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Leveraging Digitalization for Productivity and Decent Employment

ASIA-PACIFIC COUNTRIES WITH SPECIAL NEEDS DEVELOPMENT REPORT 2024

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Economic and Social Commission for Asia and the Pacific

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Foreword

In the vibrant and diverse Asia-Pacific region, the transformative role of digitalization in shaping the future of countries in special situations – least developed countries (LDCs), landlocked developing countries (LLDCs) and small island developing States (SIDS) — cannot be overstated. This report delves into the ways digital advancements can catalyse productivity and employment and includes discussions on policy options to overcome traditional development challenges, such as limited productivity capacities, lack of economies of scale and challenging geographic features.

Digitalization has emerged not just as a technological leap, but also as a catalyst for sustainable development, enabling countries in special situations to overcome conventional infrastructural limitations. Digital solutions open doors to global markets, foster entrepreneurship and transform the provision of essential services. Yet, the path to a comprehensive digital economy is fraught with obstacles — from establishing robust digital infrastructure to fostering a digitally literate workforce capable of navigating the complexities of a rapidly evolving digital landscape.

A balanced strategy that prioritizes rapid digital advancements is needed alongside the development of foundational sectors. Various examples from countries in special situations are showcased and the importance of regional cooperation in overcoming barriers to digital trade and investment is stressed, spotlighting policies that enhance legal and technical interoperability to support them.

It is our hope that this report serves as a valuable resource for policymakers, development practitioners and stakeholders of LDCs, LLDC and SIDS, and their development partners. Together, we can harness the full potential of digitalization to bridge the digital divide and lay the groundwork for a future in which digital inclusivity propels prosperity for all. The forthcoming global conferences on LLDCs and SIDS in 2024 present an opportune moment for the international community to fully acknowledge the importance of digitalization as a driver of sustainable development and to reaffirm its commitment to support and complement the efforts of countries in special situation in this regard.

Armida Salsiah Alisjahbana
Under-Secretary-General of the United Nations and Executive Secretary of ESCAP

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Acronyms

APIS	Asia-Pacific Information Superhighway
ASEAN	Association of Southeast Asian Nations
CPTA	Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific
DSGI	Digital Skill Gap Index
DTI	Digital Transformation Index
DTPs	digital trade provisions
ESCAP	Economic and Social Commission for Asia and the Pacific
e-wallet	electronic wallet
FDI	foreign direct investment
FFA	Pacific Islands Forum Fisheries Agency
GDP	gross domestic product
GPS	Global Positioning System
ICT	information and communications technology
IIDS	Institute of Integrated Development Studies
IoT	Internet of things
IT	information technology
ITU	International Telecommunication Union
IUU	illegal, unreported and unregulated (fishing)
LDCs	least developed countries
LLDCs	landlocked developing countries
MSMEs	micro, small and medium-sized enterprises
NGO	non-governmental organization
PDEP	Pacific Digital Economy Programme
PFIP	Pacific Financial Inclusion Programme
PICAP	Pacific Insurance and Climate Adaptation Programme
PTAs	preferential trade agreements
R&D	research and development
SAMOA	Small Island Developing States Accelerated Modalities of Action (Pathway)
SIDS	small island developing States
SPTO	Pacific Tourism Organisation
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNCDF	United Nations Capital Development Fund
UNCITRAL	United Nations Commission on International Trade Law
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WTO	World Trade Organization

Executive summary

The *Asia-Pacific Countries with Special Needs Development Report 2024: Leveraging Digitalization for Productivity and Decent Employment* explores the transformative potential of digitalization for enhancing productivity and employment in countries in special situations, comprising the region's least developed countries (LDCs), landlocked developing countries (LLDCs) and small island developing States (SIDS).

Advances in digitalization and the evolving tradability and productivity of the services sector present unprecedented development opportunities. To seize these opportunities, it is crucial that these countries address foundational needs, such as enhancing digital infrastructure and skills, while also fostering a conducive ecosystem for the digital economy. These opportunities come at a time when traditional labour-intensive industrialization is becoming less viable due to a surge in labour automation. Accordingly, while historically, the manufacturing sector has played a pivotal role in driving productivity growth and generating employment, especially for the relatively unskilled workforce, there has been a noticeable shift towards the services sector, which, until recently, offered relatively fewer opportunities because of its largely non-tradable nature and limited opportunities for mechanization, and the intrinsic role of labour and lower economies of scale. However, most workers have transitioned to the non-business sector in which informality is widespread and productivity at best is marginally higher than in agriculture.

Propelled by advances in digitalization, many of the positive attributes of manufacturing are increasingly exhibited by the services sector, opening the door to increased levels of productivity, especially in the business services sector. However, harnessing these benefits requires tackling several underlying challenges. First, limited digital infrastructure results in lower Internet utilization, stability and affordability in many countries in special situations, especially those in LDCs and SIDS, which are confronted with weak high-speed, fixed Internet connectivity, such as fibre optic and broadband, and often lack fast mobile connections. Moreover, low digital literacy rates, slow adoption of digital technologies and weak regulatory frameworks for data protection and online transactions are pushing operational costs higher for digital businesses in these economies. Indeed, the ESCAP Digital Transformation Index shows that especially LDCs are falling behind as evidenced by their low scores on the five pillars of the index, which reflect the state of a country's network infrastructure, government digital initiatives, digital businesses, people's capacities and the overall ecosystem.

Digitalization, productivity and employment

The impacts of digitalization on productivity and employment are dynamic and multi-faceted. Digitalization can significantly boost productivity by automating routine tasks, accelerating processes and minimizing human errors. It also can improve supply change management and resource allocation, while fostering innovation through enabling new ways of working, new product development and new business models that can be applied to a range of sectors.

However, the impact of digitalization on employment is complex and depends critically on the skills level of the workforce and the economy's ability to adapt. Automation and artificial intelligence can replace human labour, particularly in routine and manual tasks. While this leads to job losses in certain areas, new opportunities will also emerge in digitally oriented sectors, which tend to require higher skills.

Digitalization may heighten the risks of wage stagnation and a widening digital divide within and among countries. The rapid pace of digital transformation may outstrip the local workforce's ability to acquire the necessary digital skills, leading to job displacement for many workers, particularly in traditional industries. Furthermore, income disparities may widen as skill-biased technical advancements increase the demand for high-skilled workers and, at the same time, diminish demand for those lacking such skills. This dynamic is especially a concern for countries in special situations, in particular LDCs, where levels of human development tend to be lower and the risk of becoming dependent on low-wage, low-skill jobs within the global digital supply chains is higher, thereby limiting the potential for higher-value job creation.

Ensuring access to reliable digital infrastructure and skills is a prerequisite to harness the benefits of digitalization. SIDS, for instance, have, on average, only 2.9 fixed broadband subscriptions per 100 inhabitants, and LDCs have, on average, only 1.2 fixed broadband subscriptions per 100 inhabitants, compared to the regional average of 28. The same applies to mobile-broadband subscriptions per 100 inhabitants in which LDCs in the region score 64.7 compared to 85.2 in the region as a whole. These gaps highlight the necessity for substantial Investment in digital infrastructure, such as broadband and mobile networks, to harness the benefits of the digital transformation. Furthermore, the readiness of LDCs to embrace a digital transformation is notably hampered by the lack of skills of the future workforce, highlighting the importance of digital literacy.

Emerging role of the services sector

Bolstered by digitalization, the services sector is increasingly exhibiting the development attributes of the manufacturing sector, which includes, among others, tradability, economies of scale, productivity growth and innovation. However, unlike the manufacturing sector, the dual outcomes of productivity growth and employment of unskilled labour are less prevalent in subsectors within the services sector. For instance, remarkable productivity gains have been made in business services, such as information, communications and technology (ICT) services, but the employment generation potential for unskilled labour in this sector remains limited. On the other hand, modest growth in productivity has been recorded for non-business services, such as retail trade, but this sector is absorbing most of the unskilled labour.

The diffusion of digital technologies into services offers significant opportunities, especially for countries in special situations, to develop micro, small and medium-sized enterprises (MSMEs) and formalize informal activities. First, advances in digital technologies and communications have enhanced the tradability of services. This allows smaller countries to achieve economies of scale through digital platforms. Second, starting and scaling service-oriented businesses, especially those based on digital platforms, require less capital and infrastructure than manufacturing operations. Third, services, particularly in information technologies (IT), finance and tourism, can reach global markets through digital channels, offering significant growth potential. Fourth, the services sector, boosted by digitalization, can create a wide range of formal jobs that require varying levels of skills, including high-skilled jobs, in IT and finance, and more accessible jobs in areas, such as digital marketing and customer service. Finally, the services sector can quickly adapt to and innovate new technologies, making it more dynamic and responsive to digitalization trends.

Policy considerations and regional cooperation to harness digitalization

Digitalization offers a transformative pathway for countries in special situations. Mobile technology, satellite systems and solar mini grids, for instance, allow these countries to bypass traditional infrastructure, such as extensive landline networks and centralized grid systems. Digital platforms further democratize access to global markets and catalyse job creation and entrepreneurship, even in the most remote areas, by fostering economies of scale. They also enable the delivery of crucial services, such as mobile banking, online education and telemedicine.

The shift towards a digital economy requires, however, the development of essential infrastructure and inclusive policies to ensure equitable access and benefits for all. Addressing the rural-urban divide, particularly in LDCs, and ensuring inclusivity for all, including women and people in geographically isolated areas, are paramount. Additionally, fostering a digitally literate workforce is critical to fully leverage digitalization and avoid a widening of the skill gap between digitally skilled and unskilled workers, which would exacerbate social disparities.

Notwithstanding the transformative pathway for countries in special situations that digitalization offers, it also presents risks. These include exploitation in informal sectors, privacy breaches and overdependence on certain digital platforms. Addressing these risks requires establishing, implementing and enforcing strong regulatory frameworks, effective cybersecurity measures and

stringent data protection laws to promote equitable growth and protect individual and societal rights. Supporting evidence-based policymaking through digital data collection, including gender-disaggregated data, is also crucial for informed decision-making.

A balanced strategy that capitalizes on rapid digital advancements, while also nurturing foundational sectors is critical for countries in special situations. This means prioritizing high-impact areas, such as e-commerce and digital marketing, especially capitalizing on the higher tradability of services and more servitized agriculture and industrial activities. At the same time, more needs to be invested in building capacities in sectors, such as manufacturing, that require a robust infrastructure encompassing transportation, power and telecommunications to support exports.

Some strategic examples from LDCs include the digital literacy initiatives implemented in Bangladesh and support for digital entrepreneurship in Nepal, which showcase the potential for digital technologies to meet global demands and stimulate local innovation. In Cambodia, the Bakong system exemplifies the innovative use of digital currency to enhance economic independence and financial inclusivity, leveraging mobile technology for broader financial participation. In LLDCs, expanding digital infrastructure and fostering public-private partnerships, such as ICT integration and connectivity initiatives in Bhutan and "Giga" by the International Telecommunication Union (ITU) and the United Nations Children's Fund (UNICEF) in several Asian LLDCs, are vital for overcoming geographical challenges and ensuring equitable digital access. These initiatives underscore the importance of strategic policies and international cooperation to bridge the digital divide and promote development. For SIDS, tailored digital strategies are instrumental in enhancing economic sectors and addressing societal needs, with digitalization playing a pivotal role in tourism, e-commerce, and combating illegal, unreported, and unregulated (IUU) fishing. Digital marketing initiatives in Fiji, Maldives and Samoa highlight how digital marketing and e-commerce can open global markets for local products and services. Moreover, addressing IUU fishing through digital solutions, such as satellite monitoring, demonstrates the ability of digitalization to ensure equitable fisheries resource management, while also increasing public revenues from fisheries.

Regional cooperation is also critical for countries in special situations to leverage digitalization in trade and investment. Despite their growing engagement, these countries face significant hurdles in fully harnessing the potential of digital trade, hindered by domestic challenges in e-commerce and external barriers in integrating digital trade provisions into trade agreements. Addressing these complexities requires a comprehensive approach that emphasizes legal and technical interoperability, aligning with international standards to facilitate streamlined digital transactions and engaging in regional initiatives to boost digital trade capacities, rather than engaging in a proliferation of a "noodle-bowl" of digital trade agreements. Collaborative efforts are, therefore, essential to facilitate these countries' participation in digital trade and to ensure a cohesive and inclusive digital trade ecosystem that benefits all. Efforts to increase digital foreign direct investment (FDI) are also essential to develop the digital economy in these countries, focusing on policies that improve digital skills, reduce the regulatory burden on businesses and foster a supportive environment for digital businesses. Furthermore, regional initiatives, such as the Asia-Pacific Information Superhighway (APIS), and the digital transformation of rail networks, highlight the importance of collaborative efforts in enhancing connectivity and digital integration. They not only aim to reduce digital trade barriers and stimulate investment, but they also contribute towards a more integrated and inclusive digital trade framework, offering economic benefits and fostering long-term productivity and job creation across the region.

The Doha Programme of Action for the Least Developed Countries for the Decade 2022–2031 underscores the critical role of digitalization in the sustainable development of LDCs, emphasizing the importance of enhancing digital infrastructure and literacy as foundational elements. Similarly, two upcoming global conferences dedicated to LLDCs and SIDS in 2024 are a vital opportunity to highlight the significance of digitalization in the development trajectories of these States. These conferences are also pivotal moments for the international community to offer support to complement the digital transformation efforts of countries in special situations and shape a future in which digital inclusivity and resilience underpin equitable growth and sustainability for these countries.

Explanatory notes

Analyses in the report are based on data and information available up to the end of February 2024.

Groupings of countries and territories/areas are defined as follows:

- **ESCAP region:**
  - Members [49]: Afghanistan; Armenia; Australia; Azerbaijan; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; China; Democratic People's Republic of Korea; Fiji; Georgia; India; Indonesia; Iran (Islamic Republic of); Japan; Kazakhstan; Kiribati; Kyrgyzstan; Lao People's Democratic Republic; Malaysia; Maldives; Marshall Islands; Micronesia (Federated States of); Mongolia; Myanmar; Nauru; Nepal; New Zealand; Pakistan; Palau; Papua New Guinea; Philippines; Republic of Korea; Russian Federation; Samoa; Singapore; Solomon Islands; Sri Lanka; Tajikistan; Thailand; Timor-Leste; Tonga; Türkiye; Turkmenistan; Tuvalu; Uzbekistan; Vanuatu; and Viet Nam;
  - Associate members [9] – American Samoa; Cook Islands; French Polynesia; Guam; Hong Kong, China; Macao, China; New Caledonia; Niue; and Northern Mariana Islands.
- **Least developed countries** (LDCs) [10]: Afghanistan; Bangladesh; Cambodia; Kiribati; Lao People's Democratic Republic; Myanmar; Nepal; Solomon Islands; Timor-Leste; and Tuvalu.
- **Landlocked developing countries** (LLDCs) [12]: Afghanistan; Armenia; Azerbaijan; Bhutan; Kazakhstan; Kyrgyzstan; Lao People's Democratic Republic; Mongolia; Nepal; Tajikistan; Turkmenistan; and Uzbekistan.
- **Small island developing States (SIDS) [22]:**
  - ESCAP member States [15]: Fiji; Kiribati; Maldives; Marshall Islands; Micronesia (Federated States of); Nauru; Palau; Papua New Guinea; Samoa; Singapore; Solomon Islands; Timor-Leste; Tonga; Tuvalu; and Vanuatu;
  - Associate members [7]: American Samoa; Cook Islands; French Polynesia; Guam; New Caledonia; Niue; and Northern Mariana Islands.
- **Countries with special needs/countries in special situation**s [37]: least developed countries (LDCs), landlocked developing countries (LLDCs) and small island developing States (SIDS).
- Developing ESCAP region – ESCAP region, excluding Australia, Japan and New Zealand.
- Developed ESCAP region – Australia, Japan and New Zealand.
- Pacific – American Samoa; Australia; Cook Islands; Fiji; French Polynesia; Guam; Kiribati; Marshall Islands; Micronesia (Federated States of); Nauru; New Caledonia; New Zealand; Niue; Northern Marina Islands; Palau; Papua New Guinea; Samoa; Solomon Islands; Tonga; Tuvalu; and Vanuatu.
- Due to the limited availability of data, associate members of ESCAP are excluded from the analysis in the report unless otherwise indicated.
- For the purposes of this report, Singapore is not considered to be a small island developing State because of its high level of development and high-income status, and for simplicity of analysis.

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References to dollars ($) are to United States dollars, unless otherwise stated.

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CHAPTER 1

Introduction

1.1 Background

Countries in special situations (comprising LDCs, LLDCs and SIDS) face an increasingly uncertain landscape, as the unfolding wave of automation limits pathways of labour-intensive industrialization. With most labour shifting from agriculture directly to the services sector, a widespread concern is that countries are forgoing the dynamism of the manufacturing sector, which was historically instrumental in driving export revenue, productivity growth and employment, among other outcomes. Indeed, this phenomenon of "premature de-industrialization", whereby the share of the manufacturing sector peaks at lower levels of employment and per-capita income, is exhibited by a majority of developing economies and not just limited to the countries in special situations (Rodrik, 2016). However, the latter faces numerous structural impediments to development, which makes industrialization particularly challenging. The limited population size and domestic market scale of these countries hinder the growth potential of various sectors and capacity to capitalize on economies of scale. Additionally, their geographical isolation from major economic hubs impedes access to regional markets. Because of their specific terrain, many also face heightened vulnerability to climate change, natural calamities and environmental deterioration. Despite endeavours to improve, social indicators in many countries in special situations lag regional averages. Moreover, several of these countries have recently emerged from conflicts. Consequently, although comprising more than half of the members of ESCAP, these countries contribute only 3 per cent to the region's gross domestic product (GDP) and trade in goods and services.

Amid such a landscape, the evolving tradability and potential of the services sector, which has been bolstered by advances in digitalization, presents unprecedented opportunities for countries in special situations with a possible platform to leapfrog. If embraced effectively, digitalization presents significant economic dividends. Among them are the ability to expand market reach and match supply and demand through digital platforms, and raise the possibility to develop production systems that are more precise and more rapid. To effectively harness opportunities from digitalization, it is essential to address foundational requirements related to digital infrastructure and skills in addition to fostering a conducive ecosystem for digital businesses. This would enable countries in special situations to achieve a service sector-oriented transformation marked by higher productivity.

At the same time, digitalization and automation also poses risks related to labour substitution and unequal distributional outcomes. Automation has the potential to replace jobs, while digital technologies, which often favour skilled labour, diminish the comparative advantage of developing countries' abundant unskilled labour. This bias also makes it more challenging for countries to offset their technological disadvantage with their cost advantage of low-wage labour (De Melo and Solleder, 2022). Moreover, within countries and industries, the level and readiness to harness opportunities arising from digitalization varies.

Accordingly, the present report provides a succinct discussion of the nexus between digitalization, productivity and the nexus between digitalization and decent employment in countries in special situations.

This report is structured as follows:

A The first section provides an assessment of patterns of productive capacity transformation in countries in special situations, focusing, in particular, on the services sector. This is complemented by a brief assessment of the digitalization landscape in countries in special situations.

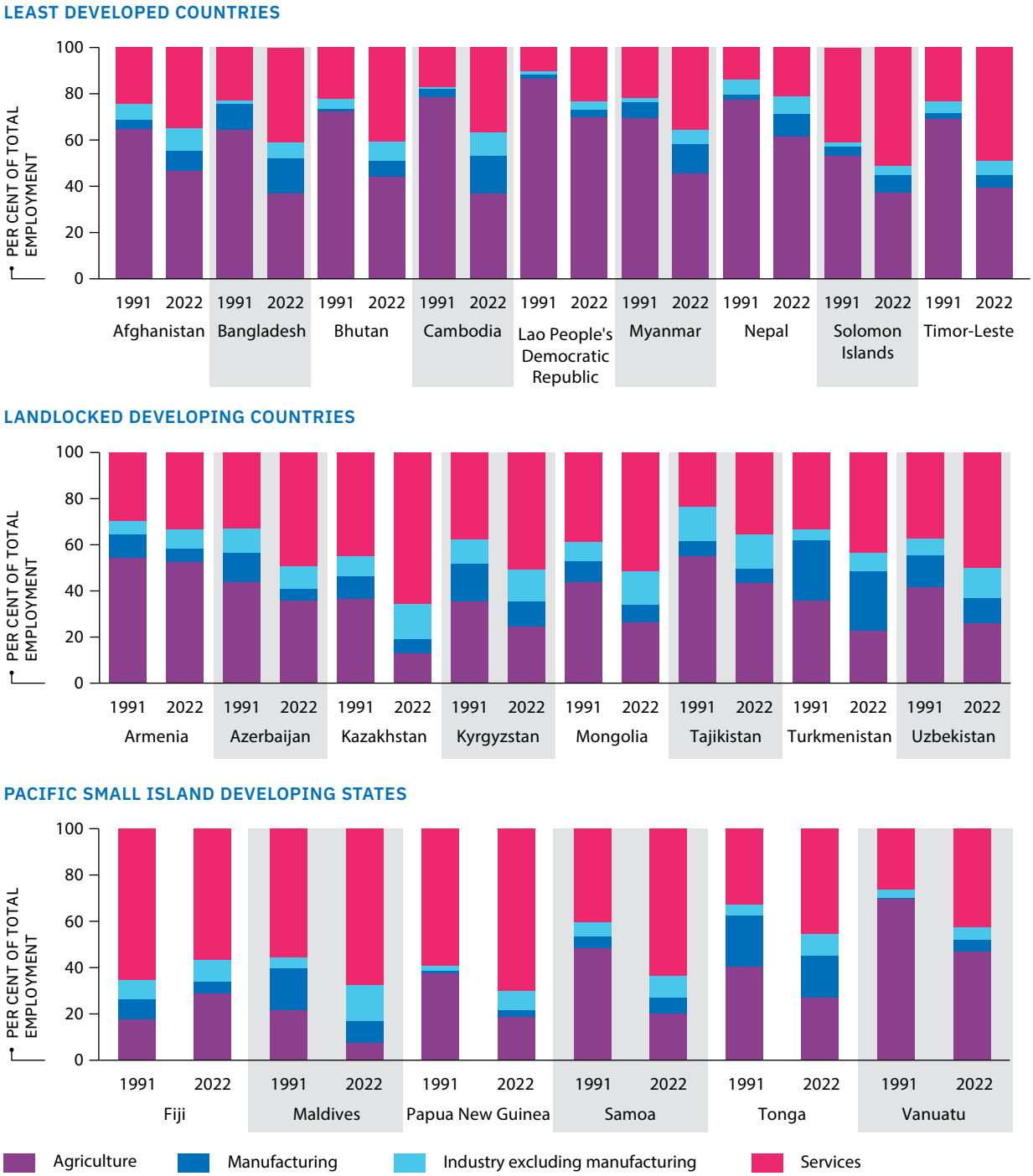
B The second section provides a brief synthesis of the potential impacts of digitalization on employment generation, productivity growth and inclusive development. The potential of the services sector in driving economic transformation is also explored in this section.

C The final section provides policy considerations and experiences from countries in special situations to help them leverage such technologies for decent employment and productivity growth, while highlighting the role of regional cooperation.

