INFORMATION AND COMMUNICATIONS TECHNOLOGY
AND DISASTER RISK REDUCTION DIVISION

The Digital Divide and COVID-19

Impact on the Socioeconomic Development in Asia and the Pacific

Yongwang Liu
Zhenxiong Fan

ESCAP WORKING PAPER SERIES

June 2022

UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific

Please cite this paper as: Mr. Yongwang Liu, Zhenxiong Fan. (2022). The Digital Divide and COVID-19: Impact on the Socioconomic Development in Asia and the Pacific. United Nations ESCAP, Information and Communications Technology and Disaster Risk Reduction Division(IDD), June 2022. Bangkok.

Available at: http://www.unescap.org/kp
Tracking number: ESCAP / 5-WP / 40

About the main author: This study is prepared by Mr. Yongwang Liu, a senior engineer from the China Acadamy of Information and Communications Technology. He has nine year experience in the ICT sector, especially in ICT infrastructure development and international cooperation. He has finished several studies and consulting projects on national and regional ICT development policies and network planning in the past years.

Acknowledgements

This report was prepared by Mr. Yongwang Liu for the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), who is working at the China Academy of Information and Communications Technology (CAICT), on supporting the implementation of the Asia-Pacific Information Superhighway (AP-IS) initiative.

Substantive comments were provided by Tae Hyung Kim, Siope Vakataki ‘Ofa, Chang Yong Son, Zhenxiong Fan and Edward Kim of the Information and Communications Technology and Development Section under the guidance of Tiziana Bonapace, Director, Information and Communications Technology and Disaster Risk Reduction Division of ESCAP.

In addition, substantive comments were provided by Dr. Hui Chen, Head, China Academy of Information and Communication Technology, China. The paper is financially supported by the China-ESCAP Coopeation Programme (CECP) fund. Tarnkamon Chantarawat and Sakollerd Limkriangkrai also provided administrative support for the issuance of this report.

June 2022

Table of Contents

Executive Summary

The COVID-19 pandemic has caused a global economic recession. As the COVID-19 pandemic spread to every part of the world, governments released policies to restrict people`s socio-economic activities to limit the spread of COVID-19. The pandemic and related measures have great impact to consumption, investment, manufacture, trade among socioeconomic activities which lead to slow economic growth and even recession. During the COVID-19 pandemic, some activities changed to online from offline which has resulted in unprecedented growth of Internet traffic. Most of Internet traffic are carried by broadband network, and global Internet bandwidth rose by 35 percent in 2020 which was the largest one-year increase since 2013. The COVID-19 pandemic demonstratesd the critical importance of telecommunications and the information and communications technology (ICT) infrastructure in the continuation of businesses, governments, and education.

Digital divide may make negative impact on vulnerable groups, in particular the people without access to Internet, who are more likely to suffer losses as lack of effective digital tools to deal with the various constraints caused by COVID-19 pandemic. Firstly, Older people aged above 60-year-old who are not familiar to using internet may have more damages from the COVID-19 impact. The ratio of Internet users of older age groups above 60-years-old, are obviously less than younger age groups, in some countries, such as China and Japan. Fortunately, digital gap between different age groups has drawn attention of governments and international communities. Secondly, the ratio of female and male in using internet becomes close in most of ESCAP member countries. In 18 selected Asia-Pacific countries which the data are available, 4 countries which the percentage of female using internet are higher than that of male, while 14 countries which the percentage of female using internet are less than that of male, but the numbers are very close in most of countries. Female working in cutting-edge and emerging digital ICT sectors, for example Artificial Intelligence research, is still lagging behind male. Thirdly, mobile network coverage gap between urban and rural areas becomes narrow. According to Global System Mobile Association (GSMA), by 2020 the mobile broadband has covered 94 per cent world population, and the remaining uncovered areas tend to live in sparely populated with difficult terrain. Fourthly, small and medium-sized enterprises (SMEs), and traditional manufacturing firms could not fully benefit digital technologies applications in the midst of the pandemic. Almost all enterprises are using digital technology and services to enhance operation management, improve product quality, and promote marketing during the pandemic, however, not all enterprises have the same resources to face the challenges. It seems clear that SMEs and traditional manufacturing firms have been adversely affected, while enterprises adopted digitalization is slightly affected by COVID-19 pandemic.

Digital transformation toward a digital economy with emphasis on digital connectivity, digital technology applications and digital data has become a key to achieving economic recovery and promoting sustainable development. The COVID-19 pandemic once again reminds us how digital readiness could preferably equip a country with resources to cope with crisis and resilience for future recovery. During the pandemic, digital technologies are increasingly integrated into all aspects of economy and society, which people's daily necessaries, such as shopping, entertainment, education, and work, quickly changed from offline to online. Digital economy has made contributions in economy sustainable development as well as reducing the risk of COVID-19 by untouched economic actives. According to China Academy of Information and Communications Technology`s (CAICT) digital economy development report, the average annual increase rate of 47 selected countries` GDP was -2.8 per cent, whilst the digital economy of those countries increased at 3.0 per cent in nominal terms in 2020.

COVID-19 demonstrates that regional cooperation is the key to overcoming global challenges. United Nations called for member countries strengthening cooperation in addressing the COVID-19 pandemic and its extensive negative impacts. Some countries, such as China, the United States of America, Japan, Korea (Rep. of), have donated hundreds of millions of vaccine doses through bilateral and multilateral supply agreements, which is a good example of coping with common challenges by cooperation. As for digital divide, ESCAP and its member states have been implementing activities to improve connectivity and bridge the gap by cooperation. However, there are still some challenges, for example low priority of ICT projects in financial support, that need to be addressed.

As the COVID-19 pandemic steps into stage of “the new normal”, the ICT infrastructure plays more vital role in personal and national actives. Governments, international organizations, private sectors, and other stakeholders should work together to bridge the digital divide and provide universal and affordable

ICT services for socio-economic sustainable development. ESCAP could help member states to raise awareness of digitalization through AP-IS platform, provide a platform to encourage member countries to share the experience and best practice, and contribute to regional ICT project coordination and cooperation. Member countries could update their digital transformation strategies to promote digital economy development and lift the priority of ICT infrastructure projects in international cooperation and investment. Private sector and other stakeholders could develop a set of measures to narrow digital gaps between different groups and accelerate the digital transformation.

Keywords: Digital Divide, Digital Transformation, Digital Economy, Regional Cooperation

1.Introduction

1.1 Background

The COVID-19 pandemic leads tohas caused a global economic recession

As the COVID-19 pandemic spread to every part of the world, governments issued policies that fully or partially restricted people's socioeconomic activities to limit the spread of COVID-19, which included lockdown of shops and buildings, closure of schools and non-essential business, and travel restrictions. Measures imposed to control the pandemic have greatly impacted consumption, investment, manufacture, trade and various socioeconomic activities, and have resulted in slow economic growth and even recessions. COVID 19 pandemic spread to every part of the world, governments released policies to fully or partly restrict people`s activities to limit the spread of COVID-19, such as lockdowns, closure of schools and non-essential business, and travel restrictions. The pandemic and government measures have great impact to consumption, investment, manufacture, trade among socioeconomic activities which lead to slow economic growth and even recession.

According to the World Bank, report[1] , the COVID-19 pandemic has, with alarming speed, delivered a global economic shock of enormous magnitude, leading to steep recessions in many countries. The cross-border spillovers have disrupted financial and commodity markets, global trade, supply chains, travel, and tourism. The global gross domestic product (GDP) in 2020 decreased to minus 3.36 per cent in 2020, compared to about 3 per cent between between 2015 and 2019 (Figure 1-1).

The United Nations World Tourism Organization (UNWTO) reporteds that almost all countries have implemented travel restrictions of one sort or another, such as travel bans, visa controls and quarantines. As a result, international tourism was almost totally suspended in April and May of 2020. Inbound tourist arrivals declined 74 per cent between January and December 2020, which amounted to an equivalent of about 1 billion trips not taken. However, if the pre-COVID months of January and February 2020 wereare excluded, the fall in arrivals amounteds to 84 per cent[2]. For example, in Thailand, where tourism is an important sector, the tourist arrivals declined by 83 per cent in 2020 compared with 2019.

