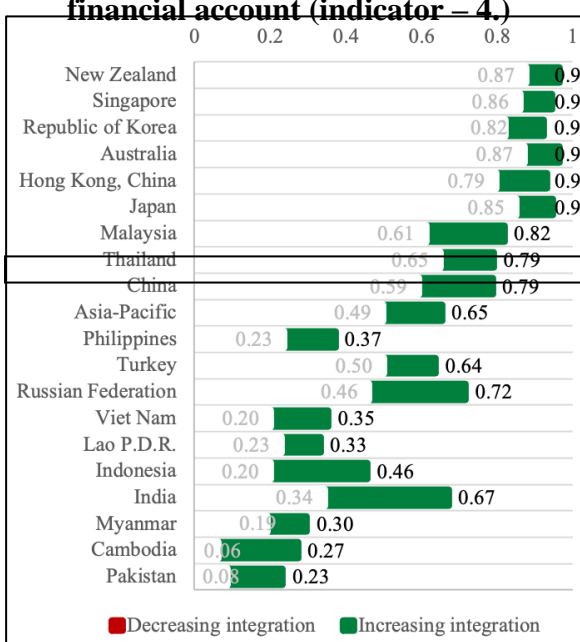
Figure 4. Conventional comprehensive regional digital integration index and additional indicators per country – 2010-2017

(a.) Comprehensive conventional index

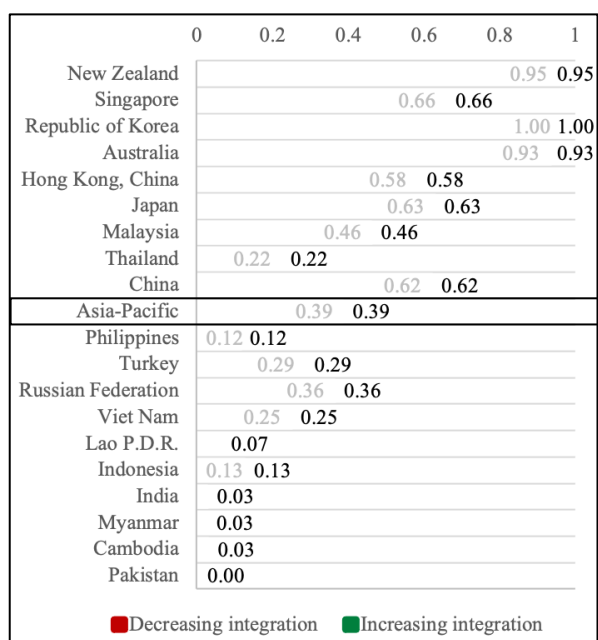


(b.) Share of population with online

financial account (indicator – 4.)



(c.) Share of population using the internet for purchases (indicator – 5.)



(b.) Digital trade regulatory similarity (indicator – 6.)



Source: Author's calculations based on data and methodology from ESCAP DigiSRII (ESCAP, 2020).
 Note: Only additional indicators to the simplified indicator reported in figure 3 are displayed here. Economies' overall comprehensive score is given as the simple average of all the simplified indicators reported above and the comprehensive ones herein. Figures may diverge from the original paper as different sample sizes were used.

Finally, despite maintaining a stable score across both integration indices, Hong Kong; China dropped from being the most digitally integrated economy to 5th place in the region.¹⁵ This is due to its relatively low degree of regulatory similarity (indicator 6.), which counterbalanced other positive indicators and led to this economy's overall score stagnation. Malaysia registered a relative drop of 3 places, while Lao P.D.R. climbed 2 and Cambodia and Thailand rose 1.

Once again, looking at each of the specific indicators in Figure 4, it is easily identifiable that between 2010-13 and 2014-17 only indicator 4. – the share of population with an online financial account – registered significant changes. However, this is due to data particularities of the remaining indicators, which are not time-variant across sample (calculated once for each economy).¹⁶ As a result, despite weighting down on economies' perceived progression in the comprehensive index, the available data points were used to calibrate country's integration levels and to identify potential shortcomings and relevant policy proposals.

Turning towards panel (b) of figure 4 (indicator 4.), the share of the population with an online financial account has grown significantly across the whole region, mirroring the internet's increasing penetration and importance across the world. This is highlighted below in indicator 7 of the sustainable integration index (figure 6.) – the share of households with internet access – and corroborated by ITU (2019), which estimated that share of the world's population using the internet has gone from close to 30% in 2010 to almost 50% in 2017. This has been possible due to the rising ubiquity of smartphones – even in LDCs, LLDCs and low digitally integrated economies (World Bank, 2016) –, which has considerably facilitated internet access to everyone everywhere and allowed mobile to reach vast parts of the population.

Further analyzing the performance of this indicator, it is possible to identify that while all economies registered strong growth, economies with a high score in 2010 progressed relatively less. This is natural since highly connected economies had fewer integration room left to progress and *vice versa*. Exceptions to this trend were the SEA economies of Lao P.D.R. and Myanmar, which, despite being poorly integrated, still struggled to progress and those of Cambodia and Pakistan, who, despite a positive evolution since 2010, remained the two lowest financially integrated economies in the whole region. India, Indonesia and the Russian Federation, on the contrary, experienced a rapid advance in terms of financial inclusion.

Regarding the share of the population using the internet for online purchases in 2017 (indicator 5), advanced economies like Australia, Republic of Korea and New Zealand ranked the highest, scoring at or very close to the highest level of existing integration.