1.2 The patterns of productivity and employment in countries in special situations

The pace of economic transformation in Asia-Pacific countries in special situations has been sluggish. As a result, many of these countries, particularly the least developed countries, remain structurally underdeveloped (in a state in which the share of agriculture in employment is greater than the share of industry or services, see figure 1.1). Indeed, except for a few of these countries, such as Bangladesh, Cambodia and Turkmenistan, the share of manufacturing in employment has remained below 10 per cent, as labour is moving directly from subsistence agriculture to informal services.

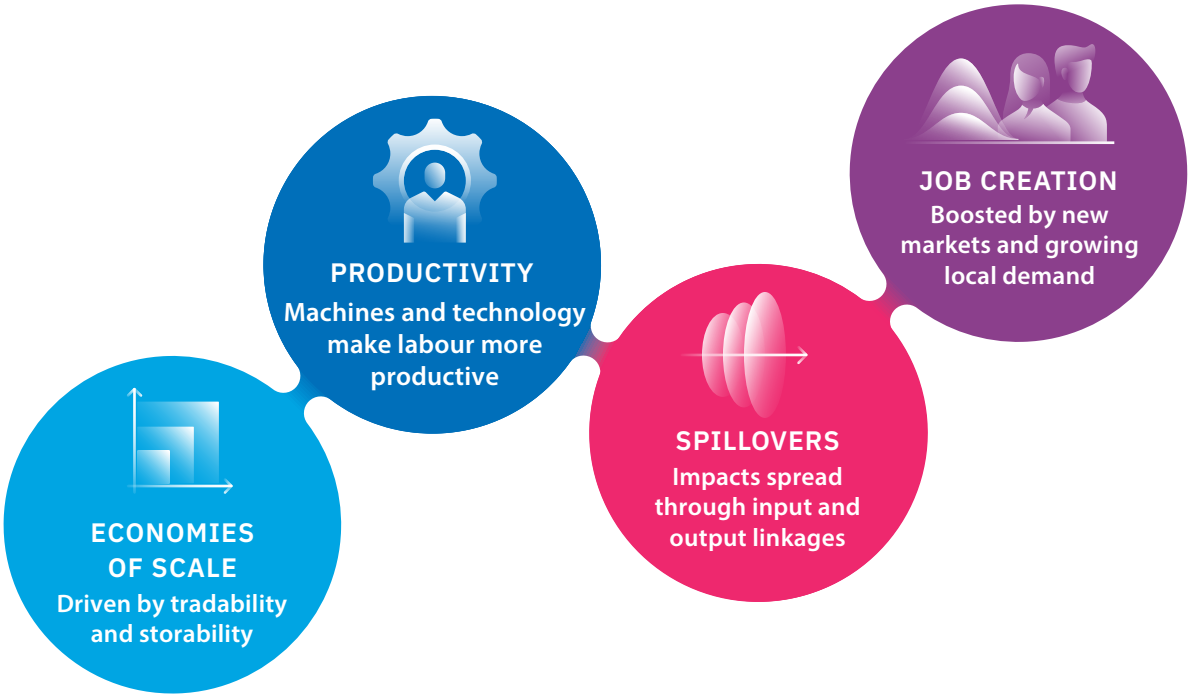
FIGURE 1.1 Change in composition of employment, 1991–2022



Sources: ESCAP, based on data from the International Labour Organization Database (ILOSTAT) and the United Nations National Accounts Main Aggregates Database (UN-AMA) (accessed on 1 March 2024).

This contrasts to earlier pathways of industrialization that typically involved a shift in employment from agriculture to industry and then to services in which manufacturing played a pivotal role in the development of today's developed economies and the newly Industrialized economies (Sen, 2023).[1] In these countries, underpinned by tradability and labour augmenting capital, the manufacturing sector has harnessed economies of scale, capital accumulation and positive spillover effects. Consequently, it has delivered unparalleled productivity growth and large-scale employment, especially for relatively unskilled labour. However, in addition to domestic supply side limitations, automation in advanced countries is creating an impediment to this pathway for development for countries in special situations.

FIGURE 1.2 Key features of manufacturing



With a manufacturing-oriented transformation becoming increasingly elusive for countries in special situations, employment is shifting directly to the services sector, circumventing industry. In fact, in the countries in special situations, services account for the largest share of new jobs created (table 1.1).[2] While a few LDCs have managed to harness their low-cost labour advantage to promote some level of manufacturing, a steep increase in the share of jobs created have occurred in the services sector of LLDCs and SIDS.

However, the services sector encounters multiple limitations in delivering the same outcomes as manufacturing (Baumol, 1967). The prevailing view outlines four broad reasons for the relatively limited opportunities: (a) its largely non-tradable nature; (b) limited opportunities for capital accumulation; (c) the intrinsic role of labour; and (d) lower economies of scale. Worryingly, workers in the countries in special situations have mostly transitioned to traditional services, which is characterized by informality and lower productivity as opposed to the modern services sector (Eichengreen and Gupta, 2013; Sen, 2023).[3] The most recent data available show that the average share of modern services accounted for only 6 per cent of overall employment in the services sector (figure 1.3).

1 This included Singapore, the Republic of Korea and more recently China, Malaysia and Thailand.
2 This is a crude estimation that simply derives the share of each sector from the aggregate change in employment between 1991 and 2022.
3 The former encompasses more modern activities, such as financial services and telecommunications, whereas the latter includes more traditional services such as public administration.

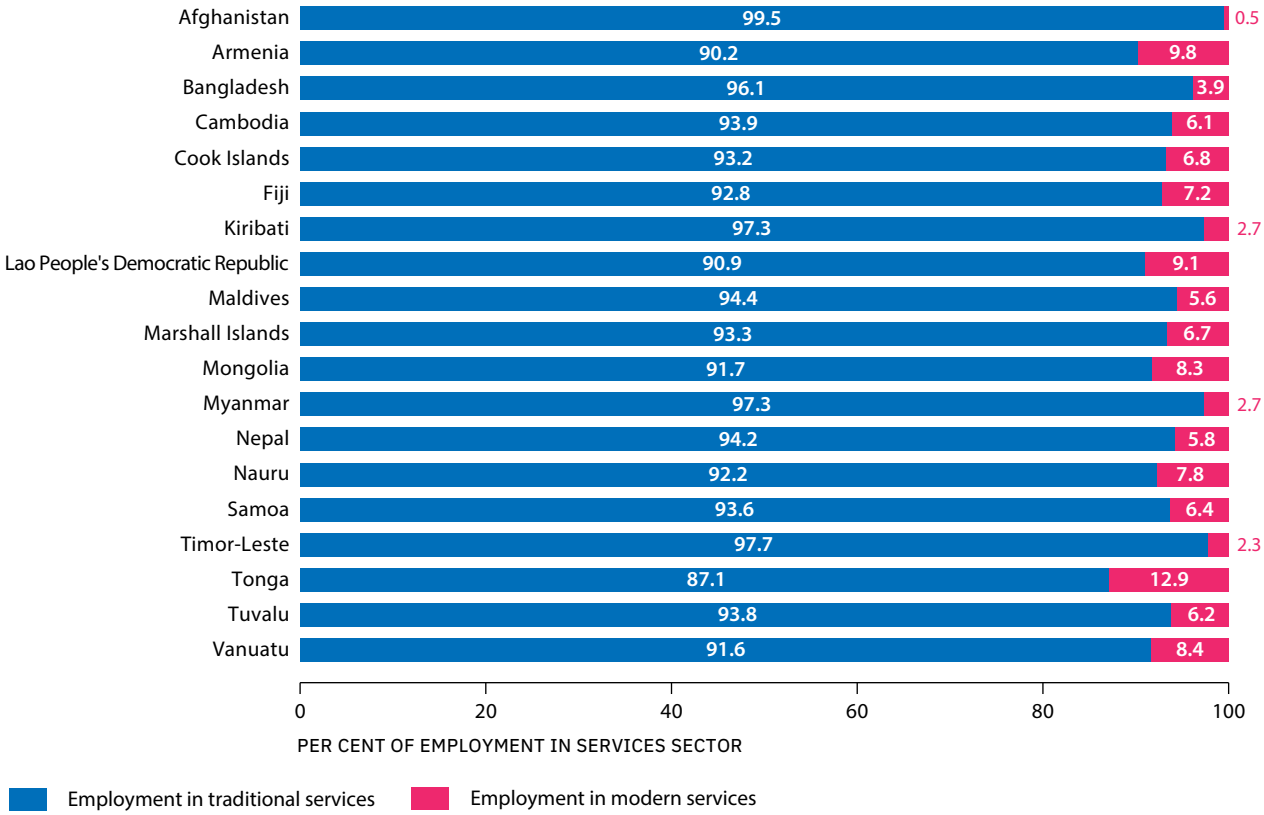
TABLE 1.1 Share of jobs created between 1991 and 2022 (per cent)

		AGRICULTURE	MANUFACTURING	INDUSTRY	SERVICES
LEAST DEVELOPED COUNTRIES	**LDC average**	2.8	19.3	14.3	63.6
	Afghanistan	38.0	10.9	11.0	40.1
	Bangladesh	8.9	18.4	13.0	59.6
	Bhutan	5.8	15.0	13.3	65.9
	Cambodia	4.1	26.9	17.0	52.0
	Lao People's Democratic Republic	50.4	5.0	6.9	37.7
	Myanmar	-157.3	58.9	46.1	152.3
	Nepal	41.4	19.8	8.8	30.0
	Solomon Islands	26.3	9.7	5.7	58.3
	Timor-Leste	7.5	9.0	7.3	76.2
LANDLOCKED DEVELOPING COUNTRIES	**LLDC Average**	-29.8	2.1	29.3	98.5
	Armenia	-60.5	-23.7	1.9	-17.7
	Azerbaijan	18.7	-10.0	8.5	82.8
	Kazakhstan	-221.4	-27.0	81.0	267.4
	Kyrgyzstan	-0.9	-2.5	22.5	80.9
	Mongolia	3.2	5.6	22.9	68.3
	Tajikistan	28.9	4.7	15.0	51.4
	Turkmenistan	5.3	24.9	12.8	56.9
	Uzbekistan	5.8	6.7	21.6	65.9
SMALL ISLAND DEVELOPING STATES	**SIDS Average**	-14.5	3.1	20.6	88.4
	Fiji	62.0	-4.6	11.0	31.6
	Maldives	2.7	6.8	19.3	71.3
	Papua New Guinea	-2.8	5.5	15.4	82.0
	Samoa	-86.1	12.8	23.2	150.1
	Tonga	-85.3	-15.6	50.9	150.0
	Vanuatu	-6200.0	1350.0	400.0	4550.0

Sources: ESCAP, based on data from the International Labour Organization Database (ILOSTAT) and the United Nations National Accounts Main Aggregates Database (UN-AMA) (accessed on 1 March 2024).

Notes: The numbers show the contribution of each sector to the percentage change in total employment. The large negative numbers need to be interpreted with caution and must be taken in relation to the other figures. For instance, in Vanuatu, total employment in agriculture declined by 12,400, employment in manufacturing, industry and services increased by 2,700, 800 and 9,100, respectively, which totaled 12,600. Accordingly, net employment only increased by 200, resulting in inflated percentages.

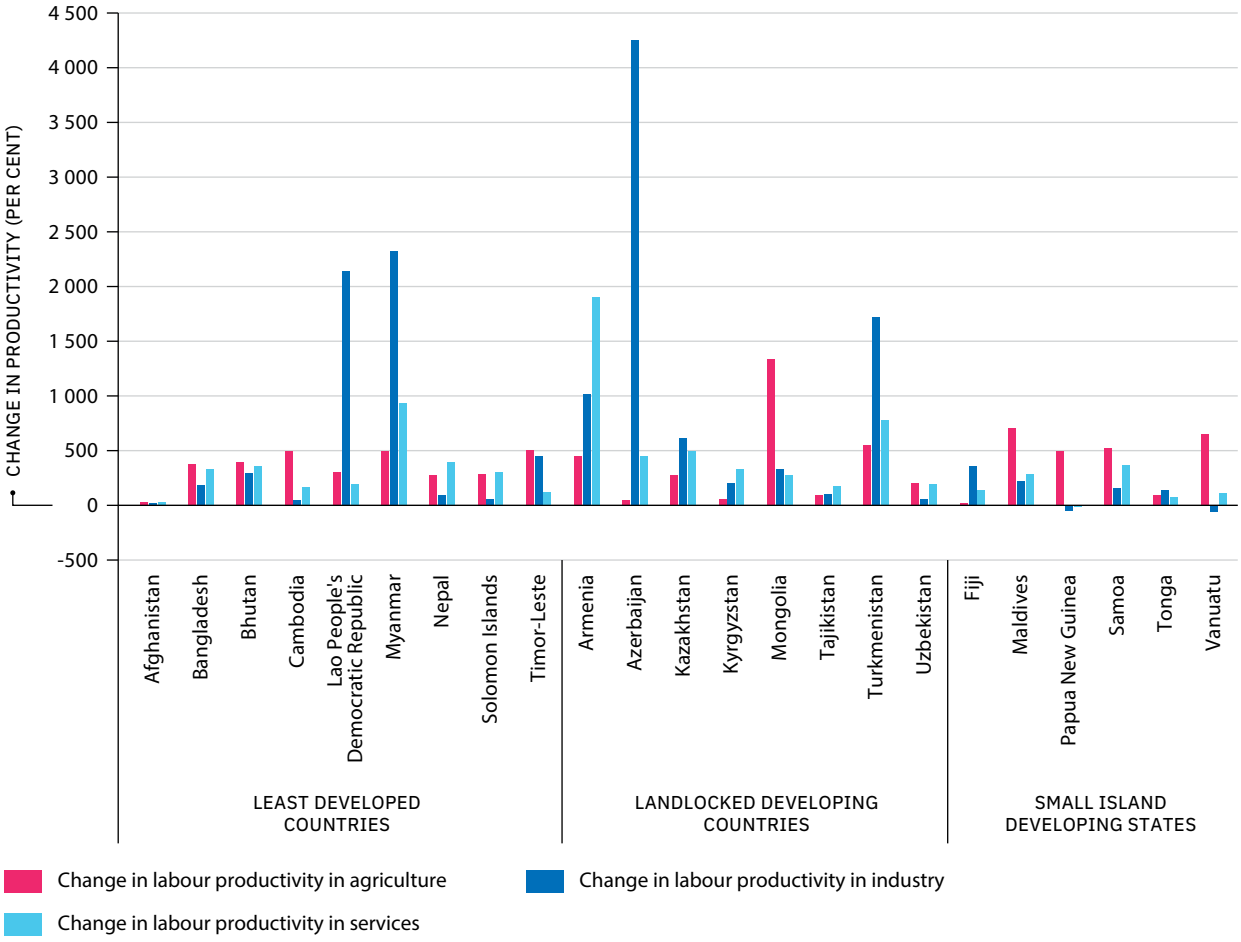
FIGURE 1.3 Employment in traditional versus modern services, most recent data



Source: International Labour Organization (ILO) ILOSTAT. Available at https://ilostat.ilo.org/. Accessed on 1 March 2024.

Recent studies (Nayyar, Hallward-Driemeier and Davies, 2021; Owusu, Szirmai and Foster-McGregor, 2020; Baldwin and Forslid, 2023), however, highlight the diversity of services, and that many modern service sectors are dynamic, tradable and offer opportunities for innovation and productivity gains, such as manufacturing, did in the past. Indeed, service productivity can be equal to or even higher than other sectors (Owusu, Szirmai and Foster-McGregor, 2020), just as improving service productivity may be even more crucial than manufacturing, as services often support and enhance other sectors, especially by digitalization and global value chains (Timmer and de Vries, 2009). Such recent findings are prompting a revision of earlier stylized facts that associated the services sector with low productivity at the aggregate level to the view that modern services can be just as productive (or even more important) for overall economic growth.[4] This is supported by the fact that even in a few countries in special situations, productivity growth for services has either been at par or exceeded industrial productivity growth (figure 1.4).

FIGURE 1.4 **Productivity growth by sectors, 1991–2022**

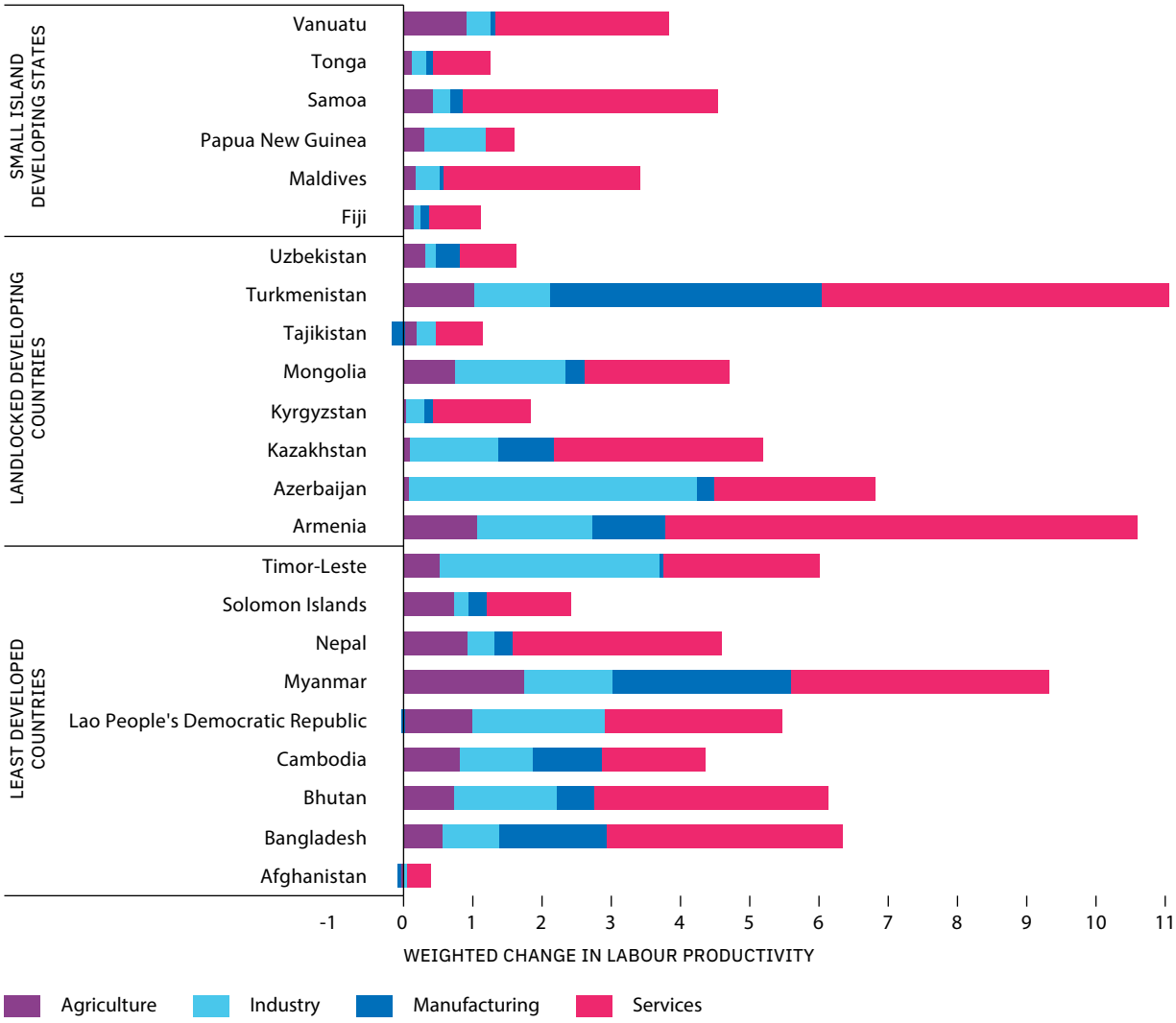


Sources: ESCAP, based on data from the International Labour Organization Database (ILOSTAT) and the United Nations National Accounts Main Aggregates Database (UN-AMA) (accessed on 1 March 2024).

When estimating the relative contribution of each sector to an economy's overall productivity growth, the service sector exceeds that of every other sector because of its sheer size and relatively higher productivity compared to agriculture (figure 1.5), while the contribution of manufacturing, despite its productivity enhancing characteristics, is muted, as it accounts for a very negligible share of employment and GDP.

4 A more detailed discussion on the potential of the services sector is presented in chapter 2.

FIGURE 1.5 Relative contribution to productivity growth, 1991–2022



Sources: ESCAP, based on data from the International Labour Organization Database (ILOSTAT) and the United Nations National Accounts Main Aggregates Database (UN-AMA) (accessed on 1 March 2024).

Notes: The percentage contribution represents the relative contribution of each sector to productivity change. Accordingly, very high productivity growth may occur in the manufacturing sector, but its relative contribution may be lower due to its size compared to other larger sectors, such as agriculture and services.

When applying a shift share decomposition technique (Peneder, 2001) to assess the drivers of productivity in structural transformation, overall productivity growth can be attributed to three components:[5]

1 **Within effect** occurs when productivity growth in the sector is attributable to improvements in technology or processes, or when firms within a sector ascend the value chain and engage in higher value-added activities. The result would be an increase in average productivity.

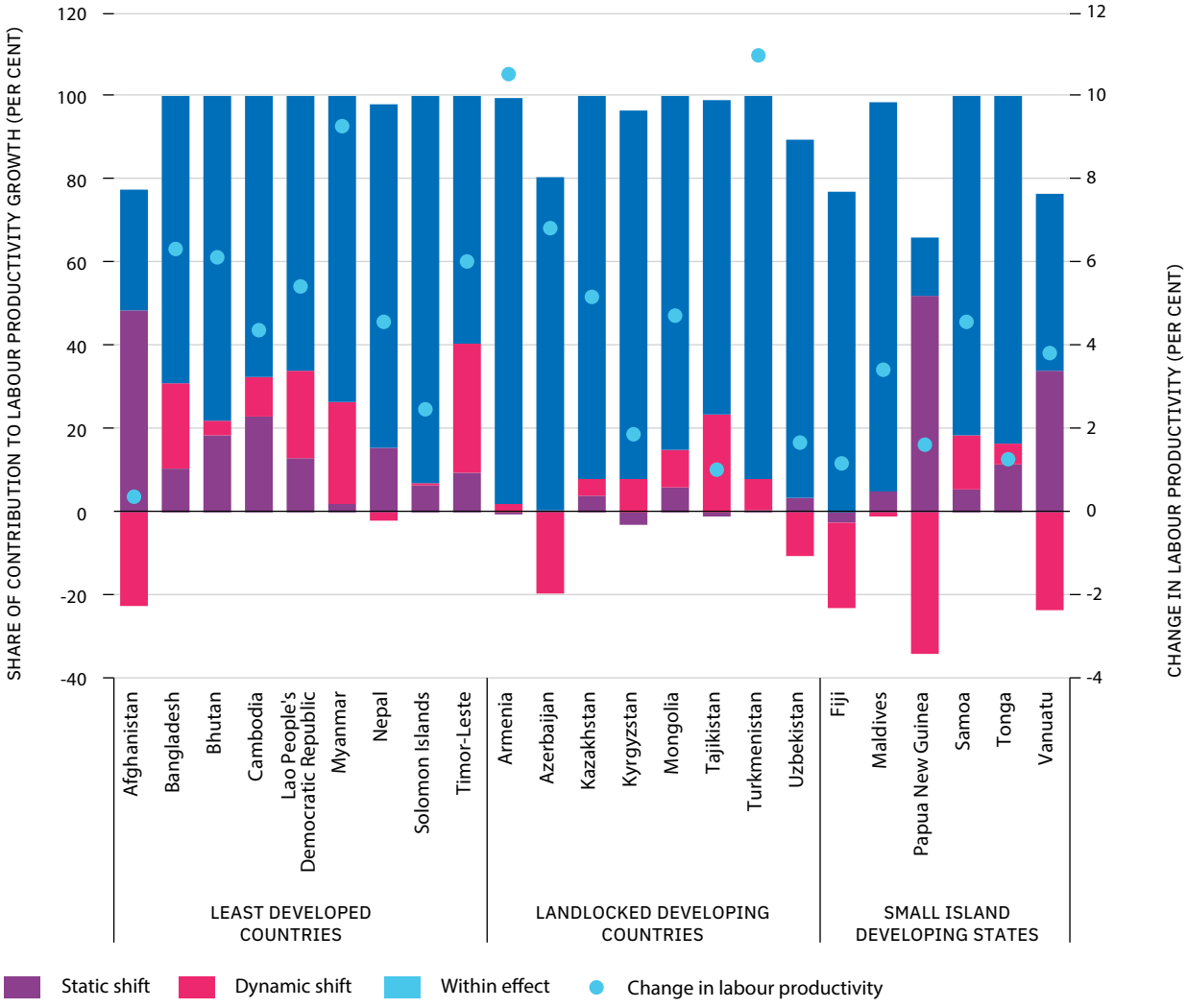
2 **Static shift growth** occurs when resources move to activities that are more productive. For instance, from agriculture to manufacturing or services, average productivity would naturally increase, as these two sectors are relatively more productive than agriculture.