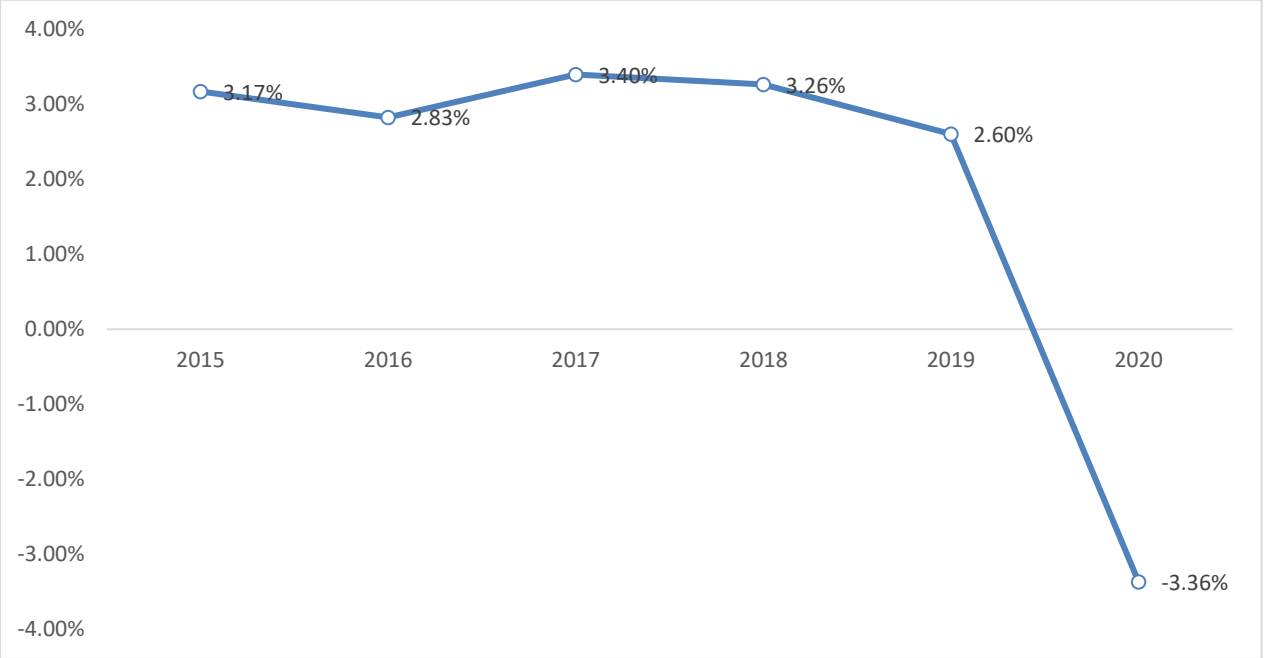
The United Nations Conference on Trade and Development (UNCTAD) estimated that global online retail sales' share of total retail sales increased from 16 per cent to 19 per cent in 2020, compared to a 2 per cent rise between 2018 and -2019. Due to COVID-19, the world witnessed a spike in demand for online goods ordering –: when overall retail sales declined by 1 per cent in 2020, online retail grew by 22 per cent in selected countries, including Australia, Canada, China, Republic of Korea (Rep. of), Singapore, United Kingdom, and United States of America.[3]

Figure 1-1: Global GDP annual growth rate

[1] World Bank, "Global Economic Prospects(2020)",June 2020, World Bank. Available at https://www.worldbank.org/en/publication/global-economic-prospects.

[2] UNCTAD, *COVID-19 and Tourism: An Update* (Geneva, 2021). Available at https://unctad.org/system/files/official-document/ditcinf2021d3_en_0.pdf.

[3] UNCTAD, "Estimates of Global e-Commerce 2019 and Preliminary Assessment of COVID-19 Impact on Online Retail 2020", UNCTAD Technical Notes on ICT for Development Issue No. 18, 2021. Available at https://unctad.org/system/files/official-document/tn_unctad_ict4d18_en.pdf.



Source: Produced by ESCAP using World Bank's data.

The COVID-19 Pandemic Highlights the Importance of Digital Technology

During the COVID-19 pandemic, some activities moved online, resulting in unprecedented growth of Internet traffic. While most data networks have seen an annual growth of 30 to 45 per cent, in some countries there have been increases of up to 40 per cent from previous data usage levels in a few weeks.[4] Fox example, in New Zealand, upstream traffic increased significantly (almost 60 per cent) because of video meetings during lockdowns (Figure 1-2). In the lockdown stage, mobile data traffic in Pakistan increased by approximately 22 per cent, while the industry managed to ensure network resilience and provide uninterrupted telecommunications services.

According to the Global Internet Phenomena Report[5], Internet traffic grew almost 40 per cent between February and April 2020, especially upstream traffic from online streaming videos, social networking, online study, online gaming and online shopping. Most Internet traffic has been carried by broadband networks and most telecom operators have successfully coped with traffic spikes without impacting network performance and quality. UNCTAD's Digital Economy Report 2021 pointed out that against the backdrop of the COVID-19 pandemic, global Internet bandwidth rose by 35 per cent in 2020, the largest one-year increase since 2013. It has been estimated that about 80 per cent of all Internet traffic relates to videos, social networking and gaming[6].

The COVID-19 outbreak has had an adverse impact on national and global economies and the social lives of people worldwide. The pandemic demonstrates the critical importance of telecommunications and the information and communications technology (ICT) infrastructure in the continuation of businesses, governments and education, and has accelerated ICT development and brought more opportunities to ICT infrastructure and application development, such as broadband and cloud services. Many countries, such as China, Republic of Korea, Malaysia and United States of America, have updated their digital strategy or roadmap for economic recovery and growth(Table 1-1). In March 2021, China adopted the proposals for formulating the 14th Five-Year Plan and Vision 2035 Targets to initiate the preparation of its economic plan for the next five years.[7] In July 2020, the Republic of Korea released a New Deal, focusing on the digital and green fields, covering 10 key fields and creating 1.9 million jobs.[8] In October 2020, the United States of America launched the National Strategy for Critical

[4] ITU, *Pandemic in the Internet Age: Communications Industry Responses* (Geneva, 2020). Available at https://reg4covid.itu.int/wp-content/uploads/2020/06/ITU_COVID-19_and_Telecom-ICT.pdf.

[5] Sandvine, "2020 COVID Internet Phenomena Spotlight Report", May 2020. Available at https://www.sandvine.com/covid-internet-spotlight-report.

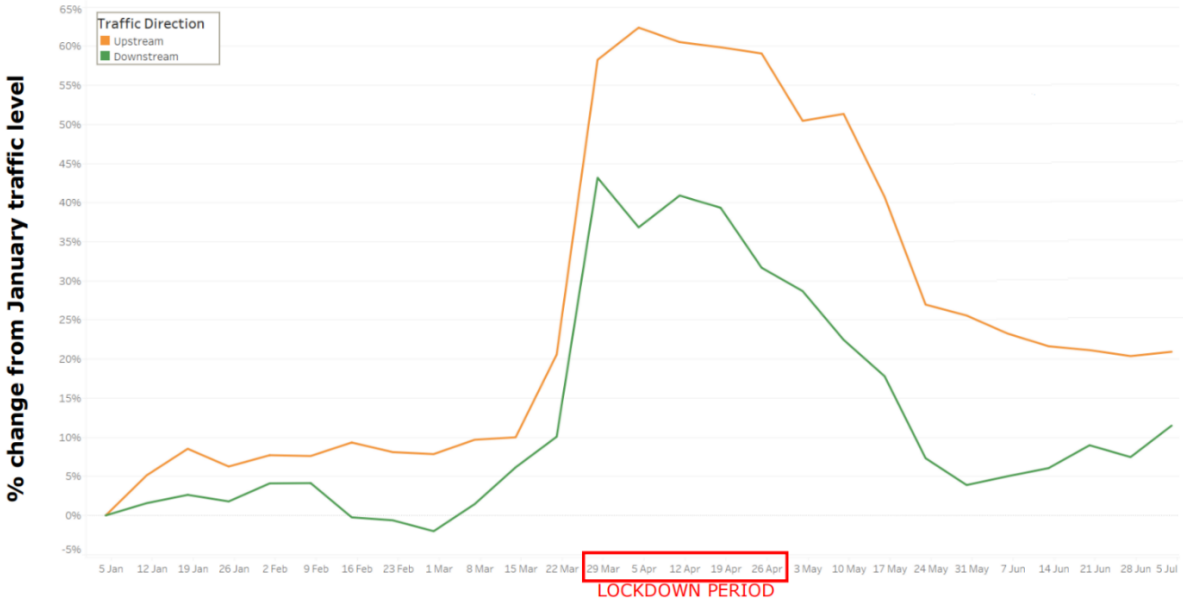
[6] UNCTAD, *Digital Economy Report 2021* (Geneva, 2021). Available at https://unctad.org/webflyer/digital-economy-report-2021.

[7] State Department of People's Republic ofChina. *14th Five-Year Plan and Vision 2035 Targets*. Available at http://www.gov.cn/xinwen/2021-03/13/content_5592681.htm.

[8] Ministry of Economy and Finance, Government of the Republic of Korea, "Government Releases an English Booklet on the Korean New Deal", 28 July 2020. Available at https://english.moef.go.kr/pc/selectTbPressCenterDtl.do?boardCd=N0001&seq=4948.

and Emerging Technologies to ensure global leadership in key technology sectors.[9] In February 2020, the European Union released the European Data Strategy to strengthen Europe's data sovereignty and become a model of global data governance and a leader in digital standards.[10]

Figure 1-2: Changes in Internet traffic during the lockdown period in New Zealand



Source: Chorus, "Q4 FY20 Connections Update Report", July 2020.