¹⁵ Relative integration rankings consider only the 19 economies included in the comprehensive index looking at their relative position in the simplified index comparatively to the comprehensive index.

¹⁶ Indicator 5. was calculated for 2017 only, while indicator 6. was calculated over the full period.

These economies enjoy widespread internet access and well-developed online payment systems, delivery services, consumer protection frameworks, among other complimentary services and characteristics that are essential for a flourishing digital economy.

However, looking at Japan, China, Hong Kong; China and Singapore – economies where these characteristics are similarly well-developed – it is possible to identify a persistent gap between both groups. This pattern points towards disparities regarding their sustainable integration indices. In particular, looking at indicator 10. – the proportion of female population using the internet for online purchases – it is immediately observable that all top-performers (i.e., Australia, Republic of Korea and New Zealand) were among the highest ranked in this indicator. Naturally, the correlation between female digital inclusion and overall digital inclusion is close to one, pointing to the need to develop inclusive digital policies towards women in order to widen overall digital accessibility.

Moving away from well-integrated economies, all other regional economies performed fairly poorly with regards to the share of the population using the internet for online purchases in 2017 (indicator 5.). In particular, all SEA economies (with the exception of Malaysia) scored particularly badly in this dimension, with Thailand standing out for its poor performance relative to its overall ranking and Cambodia, Myanmar and Lao P.D.R. – the sub-region's LDCs – scoring very close to 0.0 (no integration at all). India – a country which has secured impressive gains in terms of financial inclusion and in ICT imports – also scored very close to 0.0, reflecting the fact that only 1% of all purchases in this country in 2015 were performed online, compared to 60% in developed economies and 16% worldwide. Despite increased accessibility to the internet across the region (indicator 7.), the very limited use of online purchases highlights the need for policies to create safer and more efficient digital markets.

Lastly, analyzing indicator 6, on the digital regulatory similarity among regional partners, advanced economies like Australia, Hong Kong; China, Japan, New Zealand and Singapore were once again among the top performers. This pattern sheds a light on these economies' strong emphasis on maintaining close regulatory relationships with regional partners. An exception to this trend is Republic of Korea, who scored below other advanced economies due to its tighter restrictions on online sales and transactions from abroad (ECIPE, 2018). This is also in line with this country's relatively high tariffs on ICT imports as seen in indicator 3.

Next, SEA economies scored heterogeneously with regards to digital regulatory similarity. Despite the many successful PTAs signed under ASEAN and their impact in lowering import tariffs, more can be done in terms of harmonizing regulatory frameworks within the sub-region. Indeed, as Mitchell and Mishra (2020) mention, *“the ASEAN model of digital trade integration [provides] a relatively weak form of digital*

trade integration” due to the lack of strict enforcement mechanisms and binding frameworks of action. Some examples of barriers to the digital economy are quantitative trade restrictions in Viet Nam, FDI restrictions in Myanmar, and an anti-competitive stance in the telecoms sector of Lao P.D.R., among others (ECIPE, 2018). As such, SEA economies should push to further deepen and modernize the current ASEAN framework to address issue of regulatory similarity and NTMs that are currently dampening intraregional digital trade as prohibitively high tariffs did in the pre-ASEAN era.

While performing generally well in digital-economy integration, China’s heavily regulated digital economy shows as its low score for regulatory openness and similarity (0.0. These findings echo other indices’ results – such as the OECD DSTRI and ECIPE’s DTRI –, which ranks China as the most restrictive country in the world when it comes to digital trade regulation (ECIPE, 2018, and Box 1)

Box 1: Digital economy regulation in China.

China’s rising importance in the global and regional digital economy is hard to understate. China represents 22% of the market capitalization of the world’s 70 largest digital platforms (second only to the US, representing 68%), whereas it is estimated that in 2017 China accounted for 42% of the world’s online transactions (Hinrich Foundation, 2019; UNCTAD 2019). In addition, China boasts the highest number of internet users in the world – despite lagging in overall internet penetration – and plays a significant part in regional GVCs due to its role as a major ICT exporter and importer (World Bank, 2016).

As a result, China’s strict regulatory regime has a profound impact on the region’s trading landscape. As the ECIPE (2018) remarks, China became a major player in the digital economy, but the provision of digital products was almost exclusively located within its own domestic market. For that reason, relaxing some of China’s regulatory burdens would offer significant digital trade opportunities for Asia and the Pacific region and China.

ECIPE (2018) outlined some of the particularly heavy regulations in China, which can add costs when doing digital trade transactions:

- Public procurement restrictions – in many instances, there are restrictions on procuring digital products from foreign providers.
- Intellectual Property Rights (IPR) restrictions – concerns regarding transparent and open process for granting patents, and requirements for companies with secure internet systems to share confidential information.
- Foreign investment on telecommunication services restrictions, including screenings, license requirements, and caps on foreign ownership.
- Data flows restrictions – companies can only store data within the country.
- Transparency of procedures in terms of certification, testing and encryption which differ from those of regional partners.