3 **Dynamic shift effect** is the most powerful channel and occurs when resources move to sectors where productivity is growing.

5 The formula for the decomposition is: $$growth(LP_T) = \frac{LP_{T,fy} - LP_{T,by}}{LP_{T,by}} = \frac{\overbrace{\sum_{i=1}^{n} LP_{i,by}(S_{i,fy} - S_{i,by})}^{\text{I: static shift effect}} + \overbrace{\sum_{i=1}^{n} (LP_{i,fy} - LP_{i,by})(S_{i,fy} - S_{i,by})}^{\text{II: dynamic shift effect}} + \overbrace{\sum_{i=1}^{n} (LP_{i,fy} - LP_{i,by})S_{i,by}}^{\text{III: within growth effect}}}{LP_{T,by}}$$

Applying the above decomposition at the aggregate level of the economy reveals that a significant share of productivity growth has been due to the *within effect* component, followed by the *static shift* component (figure 1.6). In contrast, the *dynamic shift* component has been marginal and, in some cases, contributed even negatively to productivity growth, implying that in these cases employment has been shrinking in sectors in which productivity growth has been recorded (such as in Maldives, Afghanistan, Vanuatu, Kyrgyzstan and Tajikistan).

FIGURE 1.6 **Decomposing labour productivity growth, 1991–2022**

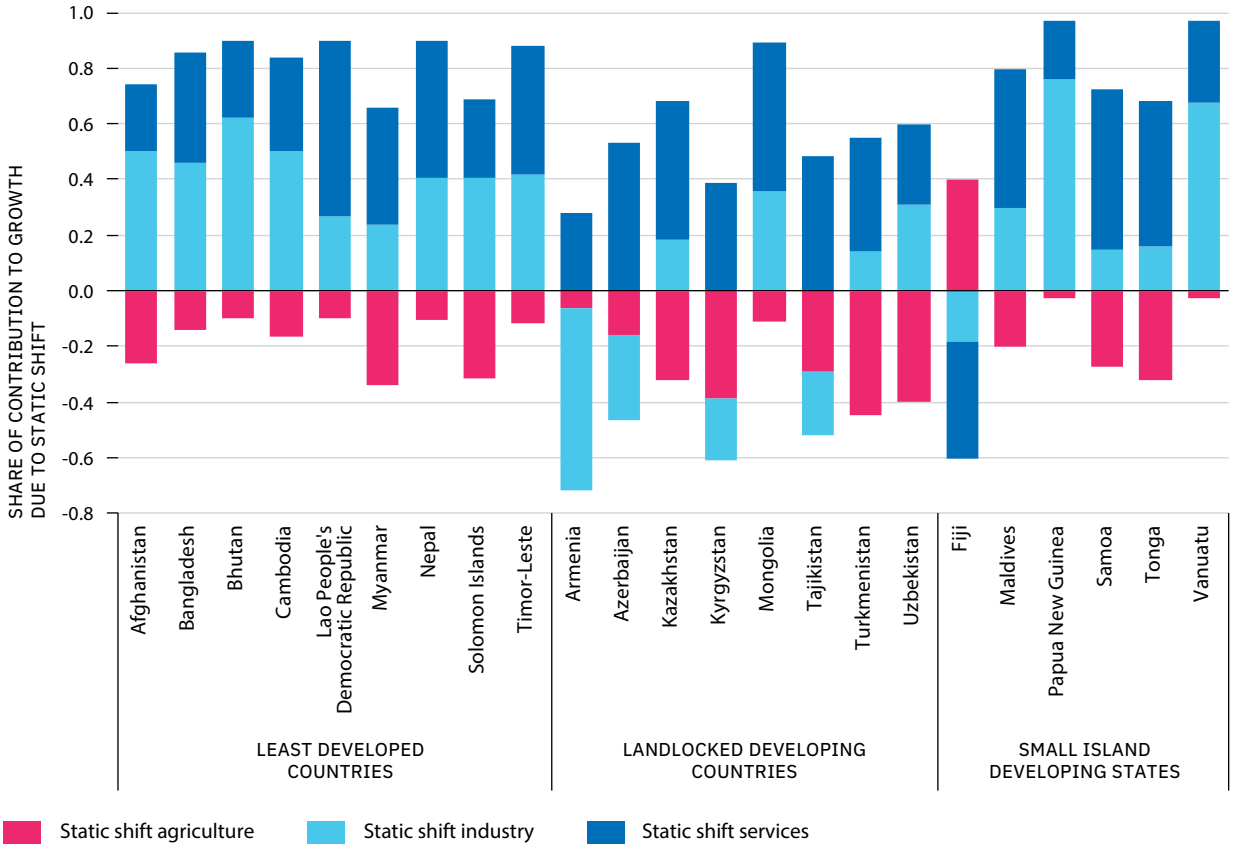


Sources: ESCAP, based on data from the International Labour Organization Database (ILOSTAT) and the United Nations National Accounts Main Aggregates Database (UN-AMA) (accessed on 1 March 2024).

Applying the same technique at a more disaggregated level to identify sectors that propelled productivity growth shows that, on average, the relative contribution of productivity growth within the services sector to overall productivity growth has been nearly at par with industry (figure 1.7-A). Moreover, the contribution to productivity growth from the movement of labour to the services sector has been higher than that from the movement to industry (Figure 1.7-B), mainly because the services sector has absorbed most of the labour. Because of its disproportionate share in employment, boosting productivity in the services sector through digital innovation can, therefore, have significant impacts, even though an assessment of the status of digitalization suggests that countries in special situations still need to address the foundational requirements of digitalization.

FIGURE 1.7 Sectoral drivers of labour productivity growth, 1991–2022

A) PERCENTAGE CONTRIBUTION DUE TO PRODUCTIVITY GROWTH WITHIN EACH SECTOR

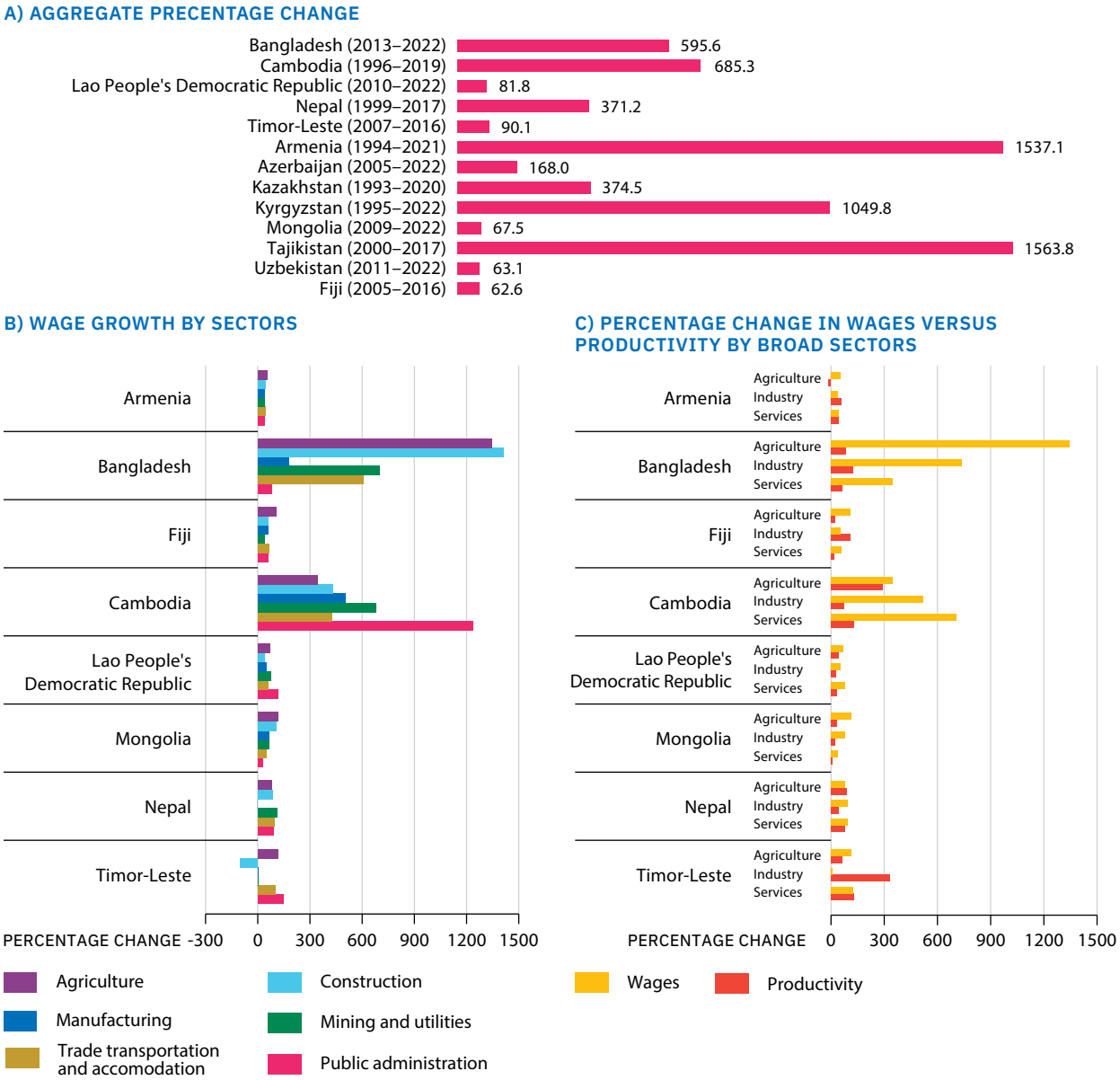


B) PERCENTAGE CONTRIBUTION DUE TO LABOUR MOVING TO MORE PRODUCTIVE SECTORS

Sources: ESCAP, based on data from the International Labour Organization Database (ILOSTAT) and the United Nations National Accounts Main Aggregates Database (UN-AMA) (accessed on 1 March 2024).

It is important to ascertain that such improvements in productivity have also corresponded to increases in real average wages, which is the case across the countries in special situations. The most dramatic increases have been recorded in Bangladesh where real average wages increased nearly sixfold over the period 2013–2022 (figure 1.7-A). A disaggregated assessment reveals that this was primarily driven by a very large increase in real wages in agriculture and industry (figure 1.8-B). Surprisingly the growth in real wages in the manufacturing sector has been relatively low, suggesting that the gains for labour from expansion in this sector are limited. This must also be assessed in the light of the minimum wage, which was increased in 2019 (Kabir and others, 2022). Other notable improvements were in Cambodia, Azerbaijan, Kazakhstan and Kyrgyzstan. In the case of Cambodia, significant growth came from the public sector followed by the capital-intensive mining and utilities sectors. These cursory findings also show that wage growth has exceeded productivity growth by a wide margin across the services, industry and agriculture sectors (figure 1.8-C). It is important to understand the factors behind the disproportionate wage increases. While wage increases are a desirable outcome, it is essential to ensure that they are supported by productivity growth and commercial sustainability.

FIGURE 1.8 Change in average real wages (earliest to latest available year)



Sources: ESCAP, based on data from the International Labour Organization Database (ILOSTAT) and the United Nations National Accounts Main Aggregates Database (UN-AMA) (accessed on 1 March 2024).

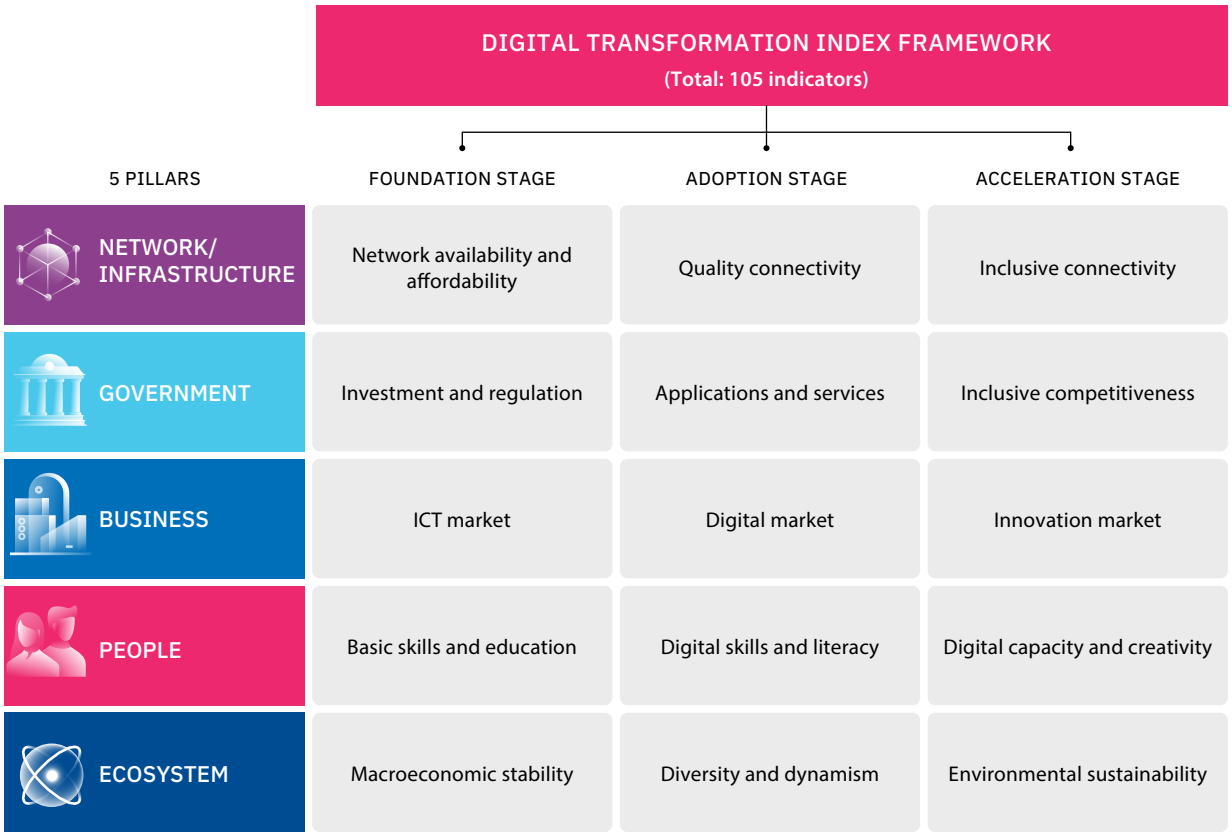
Notes: Only countries with data over a sufficiently long period were included in this analysis given that structural transformation is a long-term phenomenon. The period for the disaggregated wage and productivity growth plotted in figures 1.8-B and 1.8-C correspond to the period in 1.8-A for each country.

1.3 The digitalization landscape of countries in special situations

Harnessing the benefits of digitalization requires addressing the state of limited digital infrastructure, poor digital literacy, the weak adoption of digital technologies and weak regulatory frameworks, especially pertaining to data protection and online transactions, which drive up operational costs.

Notwithstanding the various definitions of digitalization and digital transformation,[6] ranging from information and communications technology (ICT)-specific definitions to broader definitions that include the impacts of digital technology applications on the business and/or the society, the ESCAP Digital Transformation Index (DTI) aims to capture the dynamics of digital transformation by identifying three stages (foundation, adoption and acceleration) and five pillars (network, government, business, people and ecosystem) to reflect that transformation is a comprehensive process across a country's economy, society and industry (figure 1.9).[7,8]

FIGURE 1.9 The Digital Transformation Index Framework



Source: Park, Jun and Kim (2022).

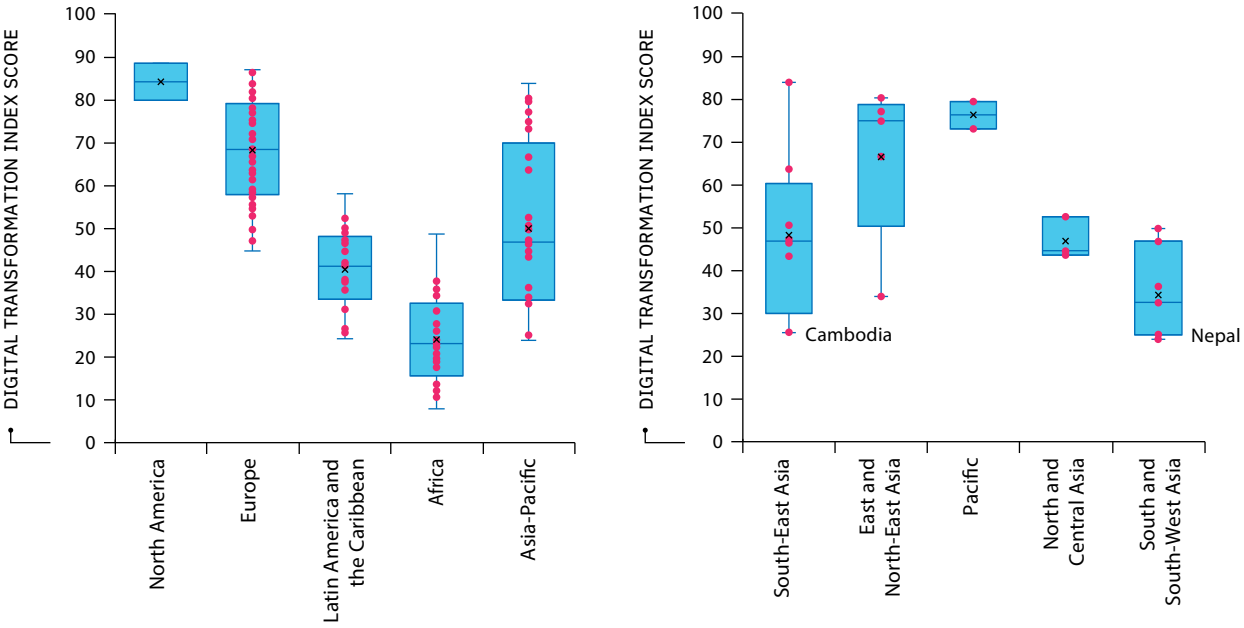
6 For example, Machekhina (2017) defines "digitalization" as transformation of all information types (text, sound, visuals, video and other data from various sources) into the digital language, while Yoo and others (2010) defines it as the development and implementation of ICT systems and concomitant organizational change that involves the transformation of socio-technical structures formerly mediated by non-digital artefacts into ones mediated by digitized artefacts. Fitzgerald and others (2014) define "digital transformation" as the use of new digital technologies, such as social media, mobile technology, analytics or embedded devices to enable major business improvements including enhanced customer experiences, streamlined operations, or new business models. Verhoef and others (2021) view digital transformation as the final phase of the implementation of digital technology in an organization that leads to the development of new business models.

7 Unfortunately, most of the countries in special situations lack sufficient data to determine their digital transformation status, resulting in their exclusion from Digital Transformation Index. More than 40 per cent of the middle-income countries also lack sufficient data for the 105 indicators related to digital transformation. On the contrary, 86 per cent of high-income countries have sufficient data to examine their digital transformation status. For countries in special situations, only 30 per cent the of countries are included in the Index.

8 More detail on the methodology are available at Park, Jun and Kim (2022).

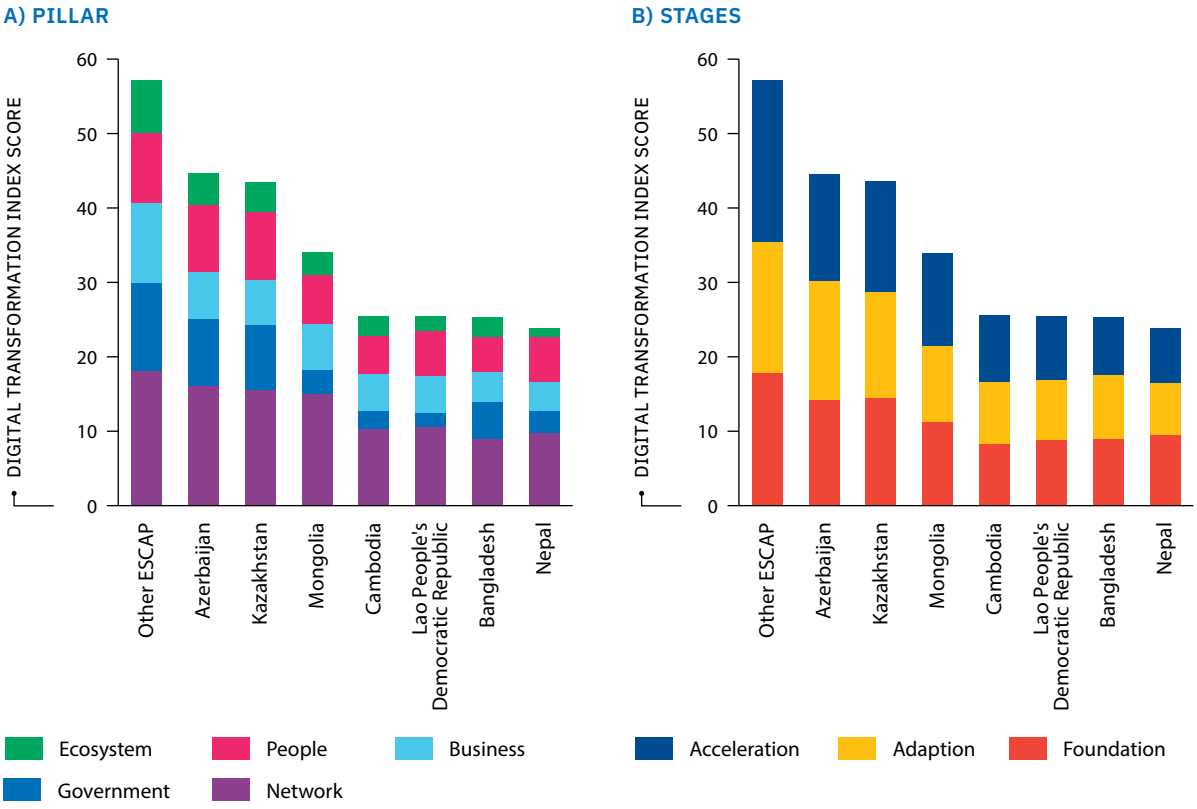
Relative to other regions, the Asia and the Pacific exhibits a very high degree of dispersion in DTI scores, suggesting a digital divide among and within subregions (figure 1.10). While this may be due to the sheer size and diversity of the region, the least developed countries included in the analysis rank at the bottom in the region as a whole (figure 1.11).