Table 1-1: National strategies and policies issued during the COVID-19 pandemic

No.	Country	Strategy	Date issued	Keywords
1	China	14th Five-Year Plan and Vision 2035 Targets	March 2021	Accelerate digital development and building digital China, including digital economy, digital society, and digital government
2	Republic of Korea	Korean New Deal	July 2020	With the amin to accelerate the transition towards a digital economy, investment will focus on the integration of data, network, and Artificial Intelligence (AI), promoting contactless industry, and digitalizing the social overhead capital.
3	United States of America	National Strategy for Critical and Emerging Technologies	October 2020	The United States will proactively lead in critical and emerging technologies (C&ET) by promote and protect National Security Innovation Base. Advanced computing, AI, communication, and networking technologies are in the list of C&ET.
4	Malaysia	Malaysia Digital Economy Blueprint	February 2021	Transform Malaysia into a digitally-driven, high income nation and a regional leader in digital economy. The key strategies include digital transformation in the public sector, boosting economic competitiveness through digitalisation, build enabling digital infrastructure, digital talent, and digital society.
5	European Union	European Data Strategy	February 2020	Aims to make the EU a leader in a data-driven society by creating a single market for data. Data can flow freely within the EU and across sectors.

Source: produced by ESCAP, see footnotes for detailed sources.

The digital divide may limit some groups' ability to cope with the recession

As mentioned previously, the lockdowns have led to dramatic increases in Internet traffic, which have raised demands for high-speed networks and other ICT infrastructures. However, ICT development has

[9] President of the United States of America, "National Strategy for Critical and Emerging Technologies", October 2020. Available at https://trumpwhitehouse.archives.gov/wp-content/uploads/2020/10/National-Strategy-for-CET.pdf.

[10] European Commission, "European Data Strategy". Available at https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en.

been uneven, and the digital divide has been documented for 30 years along with changes in ICT development from fixed telephone to mobile voice and then broadband.

The Organisation for Economic Co-operation and Development (OECD) defines the "digital divide" as the gap between individuals, households, businesses and geographic areas at different socioeconomic levels with regard both to their opportunities to access ICTs and to their use of the Internet for a wide variety of activitie. [11] The United Nations emphasized bridging the digital divide in the Sustainable Development Goals, with the target to "significantly increase access to ICTs and provide universal and affordable access to the Internet in least developed countries by 2020".

In Asia and the Pacific, the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) has conducted a series of studies on the digital divide to identify the challenges. For example, a report[12] pointed out that broadband speed during the COVID-19 pandemic varied significantly between Asia-Pacific subregions and between countries. Countries with low-speed broadband may not be able to adequately participate in various online activities such as teleworking or remote learning during the pandemic. Some vulnerable groups such as older persons, females, small and medium-sized enterprises (SMEs) and traditional manufacturing enterprises are more likely to suffer losses due to their lack of access to effective digital tools to deal with the various constraints caused by the pandemic.

1.2 Objectives

The key objectives of the study are to analyse the impact of the digital divide on different groups of people, enterprises and economies during the COVID-19 pandemic using trusted data; share some best practices to narrow digital gaps in Asia-Pacific countries; and provide suggestions and recommendations for policymakers to bridge the digital divide and accelerate digital transformation towards a digital economy.

1.3 Methodology

The study analyses and compares digital access and digital usage of different groups of people, such as older persons and youth, females and males, and people living in rural and urban areas, using datasets from the International Telecommunication Union (ITU) and the Global System for Mobile Communications Association (GSMA). The study also reviews reports and papers related to the impact of COVID-19 on socioeconomic development, people's daily life, enterprise operation and regional cooperation, as well as case studies and best practices from governments, enterprises and individuals on how they have responded to COVID-19 and reduced the digital divide. Based on these analyses, a summary of the findings and recommendations for policymakers are presented in this paper.

[11] OECD, "Understanding the Digital Divide", OECD Digital Economy Papers No. 49, 2001. Available at https://www.oecd-ilibrary.org/science-and-technology/understanding-the-digital-divide_236405667766.

[12] Siope Vakataki 'Ofa and Cristina Bernal Aparicio, "Visualizing Broadband Speeds in Asia and the Pacific", AP-IS Working Paper No. 02/2021, ESCAP, May 2021. Available at https://www.unescap.org/kp/2021/visualizing-broadband-speeds-asia-and-pacific-0.

2.The Digital Divide and Vulnerable Group

As COVID-19 spreads across the globe, digital services have become vital tools for sharing information about the pandemic, supporting livelihoods, and enabling remote access to critical services such as health care and education. [13]

2.1 Older persons are less likely to use the Internet than youth

With the rapid development of digital technologies and the Internet in recent years, many older persons have been left behind due to the lack of digital skills, slow assimilation of new technology, and weakened bodily functions such as hearing and vision.

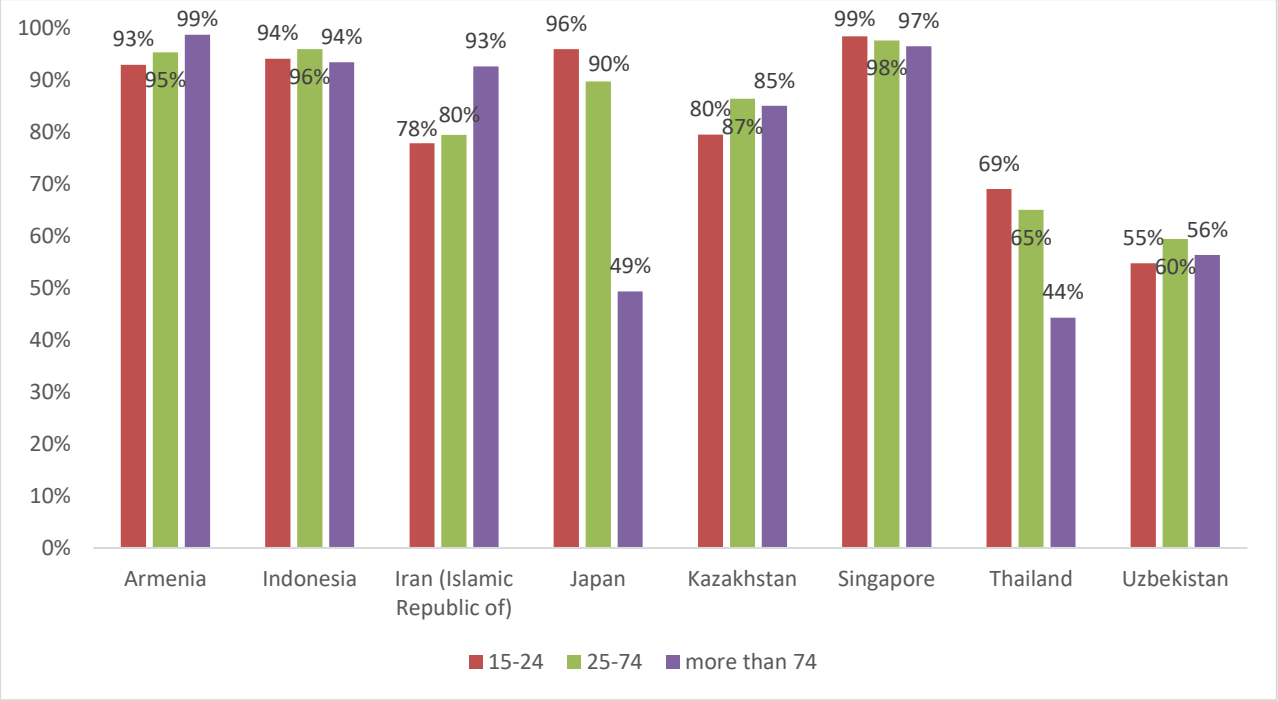
As Figure 2-1 shows that there is no significant difference in Internet use among people of different age groups in some Asia-Pacific countries, including Armenia, Indonesia and Singapore. However, in Japan and Thailand, Internet use among those over

However, some vulnerable groups such as older persons and females with limited access to the Internet due to unaffordable network fees, low Internet-enabled handset ownership and lack of digital skills may be left behind.

74 years old is obviously lower when compared with other age groups. For example, in Japan, 96 per cent of the youth age group are using the Internet, compared with only 49 per cent of those over 74 years old.

Specifically, a survey conducted by the Ministry of Internal Affairs and Communications in Japan shows that the percentage of those using the Internet in the age groups below 60 years old are almost the same at above 90 per cent, while among older persons aged over 60 years, there is a sharp decline in Internet usage with age (Figure 2-2).