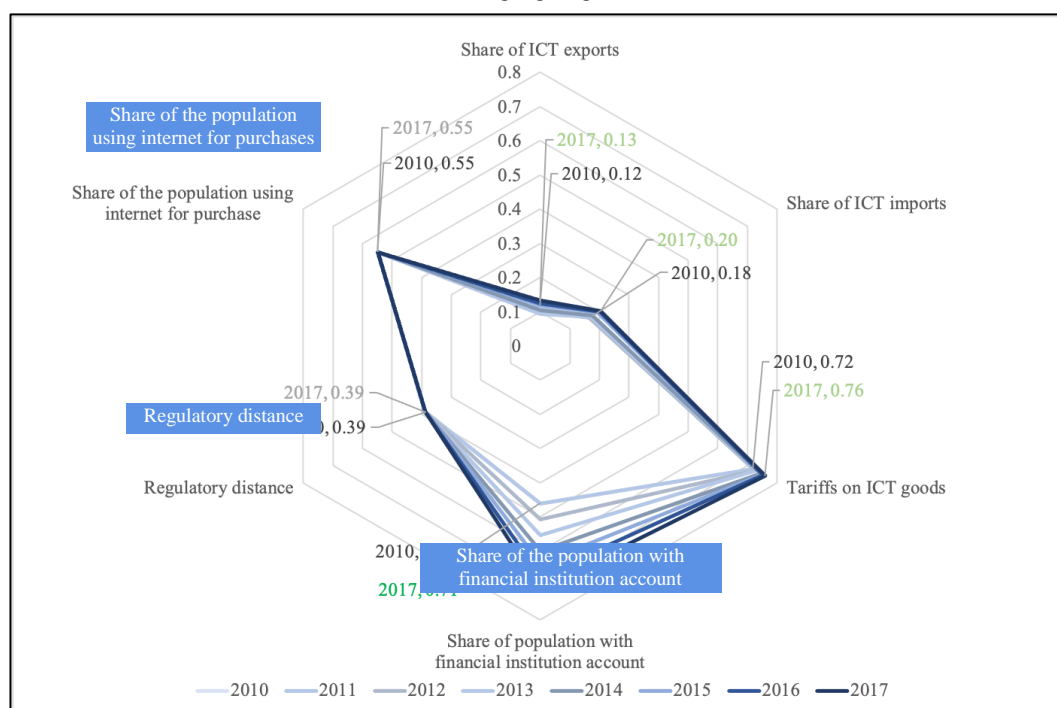
4.1.3 Asia and the Pacific's conventional digital integration overview

Finally, figure 5 plots Asia and the Pacific's conventional integration profile for the different indicators chosen across years (from light blue in 2010 to darkest in 2017) for a quick and intuitive look into the state and progression of the region's digital integration. The 3 indicators present only in the comprehensive index are highlighted in blue, as in Table 1, and report the average value for the available 19 economies. The 3 indicators present in both the comprehensive and simplified indices (not highlighted) are reported as per the simplified index's results in order to include the average of all available 46 economies.

At a first glance, in 2017, the indicators on Tariffs on ICT imports and the Share of the population with a financial institution account, followed by the indicator on the Share of the population using the internet for purchases performed the best. These positive integration indicators reflect a relatively well-connected Asia-Pacific region, bearing the fruits of the global rise in internet accessibility, new technological possibilities and continued international cooperation efforts that have streamlined a more open and efficient trading environment.

On the contrary, the region's ICT trade intensities and the intraregional digital trade regulatory similarities indicators are trailing behind. On the one hand, given the region's prominence as a top-producer of ICT goods globally, the average low score for both ICT trade intensities highlights that this is a highly concentrated feature among a few economies. Since all economies are weighted equally, the region's low score shows that the majority of regional economies remain under digitalized and under capacitated to produce and utilize digital goods. On the other hand, the fairly low regulatory similarity between reveals the need to rethink international cooperation to address NTMs and regulatory measures.

Figure 5. Asia-Pacific conventional regional digital integration index indicators – 2010-2017



Source: Author's calculations based on ESCAP DigiSRII (ESCAP, 2020).