FIGURE 1.10 Digital Transformation Index score distribution by the regions and Asia-Pacific subregions



Source: Jun, Park and Kim (2022).

FIGURE 1.11 The Digital Transformation Index by (a) pillar and (b) stages



Source: ESCAP, based on Park, Jun and Kim (2022).

Notes: Other ESCAP plots the average of the region excluding the countries in special situations. This provides a starker contrast.

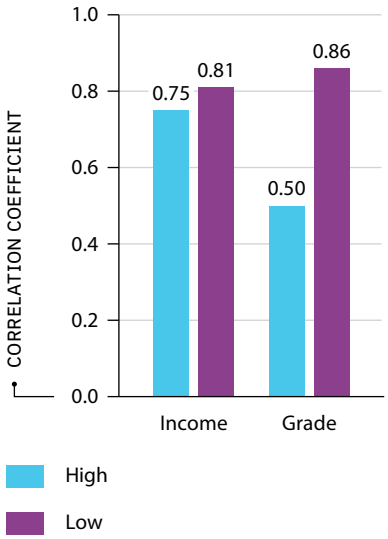
Across the five pillars of DTI, least developed countries, in particular, lag significantly, whereas landlocked developing countries exhibit a higher level of readiness to benefit from digitalization (figure 1.11). In fact, the DTI score for the least developed countries included in the analysis is only about half of the average for the region, reflecting the digital transformation divide.

Countries in special situations are constrained by a weak network infrastructure, as reflected by their lower score on the network pillar, which captures important parameters, such as availability and affordability, quality connectivity and inclusiveness. Importantly, it provides a comprehensive evaluation of an economy's network infrastructure.

The importance of the network pillar, especially for the developing countries, is evident from the correlation between the network pillar and the overall DTI. When categorizing countries by income group (high, low and low-middle) and DTI grade (high and low),[9] the correlation is much higher for the low and low-middle income group and the group with low DTI ratings. These findings indicate that the lower the degree of digitalization, the more important the network infrastructure becomes in the process of digital transformation. This is perhaps due to the more significant marginal impacts of improving the infrastructure foundation at lower levels of income.

This is expected considering that even though 68 per cent (figure 1.13) of the population in countries in special situations have access to the Internet, the Internet infrastructure in those countries is weak, lacking high-speed and fixed Internet connectivity, such as fibre optic and broadband, or high-speed mobile connections. This results in lower Internet utilization, stability and affordability. Small islands developing States, for instance, have, on average, only 2.9 fixed broadband subscriptions per 100 inhabitants, and least developed countries have, on average, only 1.2 fixed broadband subscriptions per 100 inhabitants, compared to the average of 28 for other ESCAP member countries. The same applies for mobile-broadband subscriptions per 100 inhabitants in which least developed countries in the region have recorded 64.7 per cent compared to the 85.2 per cent in the region as a whole (ESCAP, 2023).

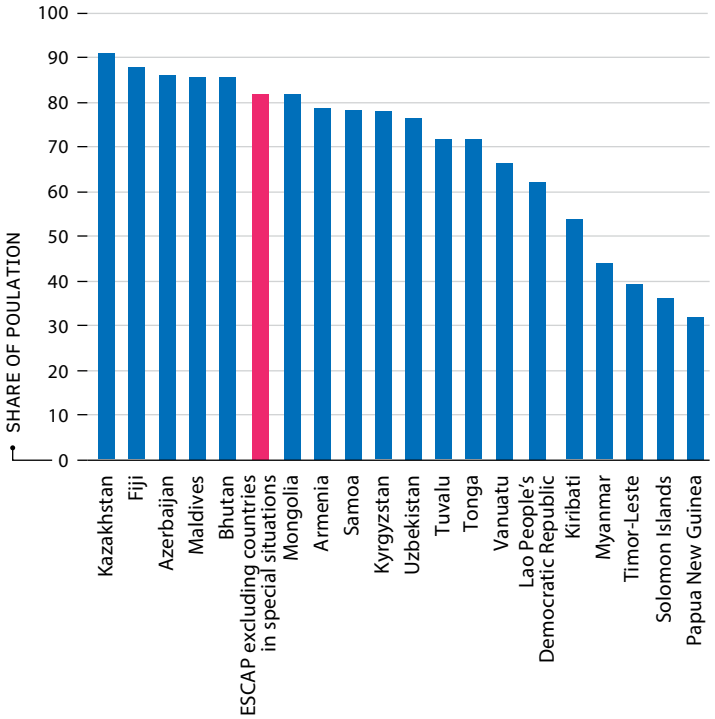
FIGURE 1.12 **Correlation between the Digital Transformation Index and the network foundation pillar**



Source: ESCAP based on Park, Jun and Kim (2022).

Note: For the income category, low includes both low and low-middle income countries.

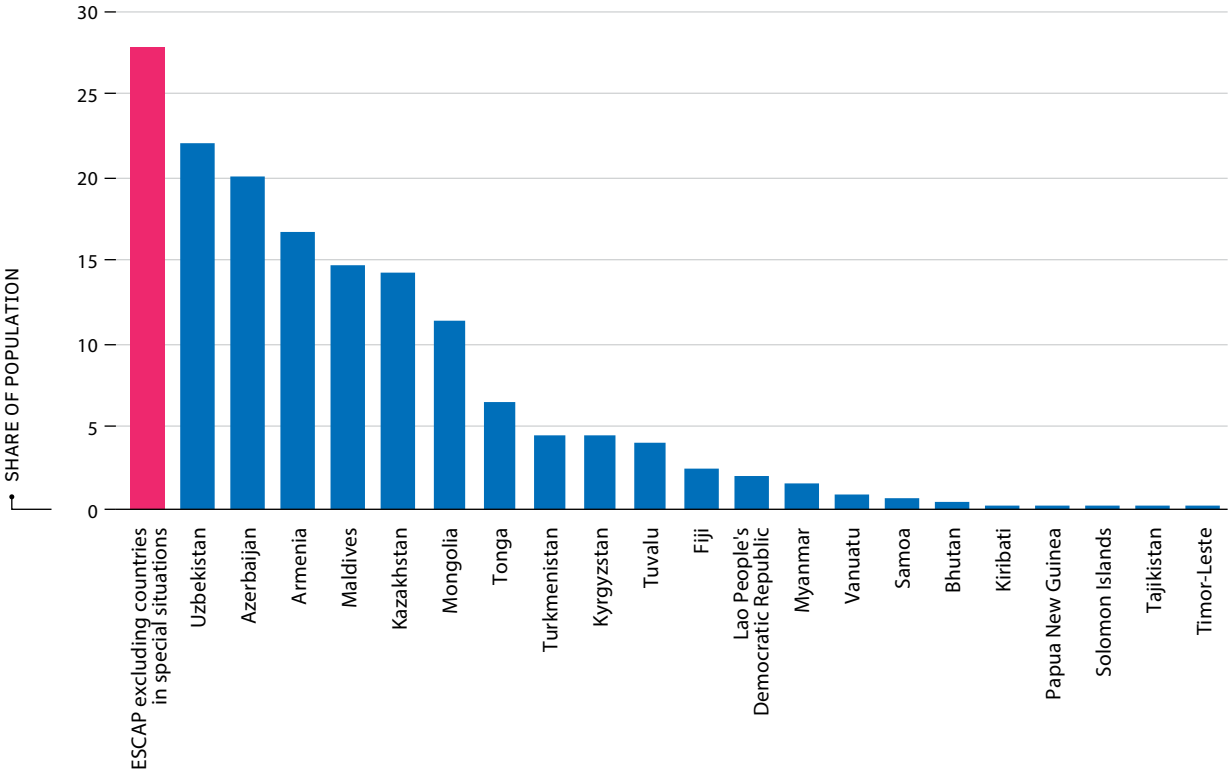
FIGURE 1.13 **Internet users**



Source: International Telecommunication Union (ITU) World Telecommunication/ ICT Indicators Database, 2021. Accessed on 5 November 2023.

9 The high-grade group includes countries that score above 60 and the low-grade group includes countries that score below 39 on the index.

FIGURE 1.14 Fixed broadband per 100 people



Source: ESCAP, based on data from International Telecommunication Union (ITU) (2021). World Telecommunication/ICT Indicators Database. Accessed on 5 November 2023.

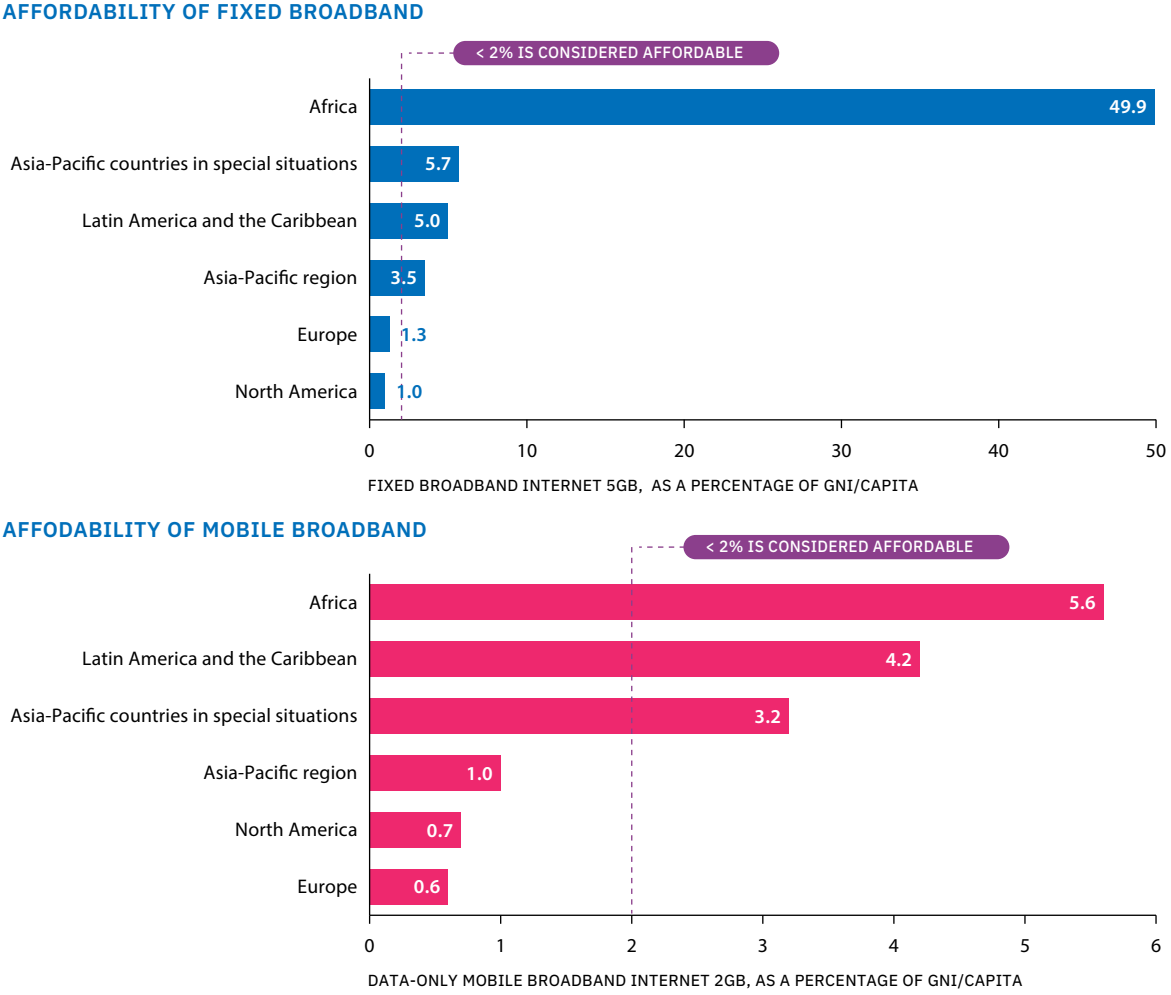
When examining the fixed broadband subscription rates (2021) for each individual country in special situations included in the analysis, only 2 out of 22 countries were above the global average. This is despite the relatively high growth in fixed broadband subscription rates in LDCs, such as Bangladesh, the Laos People's Democratic Republic and Nepal, over the past decade. Regarding mobile connectivity, the level of coverage is relatively high among Asia-Pacific LDCs.

Mobile broadband, however, in Asia-Pacific countries in special situations is, on average, three times as expensive as the average for the region (ESCAP, 2023). Fixed broadband data also remain expensive in these countries. Among the Asia-Pacific countries in special situations, LLDCs, especially those in North and Central Asia, benefit from more affordable access to broadband services than LDCs and SIDS (figure 1-15). This can partly be attributed to targeted government interventions. In Kazakhstan, for example, Digital Kazakhstan, a public digital infrastructure programme focusing on rural areas, has improved overall broadband access. While mobile broadband services have expanded in SIDS over the past five years, fixed and mobile broadband remain unaffordable.[10]

The government pillar is also important for countries in special situations, as it captures a country's position on such parameters as investment and regulation, applications and services, and inclusive competition. The countries in special situations, apart from LLDCs, lag even further on this pillar, highlighting gaps in institutional frameworks. Some of the specific areas from which these countries lag are the dimensions on the ICT regulatory environment, e-government and most glaringly on efforts related to research and development (R&D) expenditure and higher education, for which all countries in special situations rank below the seventieth position globally.

10 For more details on the digitalization landscape, including gender disaggregated figures, see ESCAP (2024).

FIGURE 1.15 **Affordability of fixed and mobile broadband, weighted averages, in Asia-Pacific countries in special situations**



Source: ESCAP (2023).

The countries in special situations are also constrained by significant skills deficit in harnessing digital technologies. The people pillar of DTI captures indicators related to digital skills and literacy, and digital creativity in addition to more general indicators of education attainment of the workforce. Given the skill-bias of digital technologies, digital skills are critical in ensuring that the workforce can realize the positive employment outcomes from digitalization, as discussed in the next section. For the countries in special situations, the quality of vocational education, in particular, requires attention.

It is evident that the countries in special situations still need to ramp up investment in digital infrastructure, regulatory frameworks and efforts to equip the workforce with the requisite skills. These factors also impede their competitiveness in the digital economy, based on the fact that Asia-Pacific LDCs received only 0.10 per cent of the digital FDI inflows in the region in 2021. Similarly, Asia-Pacific LDCs accounted for less than 1 per cent of the region's exports of digitally deliverable services in 2022 (ESCAP, UNCTAD and UNIDO, 2023). In the following section, the linkages between digitalization and the two important parameters of productivity and employment are explored.

TABLE 1.2 Digital Transformation Index score on select indicators of the government and people pillar

		AZERBAIJAN	BANGLADESH	CAMBODIA	KAZAKHSTAN	LAO PEOPLE'S DEMOCRATIC REPUBLIC	MONGOLIA	NEPAL	ESCAP AVERAGE
Intellectual property protection	Score	35.98	14.20	16.99	23.98	22.44	12.73	16.67	**28.24**
	Rank	29	100	92	61	69	103	94	
ICT regulatory environment	Score	34.46	36.88	31.47	24.90	14.87	33.98	33.01	**40.23**
	Rank	84	75	92	102	106	86	88	
Research and development expenditure by government and higher education	Score	14.77	19.35	3.17	3.05	7.08	6.57	19.35	**36.66**
	Rank	82	75	102	103	90	91	74	
E-Government index	Score	70.08	48.56	47.71	84.43	27.16	63.29	43.05	**69.22**
	Rank	58	83	86	27	106	71	90	
Artificial Intelligence Readiness Index	Score	41.21	20.98	19.68	41.38	19.76	28.19	16.03	**48.72**
	Rank	60	87	90	61	91	76	101	
Digital skills among active population	Score	39.12	16.30	16.56	33.14	25.00	19.66	18.08	**28.25**
	Rank	18	91	90	38	63	78	85	
Quality of vocational training	Score	25.15	10.54	12.59	16.25	15.38	14.41	10.04	**22.27**
	Rank	41	100	93	72	79	82	99	
Skills of current workforce	Score	66.82	26.81	32.34	46.02	46.68	27.69	32.47	**53.75**
	Rank	30	99	91	62	61	98	90	

Source: ESCAP, based on Park, Jun and Kim (2022).

CHAPTER 2

Digitalization, productivity and employment

The impact of digitalization on productivity and employment are dynamic and multi-faceted. While digitalization can significantly boost productivity, its impact on employment depends on such factors as the nature of the workforce and the adaptive capacity of economies. Nuanced policy and regulatory responses are, therefore, required so that the digitalization and productivity gains translate into inclusive employment growth.

Beyond its economic impacts, digitalization can also be leveraged to enhance public service delivery, while also contributing to wider social and environmental outcomes. Box 2.1 provides some examples of how digital applications are being pursued across a range of domains in countries in special situations.

2.1 The nexus between digitalization and productivity

Leveraging digitalization can significantly increase productivity. Digital technologies can automate routine tasks, speed up processes and reduce the room for human errors. Digital solutions can also enhance supply chain management and resource allocation. Importantly, they foster innovation by enabling new ways of working, new product development and new business models, all of which can be applied to a range of sectors. While there is limited research on the influence of digitalization on productivity in countries with special situations, insights can be gleaned from studies focused on the effects on non-digital sectors, the implications for unskilled workers and comparative analyses between developed and developing countries.

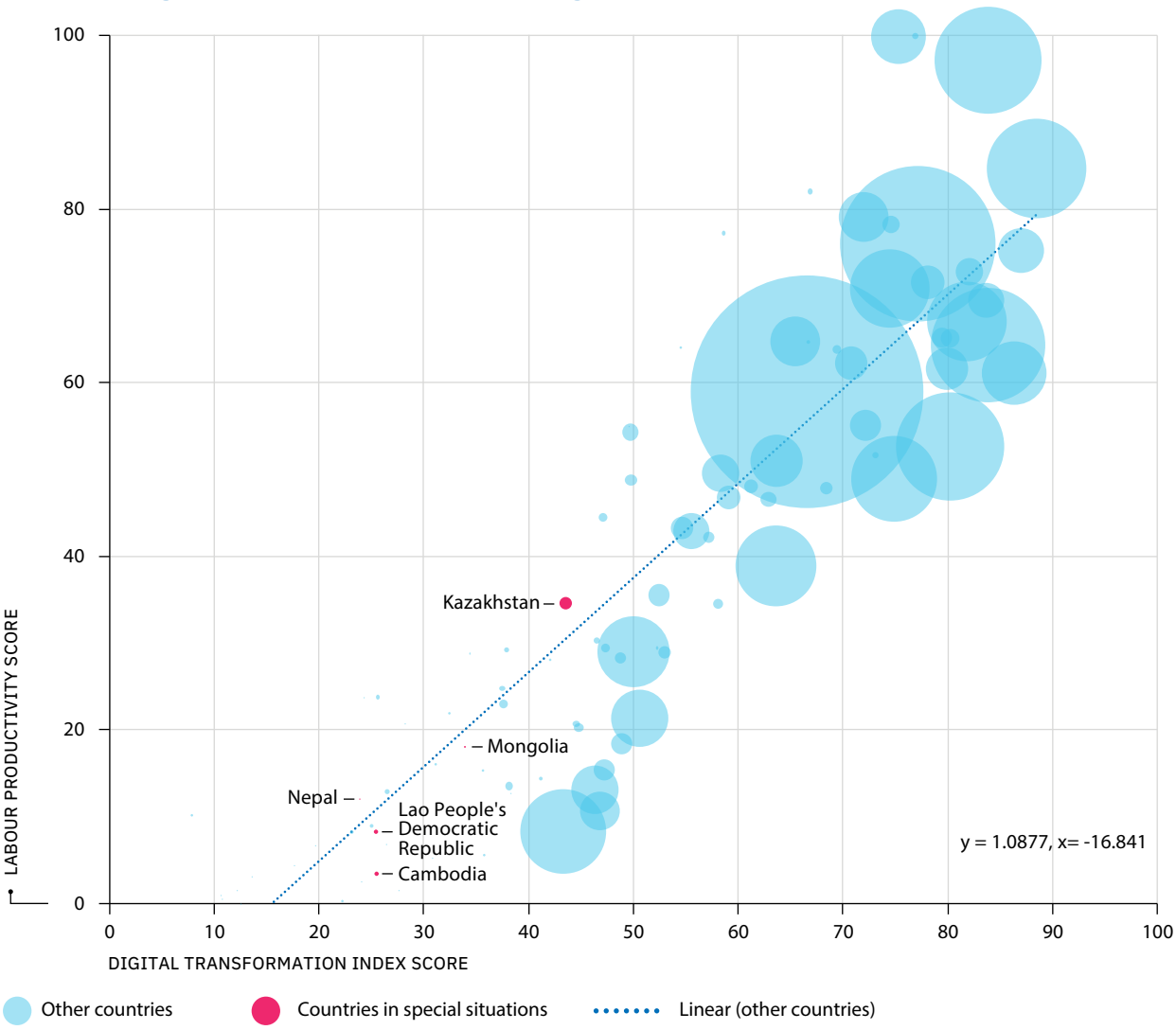
Extensive research has shown the strong correlation between the integration of digital technologies and the performance of individual companies and entire industries. For instance, a 10 percentage point rise in the proportion of companies using high-speed broadband Internet at the industry level has been estimated to correspond to a 1.4 per cent upsurge in multi-factor productivity for the typical firm in that industry within one year across European Union member countries (Gal and others, 2019). Similarly, labour productivity is an estimated 3.7 times higher in African firms using the Internet, as opposed to firms without internet access (World Bank, 2016). And the average firm in digital sectors tends to be more productive and manages to improve its productivity more rapidly than the average firm in non-digital sectors (Calvino and others, 2018). However, broadband Internet has had a positive impact on labour market outcomes and the productivity of skilled workers, while potentially having a negative effect on unskilled workers (Akerman, Gaarder and Mogstad, 2015).[11] These findings collectively carry significant implications for ongoing policy discussions surrounding government investment in broadband infrastructure, aiming to promote productivity and wage growth.

Indeed, there is a high degree of correlation between the Digital Transformation Index, labour productivity and an economy's high-tech exports (figure 2.1). Countries with a higher DTI score are also among the most productive to the extent that a one unit improvement in the score is correlated with an approximately a $1,600 increase in a country's labour productivity in services. The share of high-tech exports is also significantly higher for countries that record a stronger performance on the Index. As seen in figure 2.1, countries in special situation rank at the lower end of the spectrum and high-tech exports account for a very negligible share of their export basket.

The figure also suggests that a minimum threshold score is necessary to achieve success with high-tech exports. This can be seen from the larger size of the bubbles for countries that score above 40 on DTI.

11 Investigating the various potential reasons for the skill-specific nature of broadband Internet's effects indicates that the adoption of broadband in firms complements the capabilities of skilled workers in carrying out non-routine abstract tasks and, conversely, substitutes for unskilled workers in routine tasks.