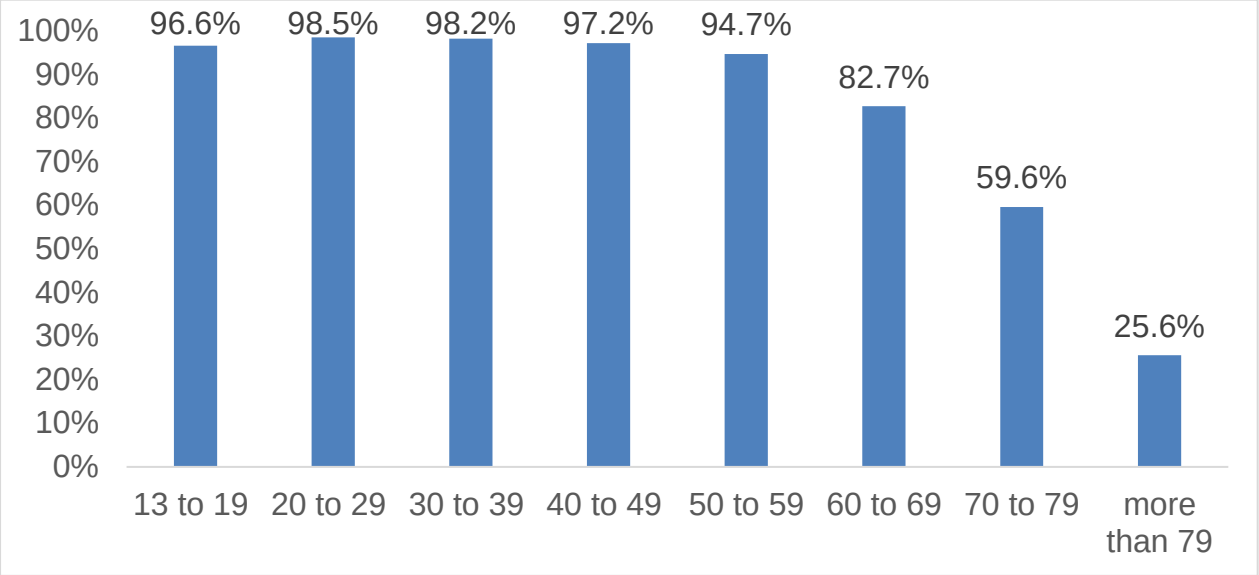
Figure 2-1 Individuals Using Internet by ages



Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database 2021", July 2021.

Figure 2-2: Individuals using the Internet by age group in Japan

[13] Dominica Lindsey, "Why COVID-19 has increased the urgency to reach women with mobile technology", GSMA, 20 April 2020. Available at https://www.gsma.com/mobilefordevelopment/blog/why-COVID-19-has-increased-the-urgency-to-reach-women-with-mobile-technology/.

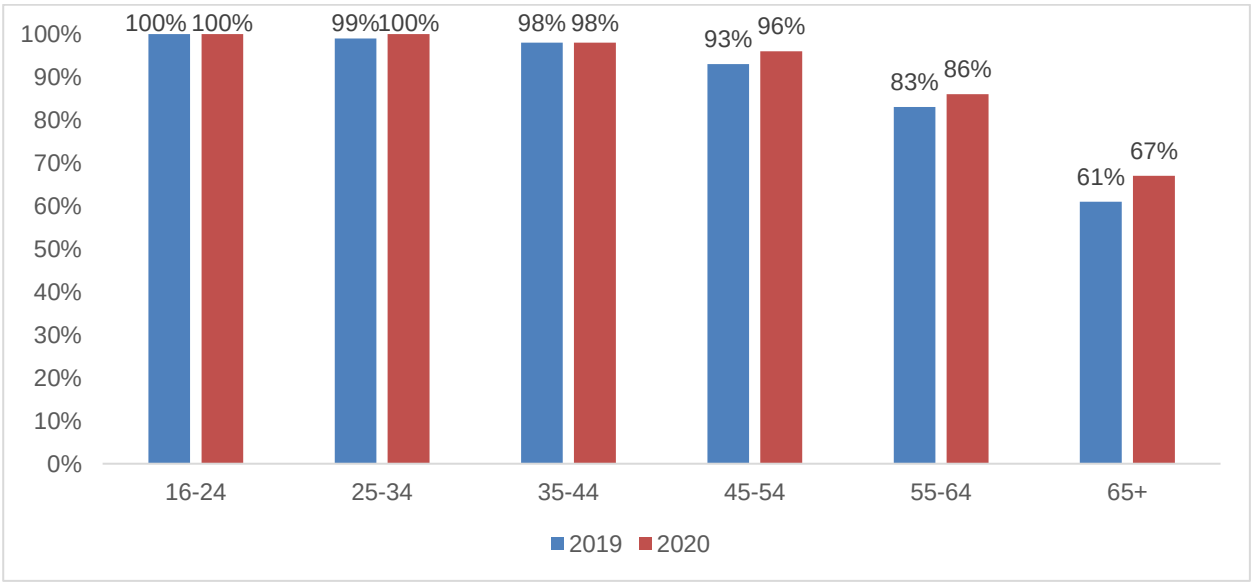


Source: Ministry of Internal Affairs and Communications, Government of Japan, July 2021.

A similar trend is found in the case of the United Kingdom(Figure 2-3). Since the survey began in 2011, the older persons group has consistently been the lowest users of the Internet, although the proportion of people using the Internet daily (or almost every day) has been increasing in all age groups. Interestingly, in the past two years since the start of the COVID-19 pandemic, Internet usage among those aged above 65 years old has increased more rapidly than others.[14]

According to an ITU report, the age digital divide is a global problem, with young people more connected than the rest of the population as 71 per cent of the world's youth (aged between 15 and 24 years) are using the Internet compared with 57 per cent of the other age groups.[15]

Figure 2-3: Percentage of people using Internet daily or almost every day by age group in the United Kingdom in 2019 and 2020



Source: Office for National Statistics, United Kingdom, "Labour Force Survey", 2020.

2.2 Case: China promotes websites and mobile applications to provide age-friendly

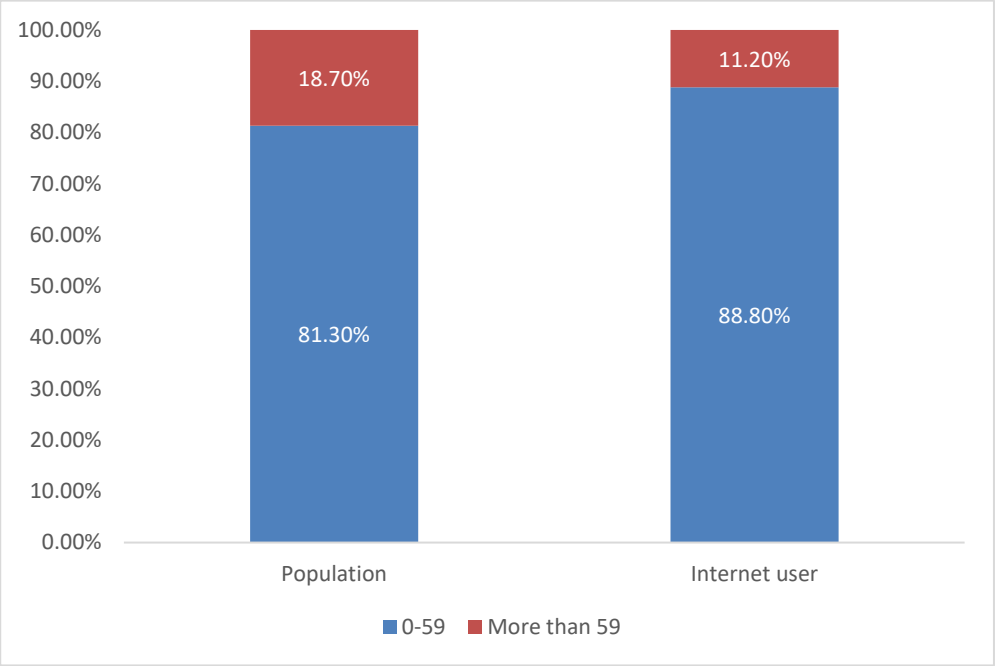
[14] Office for National Statistics, United Kingdom, "Internet users, UK: 2019", 24 May 2019. Available at https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2019#generation-gap-narrowing-in-recent-internet-use.

[15] ITU, "Measuring digital development: Facts and figures 2021", 2021. Available at https://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx.

services

According to the results of China's seventh population census conducted in 2020, there are 264 million people aged 60 years and above, which account for 18.5 per cent of China's total population, and 13.5 per cent of China's population are over 65 years old.[16] According to United Nations standard, China is considered an ageing society. Internet users aged over 60 years old only account for 11.2 per cent of total Internet users in China by the end of 2020.[17] There is a 7.5 percentage point gap between Internet users and the population in the above 60-years age group (Figure 2-4). Fortunately, the percentage of Internet users among this age group is increasing from 3.9 per cent[18] in 2015 to 11.2 per cent in 2020.[19]

Figure 2-4: Comparison of the percentages of older persons in the population and Internet users in China in 2020



Produced by ESCAP based on data from National Bureau of Statistics of China and China Internet Network Information Center.

With the Government of China's priority to digitalize public services, an increasing number of services from health, ticketing and entertainment have become available online. Most of the digital platforms integrate serval types of services. For example, WeChat, one of the most popular social networking applications in China, offers instant messaging, audio/video calls, payment services, online shopping and ticketing services on their platform, but these applications seem too complicated for many older persons. With the COVID-19 pandemic, however, some applications for COVID-19 prevention, such as Healthy QR Code and Travel Itinerary Card, are indispensable. The inability to use these applications can restrict older persons' access to essential services.

In order to ensure that older persons enjoy the benefits of digital technologies and the Internet, the State Council, China's Cabinet, issued a guideline in 2021 that called for a three-year campaign to help older persons cross the digital divide and enjoy the benefits of intelligent technology. The Ministry of Industry and Information Technology of China is taking measures to push age-friendly Internet websites and mobile applications development. Today, more than 100 mobile applications have launched age-friendly versions, with improved user

[16] National Bureau of Statistics, China, "The 7th National Population Census Communiqué (No. 5)", 11 May 2021. Available at http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/202106/t20210628_1818824.html.