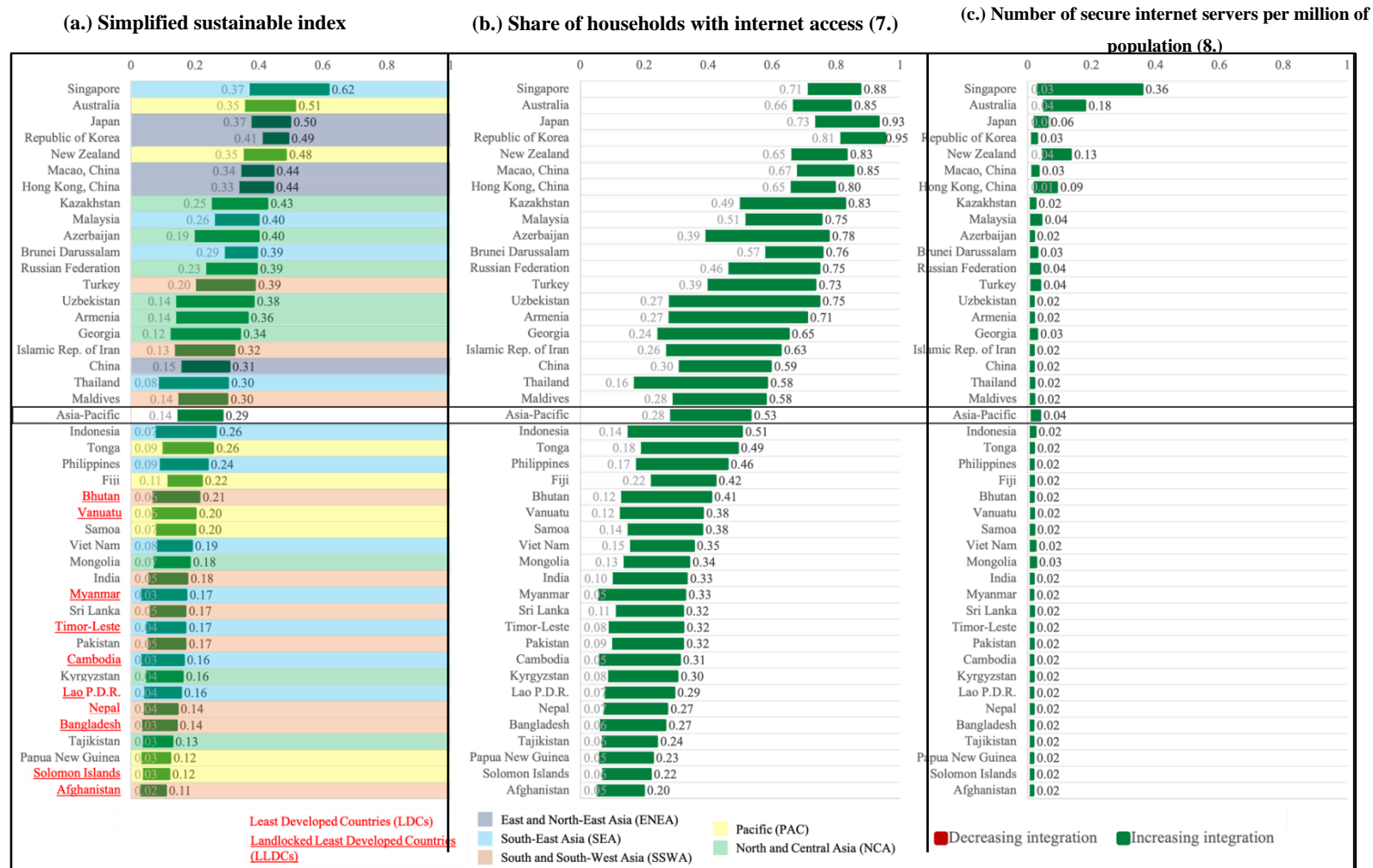
Note: Indicators highlighted in blue are only featured in the comprehensive index of regional digital integration. As such these include only the 19 economies considered in this index. Indicators not highlighted are considered in both the comprehensive and simplified indices. Herein, the simplified index's values are reported as to include all 46 available economies.

4.2. Sustainable index of regional digital integration

4.2.1. Simplified index of sustainable regional digital integration

Albeit starting from a very low position, over the 2010-2017 period, Asia and the Pacific's simplified sustainable digital integration index has progressed considerably well. As figure 6 shows, most of the region's gains can be attributed to an increase in the proportion of households with internet access across the region, mirroring above-explored trends of rising internet penetration globally (panel b.). In contrast, regionally, little to no progress in the number of secure internet servers per million of population (panel c.) has been made.

Figure 6. Sustainable simplified regional digital integration index and indicators per country – 2010-2017



Source: Author's calculations based on data obtained from ESCAP DigiSRII database and methodology (ESCAP, 2020).

Note: Figures may diverge from the original paper as a different sample size was used. Economies are ordered according to their 2017 scores in panel (a.).

At the country and sub-regional level, the simplified index of sustainable integration displays a similar distribution to that of the comprehensive index of conventional integration (figure 4). This is due to the fact that both indices include complementary measures of internet penetration (i.e., the share of the population with a financial account or performing online purchases – conventional measure – compared with the share of households with internet access – a sustainable indicator), which naturally preserve their country-distribution across indicators.

Accordingly, advanced economies in SEA – light blue in figure 6 – and ENEA – dark blue – such as Singapore, Hong Kong; China, Japan, Republic of Korea, along with developed economies in the PAC – yellow – such as Australia and New Zealand, are the most sustainably digitally integrated. Noteworthy, are also NCA economies – green –, who compared to the simplified index of conventional integration scored relatively higher, with most going from below the regional average to above. In contrast, LDCs – in red –, LLDC – in red underlined – and other developing economies such as Afghanistan, Nepal, Bangladesh in SSWA – in orange – and Papua New Guinea and Solomon Islands in the PAC region are the worst performers on the sustainable digital integration index.

Looking at indicator 7. (panel b) all nations secured positive gains with regards to their share of households with internet access. However, differing dynamics across economies can be identified. For instance, among the poorest performers in the region are Asia and the Pacific's top 6 most digitally integrated economies: The Republic of Korea, Japan, Singapore, Macao; China, Australia, and New Zealand – in descending order of internet penetration. In these economies, widespread high-speed internet connectivity and broadband penetration since 2010 can help explain their top positions across years despite below-average improvements. Contrastingly, Afghanistan, Solomon Islands, Papua New Guinea, Tajikistan, Bangladesh and Nepal, who are among the least integrated economies in the region, also recorded among the lowest level of indicator progressions in the region – 30% to 40% lag compared to the regional average. This is a worrying signal for under connected economies and for the region who saw its digitalization gap widen during this period. Finally, Uzbekistan, Armenia, Thailand, Georgia and Azerbaijan, in descending order progressed the most, with their percentage share of households with internet access growing over 50% more than the rest of the region.