FIGURE 2.1 Digitalization, productivity and high-tech exports



Sources: ESCAP, based on data from International Labour Organization (ILO) ILOSTAT. Available at https://ilostat.ilo.org/. Accessed on 1 March 2024; and United Nations Department of Economic Development and Social Affairs. UNSTATS. Available at https://unstats.un.org/UNSDWebsite. Accessed on 1 March 2024; and Park, Jun and Kim (2022).

Note: The size of the bubbles reflect an economy's ranking on the dimension on high-tech exports.

2.2 The nexus between digitalization and employment

The impact of digitalization on employment depends on the skills level of the workforce and the availability of new opportunities. Automation and artificial intelligence can often replace human labour, particularly in routine and manual jobs. However, new opportunities are emerging in digitally oriented sectors, which tend to be in high-skilled areas. For instance, while the advent of generative artificial intelligence has rendered certain low-end programming jobs obsolete, it has created new jobs, such as prompt engineers, which previously did not exist. Digitalization, therefore, leads to a transformation in the types of skills that are in demand. However, there are potentially significant challenges and negative consequences as the rapid pace of digitalization may outstrip the local workforce's ability to acquire the necessary digital skills, leading to job displacement, particularly in traditional industries. Additionally, the digital divide, limited access to technology and infrastructure gaps can further marginalize large segments of the population, hindering their participation in the digital economy and job opportunities. Moreover, there is a risk that countries in special situations may become dependent on low-wage, low-skill jobs in global digital supply chains, limiting the potential for higher-value job creation.

BOX 2.1 Application of digitalization in countries in special situations

Digital technologies can boost productivity, even in agriculture, which accounts for the largest share of employment in several LDCs. For example, technologies, such as Global Positioning System (GPS), Internet of things (IoT) and drones, can make farm management more efficient by enabling farmers to access real-time information about weather, disease control and best practices and improve crop yields and quality, and digital platforms can enable business-to-business and business-to-consumer interaction, bypassing intermediaries and improving pricing. One example is iPAGE, a United Nations award-winning tech start-up in Bangladesh, which uses data, machine learning and artificial intelligence to provide small farmers and ecosystem players with actionable information to improve their operations. iPAGE has collaborated with more than 10,000 small farmers and has helped reduce fertilizer usage by 25 per cent. On average, the initiative has improved yields by 12 per cent, slashed capital costs by 75 per cent, lowered sourcing costs for buyers, and boosted sales for input vendors and machine partners. It has contributed to a reduction of 2 million kilograms in carbon emissions annually.

In **LDCs**, modernizing production processes in the manufacturing sector through digitalization and automation can boost productivity significantly. However, while these countries have experienced some success in manufacturing by leveraging their low-cost labour, automation would reduce their comparative advantage in labour-intensive production, prompting a drive to climb up the value chain.

In Asian **LLDCs**, where mining and commodity exports constitute a large share of the economy, digitalization can enhance productivity and create decent employment. For instance, automated and remote-controlled mining technologies increase efficiency and safety. Digital tools can optimize logistics and supply chain management, reducing costs and improving transparency. Digital solutions, such as three-dimensional mapping software used to create digital underground maps and machine automation, also improve efficiency, reliability and cost effectiveness. For instance, in Kazakhstan, to adapt to increasingly complex and competitive conditions in the mining industry, which accounts for 13 per cent of GDP, digital transformation of existing business models is being pursued.

In **SIDS,** digital banking and mobile money services play an instrumental role in improving financial inclusion, especially for remote communities. Furthermore, they have reduced the cost of remittances, an important source of financial flows in many these States, such as in Fiji and Samoa. Additional efforts are required for people in vulnerable situations, who are the most likely to be excluded from digital banking due to lack of skills, engagement in the informal sector and limited access.

E-commerce platforms to promote and sell local products globally can help diversify the economy. For instance, through the Pacific Agreement on Closer Economic Relation (PACER) Plus implementation unit, e-commerce strategies and policies across the Pacific have been launched. Recent examples are the E-Commerce Acceleration Work Plan in the Cook Islands and the National E-Commerce Strategy of Samoa in two of its islands. Digital marketing and online booking platforms can greatly expand the global reach of their tourism industry. Virtual tourism experiences can also be developed.

Continues on next page

BOX 2.1 ***... continued***

Beyond commercial benefits, the productivity dividends from digitalization are also significant for government services and are critical for **SIDS** that have limited avenues for economic activities. By improving efficiency and accessibility, they are especially important for countries with geographically dispersed populations as they can promote interoperability, facilitating smooth integration with a range of government and private sector services. Digital technologies can also be used for monitoring and responding to climate-related challenges and natural disasters. The Science Monitoring and Reliable Telecommunications (SMART) Subsea Cables initiative does this by measuring sea bottom temperatures and pressure. Digital technologies also provide reliable data for climate observation and early warning data for disaster mitigation to better understand climate change and enhance climate resilience and crisis response for the vulnerable small island developing States.

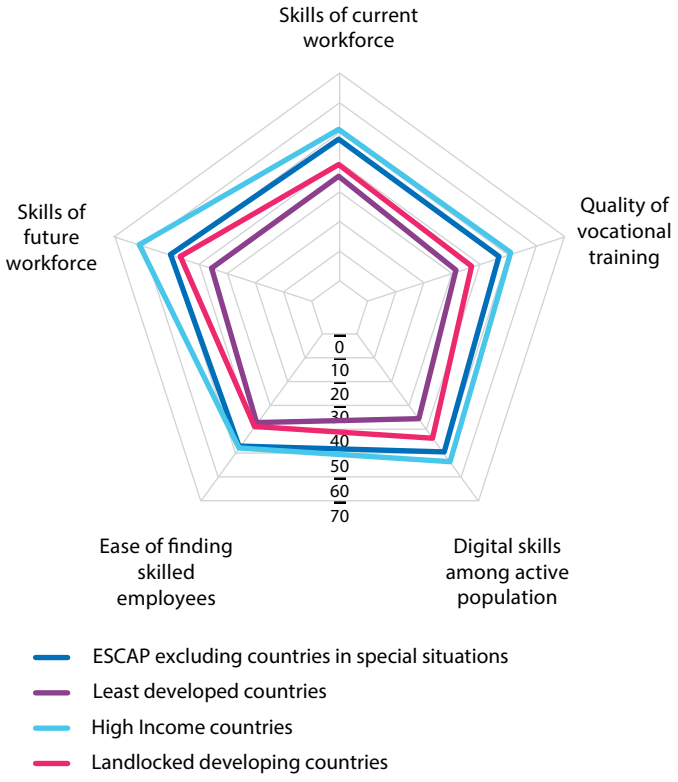
Sources: https://www.ipageglobal.com/; Issatayeva, Farida M., and others (2023). Fuel and energy complex of Kazakhstan: geological and economic assessment of enterprises in the context of digital transformation. *Energies*, vol. 16, No. 16,6002; Digwatch (2023). Papua New Guinea rolls out platform for management of digital IDS. 4 May.; United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) (2023), *Asia-Pacific Countries with Special Needs Development Report 2023: Strengthening Regional Cooperation for Seamless and Sustainable Connectivity*. United Nations publication; and The Fiji Times (2023). $782.4m mobile money transfers. 29 March.

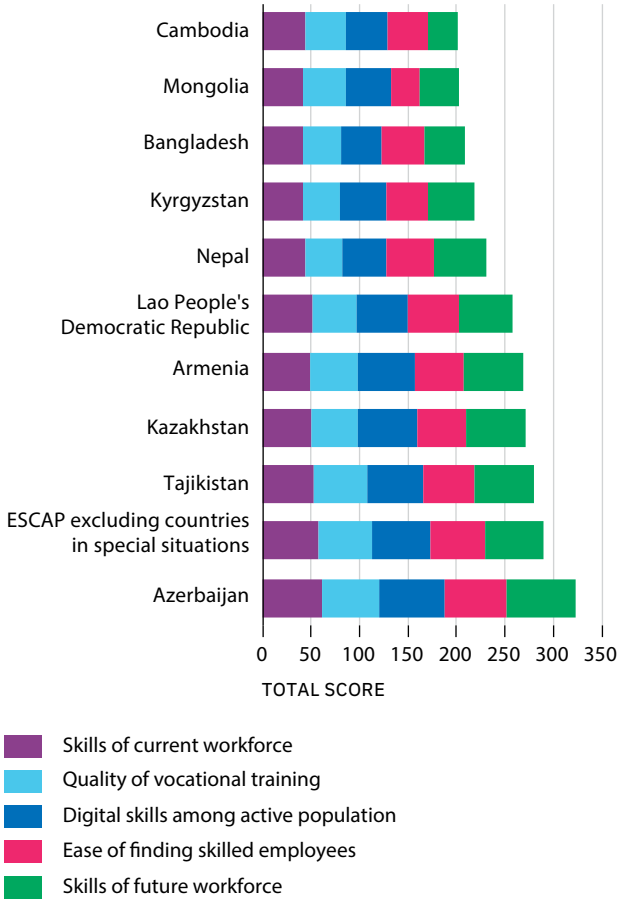
Productivity growth generally results in increased labour demand, subsequently leading to higher employment and wages, even if technological advancements tend to favour workers with higher skills. Moreover, while productivity gains may result in job reductions within that sector, other sectors expand and contribute to employment and wage increases. Overall, innovation has led to shifts in employment patterns rather than a net decline in employment (Bessen, 2015; Katz and Margo, 2014). One reason for this is that the introduction of high-productivity technology can lower the input costs for production factors, resulting in production expansion and increased demand for labour (Acemoglu and Restrepo, 2017, 2019). Data also show that while labour demand is subject to fluctuations based on the skill set of the workforce (O'Mahony, Robinson and Vecchi, 2008), the need for highly skilled labour capable of effectively managing technology rises in the initial phases of adopting digital technology. However, over time, as new technologies become more standardized, they also become accessible to low-skilled workers and labour demand gradually transitions towards lower-wage, lower-skilled labour.

As a result, digitalization can initially widen existing disparities (Brynjolfsson and McAfee, 2014); as skill-biased technical advancements increase, the demand for high-skilled workers rises. For the Asia-Pacific countries in special situations to effectively leverage digitalization, comprehensive measures are, therefore, required to ensure that the workforce is equipped with the requisite skills. However, even the relatively more developed LLDCs do not possess the average skills endowment of the Asia Pacific region (figure 2.3), although their favourable position for the dimension on "skills of future workforce" is encouraging. LDCs lag the furthest in term of their preparedness to harness digital transformation in several indicators, particularly in terms of the quality of vocational training, highlighting the importance of digital literacy.

The Digital Skill Gap Index (DSGI) was developed to measure the gap in demand for digital skills for a given level of industrial development and the supply side of digital skills. In other word it measures the capacity of economies' policymakers to respond to the talent deficit, and education institutions and corporate trainers to deliver the needed skills and present additional insights. Built on six pillars: digital skills institutions; digital responsiveness; government support; supply, demand and competitiveness; data ethics and integrity; and research intensity, a higher DGSI score signals a narrower digital skill demand and supply gap in a country. While most of the Asia-Pacific countries in special situations have low DGSI scores and global rankings, some of them, specially LLDCs in North Central Asia, have higher scores and rankings than countries that are not categorized as countries in special situations (see table 2.1).

FIGURE 2.2 The competitiveness of the workforce





Source: Schwab and Zahidi (2020).

TABLE 2.1 Digital Skill Gap Index (DSGI) in selected Asia-Pacific countries, 2021

	COUNTRY/TERRITORY	DSGI SCORE	GLOBAL DSGI RANKING
NON-COUNTRIES IN SPECIAL SITUATIONS	Singapore	7.8	1
	Malaysia	7.2	10
	Republic Korea	7	15
	China	6.7	18
	Hong Kong, China	6.6	19
	Indonesia	5.2	47
	Philippines	5.1	51
	Viet Nam	5	53
	India	5	56
	Brunei Darussalam	6.1	32
	Japan	5.9	36
	Sri Lanka	4.9	62
	Thailand	4.5	78
	Pakistan	3.9	94
COUNTRIES IN SPECIAL SITUATIONS	Armenia	5	59
	Azerbaijan	6.2	31
	Kazakhstan	5.6	43
	Uzbekistan	4.6	76
	Mongolia	3.3	108
	Fiji	5	58
	Papua New Guinea	3.3	109
	Bangladesh	3.4	106
	Myanmar	3	115
	Cambodia	2.8	117
	Nepal	2.4	124

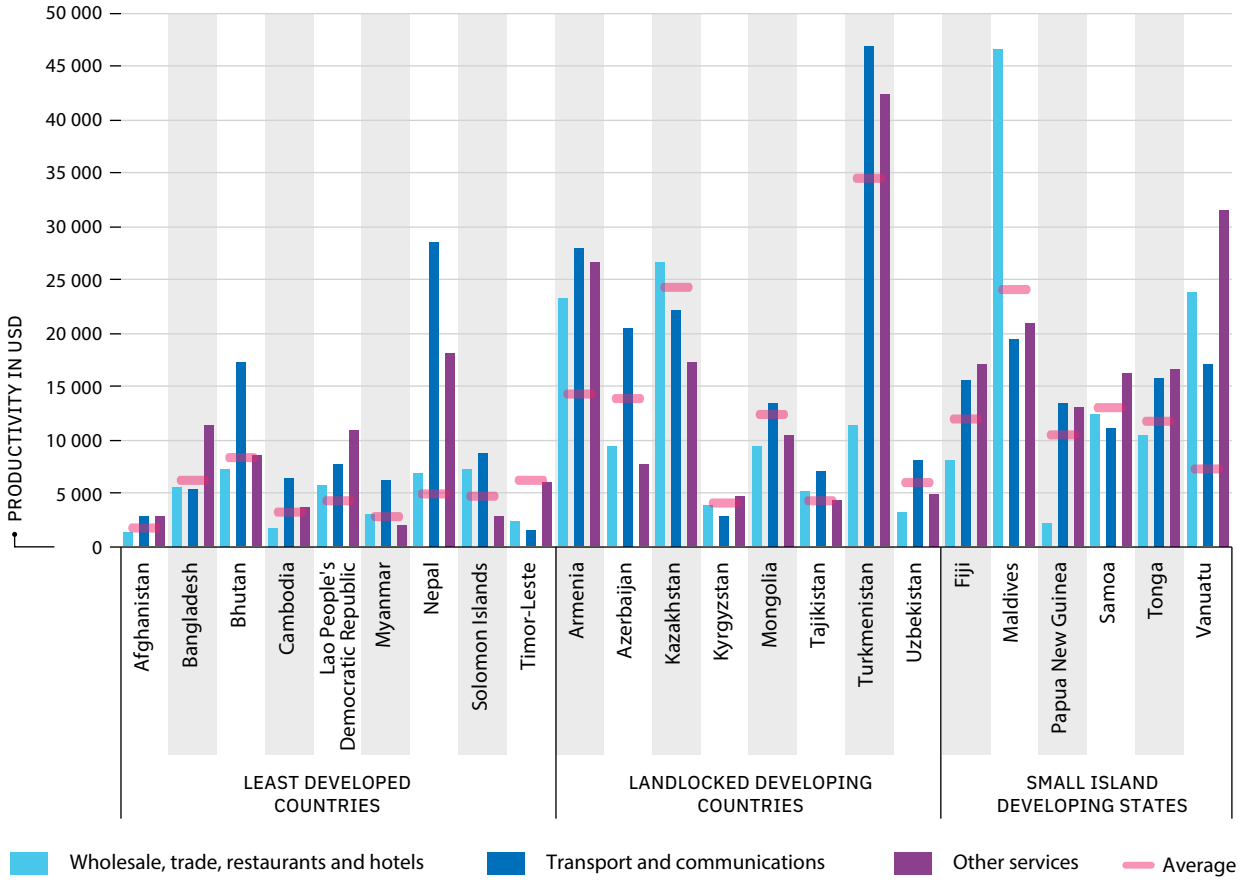
Source: Wiley (2024).

2.3 The role of the services sector in the digital era

The services sector is not a uniform sector; it varies significantly across parameters, from skill levels to tradability and the use of capital. Accordingly, because of digitalization, there is a need for a more granular understanding of its various subsectors. This includes not only differentiating between formal and informal services[12] but also between "business services" and "non-business services" (Sen, 2023). The latter is because a large proportion of the non-business service sector is informally employed, while a large proportion of the business services sector is formally employed, between "traditional services" (construction, transport and tourism) and "modern services" (R&D and development, business services, computer and information services, and financial intermediation) (Cornelli, Frost and Mishra, 2023). It can also be differentiated by classifying the services sector into four categories (Nayyar, Hallward-Driemeier and Davies, 2021): low-skill domestic services; low-skill tradable services; skill-intensive social services; and global innovator services (see box 2.1). Using this classification, most of the services in Asia Pacific countries in special situations would fall into the low-skill domestic services and the low-skill tradable services categories.

Indeed, a quick glance at the productivity levels of various subsectors under services shows the diversity (see figure 2.3). Some capital and technology intensive subsectors, such as transport and communications exhibit high productivity levels relative to trade and accommodation.

FIGURE 2.3 Productivity variation within services, 2022



Sources: ESCAP, based on data from International Labour Organization (ILO) ILOSTAT. Available at https://ilostat.ilo.org/. Accessed on 1 March 2024; and United Nations Department of Economic Development and Social Affairs. UNSTATS. Available at https://unstats.un.org/UNSDWebsite. Accessed on 1 March 2024.

12 The informal economy refers to all economic activities by workers and economic units that are – in law or in practice – not covered or insufficiently covered by formal arrangements (ILO, 1993).

The evolving nature of the services sector and advances in digitalization also presents opportunities for the development of countries in special situations. Recently, the services sector has exhibited many of the positive attributes of manufacturing in addition to other advantages (Baldwin and Forslid, 2023), as follows:

A **Tradability:** One such area is tradability, as advances in digital technologies and communications have made many services more tradable. Among them are information technology (IT) services, online education and telemedicine, which can be provided globally without a physical presence.

B **Scalability:** Digital platforms also expand accessible markets, allowing countries in special situations to benefit from economies of scale.

C **Ease of establishment:** Importantly, service-based businesses typically require less capital investment than manufacturing, benefiting development in countries with scarce financial resources.

D **Employment:** The services sector, boosted by digitalization, can create a wide range of jobs that require varying levels of skills, including high-skilled jobs, in IT and finance, and more accessible jobs in areas, such as digital marketing and customer service.

E **Adaptability:** The services sector can quickly adapt to new technologies, making it more responsive to digitalization trends and more agile in leveraging new opportunities.

However, unlike the manufacturing sector, the dual outcomes of productivity growth and employment of unskilled labour are less prevalent in subsectors within the services sector. For instance, while subsectors within business services, such as ICT, are characterized by extremely high levels of productivity, their employment generation potential for unskilled workers is limited. On the other hand, the non-business services sector, such as retail trade, is characterized by limited productivity growth, but it can absorb most of the unskilled labour.

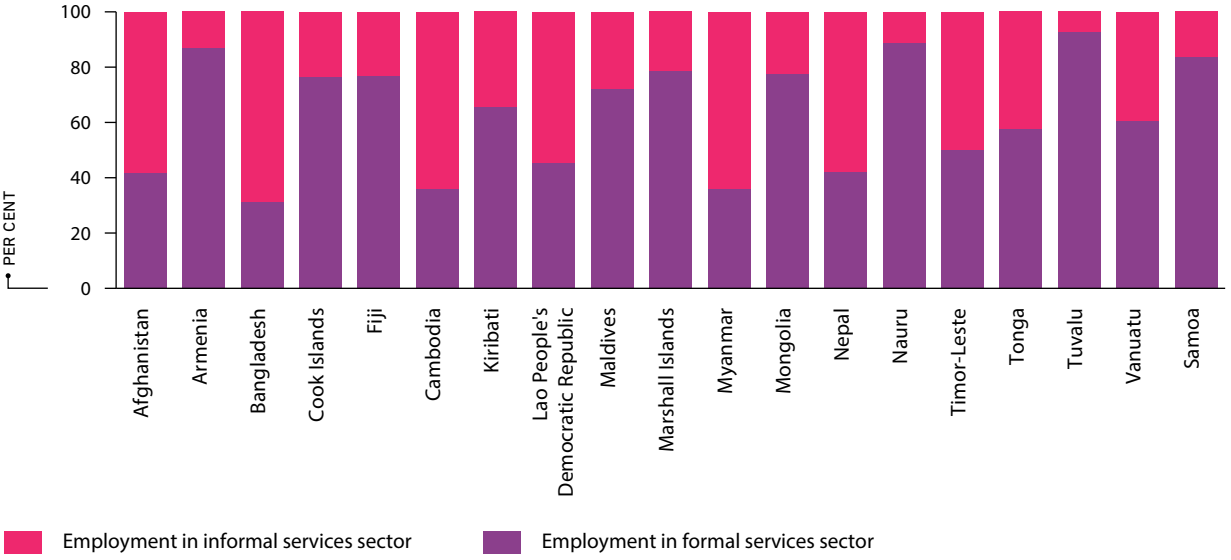
Regardless, digital platforms enable informal workers to access wider markets and, therefore, increase their incomes as online marketplaces and social media enable artisans to showcase their products and reach customers globally. This boosts income and reduces reliance on traditional middlemen, as exemplified in Nepal where digitalization and online market access has benefited local artisans, and in Cambodia, where transport and delivery platforms have integrated motorbike taxis and tuk-tuks into their services, offering workers access to a formalized system of employment. In addition, the rise of global freelancing platforms creates opportunities for workers in countries in special situations.

Digitalization can, therefore, transform low-skilled, non-business, informal services, which account for 37 per cent of employment in services in countries in special situations. This can come about by (a) providing access to online training and education platforms, (b) creating new job opportunities in areas, such as e-commerce, delivery services and digital administration and (c) formalizing informal workers, offering them with digital financial services (mobile banking) and more job security and benefits.

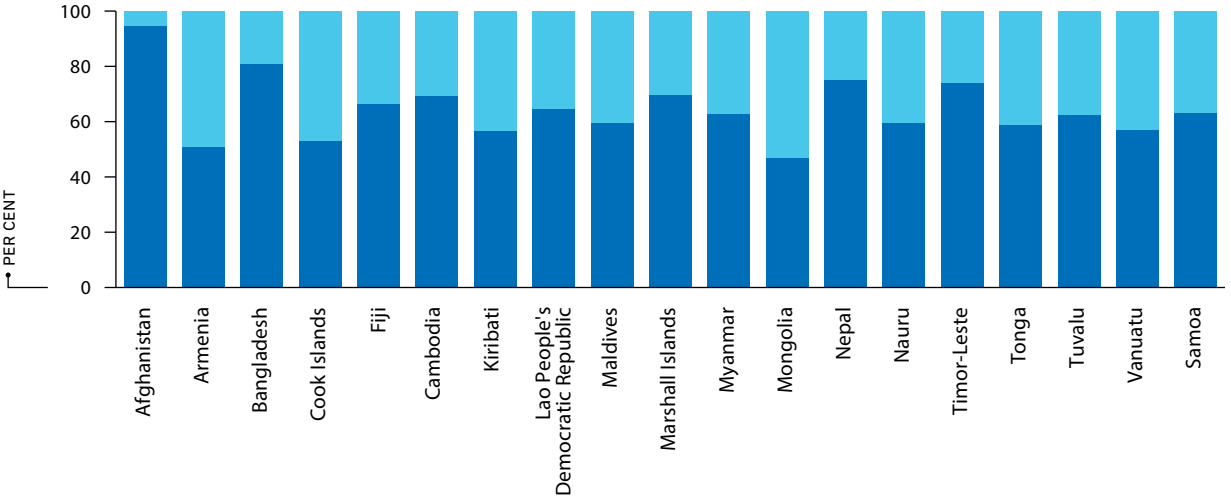
This also has implications for gender-related objectives considering that the share of female employment in the services sector to total female employment is higher than the share of male employment in this sector to the total male employment. Trends in employment gap between males and females also show that the increase in female employment is greater than the increase of male employment in the services sector (figure 2.5).