[17] China Internet Network Information Center, "The 47th Statistical Report on China's Internet Development", February 2021. Available at https://www.cnnic.com.cn/IDR/ReportDownloads/202104/P020210420557302172744.pdf.

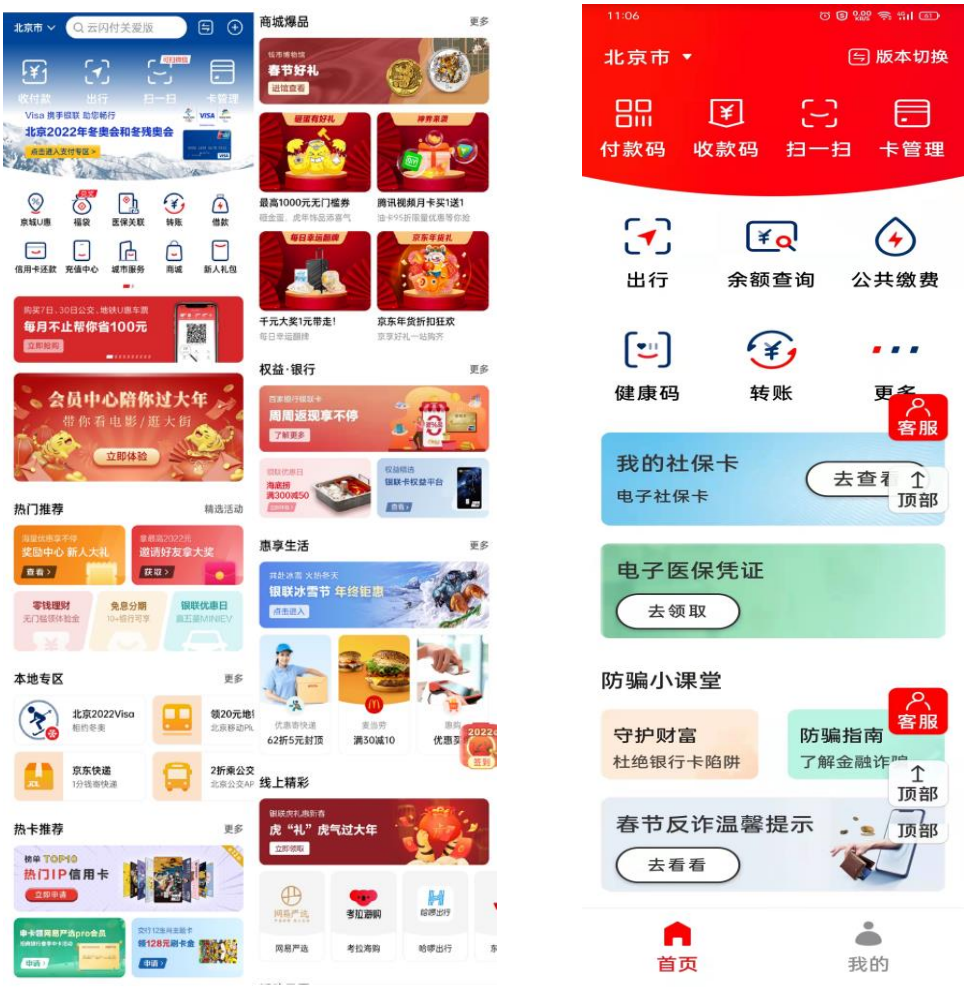
[18] China Internet Network Information Center, "The 37th Statistical Report on China's Internet Development", January 2016. Available at http://www.cnnic.com.cn/IDR/ReportDownloads/201604/P020160419390562421055.pdf.

[19] China Internet Network Information Center, "The 47th Statistical Report on China's Internet Development", February 2021. Available at https://www.cnnic.com.cn/IDR/ReportDownloads/202104/P020210420557302172744.pdf.

interfaces and larger icons and font size.[20]

For example, China UnionPay is a Chinese financial services corporation headquartered in Shanghai, China. It provides bank card services and a major card scheme in mainland China. Founded on 26 March 2002, China UnionPay is an association for China's banking card industry, operating under the approval of the People's Bank of China (PBOC, central bank of China). In the "special care version" of the UnionPay Android application, the home page has been streamlined to contain just a few icons and functions(Figure 2-5), retaining only the business entrances commonly used by the elderly, such as "account inquiry", "money transfer" and "card management". It contributes to older users' access to mobile financial services easily.

Figure 2-5: Comparison of standard and special care versions of the UnionPay Android application's home page



(a) The standard version (b) The Special Care Version

Source: screenshot of Standard Version of andriod application 9.0.8 on 7 February 2022

2.3 The gender digital divide in most ESCAP member countries has narrowed

Digital technology has the power to create connections, foster learning, accelerate financial transactions and provide life-saving information. However, barriers such as cost, harassment, and the lack of security, trust and technical literacy all contribute to the fact that women in developing countries are less likely to have access to the Internet and digital services than men.[21] As the COVID-19 pandemic spreads globally, people spend more time at home and women tend to be responsible for most of the domestic work. A broadband connection can support women during the current global crisis in several ways, including: online medical advice or remote video consultations with doctors, keeping in touch with friends and relatives during isolation, using mobile finance services, online educational content to support children with home schooling, and online shopping for essential products.[22]

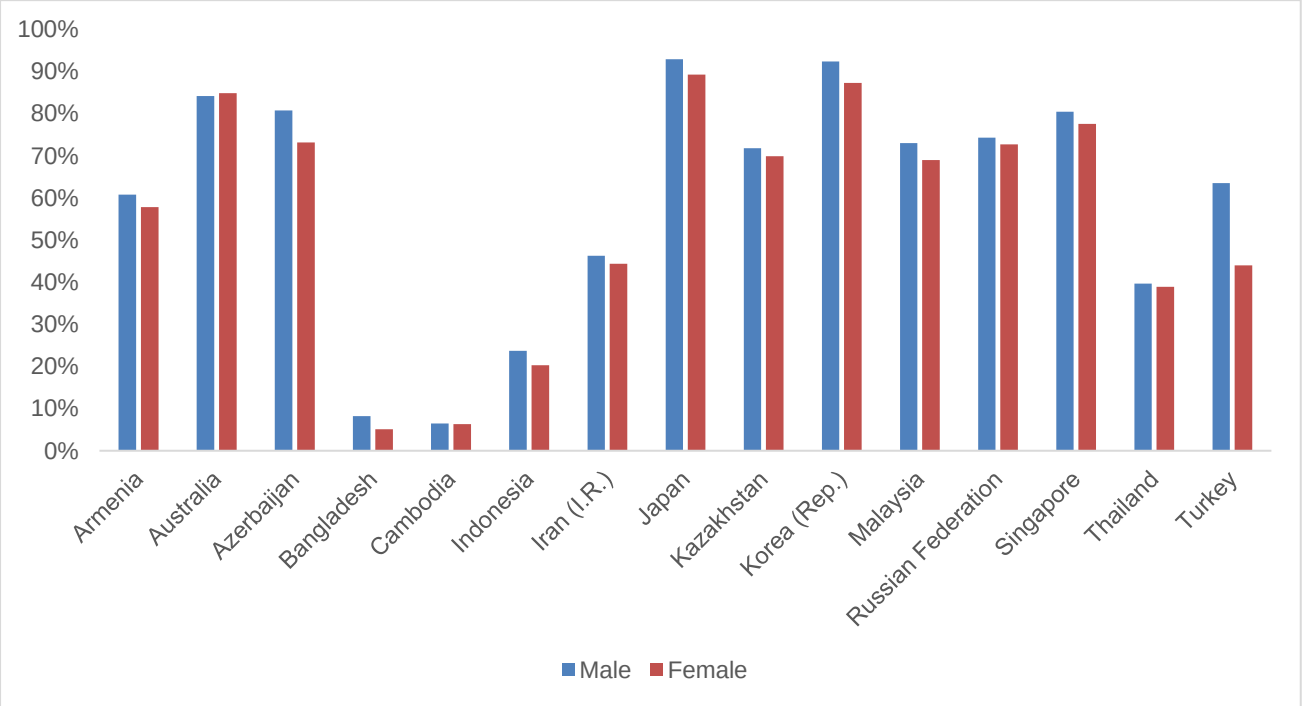
[20] Huanqui, "China's Elderly Embrace Big Tech Products", 15 July 2021. Available at https://en.huanqiu.com/chinas-elderly-embrace-big-tech-products/.

[21] U.S. Global Development Lab, "Closing the digital gender gap". Available at https://www.usaid.gov/sites/default/files/closing_the_digital_gender_gap.pdf.