Looking at indicator 8. on the number of secure internet servers per million of population, Singapore has considerably outperformed all other economies, growing more than double the second-best performer and eight-fold the regional average. This can be attributed to Singapore's government proactive approach to dealing with cybercrimes and secure its digitally-enabled economy by building resilient critical information infrastructures, safer cyberspace, and strengthening international

partnerships, especially with ASEAN nations (Singapore's Cybersecurity Strategy, 2016). Australia and New Zealand, followed by Hong Kong; China and Japan, are second to fourth in line, respectively, for providing a more secure online environment to its businesses and essential services. Other economies that have performed at par with the regional average are Russian Federation, Turkey, and Malaysia, while all other economies recorded both a marginal progress and level of secure internet servers per million.

4.2.2. Asia and the Pacific's regional sustainable digital integration overview

Further to the indicators on internet penetration and security, the comprehensive sustainable digital integration index gauges country's digital inclusion by measuring female online participation across different indicators. As UNCTAD (2019) notes, the proportion of women online persistently lags behind that of men in at least in around two thirds of economies around the world, making this a key topic in understanding sustainable digital integration.

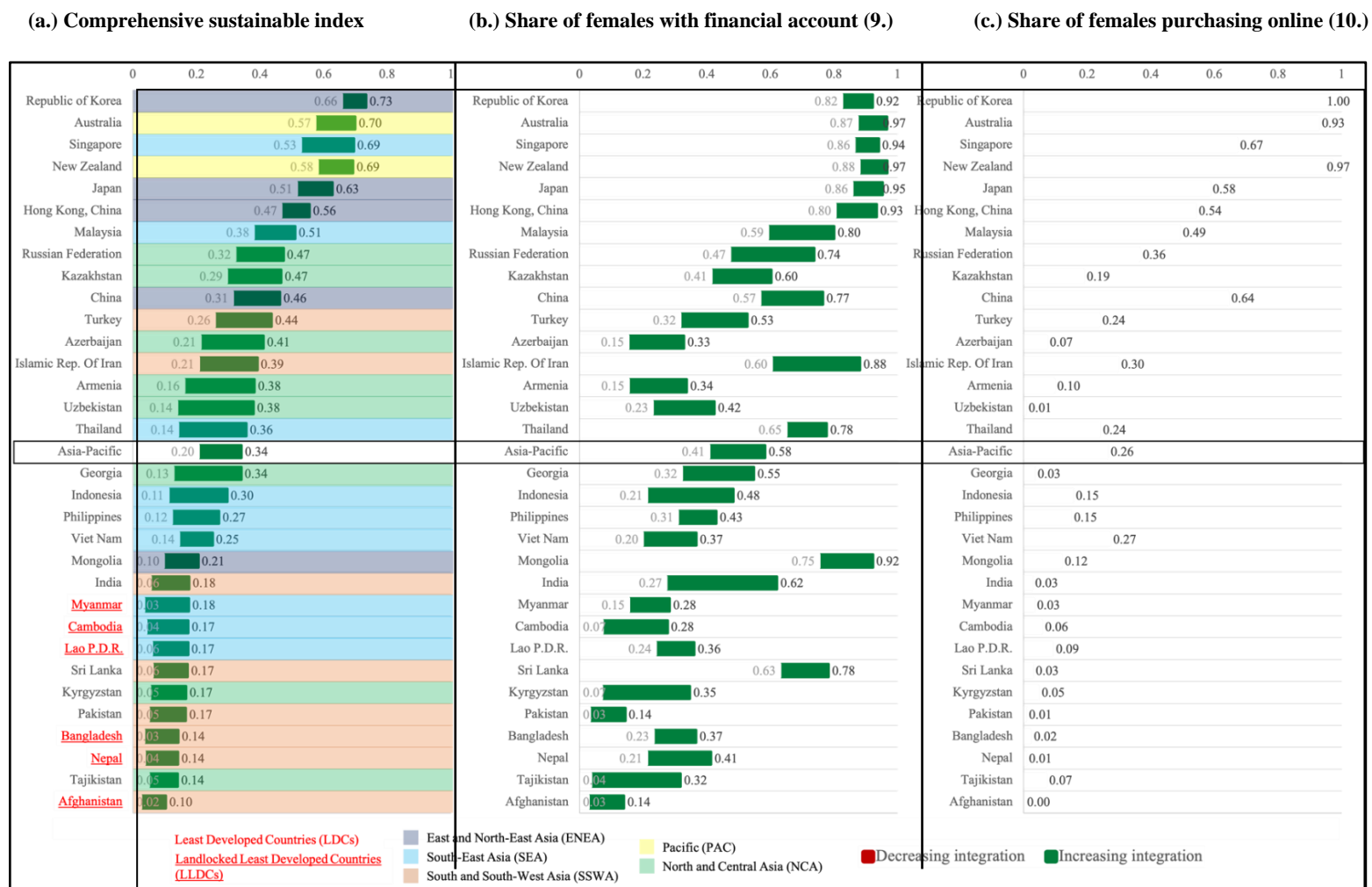
As with the conventional indices of integration, the introduction of new indicators produced significant changes to economies' overall rankings and scores. In general, all top performers saw their integration score rise, while low performers either stagnated or slightly declined. Indeed, the top 10 most integrated economies registered the 9 steepest score increases: Republic of Korea (now the region's highest integrated country), Australia, New Zealand and China rose the most. The Islamic Republic of Iran also registered a considerable boost. Contrastingly, despite positive score increases for Singapore, Japan and Hong Kong; China their poor female participation in online purchases dragged these economies' performance compared to other highly integrated ones. Contrastingly, 7 out of the 10 worst performances belonged to the bottom 10 least integrated economies in the region. Afghanistan, Nepal and Pakistan were the worst performing nations of all, with their scores slightly (less than 0.01) declining.