FIGURE 2.4 Share of employment in the formal and informal services in the Asia-Pacific countries in special situations

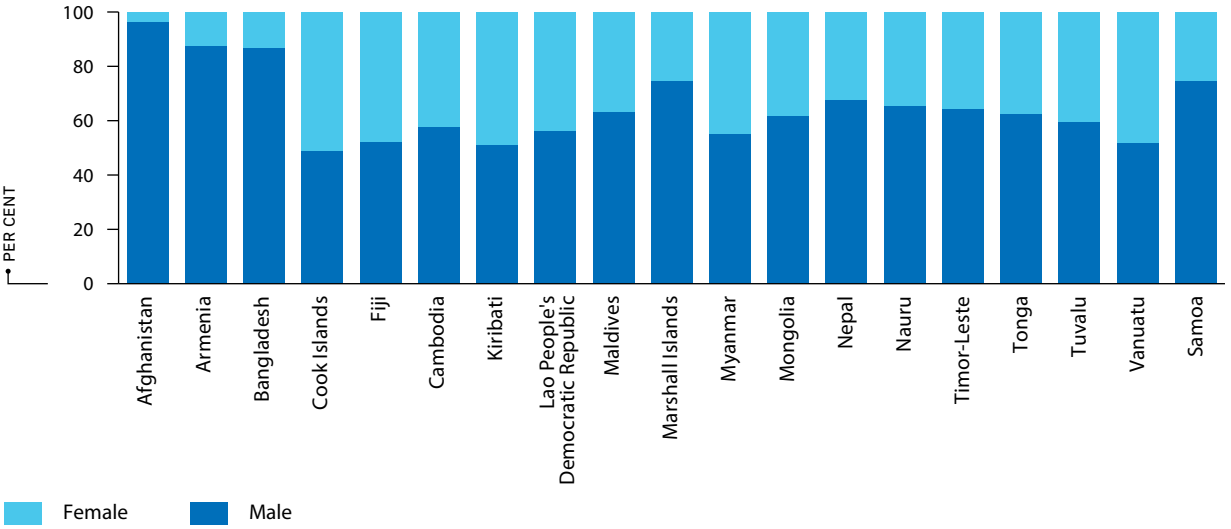
SHARE OF EMPLOYMENT IN THE FORMAL AND INFORMAL SERVICES IN THE ASIA-PACIFIC COUNTRIES IN SPECIAL SITUATIONS (PERCENTAGE OF TOTAL EMPLOYMENT IN SERVICES SECTOR)



MALE VS. FEMALE EMPLOYMENT IN FORMAL SERVICES (AS SHARE OF TOTAL EMPLOYMENT IN FORMAL SERVICES)

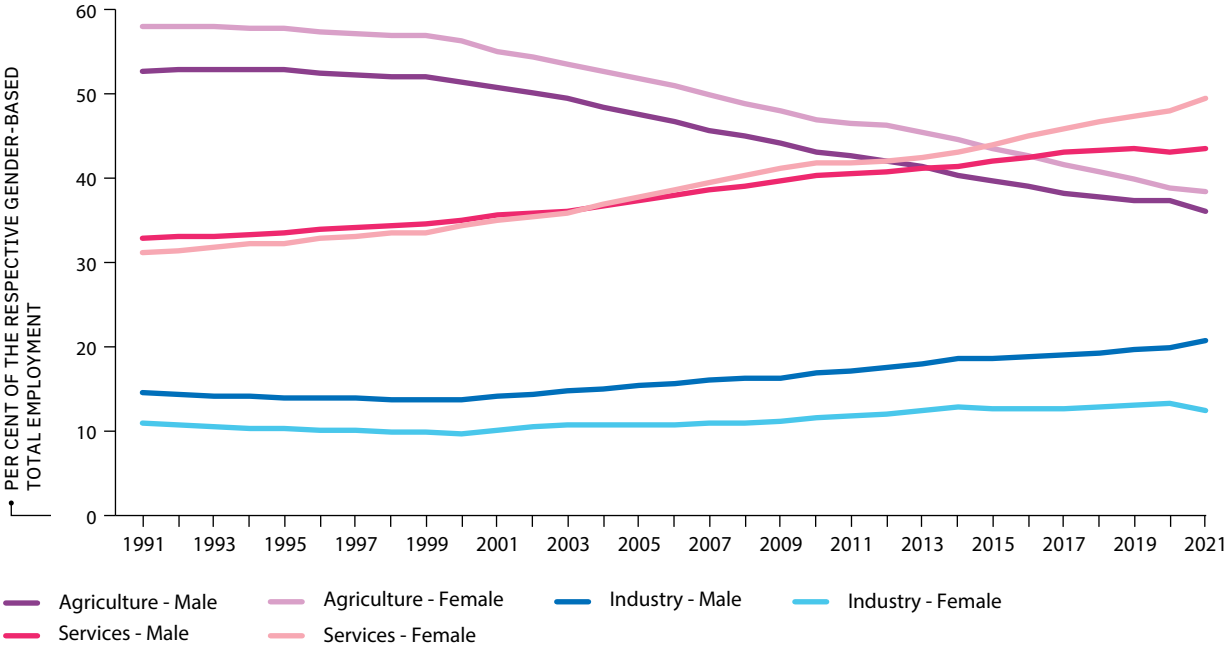


MALE VS. FEMALE EMPLOYMENT IN INFORMAL SERVICES (AS SHARE OF TOTAL EMPLOYMENT IN INFORMAL SERVICES)



Source: International Labour Organization (ILO) ILOSTAT. Available at https://ilostat.ilo.org/. Accessed on 1 March 2024.

FIGURE 2.5 **Gender-based employment in the Asia-Pacific countries in special situations by economic sector, 1991–2021**



Source: ESCAP based on data from International Labour Organization (ILO) ILOSTAT. Available at https://ilostat.ilo.org/. Accessed on 1 March 2024.

Digital financial services have also significantly increased financial inclusion, particularly in countries where banking infrastructure is limited. This has enabled a range of additional transactions. These services empower informal workers, enabling them to access banking services, credit and insurance; securely save money; and conduct transactions. Furthermore, the impact extends to street vendors and small retailers, who, through mobile payment systems and e-commerce platforms, gain access to broader markets. This allows for more efficient inventory management and the receipt of electronic payments, offering a safer and more convenient alternative to traditional cash transactions. In Bangladesh, online payment platforms have played a revolutionary role in mobile banking, transforming small-scale transactions that were once primarily cash based. The use of online platforms and applications also contributes to skill development and enhances digital literacy. It is, however, important to ensure that these platforms are accessible, affordable and regulated in a way that protects the rights of informal workers.

Digitalization and services trade

As mentioned earlier, digitalization has facilitated a significant increase in the tradability of services. While this requires addressing trade-related barriers (discussed in the following section on policy considerations), an understanding of countries in special situations in this area is important to deal with bottlenecks.

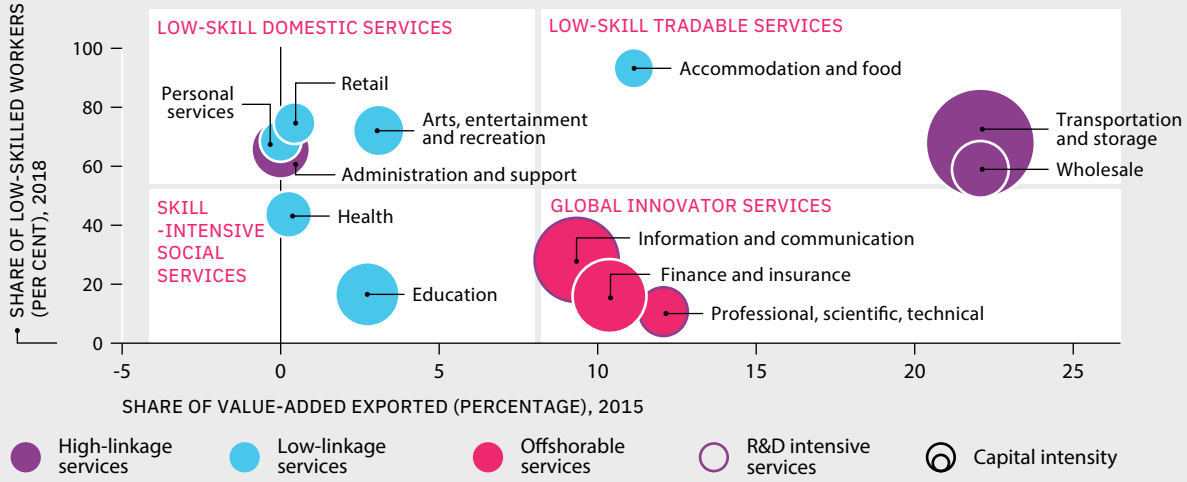
Tradable services are those that can be easily exchanged or traded across borders, allowing for international transactions. These services typically involve activities that can be delivered remotely or involve tangible outputs that can be transported. For example, software development, consulting services and financial services are often considered tradable as they can be provided to clients located in different countries. On the other hand, non-tradable services are those that are locally bound and cannot be easily exported. Some examples are hairdressing, and health-care and construction services, which are inherently tied to specific geographic locations because of the need for physical presence or proximity to the consumer.

BOX 2.2 A new set of stylized facts for the services sector

Nayyar, Hallward-Driemeier and Davies (2021) classify the services sector into four categories based on six parameters, namely trade intensity, offshorability, R&D intensity, capital intensity, intersectoral linkages and low skill intensity. These categories include the following:

1. **Low-skill domestic services:** Services under this category are characterized by the low share of value-added exported and the high share of low-skill workers: administrative and support services; personal services; retail services; and arts, entertainment and recreation services.
2. **Skill-intensive social services:** This category comprises services with a low share of value-added exports and a low share of low-skill workers: health and education sectors.
3. **Low-skill tradable services:** The category includes services with a high share of value-added exports and a high share of low-skilled workers: services in the accommodation and food, wholesale; and transportation and storage sectors.
4. **Global innovator services:** Services under this category are characterized by the high share of value-added exports and the low share of low skilled workers: ICT services; finance and insurance services; and professional, scientific and technical services.

FIGURE A new classification for the services sector



Source: Nayyar and others (2021).

Based on this classification the authors have derived a set of stylized facts that characterize the services sector in the digital era:

A There is a productivity and jobs dichotomy such that no subsector generates productivity growth and employment simultaneously.

B Wide productivity variation exists across subsectors.

C Services firms are smaller in employment terms than manufacturing.

D Size matters less for productivity.

E Physical capital plays a small role.

F Productivity dispersion is higher in services than in manufacturing.

G Services firms' employment growth is lower than in manufacturing firms.

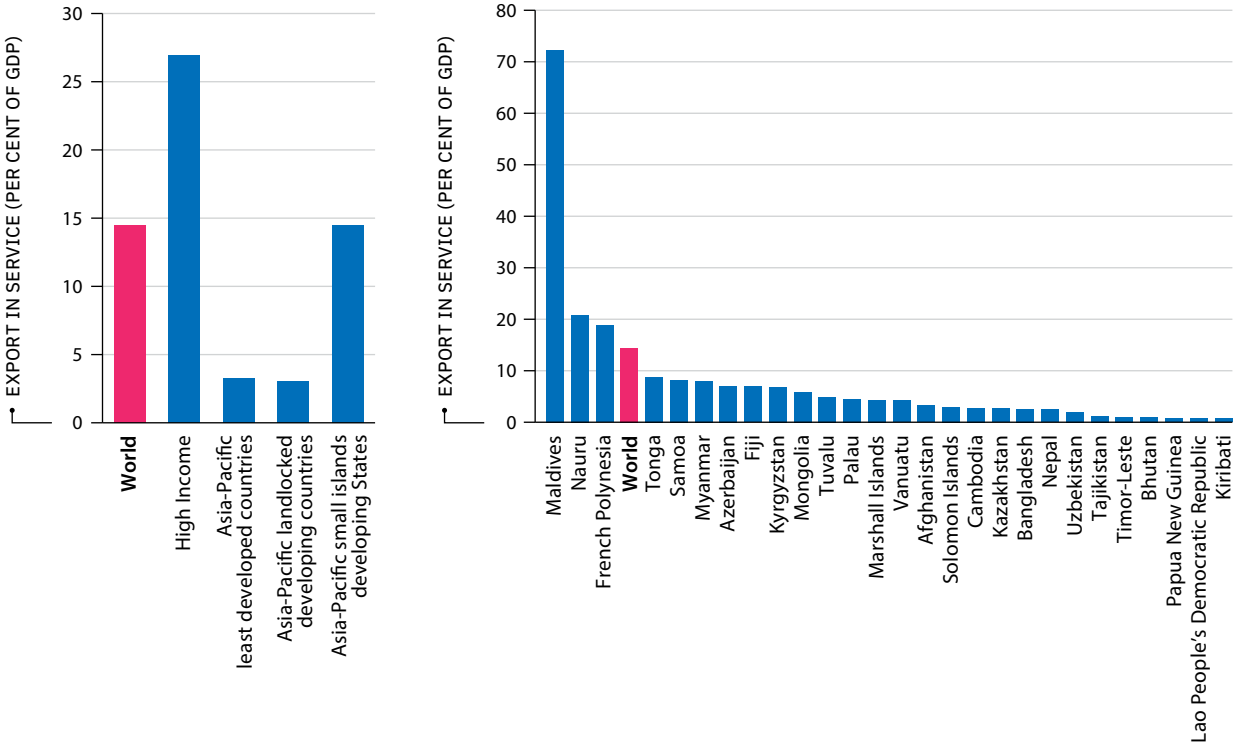
H Firms boost their productivity over their life cycles.

I Entry and exit play much larger roles in job creation and destruction in services than in manufacturing.

Source: Nayyar, Guarav, Mary Hallward, Driemeier and Elwyn Davies (2021). *At Your Service? The Promise of Services-Led Development*. Washington, D.C.: World Bank.

On a global scale, tradable services contribute approximately 15 per cent to GDP, on average, with high-income countries exhibiting a higher proportion, which exceeds 25 per cent. For Asia Pacific countries in special situations, the share of services exports of LDCs and LLDCs is 3.24 and 3.06 per cent, respectively, which is notably lower than the worldwide average. Clearly, there is significant scope to enhance the tradability of services in the countries in special situations.

FIGURE 2.6 **Export in services (per cent of GDP)**

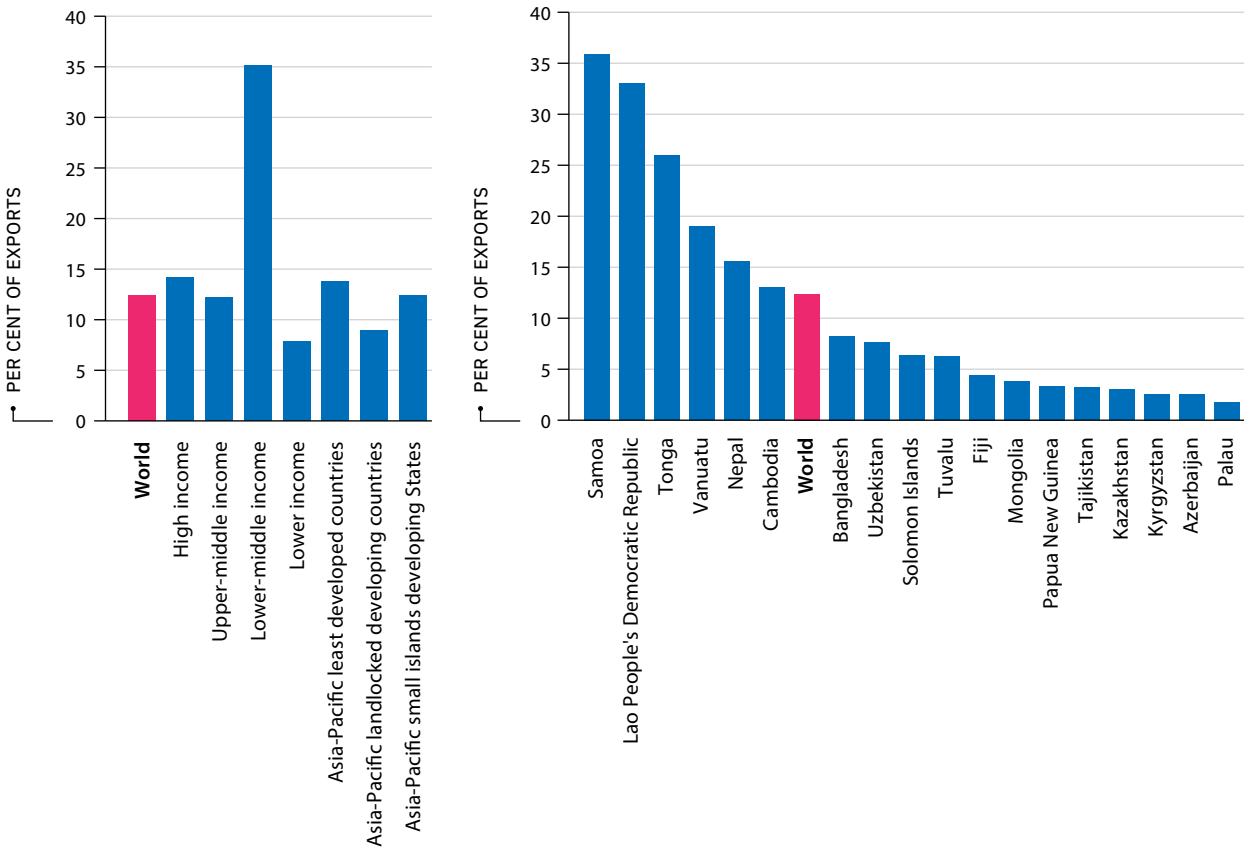


Source: ESCAP, based on data from World Bank, World Development Indicators database. Available at https://data.worldbank.org/. Accessed on 5 November 2023.

A quick glance the top 50 service exporting countries shows that 68 per cent of them are high-income countries, indicating a strong correlation between income and service exports. On the other hand, only four out of the Asia Pacific countries in special situations analysed in this report have a higher proportion of service exports than the world average. Moreover, the ICT sector accounts for a relatively high proportion in service exports of the lower-middle-income group, while the travel sector accounts for a relatively high proportion of low-income groups. In the case of ICT services, the proportion of such exports for the lower middle-income group is significantly higher, perhaps because of high rates for India and Philippines, while the share of the travel sector was higher in the low-income group.

The digitalization of trade in services has expanded significantly, particularly in the realm of digitally delivered services. Developing economies have played a pivotal role in this expansion by exporting more services and embracing digital trade. As of 2022, exports of digitally delivered services amounted to $3.82 trillion, constituting 54 per cent of the total global services exports for the same year (WTO, 2023). Trade in digitally delivered services has surged nearly fourfold since 2005. While at the global level, developed countries continue to exert a predominant influence on trade in digitally deliverable services, the contribution of developing countries has increased from 19 per cent in 2010 to 24 per cent in 2022, with China making a noteworthy contribution. However, small island developing States have exhibited the highest annual growth rate, at 12 per cent, elevating their share of global exports of digitally deliverable services by two percentage points to reach 5 per cent, which is aligned with their overall share of services exports. In contrast, LDCs and LLDCs command significantly lower shares in digitally deliverable services trade compared to general services trade. In 2022, LLDCs represented 0.75 per cent of global services trade, but only 0.3 per cent of digitally deliverable services exports, while for LDCs, these figures were 0.6 per cent and 0.2 per cent, respectively.

FIGURE 2.7 **Information and communications technology export share of service export**



Source: ESCAP, based on data from World Bank, World Development Indicators database. Available at https://data.worldbank.org/. Accessed on 5 November 2023.

The potential for skilled providers worldwide to engage in trade is facilitated by digital delivery, but such opportunities are not universal. While digitally deliverable services can be provided remotely through computer networks, certain services continue to be delivered using non-digital means. Developing countries often grapple with challenges related to infrastructure and resources, limiting their ability to fully participate in digitally delivered trade. Moreover, only a select few countries actively measure the scope and types of trade in digitally delivered services, encompassing sectors, such as telecommunications, computer services, financial services, insurance, pension and various business services. In the next section, policy considerations that countries can pursue towards this effect and the role of regional cooperation in supporting the countries in special situations are highlighted.

CHAPTER 3

Policy considerations and regional cooperation to harness digitalization

This chapter contains a summary of the key opportunities, challenges and risks of digitalization as previously discussed, focusing on how Asia-Pacific LDCs, LLDCs and SIDS can leverage them. By reviewing the experiences of these countries, the discussion in this chapter includes several policy considerations and underscores the importance of regional cooperation in maximizing the benefits of digitalization, while mitigating its potential drawbacks.

Digitalization offers a range of opportunities for leapfrogging development in countries in special situations. Technological advancements are transforming connectivity in remote areas, enabling LDCs, LLDCs and SIDS to bypass traditional infrastructure hurdles. For example, the swift adoption of mobile technology and satellite systems has negated the need for extensive landline networks, while solar mini grids offer an alternative to centralized electricity grids.

Furthermore, digital platforms are democratizing access to global markets, spurring entrepreneurship and job creation, including in remote and rural areas. This is especially beneficial for SIDS and remote, rural regions of LLDCs, where it catalyses economies of scale. The impact of this can be substantial, as these countries, particularly LDCs, strive to amplify their presence in business services exports, an area in which they have traditionally had only limited engagement. Additionally, digital technologies are revolutionizing the delivery of essential services, such as mobile banking, online education and telemedicine, offering cost-effective solutions that are crucial for countries in special situations.

Despite the potential of digitalization, the digital transition requires nuanced policies to ensure equitable benefits and mitigate risks. Developing fundamental infrastructure, such as reliable electricity and Internet connectivity, is essential. This is particularly vital to bridge the persistent rural-urban divide in LDCs and ensure equitable access to all, including for women, and in the geographically isolated and infrastructure-challenged areas in LLDCs and SIDS.

Building human capital through education and training is another significant challenge, as a digitally literate workforce is critical to maximize the benefits associated with digitalization and prevent a divide between digitally skilled and unskilled workers, which could exacerbate existing disparities.

The rapid proliferation of digital technologies may, however, also lead to certain risks. For instance, digital platforms, especially within the informal economy, may precipitate exploitation through unfair wages, absence of job security and lack of social security benefits. There is also the looming risk of personal data exploitation and privacy breaches if digital literacy is not adequately fostered. Furthermore, overreliance on specific digital platforms can breed vulnerabilities, amplifying the impact of policy shifts or the fee adjustments these platforms may impose.

Establishing robust regulatory frameworks, cybersecurity measures and data protection laws is a complex process that typically evolves over time. Yet, addressing these challenges is crucial to align the trajectory of digitalization with equitable growth and the safeguarding of individual rights and societal well-being. It also requires strong institutions for proper implementation and enforcement. Furthermore, digital data collection, including disaggregated data by gender, is essential to support the evidenced-based policy-making process.