[22] Dominica Lindsey, "Why COVID-19 has increased the urgency to reach women with mobile technology", GSMA, 20

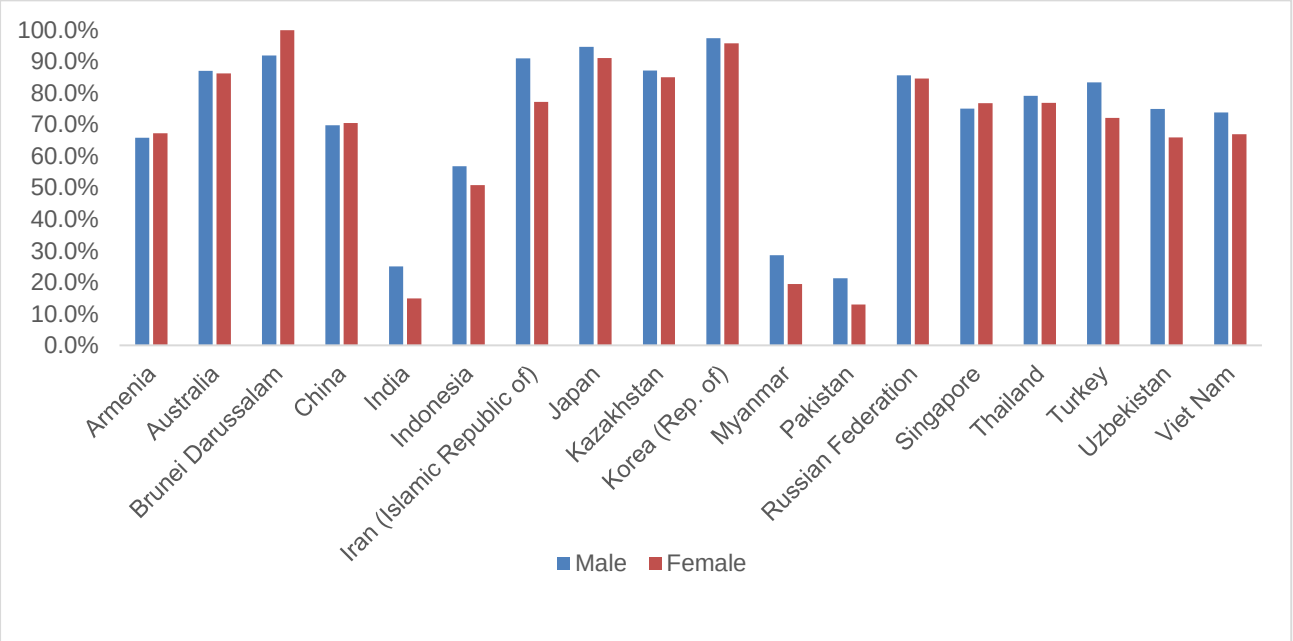
The figures display the ratio of individuals using Internet had increased both male and female from 2015 to 2020. In 2020, there were four countries of 18 data available countries, which the percentage of female using internet were higher than that of male, while in other 14 countries, the percentage of female using internet were lower than that of male. It is evident that gender digital divide is still here but the ratio of female and male in using internet are becoming close in most of countries(Figure 2-6, Figure 2-7).

Figure 2-6: Individuals using the Internet by gender in 2015



Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database", July 2017.
Note: Most data is from 2015.

Figure 2-7: Individuals using the Internet by gender in 2020



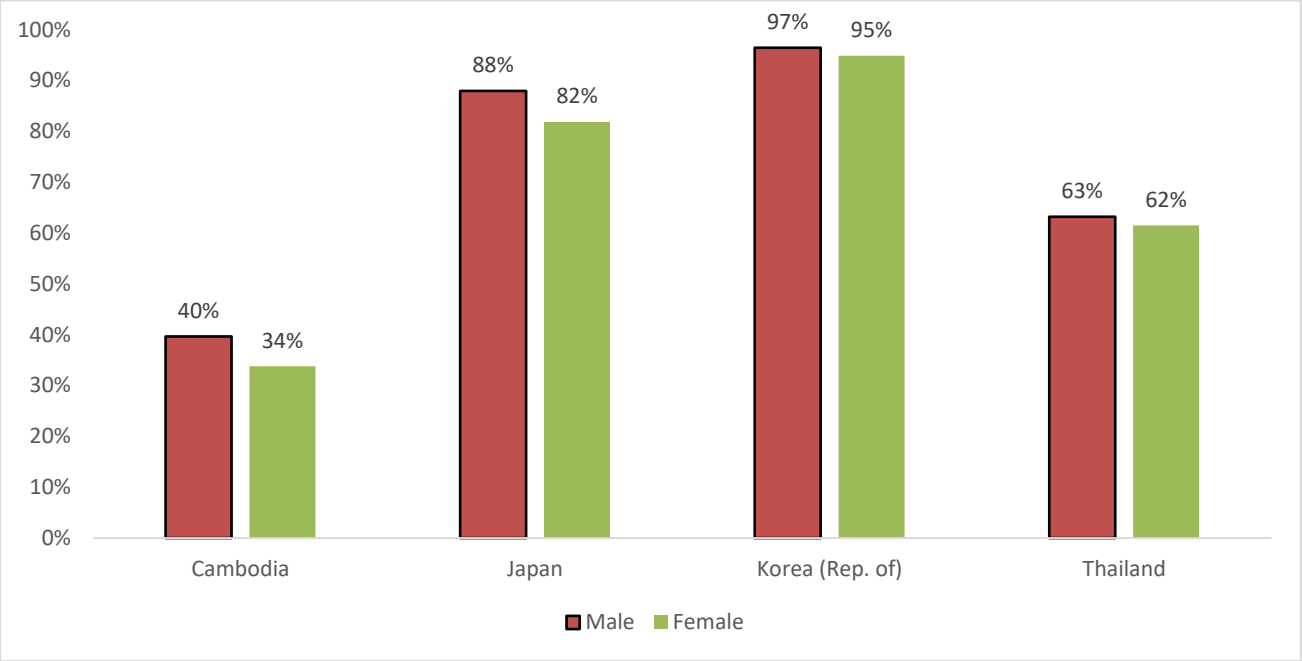
Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database 2021", July 2021.
Note: Most data is from 2020.

Women's lack of access to Internet-enabled devices such as smartphones and computers is a direct barrier to their access to the Internet. Limited by the availability of data, the study analysed four countries

April 2020. Available at https://www.gsma.com/mobilefordevelopment/blog/why-COVID-19-has-increased-the-urgency-to-reach-women-with-mobile-technology/.

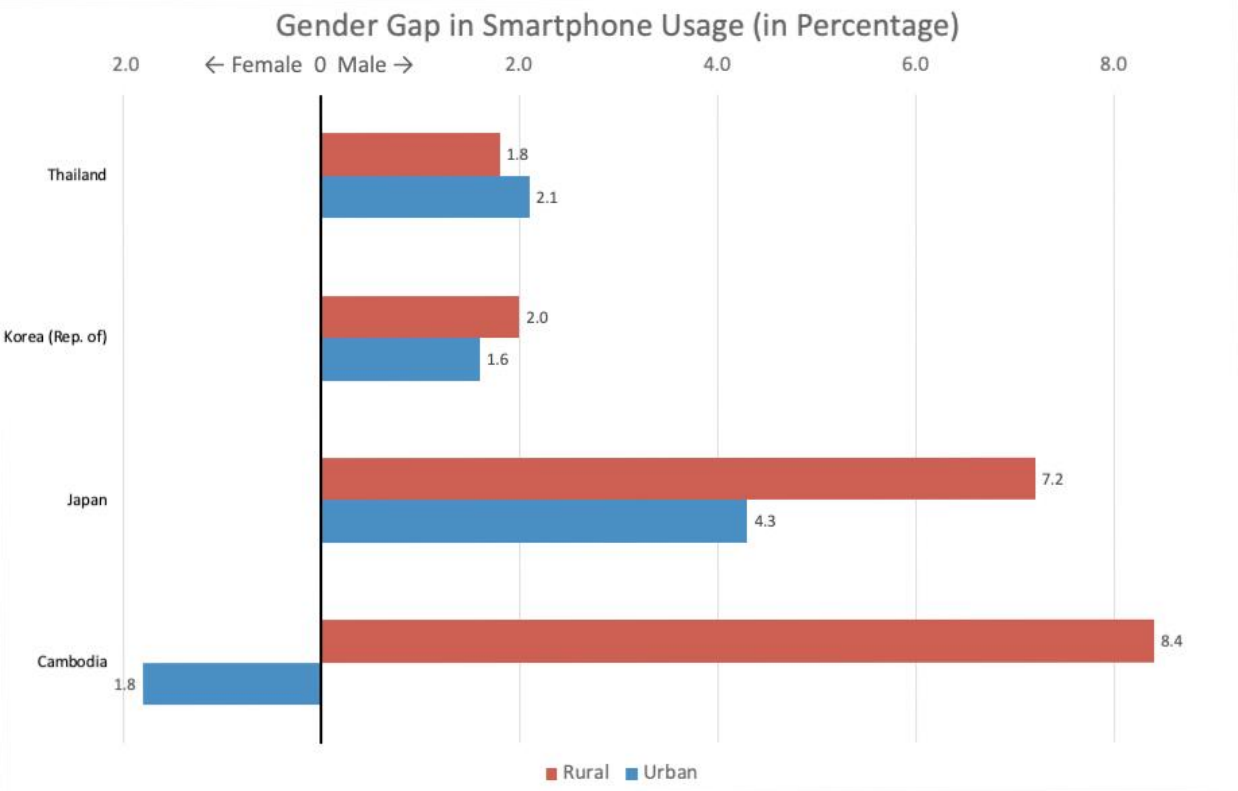
in the Asia-Pacific region, namely Cambodia, Japan, Republic of Korea and Thailand. Figures 2-8, Figures 2-9 and Figures 2-10 show that the percentage of females using a smartphone is slightly lower than that of males in the four countries, and the gender gap is wider in rural areas than in urban areas. Similar results are found when comparing the percentages of females and males using a computer, especially in Iran, Pakistan and Turkey (Figure 2-11).