On the indicator of female digital financial inclusion, results vary greatly. Some frontrunners are Australia, New Zealand, Japan, Singapore, Hong Kong; China, and the Republic of Korea. These economies have made significant progress in including more females in the digital financial systems. The major drivers of formal bank account penetration among females in these economies include greater access to mobile technology, increased ownership of mobiles and smartphones by females, and several government initiatives extending financial services to women. Moreover, other economies such as Mongolia, the Islamic Republic of Iran, Malaysia, Thailand, China, and Sri Lanka have also shown positive progress in providing financial services for women online. The gender gap in financial inclusion in these economies is gradually diminishing. On the contrary, Afghanistan, Pakistan, Myanmar, and Cambodia have

persistent gender disparities in access to digital financial accounts owing to inadequate digital infrastructure, low ownership of mobiles by women, among others.

This trend continues for the indicator of the proportion of the female population using the internet for online purchases, where top and bottom performers are even more segregated. The factors such as greater access to mobile phones, high internet connection speed, and world-class information technology infrastructure are driving growth in e-commerce purchases by females in the Republic of Korea, Australia and New Zealand. Surprisingly, China has also recorded a very positive integration score on this indicator. As the largest retail e-commerce market in the Asia-Pacific region, China's positive integration of females in online purchases can be attributed to middle and high-income female shoppers (Feifei and Fan, 2020). On contrary, the worst-performing economies include Afghanistan, Nepal, Bangladesh, among others. These results indicate that there are persistent and substantial gaps in extending internet services to the female population, thus hindering their inclusion in the digital space.

Figure 7. Sustainable comprehensive regional digital integration index and indicators per country – 2010-2017



Source: Author's calculations based on data obtained from ESCAP DigiSRII database and methodology (ESCAP, 2020).

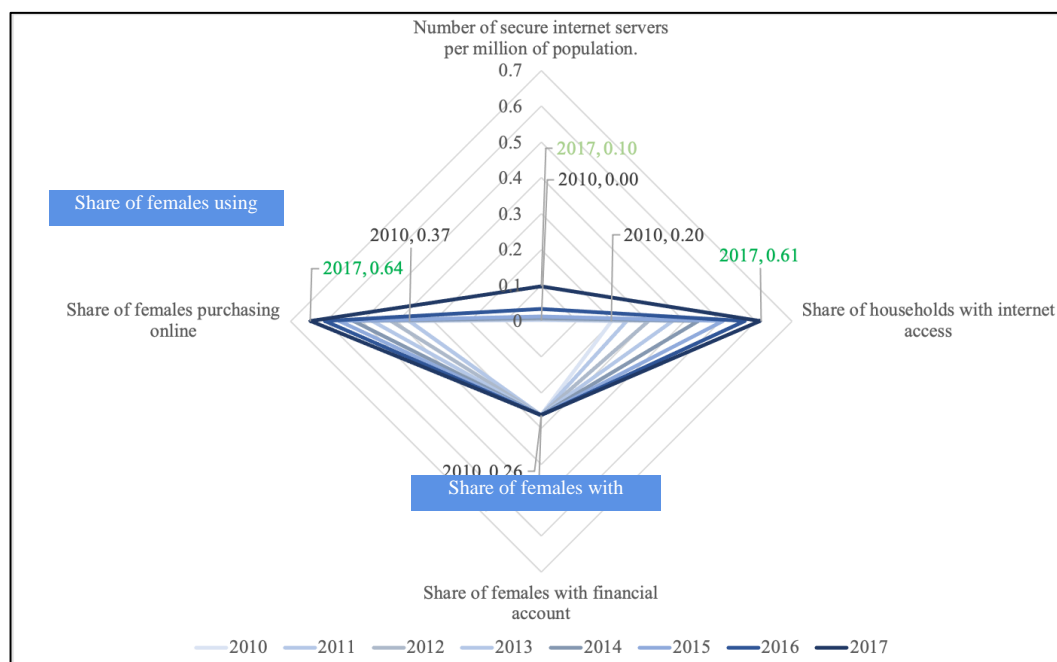
Note: Figures may diverge from the original paper as a different sample size was used. Economies are ordered according to their 2017 scores in panel (a.).

4.2.3. Comprehensive index of sustainable regional digital integration

Finally, figure 8 plots Asia-Pacific's sustainable integration profile for all sustainable indicators across years (from light blue in 2010 to darkest in 2017) for a quick and intuitive look into the progression and state of the region's sustainable digital integration. The 2 indicators solely present in the comprehensive index are highlighted in blue, as in Table 1, and report the average value for the available 32 economies. The 2 indicators present in both the comprehensive and simplified indices (not highlighted) report the average of all available 43 economies as per the simplified index's results.

Asia and the Pacific's overall sustainable integration score has largely been driven by substantial progresses in household's access to internet and in female's access to online purchasing. These indicators mirror the rising ubiquity of the internet across the world in positive a movement towards an inclusive and interconnected region. However, it is important to note that little to no progress has been achieved in increasing the number of secure internet servers per million of population regionally, as well as in creating a more inclusive digital environment by empowering females to access financially instruments online. These are key points for advancing the region's sustainable digital integration and underpin a long-lasting and successful Asia-Pacific-wide digital transformation.