3.1 Policy considerations

Considering these nuanced dynamics, a balanced strategy that leverages rapid digital advancements, while fostering foundational sector development is essential. This entails targeting sectors, such as e-commerce and digital marketing, for their immediate impact, especially capitalizing on the higher tradability of services and more servitized agricultural and industrial activities. At the same time, it is crucial to invest in building capacities in sectors, such as manufacturing, that require a robust infrastructure encompassing transportation, power and telecommunications to support exports. Strategic planning, therefore, is pivotal in identifying areas where quick gains are achievable and those requiring long-term, sustained investment.

Some examples of such strategic planning from LDCs include the following: initiatives in Bangladesh to promote digital literacy and skills to meet global technological demands (see box 3.1); efforts in Cambodia to establish a smart government through comprehensive digital infrastructure and technology (see box 3.2); and supportive policies set by Nepal for digital entrepreneurship, which has encouraged innovation and investment in digital start-ups and spurred more than 80 new digital initiatives following the implementation of the 2019 Digital Nepal Framework (see box 3.3).

BOX 3.1 Navigating towards a Smart Future: the digital transformation in Bangladesh

Bangladesh is working towards a digital future, with the goal to achieve a smart future by 2041. This ambition is part of a broader initiative to leverage technology to boost economic growth. The country has made progress in this regard by establishing union digital centres, which facilitate access to essential government services online, such as birth registration and citizen certificates. This progress is mirrored in the private sector through digital platforms, such as bKash (mobile finance), Chaldal (grocery e-commerce) and Pathao (ride-sharing and food delivery), which have become integral to people's daily life.

In the fiscal year 2022–2023, the ICT sector contributed 1.25 per cent to the GDP of Bangladesh and accounted for an estimated 13 per cent of GDP through its enabling chain impact. The domestic software and information technology enabled improvements in the services market, currently valued at $1.5 billion, underscoring the sector's potential for further expansion and job creation (Latifee, 2023).

Despite these advances, challenges remain in sustaining the digital revolution through technology investment and skill development. Digital literacy remains low in the country, especially in rural areas, as three quarters of rural households have no or only limited digital skills (Jahan and others, 2020). While more than 25,000 students pursued computer science and related subjects in 2022, this falls short of the demand for ICT professionals; to date, 300,000 jobs have been created by the sector and 500,000 jobs are projected to be created by 2025. Efforts are also needed to enhance their quality. Currently, an ICT professional contributes an average value addition of $9,800 per year; this contribution is targeted to triple by 2041 through skill development.

The Bangladesh Association of Software and Information Services has proposed several strategies to address these challenges and ensure the successful realization of the country's ICT ambitions. These strategies include, among others, conducting skills-demand studies, updating national ICT competencies and introducing early-stage coding education. Modernizing technical and vocational education and training and fostering public-private partnerships for training are also essential to enhance the sector's capacity. Moreover, initiatives aimed at supporting small ICT firms, promoting gender equality in the sector and providing incentives for IT enterprises are essential to bolster the sector.

To maintain and accelerate progress, a comprehensive road map that includes a detailed demand-supply assessment of ICT professionals and targeted initiatives to enhance digital literacy and skills development is crucial (Latifee, 2023). By addressing these challenges, Bangladesh aims to achieve its vision of a smart future, characterized by robust economic growth and enhanced societal well-being through digital transformation.

Sources: Bangladesh (2022). Smart Bangladesh: ICT Master Plan 2041; Latifee, Enamul Hafiz (2023). Navigating towards SMART Bangladesh: the ICT transformation. PressXpress, 17 September;. and Jahan, Nusrat, and others (2020). Digital literacy in rural Bangladesh: survey 2019. Dhaka: BRAC Institute of Governance and Development.

BOX 3.2 Advancing the information and communications technology penetration and digital transformation of Cambodia

Cambodia stands out among LDCs in Asia and the Pacific for its moderately high ICT penetration and dynamic digital economy. From 2015 to 2022, Internet users in Cambodia surged from 18.0 per cent to 60.2 per cent of the population, highlighting the country's significant strides towards digital inclusion. Despite a decrease in mobile cellular phone subscribers, attributed to regulatory compliance actions, the country's commitment to a digital future remains unwavering. The launch of the central bank digital currency, Bakong, in 2020, and the remarkable growth in e-wallet accounts and payment service transactions underscore the progress made towards the digital transformation. In 2022, the number of e-wallet accounts in Cambodia was 17.9 million whereas the number of payment service transactions reached 1 billion, amounting to $272.5 billion, which is approximately 10 times the country's GDP (National Bank of Cambodia, 2023). However, comparing these figures with those of other countries is challenging due to the limited availability of comparable data and the largely informal nature of the economy of Cambodia, which may result in an underestimated GDP.

The Government of Cambodia has been a key proponent of digitalization and digital transformation. It established the National Information Communication Technology Development Authority in 2000 and the National Digital Economy and Society Council in 2023 to oversee and coordinate digital initiatives. The Cambodia Digital Economy and Society Framework 2021–2035 sets a comprehensive road map for building a vibrant digital economy and society, focusing on developing digital infrastructures, ensuring reliability and confidence in digital systems and promoting digital citizenship, government and businesses through a phased transformation approach (Cambodia, 2021). In terms of specific economic activities, the Asia Foundation and the Cambodia Development Research Institute (2023) suggests developing its tourism sector through digitalization of the tourism-related MSMEs.

Despite notable achievements, Cambodia faces challenges in ICT infrastructure availability and digital literacy. In response, the Government has formed partnerships with local non-governmental organizations (NGOs) and international donors to enhance digital literacy across various societal segments. Collaborative programmes with Kampuchea Action to Promote Education, the ASEAN Foundation, Google and Meta aim to provide digital literacy training and improve the ICT curriculum, demonstrating a commitment to overcoming barriers to digital transformation.

The country's digital transformation is marked by ambitious initiatives, strategic partnerships and a clear vision for a digitally inclusive society. To sustain momentum and address existing challenges, continued investment in ICT infrastructure and targeted efforts to enhance digital literacy are essential. By fostering an environment conducive to digital innovation and inclusion, Cambodia aims to fully leverage digital technologies to drive economic growth and promote social well-being.

Sources: Cambodia (2021). Cambodia Digital Economy and Society Policy Framework 2021–2035; National Bank of Cambodia (2023). Annual Report 2022; The Asia Foundation and Cambodia Development Resource Institute (2023). The current state and role of digital technology adoption in tourism MSMEs in Cambodia; and Khemera, Mok (2023). Cambodia's digital journey. Presentation at the Expert Group Meeting on the Asia-Pacific Countries with Special Needs Development Report 2024, Bangkok, 1 December 2023.

BOX 3.3 Accelerating digital transformation in Nepal: strategies, progress and future directions

In 2019, the Government of Nepal issued the Digital Nepal Framework, a strategic road map for harnessing digitalization to spur economic growth, address social challenges and integrate Nepal into the global economy. Emphasizing a multi-sectoral approach, the Framework targets 80 initiatives across eight key sectors: digital foundation; agriculture; health; education; energy tourism; finance; and urban infrastructure.

Building on the foundation laid by previous policies and regulations, such as the National Information and Communication Policy (2015), the National Broadband Policy (2016) and the Electronic Transaction Act (2017), the Framework envisions a robust digital ecosystem. Among its key projects are the development of the National Optical Fiber Network and the establishment of the National Cyber Security Center, a provincial data centre, and public Wi-Fi hotspots. Innovations, such as national biometric ID cards, e-governance 2.0, the Government Enterprise Architecture and the Nepal e-Governance Interoperability Framework, are aimed at enhancing public service efficiency and quality. To foster a conducive environment for digital sector growth, the Framework plans special economic zones for the ICT sector, with no minimum threshold for FDI.

The dynamism of the digital transformation is not solely driven by governmental initiatives; the private sector, academia, NGOs and industry associations are also playing critical roles. For instance, private equity firms are establishing start-up business incubators and accelerators, while educational institutions and NGOs are enhancing IT skills and capacity-building across the population.

Despite a late start, Nepal is rapidly catching up to other developing countries in terms of ICT penetration, with significant increases in mobile phone subscriptions, Internet usage, mobile banking and e-wallet adoption. The number of mobile phones in Nepal rose from 99.7 per 100 population in 2015 to 127.2 in 2021, while the number of internet users almost tripled from 17.6 per cent of the population to 51.6 per cent over the same period. The number of mobile banking users in Nepal grew tenfold, from 1.8 million in 2016 to 18.3 million in 2022, while the number of Internet banking users tripled from 500,000 to 1.6 million over the same period. Meanwhile, the number of e-wallet users increased from 6.3 million in 2020 to 13.7 million in 2022 (Nepal Rastra Bank, 2023). The COVID-19 pandemic has further accelerated the shift towards digital banking and online transactions.

Many IT companies provide services to various economic sectors, such as the Nepal Clearing House and Sewa (banking and finance), Sajilo and Betayo (service marketplace), Foodmandu and Pathao (food services) and Veda and Midas (edutech). Nepal is also exporting IT products. The Institute of Integrated Development Studies estimates that the IT service exports grew by 64.2 per cent in 2021–2022 to $515 million, accounting for 1.4 per cent of the country's GDP. In 2022, there were 106 IT companies in Nepal, 14,728 IT freelancers working in software development and technology, and 51,781 freelancers engaged in exporting IT services through various digital platforms (IIDS, 2023). The growth in IT service exports and the vibrant ecosystem of IT companies and freelancers underscore the sector's potential for further expansion.

Despite these achievements, Nepal faces challenges, such as limited ICT infrastructure, low digital literacy and a significant IT brain drain, resulting from skilled professionals seeking opportunities abroad. These issues represent key barriers to the full realization of the country's digital potential. The journey of Nepal towards digital transformation is marked by strategic planning, collaborative efforts and tangible progress across its digital ecosystem. Looking ahead, addressing the challenges of infrastructure development, enhancing digital literacy, and retaining IT talent are crucial for sustaining momentum and achieving the ambitious goals set forth in the Digital Nepal Framework.

Sources: Nepal (2019). 2019 Digital Nepal Framework: Unlocking Nepal's Growth Potential; Institute of Integrated Development Studies (IIDS) (2023). Unleashing IT: Advancing Nepal's Digital Economy: Expanding jobs and exports; Nepal Rastra Bank (2023). *Payment System Oversight Report 2021/2022*; Shrestha, Nidhaan (2023). Digital Landscape of Nepal: Opportunities and Challenges. Presentation at the Expert Group Meeting on the Asia-Pacific Countries with Special Needs Development Report 2024, Bangkok, 1 December 2023; and World Bank, World Development Indicators database. Accessed on 29 February 2024.

In terms of specific instruments, the Bakong system, launched in 2020 by Cambodia, is a pioneering effort in the realm of central bank digital currencies, aimed at bolstering the country's de-dollarization efforts by enhancing local currency payments. Leveraging the widespread mobile phone penetration in Cambodia, Bakong facilitates interbank and retail transactions, using an open-source blockchain framework for digital asset management (Saisho, 2024). The adoption of Bakong marks a significant leap in financial technology, bypassing traditional banking hurdles and contributing to a surge in e-wallet accounts and payment service transactions (see box 3.2). This innovative approach has not only increased the usage of the Cambodian riel in deposits, transactions and loans, but it has also incentivized the preference for local currency over the dollar, reflecting a step forward towards financial independence and inclusivity (Saisho, 2024).

In LLDCs, the benefits of digitalization could be further harnessed through policies that focus on expanding digital infrastructure to rural areas, leveraging public-private partnerships for technological advancements and implementing skill development programmes. Such strategies are vital for overcoming geographical and infrastructural challenges inherent to LLDCs, thereby ensuring equitable access to digital technologies and their associated socioeconomic benefits.

Illustrative of these strategic approaches are comprehensive integration of ICT across economic sectors and governance in Bhutan (see box 3.4) and the partnerships of several Asian LLDCs with the International Telecommunication Union (ITU) and the United Nations Children's Fund (UNICEF), which launched the connectivity initiative "Giga" to connect every school to broadband Internet. This initiative has enhanced digital access within LLDCs, including the extension of broadband connectivity to schools in rural, remote areas of Kazakhstan, cost savings and speed improvements for Internet access in schools in Kyrgyzstan, and the innovative "schools-as-hubs" model under which schools are transformed as Internet access hubs for redistribution to surrounding communities of Uzbekistan (see box 3.5).

These examples underscore the importance of strategic policy frameworks, international collaboration, and innovative models in harnessing the full potential of digitalization for LDCs and LLDCs. They serve not only to bridge the digital divide, but also to foster sustainable development, educational access and economic opportunities in geographically disadvantaged regions.

BOX 3.4 Digital transformation in Bhutan: progress, strategy and the path forward

Bhutan is undergoing a digital transformation, reflecting a strategic commitment to integrate ICT across various sectors of its economy and governance. This progress is marked by a notable increase in ICT penetration, with mobile phone users per 100 people rising from 90.9 in 2015 to 94.9 in 2022, and Internet users surging from 39.8 per cent to 85.6 per cent of the population over the same period.[a] The evolution of digital financial services is evident through the exponential growth in mobile banking transactions, which expanded from 20.6 million ngultrum in 2018 to 452.6 million ngultrum in 2022, and the tripling of Internet banking transactions from 0.7 million ngultrum to 2.1 million ngultrum (Royal Monetary Authority of Bhutan, 2023). Given the modest size of its domestic market, with the population of less than 800,000, the country's digital industry is outward-looking, focusing on exporting ICT-enabled services such as business process outsourcing.

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BOX 3.4 *... continued*

In alignment with its vision of a "Developed Bhutan," the Government has prioritized digital sector development within its 13th Five-Year Plan (2024–2029). This strategic plan aims for the digital economy to contribute 10 per cent to the GDP by 2029, alongside the creation of 1,000 jobs annually, starting from 2024. Recognizing the constraints of its fiscal budget, Bhutan seeks to attract private sector investments and international donors to support its digitalization initiatives.

The development and transformation of the digital economy are structured around six foundational pillars:

1. **Digital infrastructure and enterprise development:** This includes enhancing ICT infrastructure through new fibre optic systems and satellite-based Internet services, especially in rural areas, and supporting private enterprise growth in business process outsourcing and IT outsourcing.
2. **Digital government development:** Related efforts focus on deploying digital systems to improve the efficiency of public service delivery, encompassing initiatives, such as a national digital ID system, e-procurement and a government data centre.
3. **Private sector and business enablement:** Measures include simplifying digital business permits, promoting cross-border digital trade, supporting digital startups, and offering business development services tailored for young people, women and the national workforce.
4. **Digital financial services development:** Initiatives involve establishing an international payment gateway, developing G2C (Government-to-citizen) and B2B (business-to-business) payment systems, and planning a digital development fund.
5. **Skills development:** Strategies include recruiting digitally skilled government employees, offering digital skills training, establishing digital help desks and providing fiscal incentives for digital skill acquisition among young people women and members of the national workforce.
6. **Governance, institutional arrangements and legal reforms:** This encompasses drafting a national digital development plan, creating a digital development strategy board, revising digital laws and enhancing cyber security regulations.

Despite its progress and commitment to digitalization, Bhutan faces challenges, such as limited funding for ICT infrastructure development, a low rate of digital literacy and the emigration of IT professionals. A study conducted by Bhutan and UNDP in 2021 recommends prioritizing the digital tourism sector and related industries in the short term, leveraging the post-COVID-19 resurgence in international tourism. It also suggests focusing on nurturing small to medium-sized data outsourcing and software companies, highlighting the potential for Thimpu TechPark to attract digital FDI and global talent (Bhutan and UNDP, 2021).

The digital transformation of Bhutan is pivotal for its socioeconomic development, requiring sustained investment, enhanced digital literacy and international collaboration to overcome existing challenges. Addressing these, with a strategic approach and focused efforts on the outlined pillars, is crucial for Bhutan to realize its digital transformation objectives fully.

Sources: Bhutan and UNDP (2021). Digital jobs in Bhutan: future skilling and demand creation; Royal Monetary Authority of Bhutan (2023); and Puttasuwan, Tanatat (2023). Digitalization, transformation and challenges for CSS: cases of Kingdom of Bhutan and selected ASEAN member countries. Presentation at the Expert Group Meeting on the Asia-Pacific Countries with Special Needs Development Report 2024, Bangkok, 1 December 2023.

a World Bank, World Development Indicators database. Available at https://data.worldbank.org/. Accessed on 29 February 2024.

For SIDS, digital strategies that are tailored to their unique challenges and opportunities are instrumental in effectively navigating the digital landscape. Leveraging digitalization can significantly enhance key economic sectors and address societal needs. Enhancing digital connectivity, especially in the tourism sector, can expand global reach and operational efficiency, which is vital for several tourism-depended economies of SIDS. Digital marketing strategies, such as search engine optimization, social media and virtual reality, can enhance the tourist experience by showcasing unique cultural and natural attractions. Campaigns, such as "Fiji Me" and the targeted online promotions of Maldives, have successfully increased tourism through digital storytelling, influencer partnerships and tailored booking platforms. The Pacific Tourism Organisation (SPTO), through its Pacific Digital Champions, provides training to empower individuals with the skills and knowledge needed to navigate the digital landscape effectively (Tamanilo, 2023). Similarly, e-commerce development enables SIDS to diversify their economies and penetrate new markets, fostering economic resilience. The "Buy Samoa Made" campaign exemplifies how global marketing, including through online platforms, can promote local products, such as virgin coconut oil and other niche products. Such platforms are essential for local entrepreneurs, especially women, and MSMEs to access global markets, thereby contributing to sustainable economic development (Hess, 2023).

BOX 3.5 Connecting every school to broadband Internet for enhanced digital learning: Giga initiative in Asian landlocked developing countries

Launched in 2019 by UNICEF and ITU, the Giga initiative embodies a global ambition to connect every school to broadband Internet. This project offers open-source connectivity solutions and technical assistance for school mapping, infrastructure planning, real-time connectivity monitoring, financing solutions, and improvements to market access and procurement processes. As of November 2023, Giga has expanded its operations to 30 countries, including four Asian LLDCs: Kazakhstan; Kyrgyzstan; Mongolia; and Uzbekistan.

In **Kazakhstan**, a country where 99 per cent of schools were already connected, Giga partnered with the local government of Turkestan to extend high-speed Internet access for every child. Despite challenges posed by national procurement restrictions, investment made through Giga enabled the connection of 38 remote schools. This effort not only improved access, but it also highlighted the need for regulatory reform. The government of Turkestan advocates policy adjustments to foster greater connectivity investments.

In **Kyrgyzstan**, Giga has provided the Government with open-source solutions, including school mapping and real-time connectivity monitoring. By providing a clear picture of all schools and their corresponding connectivity on a map, the Government has renegotiated contracts, nearly halved Internet costs and doubled connection speeds, making digital learning more accessible and effective nationwide.

In **Uzbekistan**, Giga is exploring innovative business models to sustainably finance school connectivity. In collaboration with the Ministry of Education, Giga is pioneering a "schools-as-hubs" model in which schools are transformed as Internet access hubs for surrounding communities. In this model, schools receive compensation from the Internet service provider that is equal to 50 per cent of the profits raised from selling connectivity to the public in a 5 km radius. This model allows schools to cover their service fees and potentially support disadvantaged households by redistributing a portion of the profits from connectivity services.

The Giga initiative exemplifies a forward-thinking approach to leveraging technology for educational advancement worldwide. Its progress in enhancing digital access and fostering regulatory reforms and business model innovation helps to eliminate the digital divide in education.

Sources: UNICEF and ITU (n.d.). Giga – Connect every school to the Internet; UNICEF and ITU (2023a). Giga Annual Report 2022; and UNICEF and ITU (2023b). Giga expands its reach to 30 countries, advancing universal school connectivity. Accessed on 9 November 2023.

Digitalization also offers a comprehensive strategy to combat illegal, unreported, and unregulated (IUU) fishing, a key concern, which is exacerbating overfishing. As fisheries are crucial for several SIDS, generating significant revenue, accounting for as much as 50–60 per cent of government revenue in such countries as Kiribati, Nauru and Tuvalu. Globally, addressing IUU fishing could reduce losses by $26 billion annually, or 20 per cent of all wild marine catches (Sumaila and others, 2020). While technology has made IUU fishing more feasible, it also offers new conservation tools. Satellite imagery, GPS tracking, and electronic monitoring systems can enhance real-time monitoring and enforcement in fishing activities (ESCAP, 2020; Giron, 2022).

Several concrete examples highlight the effectiveness of digital solutions in addressing IUU in the Pacific. For instance, the Tuvalu Fisheries Department collaborated with the New Zealand Starboard Maritime Intelligence to complete 60 satellite scans of its exclusive economic zone as part of the World Bank-funded Pacific Islands Regional Oceanscape Program, which monitors fishing activities and identifies non-authorized vessels (Godfrey, 2022). Moreover, the Pacific Islands Forum Fisheries Agency (FFA) is exploring innovative technologies, such as Starboard and satellite radio frequency detection. These integrate electronic monitoring systems with satellite signals for real-time tracking of vessel positions and fishing activities in real-time, demonstrating promising potential in enhancing the identification and tracking of non-reporting vessels (FFA, 2022). Moreover, ensuring equitable access to digital technologies is paramount to avoid exacerbating the digital divide. Initiatives, such as the Pacific Financial Inclusion Programme (PFIP) and the Pacific Insurance and Climate Adaptation Programme (PICAP), demonstrate the potential of digital solutions to address specific needs, such as financial inclusion and climate resilience, while promoting gender equality and social inclusion (see box 3.6).

BOX 3.6 Enhancing financial inclusion through digital transformation in Asia-Pacific small island developing States

Asia-Pacific small island developing States are characterized by their small land masses, limited populations, relatively small economies and being heavily reliant on sectors, such as tourism and fisheries. These characteristics pose unique challenges in accessing formal financial services and credit. The number of borrowers from commercial banks per 1,000 adults in 2022 was 326 in Maldives, 105 in Samoa, 41 in the Solomon Islands, and 53 in Timor-Leste.[a] Thirty-two per cent of adults in Vanuatu have no access to formal or informal financial services (Nile, 2023). These underscore the critical need for innovative solutions to enhance financial inclusion and stimulate economic growth. Digital technology emerges as a pivotal leapfrogging tool, offering a pathway to broaden financial access and foster the digital economy across these dispersed island communities.

The United Nations Capital Development Fund (UNCDF), through PFIP, has been at the forefront of promoting financial inclusion across Asia-Pacific SIDS. The Programme has successfully launched projects, such as M-PAiSa mobile money service in Fiji by Vodafone Fiji in 2010, which has transformed financial transactions by allowing users to send, receive, and save money via mobile phones. As of October 2023, M-PAiSa boasts 600,000 users, representing more than two thirds of the country's population, with more than 10,000 merchants accepting payments through the service, highlighting its widespread adoption and success in enhancing financial access (Nile, 2023).

Similarly, PFIP supported ANZ Bank in promoting digital banking, leading to significant shifts in customer behaviour. The bank reported that the share of its Pacific customers using internet banking increased from 26 per cent in 2020 to 35 per cent in 2021, and the adoption of its Pacific app nearly doubled, indicating a successful transition towards digital banking solutions in the region (Price, 2021).