Figure 2-8: Individuals using a smartphone by gender



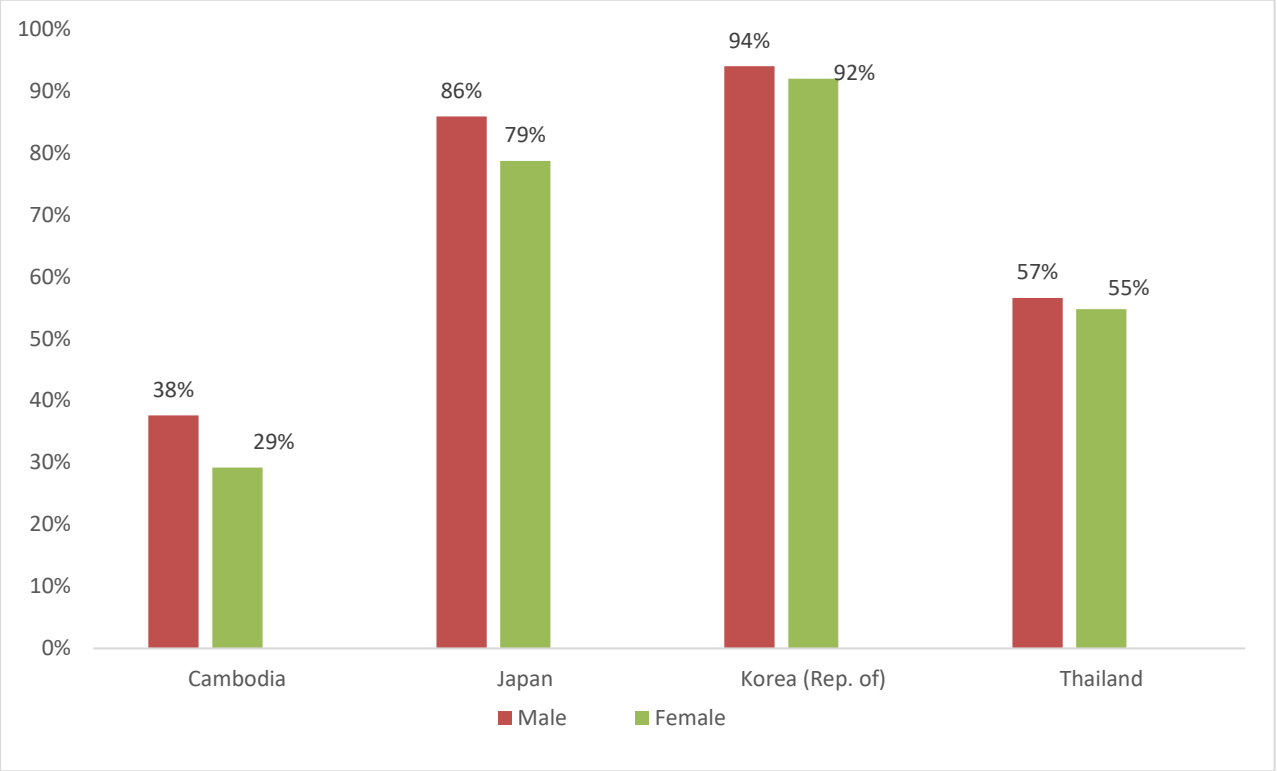
Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database 2021", July 2021.

Figure 2-9: Individuals using a smartphone by gender in urban areas



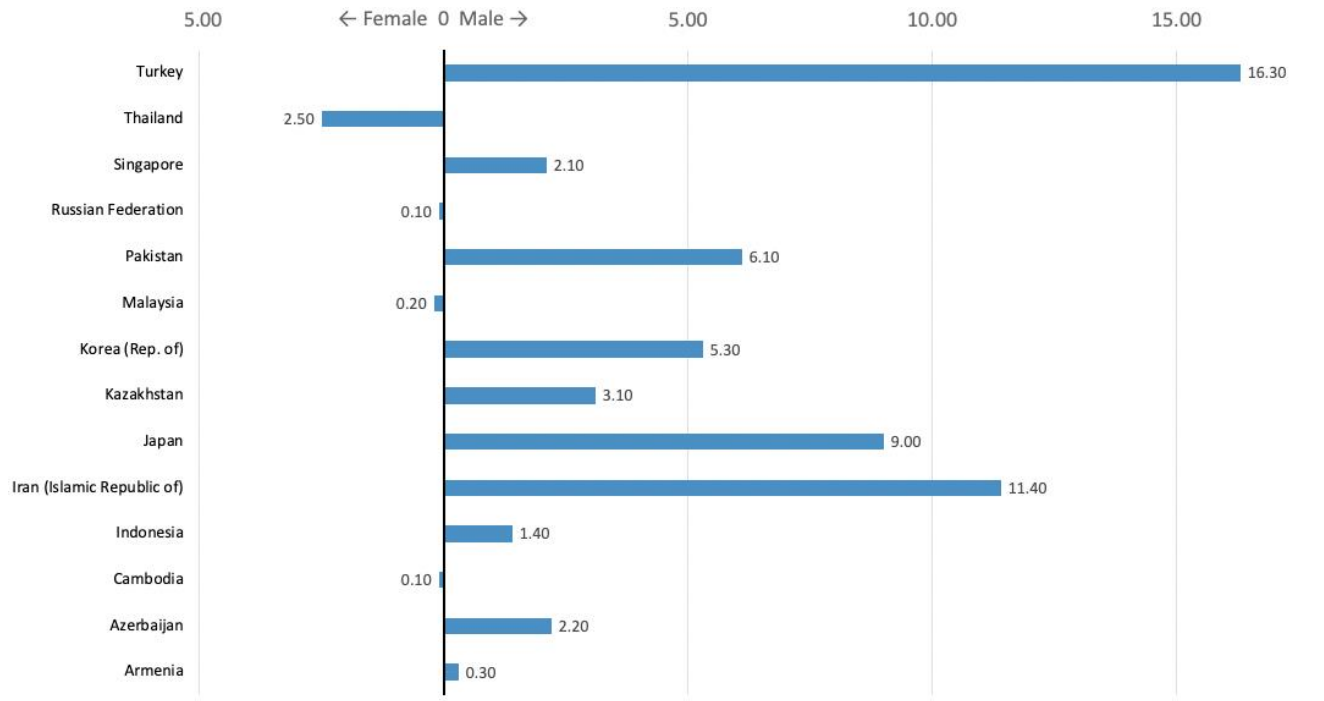
Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database 2021", July 2021.

Figure 2-10: Individuals using a smartphone by gender in rural areas



Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database 2021", July 2021.

Figure 2-11: Individuals using a computer by gender



Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database 2021", July 2021.
Note: The Gender gap equals the percentage of male using Internet minus that of female

GSMA reported that the gender gap in mobile ownership in East Asia and Pacific is 1 per cent, while the gender gap in mobile Internet use is about 3 per cent. In South Asia, however, the gender gap

in mobile ownership and mobile Internet use is high at 19 per cent and 36 per cent, respectively.[23] The gender gap in smartphone ownership has reduced across low- and middle-income countries – in 2019, women were 20 per cent less likely than men to own a smartphone, but this dropped to 15 per cent in 2020.
This has largely been driven by progress in South Asia, especially growth in smartphone ownership among women in India, which increased significantly and reached 25 per cent in 2020 from 14 per cent in 2019, while that of men grew only to 41 per cent from 37 per cent.

Digital Traces of the Gender Digital Divide[24], which based on big data analysis from the Facebook API in combination with different development indicators from sources such as the World Bank, ITU, and GSMA, also shows the similar results that in main challenge of gender digital dive is in South Asia.

The reasons why gender digital divide still exist in some countries are various, such as affordability, income, smartphone ownership, security, literacy and skills and cumulative effect. [25] With the socioeconomic development, some barriers will be reduced and the gender digital gap will narrow. For example, insufficient digital skill caused by education inequality is one of factors in digital divide. Fortunately, according to WEF report, in term of education attainment, 121 countries have closed at least 95 per cent of their educational gender gaps and 64 countries (more than one-third of the sample) have already achieved at least 99.5 per cent gender parity.[26]

2.4 Case: India aims to bridge the gender digital divide by providing low-price handset[27]

According to a GSMA report[28], in 2020, the number of women in India who reported using mobile Internet and owning a smartphone grew rapidly, with nearly 55 per cent of Indian women owning mobile phones and 30 per cent of them using mobile Internet. However, gender gaps remain with men's ownership of mobile phones at 74 per cent and men's usage of mobile Internet at 45 per cent. India ranks 20th of 120 on Internet affordability in the Inclusive Internet Index,[29] which means the price of mobile data package is more affordable than most countries. Therefore, improving women's ownership of smartphones is an effective way to narrow the gender digital gap.