Figure 8. Asia-Pacific sustainable regional digital integration index indicators – 2010-2017



Source: Author's calculations based on ESCAP DigiSRII (ESCAP, 2020).

Note: Indicators highlighted in blue are only featured in the comprehensive index of regional digital integration. The value reported is thus the average of the available 32 economies available. Indicators not highlighted are considered in both the comprehensive and simplified indices and include 43 economies as per the simplified index's results.

5. Policy recommendations

Mirroring the wide range of indicators included in the regional digital trade integration indices, in this section we provide key policy recommendations to accelerate economies' digital regional integration from the perspective of both conventional and sustainable integration. These policy recommendations are organized according to four main policy areas linked to the indicators above: (a) Facilitating cross-border digital trade, (b) Providing safe and widespread digital access (c) Promoting inclusive digital participation and (d) Widening financial inclusion and the usage of digital payments. Together these policies can significantly accelerate economies' digital transformation towards resilient 21st digital economies.

5.1 Facilitating cross-border digital trade

Facilitating cross-border digital trade is an essential route to streamlining economies' digital transformation. In fact, most of well-digitally integrated economies in Asia-Pacific have minimal ICT import tariffs (indicator 3.) and are highly integrated in terms of digital trade regulatory similarity (indicator 6.). This clearly highlights the significance of a free digital trade environment for a lasting digital transformation. For under-digitalized economies there are many reasons why this can be extremely important.

First, as indicator (1.) and (2.) on the ICT export and import trade intensity show, respectively, ICT GVCs in Asia and the Pacific are almost all concentrated around a few economies, who produce all sorts of internet accessing and supplying technology. Accordingly, removing trade barriers to acquire necessary digital technology and services is an extremely efficient way of reducing technological bottlenecks and decreasing overall digital transition costs. Second, as ICT GVCs become increasingly important, developing nations can reap immense economic opportunities by attracting FDI and building digital production capabilities at home. However, since ICT GVCs often span multiple economies, seizing this opportunity is contingent on fostering a multilateral liberalized ICT trade environment that can accommodate efficient border crossings with multiple partners. Third, as both consumers and firms can accrue immense benefits from joining the internet, easing cross-border digital trade can further accelerate digitalization by expanding the size and availability of goods and services online. For consumers, liberalized cross-border trade means accessing a vast array of foreign products that can meet every need as efficiently as possible. For businesses, easy cross-border exports are an inexpensive way of accessing large foreign markets and lower production costs.

Accordingly, working multilaterally to liberalize trade and investment in ICT goods and services is an essential step to build a more resilient and efficient digital transformation. However, while import tariffs are a key issue that should be addressed, regulatory distances are much more prominent in the region, calling for strengthening international cooperation in PTAs and FTAs around non-tariff barriers and harmonizing rules, regulations and standard for digital products. For instance, utilizing existing digital trade facilitation frameworks like the UN's Framework Agreement on Facilitation

of Cross-border Paperless Trade in Asia and the Pacific¹⁷ or raising the *De Minimis* value¹⁸ are efficient ways of encouraging cross-border trade, especially in small-value products which are the most intensively traded digitally. Finally, protecting domestic and foreign firms' Intellectual Property Rights (IPRs) is key to promoting innovation and encouraging entry of foreign firms. Furthermore, facilitating the access of firms to capital financing for ICT-related projects and digitalization processes, upgrading workers' skills, and ensuring a diverse and competitive marketplace are other important measures that can help accelerate the digital transition of economies (EBRD, 2020).

5.2 Providing safe and widespread digital access

Many economies in Asia-Pacific lack adequate digital infrastructure to provide and / or access a seamless, low-cost and widespread internet coverage. Naturally, this is a key pain-point in streamlining economies' digital transformation, further blocking the under-digitalized from reaping the economic and social digital dividends accruing from it. Indeed, despite the rising ubiquity of internet-accessing devices (e.g., smartphones) that have helped boost internet connectivity across the world, some of Asia and the Pacific's LLDCs, LDCs and developing nations are still considerably behind. As indicator (7.) on the share of households with internet access shows, despite major improvements, economies like Afghanistan, Bangladesh, Cambodia, Kyrgyzstan, Lao P.D.R., Nepal, Papua New Guinea, Solomon Islands, Sri Lanka and Tajikistan, among many others, remain under-connected. On the contrary, Armenia, Azerbaijan, Georgia, Thailand and Uzbekistan are extremely positive examples of economies who grew more than 50% faster than the overall regional average. For a digitally connected world, it is essential to improve the availability and affordability of high-speed internet. Accordingly, governments should adopt various strategies in order to modernize and extended existing ICT infrastructures. For instance, encouraging public-private partnerships in highly-populated areas can be an efficient way to procure private sector investment in key infrastructural programs. However, as the telecom sector often tends to turn monopolistic and hurt consumer welfare, specialized legislation focused on

¹⁷ Visit <https://www.unescap.org/resources/framework-agreement-facilitation-cross-border-paperless-trade-asia-and-pacific> for more information and resources on this multilateral framework agreement.