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BOX 3.6 *... continued*

The United Nations Capital Development Fund initiated the Pacific Insurance and Climate Adaptation Programme (PICAP) in 2021, offering micro-insurance to protect the population of Fiji against cyclones and excessive rainfall. Incorporating its Gender Equality and Social Inclusion strategy in 2022, PICAP has made strides in empowering women and people with disabilities, demonstrating the pivotal role of digital financial products in promoting gender equality and financial resilience. Micro-insurance policies developed under PICAP were offered by three insurance companies: FijiCare, Sun Insurance and Tower Insurance. In February 2023, FijiCare issued the first claim payouts via digital wallets to 559 farmers, fishers and MSME owners, amounting to more than FJ$100,000 in which nearly 50 per cent of the recipients were women and 200 people with disabilities (Cook, 2023).

The United Nations Capital Development Fund, UNDP and UNCTAD jointly introduced the Pacific Digital Economy Programme (PDEP) in April 2021, with a focus on the development of the digital economy in the Pacific SIDS. PDEP involves partnerships between these United Nations agencies with governments, central banks, private companies, and other donors. Among the success stories of PDEP is the introduction of mobile money services in Solomon Islands by Our Telekom with the support of the three United Nations agencies and the Government of Australia (Chanel and Bower, 2022; O'Grady, 2023).

Despite significant progress, the journey towards digitalization in SIDS faces substantial hurdles, including inadequate ICT infrastructure and low digital literacy levels. The average digital penetration rate in Asia-Pacific SIDS remains moderate, with Internet users and cellular subscriptions trailing regional and global averages.[b]

Governments in SIDS have launched various digitalization and digital transformation blueprints, such as the Timor Digital 2032 Strategic Plan of Timor-Leste, the Digital Fiji programme, and the Maua e-commerce platform in Vanuatu. These ambitious efforts are laying the groundwork for a digitally inclusive future. To further enhance the impact of these transformative initiatives, there is an opportunity to strengthen regulatory frameworks, ensuring they fully support and accelerate the digital transformation process. Embracing more coherent and comprehensive approaches will maximize the potential of these digital endeavours (Nile, 2023).

The Asia-Pacific SIDS are making strides towards digital inclusion and economic transformation through targeted financial inclusion initiatives and digital economy development. Success stories from Fiji and other SIDS illustrate the potential for digital technologies to overcome geographical and structural challenges, enhancing access to financial services and promoting economic growth. To sustain progress and address existing impediments, continued investment in ICT infrastructure, efforts to boost digital literacy and skills, and clear governmental strategies and regulations are essential (Massa and others, 2022; Sturm and Redeker, 2020). By embracing a holistic approach to digital transformation, Asia-Pacific SIDS can leverage their unique positions to achieve significant socio-economic advancements in the digital age.

Sources: Chanel, Sheldon and Velma Bower (2022). Q&A Lasaqa: mobile money will improve access to financial services among the underserved in Solomon Islands. UNCDF, 10 May; Cook, Elizabeth (2023). Digital financial services – a lifeline for women during disasters. UNCDF, 27 March; Massa, Isabella, and others (2022). How structural vulnerabilities impede progress towards achieving SDG 4 (Quality Education) in SIDS. Policy Brief. UN Sustainable Development Solutions Network; Nile, Md. Asad-Ur-Rahman (2023). Unleashing the potential of mobile money in Vanuatu. UNCDF, 2 October; O'Grady, Vaughan (2023). Solomon Islands operator launches mobile money service. Developing Telecoms, 13 June; and Price, Tessa (2021). The Pacific's digital answer. Bluenotes, 9 April.

a International Monetary Fund (IMF). Financial Access Survey (FAS). Available at https://data.imf.org/?sk=e5dcab7e-a5ca-4892-a6ea-598b5463a34c&sid=1390030341854. Accessed on 29 February 2024.

b World Bank, World Development Indicators database. Available at https://data.worldbank.org/. Accessed on 29 February 2024.

International support and partnerships remain indispensable to realizing sustainable development of SIDS, including efforts to curb IUU fishing through regional cooperation and the implementation of the United Nations Convention on the Law of the Sea (UNCLOS) (ESCAP, 2020). Collaborative efforts with global agencies, alongside the support from governments and the private sector, are crucial. These partnerships not only provide the necessary financial resources and technical expertise, but they also help in crafting policies that encourage innovation, protect consumers and ensure a fair and competitive digital economy in SIDS of Asia and the Pacific.

3.2 Regional cooperation for digital trade and investment

Regional cooperation plays a crucial role in leveraging digitalization in trade and investment for countries in special situations. While these countries are increasingly engaging in digital trade and investment, their presence in the global market, especially that of LDCs, remains marginal. The potential gains from liberalizing services trade, with its significant spillover benefits, underscore the importance of digital trade cooperation and coordination to establish a robust regulatory environment.

Enhancing legal and technical interoperability in digital trade

The global surge in digital trade offers a transformative potential for economies worldwide, yet countries in special situations in the Asia-Pacific region face significant barriers to full participation. These obstacles are twofold: domestically, e-commerce engagement remains low; and externally, many of these countries have not integrated digital trade provisions (DTPs) into their preferential trade agreements (PTAs), with Central Asia and South Asia notably trailing in this regard. The efficiency of digital trade facilitation, crucial for the viability of cross-border e-commerce, is compromised as a result. The complexity of embedding DTPs into PTAs, alongside the requisite for substantial resources and negotiation capabilities—often scarce in these countries—poses a challenge. Moreover, the emergence of a "noodle-bowl" of DTPs threatens to further marginalize small developing countries by complicating the digital trade landscape, with overlapping and inconsistent regulations (ESCAP, UNCTAD and UNIDO, 2023).

To address these challenges, a multifaceted approach emphasizing legal and technical interoperability is essential (Du and others, 2023). Domestically, countries in special situations can enhance their regulatory frameworks by aligning with established international standards and instruments, such as those developed by the United Nations Commission on International Trade Law (UNCITRAL) and the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT). This alignment facilitates the harmonization of electronic trade data and the documenting of exhange rules, paving the way for more streamlined cross-border digital transactions. Additionally, active engagement in multilateral and regional cooperation frameworks offer another avenue for these countries to bolster their digital trade capacities. Participation in initiatives, such as the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific (CPTA) and the World Trade Organization (WTO) Joint Statement Initiative discussions on e-commerce, can provide them with platforms for sharing best practices, accessing capacity-building resources and contributing to the development of a cohesive digital trade environment.

Furthermore, regional and subregional cooperation represents a strategic opportunity for countries in special situations to amplify their digital trade engagement. By building on existing PTAs, these countries and their regional or subregional partners can jointly establish DTPs tailored to their specific needs and constraints. Such cooperative efforts could include provisions that offer special support to MSMEs, facilitate capacity-building and enable the transfer of digital technologies. These measures are instrumental in fostering an inclusive digital trade ecosystem that not only addresses the immediate challenges faced by the countries in special situations, but also contributes to their long-term

productivity and job creation. By ensuring interoperability across agreements and incorporating differential treatment for these countries, the region can move towards a more integrated and inclusive digital trade framework (ESCAP, UNCTAD and UNIDO, 2023).

Leveraging digital foreign direct investment for digital economy development

Digital FDI is critical for facilitating the expansion of the digital economy, particularly in countries in special situations. Digital FDI can stimulate the development of digital infrastructure, promote digital adoption and foster digital businesses. However, digital FDI inflows to countries in special situations, particularly to LDCs, remain significantly lower than the global trend; only 0.1 per cent of the region's digital FDI inflows were channelled towards LDCs in 2021, primarily due to a shortage of digital skills and stringent ownership and licensing regulations (ESCAP, UNCTAD and UNIDO, 2023).

To address these challenges, enhanced digital FDI policies and partnerships are crucial. Policies aimed at improving the digital skills workforce, liberalizing ownership and licensing regulations, and promoting a conducive environment for digital businesses can attract more digital FDI. Additionally, regional initiatives that support digital infrastructure projects and cross-border digital services can further encourage investment.

Facilitating information and communications technology connectivity and rail digital transformation

Collaborative efforts can facilitate the harmonization of digital standards and regulatory frameworks, reducing barriers to digital trade and investment. For instance, the Asia-Pacific Information Superhighway (APIS) initiative aims to improve regional connectivity and digital integration, offering a platform for sharing best practices and fostering digital skills development. Its latest action plan, which runs until 2026, is a regional blueprint for the next phase of cooperative actions to bridge the digital divide and fast-tracking the digital transformation.

Regional cooperation is also indispensable for seizing opportunities in the digital transformation of rail networks. While the Trans-Asian Rail Network is expanding regional partnerships, regulatory frameworks, and interoperability are essential to fully capitalize on this opportunity. By synergizing traffic management, rail business processes, and, notably, rail border crossings and information exchange, the transport experience can be enhanced. This, in turn, allows for more and faster transport, resulting in economic benefits for the countries in the region.

3.3 Digitalization in the latest and upcoming programmes of action for countries in special situations

Digitalization is increasingly recognized as a pivotal in shaping the future of LDCs, LLDCs and SIDS. This section delves into how the latest and upcoming programmes of action for countries in special situations are incorporating digitalization as a key strategy for sustainable development. While the current programmes for LLDCs and SIDS have not fully acknowledged the role of digitalization as a driver of sustainable development due to their development in early 2010's, ongoing discussions for their forthcoming programmes are placing a strong emphasis on leveraging digital technologies to enhance productivity, job growth and economic diversification.

Digitalization in the Doha Programme of Action for the Least Developed Countries for the Decade 2022–2031

The Doha Programme of Action for the Least Developed Countries for the Decade 2022–2031[13] emphasizes the critical role of digitalization, digital technologies, and innovation in driving sustainable development within LDCs. Highlighting the potential of digital technologies to advance the Sustainable Development Goals in LDCs, the Programme integrates digitalization issues in six focus areas for action, namely (a) investing in people; (b) leveraging the power of science, technology and innovation; (c) supporting structural transformation; (d) enhancing international trade and regional integration; (e) building resilience against future shock; and (f) mobilizing international solidarity.

The Programme recognizes the necessity of robust **digital infrastructure** and calls for increased efforts to expand access to high-speed Internet and improve ICT infrastructure in LDCs, aiming to bridge the digital divide and facilitate equitable access to digital technologies.

It also emphasizes the development of **digital skills and literacy**. This includes education and training initiatives to equip individuals, especially women and girls, with the necessary skills to participate in the digital economy and benefit from digital services.

Furthermore, the Programme encourages the growth of the **digital economy** and the expansion of **e-commerce** as avenues for economic diversification and growth. It supports the creation of enabling environments for digital entrepreneurship, including legal and regulatory frameworks that foster innovation, protect intellectual property and encourage investment in digital businesses.

Recognizing the challenges posed by digital transformation, the Programme also addresses the need for **cybersecurity capabilities** to safeguard against online threats and ensure the protection of national critical infrastructure, including critical ICT infrastructure, thereby increasing cyber-resilience.

The Programme advocates the establishment of an **online university**, a pivotal initiative aimed at enhancing digital education and skills development. This online university could serve as a cornerstone for building digital literacy and expertise, thereby enabling individuals across LDCs to participate more fully in the digital economy and benefit from the opportunities it presents.

Finally, the Programme specifically underscores the role of **international cooperation** in supporting the digital transformation of LDCs. This includes financial and technical assistance, capacity-building initiatives and partnerships with international organizations, the private sector and civil society to facilitate access to digital technologies and know-how.

By integrating these elements, the Programme aims to leverage digitalization, digital technologies and innovation as powerful enablers of economic growth, social inclusion and environmental sustainability of the world's most vulnerable countries. The successful implementation of the Programme is pivotal for LDCs to overcome structural challenges, achieve their development goals and make substantial progress towards the 2030 Agenda.

13 See General Assembly resolution 76/258.

Digitalization in the Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014–2024 and the discussion for the next programme of action for landlocked developing countries

Having been developed in the early 2010s, the Vienna Programme of Action for Landlocked Developing Countries for the decade 2014–2024[14] does not focus on digitalization, digital technologies and innovation to the same extent as some later development agendas do, such as the Doha Programme of Action for Least Developed Countries. Nevertheless, the Programme acknowledges the vital role of digital infrastructure in fostering the participation of LLDCs in the global digital economy. It advocates promoting **digital bridges** to ensure access to affordable broadband and Internet services, thereby enhancing digital inclusion and connectivity.

The Programme also underscores the necessity of **partnerships** involving LLDCs, transit countries, development partners and the private sector. These collaborations are vital for mobilizing resources, facilitating technology transfer and implementing digital solutions tailored to the unique needs of LLDCs.

In sharp contrast, the next programme of action for LLDCs, to be adopted in June 2024, is expected to prominently feature the importance of digital connectivity and digital transformation. While the new programme is still being developed, the outcome of the regional final review of the Vienna Programme of Action, which was fed into the preparatory process of the next programme of action, highlighted digitalization as offering significant opportunities. For example, it noted that **digital trade in services** is among the most dynamic sectors and can facilitate LLDCs participation in international trade, especially by helping to overcome traditional trade barriers and to move more commerce online.

The forthcoming programme of action for LLDCs is expected to spotlight digital connectivity and transformation more prominently. The outcome of the Euro-Asia regional final review of the Vienna Programme of Action,[15] feeding into the preparatory process, has highlighted digitalization as a significant opportunity. It notes, for instance, that **digital trade in services** represents one of the most dynamic sectors capable of facilitating the participation of LLDCs in international trade. By helping to overcome traditional trade barriers, digitalization enables a shift towards more e-commerce, emphasizing the need for LLDCs to foster an environment conducive to the digital economy and trade.

There was a call for LLDCs to establish **supportive frameworks** that enable them to harness the advantages of the digital economy. This includes urging development and transit partners along with United Nations entities to increase their technical support for LLDCs. The focus is on developing hard and soft ICT infrastructure, in addition to the necessary legal frameworks and policies to bolster ICT development. Enhancing digital skills, promoting digital inclusion, and increasing the adoption of ICT applications and services are pivotal steps towards closing the digital divide.

These elements are essential for overcoming the geographical and infrastructural barriers LLDCs face, enhancing their competitiveness and facilitating their integration into the global economy.

14 See General Assembly resolution 69/137.

15 See the Outcome Document of the High-Level Euro-Asia Regional Review Meeting of the Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014–2024, held on 22–23 August 2023, Bangkok.

Digitalization in the SAMOA Pathway and in the discussion for the next programme of action for small island developing States

The Small Island Developing States Accelerated Modalities of Action (SAMOA) Pathway[16] is an international framework adopted in 2014 to guide the sustainable development of SIDS. It covers a broad range of priorities, such as climate change, disaster risk management and biodiversity. Similar to the Vienna Programme of Action, the SAMOA Pathway only subtly covers digitalization issues.

The Pathway calls for action to enhance the enabling environment at national and regional levels to attract investment in **ICT infrastructure** and to increase the use of ICT for education and job creation. It also recognizes that SIDS **access to appropriate technologies that are reliable, affordable, modern and environmentally sound** is critical to achieving their sustainable development objectives and fostering an environment that provides incentives for innovation and entrepreneurship, and that science, technology and innovation are essential enablers and drivers for sustainable development. The Pathway emphasizes the role of international cooperation and partnerships in this regard. Through it, the international community has reaffirmed its commitment to support SIDS to access such technologies and know-how and to increase connectivity and the use of ICT through improved infrastructure, training and national legislation, as well as public and private sector involvement.

The next programme of action for SIDS is likely to feature **digital transformation** as a critical enabler for SIDS to advance towards sustainable development and build resilience. For instance, the draft outcome document of the upcoming SIDS conference in May 2024,[17] which forms the basis of the next programme of action, recognizes that digital technologies and infrastructure are not leveraged to their full potential and that accessibility to digital technologies remains a challenge in SIDS. It, therefore, underscores the urgent need for improved access and boosted capacity to utilize digital technologies that result in transformational action.

To spread the benefits of digitalization in SIDS, the next programme of action for SIDS is expected to call for the following actions:

A Provide SIDS with the means to strengthen their science, technology and innovation capacities;

B Assist SIDS in developing digitalization and science, technology and innovation road maps and building capacities for key technologies, including digital technologies;

C Develop enabling policies and legislation for digital transformation, infrastructure enhancement and leveraging emerging technologies;

D Support the SIDS Centre of Excellence in efforts to promote innovation and technology exchange, capacity-building, and the narrowing of the digital divide;

E Create digital solutions for SIDS to improve commerce, addressing remoteness and structural constraints;

F Build capacity to access new and emerging technological innovations and improve digital literacy and skills for inclusive access to services and economic opportunities; and

G Engage in Global Digital Compact discussions for actions that use digital technologies to achieve Sustainable Development Goals, bridge the digital divide, and ensure a secure, inclusive digital future for SIDS.

These actions should enable SIDS to overcome their unique challenges, including geographical isolation and vulnerability, and to achieve sustainable development through the effective use of ICT.

16 See General Assembly resolution 69/15 .
17 See Zero Draft Outcome Document: Fourth International Conference on Small Island Developing States.

3.4 Conclusion

A few key policy considerations distilled from the experiences and current focused areas of Asia-Pacific LDCs, LLDCs and SIDS, as discussed in this chapter, are as follows:

A Formulate clear digitalization and digital transformation strategies;

B Strengthen policy coordination;

C Develop ICT infrastructure in partnership with the private sector;

D Provide incentives to promote digital businesses, particularly for MSMEs;

E Improve digital skills through education and training.

Regional platforms can support the negotiation of fair and inclusive digital trade agreements that reflect the interests and capacities of countries in special situations. Promoting digital FDI through regional partnerships can also drive innovation and competitiveness in the digital sector, providing the necessary capital and expertise to nurture a vibrant digital ecosystem.

The Doha Programme of Action for Least Developed Countries for the Decade 2022–2031 positions digitalization as essential for the sustainable development of LDCs, emphasizing the need for digital infrastructure and literacy. Upcoming global conferences for LLDCs and SIDS provide a critical juncture to highlight digitalization's role in these countries' development and to reaffirm the international community's support for their digital transformation.

In conclusion, digitalization offers a pathway to accelerated development and enhanced connectivity for LDCs, LLDCs and SIDS. However, unlocking its potential requires carefully crafted policy interventions at the national level, complemented by regional and international cooperation. This strategic approach is vital to address the multifaceted challenges of digital transformation and to ensure that the process is inclusive, sustainable, and beneficial for all. The implementation of the relevant global programmes of action for these countries can further facilitate concerted efforts. By embracing these approaches, countries in special situations can leverage digitalization as a powerful tool for achieving the Sustainable Development Goals and fostering long-term economic resilience.

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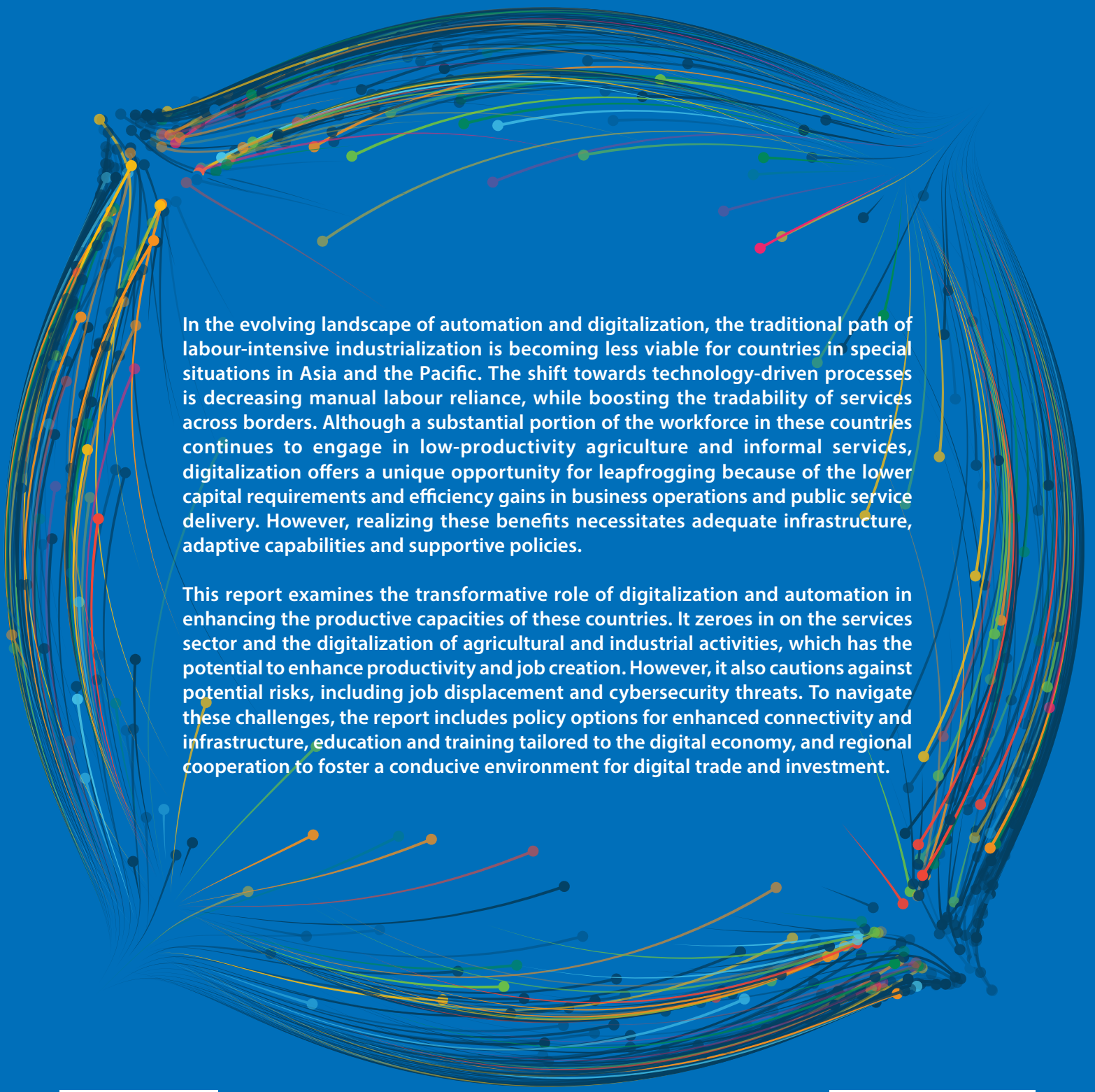

In the evolving landscape of automation and digitalization, the traditional path of labour-intensive industrialization is becoming less viable for countries in special situations in Asia and the Pacific. The shift towards technology-driven processes is decreasing manual labour reliance, while boosting the tradability of services across borders. Although a substantial portion of the workforce in these countries continues to engage in low-productivity agriculture and informal services, digitalization offers a unique opportunity for leapfrogging because of the lower capital requirements and efficiency gains in business operations and public service delivery. However, realizing these benefits necessitates adequate infrastructure, adaptive capabilities and supportive policies.

This report examines the transformative role of digitalization and automation in enhancing the productive capacities of these countries. It zeroes in on the services sector and the digitalization of agricultural and industrial activities, which has the potential to enhance productivity and job creation. However, it also cautions against potential risks, including job displacement and cybersecurity threats. To navigate these challenges, the report includes policy options for enhanced connectivity and infrastructure, education and training tailored to the digital economy, and regional cooperation to foster a conducive environment for digital trade and investment.

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