¹⁸ The *De Minimis* value refers to the threshold under which goods are not subject to import duties.

maintain the long-term competitiveness of the sector and on regulating the scope of public-private partnerships is vital for a successful and lasting digital transformation. On the other hand, when market conditions might inhibit private companies to participate in the market – as it occurs in remote areas, where service costs are prohibitively high for the existing demand –, national governments should resort to alternative funding mechanisms such as Universal Service Funds (USFs) to ensure access to digital services for rural and sparsely populated regions.

Another issue for establishing a well-digitally integrated region is to provide a secure internet environment. As indicator (8.) on the number of secure internet servers per million of population highlights, apart from a few exceptions such as Singapore, Australia, New Zealand, Hong Kong; China and Japan, Asia-Pacific economies count very few of these secure servers in their internet networks. Furthermore, ensuring a secure internet environment is also tightly intertwined with establishing strong regulatory frameworks and data protection protocols that can promote economic activity and sensitive matters to be conducted online.

For this, it is essential to make effective regulatory policies in areas of data flows, data privacy, and cybersecurity. A more favorable regulatory environment may require investments in improving the security of hard infrastructure, for instance, by employing encryption technology. Since much of the telecommunication equipment is privately owned, governments must engage in public-private partnerships to provide secure physical and digital infrastructure (World Bank, 2016). This could also involve setting up an institutional mechanism for promoting cooperation on e-commerce, cybersecurity matters, and digital trade rules within the ambit of Preferential Trade Agreements (PTAs), which generally leave out such considerations (Mitchell and Mishra, 2020). Ensuring the regulatory coherence in consumer protection and cybersecurity laws in the region are important measures to ensure a safer and more secure digital economy integration. As cross-border cyber-attacks are frequent, further cooperation on exchanging adequate and timely information on cyber threats among the regional partners is also essential (World Bank, 2016).

5.3 Promoting inclusive digital participation

Several economies around the world are transforming their regional digital integration strategies to make them more inclusive and broad-based by extending digital services and technologies to women and underserved populations. As indicator (10.) on the proportion of females doing online purchases and indicator (9.) on female digital financial inclusion show economies like Australia, Republic of Korea and New Zealand have been extremely successful in promoting female digital inclusion. Although not so successful in integrating females in online purchases, Hong Kong; China, Japan, Mongolia and Singapore have also done very well in creating an inclusive digital financial environment. On the contrary, females participate in online purchases the least in Afghanistan, Bangladesh, Georgia, India, Kyrgyzstan, Myanmar, Nepal, Pakistan, Sri Lanka and Uzbekistan (albeit in most of these economies overall internet access is also extremely low) and financially in Afghanistan, Armenia, Azerbaijan, Bangladesh, Cambodia, Kyrgyzstan, Lao P.D.R., Myanmar, Pakistan and Tajikistan.

One of the priorities for digital integration is to improve digital literacy among females. It is important to train women to develop soft digital skills, which include using smartphones, computer programs, web applications, online communication, and accessing secure networks for storing and exchanging information. Greater digital integration in the region is contingent upon creating a more gender-inclusive financial environment. Reforms must also be undertaken in the education programs, where more females are encouraged to learn Science, Technology, Engineering, and Math (STEM) skills. Moreover, addressing the issue of the widening gender-wage gap is critical to greater participation by women in digital activities. For instance, by introducing more flexible work arrangements to account for childcare, females can stay in the workforce and eventually gain greater access to the internet and other digital services. Addressing gender stereotypes that may dissuade women from being active players in the digital economy is also particularly important. This can be done by focusing on gender inclusivity in public policy programs and incentivizing companies to implement gender-neutral hiring policies (OECD, 2018).

5.4 Widening financial inclusion and the usage of digital payments

Financial inclusion is a key characteristic for a strong digital market as it allows merchants and consumers to safely and efficiently conduct transactions online over an increasingly wider array of products and services. Furthermore, it is a powerful and inexpensive way of boosting growth and economic prosperity among disadvantaged communities by expanding their access to important financial instruments, such as insurances and credit lines, allowing them to receive payments instantly and securely and fostering better financial planning (Jack and Suri, 2014; World Bank, 2017). In this regard, indicators (4.) and (9.) on digital financial access and female digital financial access, respectively, shows that Asia and the Pacific has progressed considerably well over the years, with most economies logging substantial gains. In particular, India, Indonesia, Islamic Rep. Of Iran, Kyrgyzstan and Tajikistan evolved the most. However, Cambodia, Lao P.D.R., Myanmar and Pakistan were among the worst-performers on both indicators, while Afghanistan, Armenia, Azerbaijan, Bangladesh, Kyrgyzstan and Tajikistan, economies who do not have data for indicator (4), also scored very poorly in (9.).

Subsequently, for incentivizing the use of online bank accounts and increasing financial inclusion, governments can begin providing transfers, such as payments to public servants, pensions, subsidies and credit lines, digitally. Moreover, encouraging businesses to pay employees and utility bills through bank accounts instead of cash would be vital in transitioning towards a widespread digitization of economic activity (World Bank, 2017). Furthermore, improving existing standards for online payment systems, creating strong legal protections for online consumers, and expanding internet services to users in remote areas, are a few other recommendations to boost digital financial inclusion. Finally, encouraging the transaction of small value products would provide a big stimulus to internet purchases since these are among the most intensively traded digitally. Policies aimed at fostering the creation and expansion of digital platforms such as easing domain names restrictions and online payments restrictions, enforcing a consumer protection framework, and improving the speed and reliability of the postal service are effective in bringing a larger share of the population to online shopping (UNCTAD, 2017; ECIPE, 2018).

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