The main telecom operators of India, such as Airtel, Reliance Jio and Vodafone Idea, have commitments to reduce the gender gap in their mobile Internet customer base. For example, Reliance Jio in partnership with KaiOS launched Jiophone, an LTE-enabled smart feature phone, which is available for under USD10. Over 100 million Jiophones were sold in the first two years of its launch, which helped many women as well as men access the Internet for the first time.

Regarding the usage gap, GSMA's gender divide survey found that men on average engage in seven use cases on a weekly basis compared with four use cases for women in India. The barriers to Indian women's use of mobile Internet include social control, digital literacy, cost of mobile phone and online harassment. For example, village councils across India have often imposed fines or barred women and girls from owning mobile phones or

[23] GSMA, "The Mobile Gender Gap Report 2021", June 2021. Available at https://www.gsma.com/r/wp-content/uploads/2021/06/The-Mobile-Gender-Gap-Report-2021.pdf.

[24] Digital Gender Gaps Project, "Monthly Report 2021-10". Available at https://www.digitalgendergaps.org/monthly?report=2021-10

[25] The costs of exclusion report, Alliance for Affordable Internet, October 2021

[26] World Economic Forum, Global Gender Gap Report 2021 (Geneva, 2021). Available at https://www3.weforum.org/docs/WEF_GGGR_2021.pdf

[27] Sajneet Mangat, "Infographic: India's Mobile Internet Gender Gap", Feminism in India, 28 September 2020. Available at https://feminisminindia.com/2020/09/28/infographic-indias-mobile-internet-gender-gap/.

[28] GSMA, "The Mobile Gender Gap Report 2021", June 2021. Available at https://www.gsma.com/r/wp-content/uploads/2021/06/The-Mobile-Gender-Gap-Report-2021.pdf.

[29] Economist Intelligence Unit, "The Inclusive Internet Index: 2021 Affordability Rankings". Available at https://theinclusiveinternet.eiu.com/explore/countries/IN/?category=affordability.

accessing the Internet.[30] Therefore, improving awareness of the empowering nature of the Internet is important to bridge the gender digital divide.

2.5 The number of females working in cutting-edge and emerging digital sectors is still significantly less than males

Gender equality has improved in the past decade, but the percentage of females working in many sectors, especially in the tech sector, remains low compared to men. For example, the percentage of women in the United States labour force has gradually climbed to 47 per cent, while female employees make up between 29 and 45 per cent of the total workforce at America's largest tech companies. Moreover, the latest available data shows that women only hold 26.5 per cent of executive, senior-level and management positions in S&P 500 companies.[31]

New technologies, especially for the artificial Intelligence (AI), will inevitably lead to a major shift in the labour market, including the disappearance of jobs in some sectors and the creation of opportunities in others, on a massive scale. However, UNCTAD in its Digital Economy Report highlighted the gender gap in AI research.[32] It pointed out that there is a very important gender gap in AI talent, for example, female graduates of AI and Computer Sciences doctoral programmes in North America accounted for only 18.3 per cent of all doctoral graduates in the period 2010-2019. The attendance of women in machine learning workshops was on average only about 10 per cent of the total at one of the most prestigious annual AI conferences on neural information processing systems from 2016 to 2019. Therefore, to achieve gender equality in the ICT sector, girls and young women need equal access to technology, digital training and safety online.[33]

2.6 Key Findings

Many vulnerable groups have not been able to fully enjoy the convenience and assistance brought about by digital technologies and services during the COVID-19 pandemic. The proportion of older persons using the Internet is significantly lower than younger age groups in some countries. Fortunately, the international community and countries like China are promoting digital services and applications that are more inclusive and age-friendly.

It is evident that the gender digital divide exists but it is narrowing in most ESCAP member countries. Governments and the ICT sectors have been taking actions to narrow the gender digital divide, for example, India has been promoting low-price smartphones to increase female ownership of Internet-enabled devices. However, in the ICT industry and in high-tech research and development, the proportion of females is still much lower than that of males.

[30] Sajneet Mangat, "Infographic: India's Mobile Internet Gender Gap", Feminism in India, 28 September 2020. Available at https://feminisminindia.com/2020/09/28/infographic-indias-mobile-internet-gender-gap/.

[31] Felix Richter, "Women's Representation in Big Tech", Statistica, 1 July 2021. Available at https://www.statista.com/chart/4467/female-employees-at-tech-companies/.

[32] UNCTAD, *Digital Economy Report 2021* (Geneva, 2021). Available at https://unctad.org/webflyer/digital-economy-report-2021.

[33] Plan International, "Bridging the Digital Divide". Available at https://plan-international.org/education/bridging-the-digital-divide/.

3.The Rural – Urban Digital Divide

Globally, people in urban areas are twice more likely to use the Internet than those in rural areas.[34] In Asia and the Pacific, 75 per cent of urban dwellers are using the Internet, compared with 39 per cent of the rural population. This is caused by several factors. On the one hand, telecom operators generally give priority to building new generation networks in urban and densely-populated areas for the profit, before extending the networks to small towns and rural areas. In some remote areas, telecom operators are unwilling to carry out infrastructure construction from a commercial perspective because of the high cost of network construction and low average revenue per user. Therefore, some countries have adopted universal service funds to promote network construction in unserved and underserved areas.[35] On the other hand, people living in rural area are less able to use the Internet since they are limited by digital skills and affordability.

3.1 Mobile network coverage gap between rural and urban areas has narrowed, but new generation 5G network construction in rural areas cannot keep pace with urban areas.

There are many types of ICT networks, such as fixed telephone, mobile voice, fixed broadband, mobile broadband and cable television networks, but in most developing countries, mobile broadband is the main way to access the Internet. According to a GSMA report[36], the rural-urban mobile network coverage gap has narrowed since 2014 when almost a quarter of the world's population did not have mobile broadband coverage. With the development of universal service in most countries, the mobile network has extended to rural and remote areas. By 2020, 94 per cent of the world's population lived in areas with mobile-broadband network coverage. The remaining uncovered areas tend to be sparely populated with difficult terrain. For instance, in China, 98 per cent of villages are now covered by 4G networks following six batches of universal service project implementation in the past six years.

GSMA reported that the mobile network coverage gap in South Asia has significantly narrowed from 44 per cent in 2014 to 5 per cent in 2020. This has mainly been driven by India's giant leap in 4G coverage, while other countries in South Asia have also expanded 4G coverage, notably Bangladesh and Nepal.

More than 60 countries have launched or are planning to commercialize 5G since 2019, but the 5G networks are mainly constructed in urban areas. Similarly, fixed-broadband networks, especially fibre-based networks, are built primarily in urban areas. This trend threatens to widen the rural-urban digital divide.

3.2 Case: China has successfully narrowed the rural-urban digital divide with universal service pilot projects

The Chinese government attaches great importance to bridging the digital divide between rural and urban areas and specifies the requirements for telecommunications universal service in various planning policies. The universal service started from 2004 in China to promote telephone communications in villages. Since then, activities of universal services, such as broadband and communications terminals going into the villages, have been carried out successively. However, by 2014, there were still about 50,000 administrative villages uncovered by wired or wireless broadband and 150,000 villages with broadband access capacity of less than 4Mbps.

In 2013, the Broadband China Strategy positioned broadband network as "Strategic Public Infrastructure In The New Era" like water, electricity and roads, and emphasized the implementation of universal service measures to narrow the digital divide between rural and urban areas. However, broadband network construction and maintenance costs are very high in remote areas, resulting in significant cost recovery challenges.

[34] ITU, "Measuring digital development: Facts and figures 2021", 2021. Available at https://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx.

[35] ESCAP, "The Impact of Universal Service Funds on Fixed-Broadband Deployment and Internet Adoption in Asia and the Pacific", AP-IS Working Paper Series, October 2017. Available at https://www.unescap.org/resources/impact-universal-service-funds-fixed-broadband-deployment-and-internet-adoption-asia-and.

[36] GSMA, "The State of Mobile Internet Connectivity 2021", September 2021. Available at https://www.gsma.com/r/wp-content/uploads/2021/09/The-State-of-Mobile-Internet-Connectivity-Report-2021.pdf.

In order to narrow the digital divide, especially the broadband divide between rural and urban, the Chinese government started pilot projects to promote optical fibre and 4G network coverage in administrative villages, based on central fund guidance, local government support and enterprise-oriented promotion. The subsidies for universal service, which are from spectrum usage fees, include construction costs and six-year maintenance costs, and the subsidy proportions range from 15 to 35 per cent depending on the geographical conditions.

The first three batches of pilot projects mainly supported fibre-optic cable construction, and the second three batches focused on 4G network coverage in rural areas. After six batches of universal service project implementation, 98 per cent of administrative villages are covered by fibre-based broadband and 4G networks with an average download speed of over 70Mbps. These pilot projects have resulted in no difference in quality of broadband, such as download speed and latency, between rural and urban areas. Moreover, the government has encouraged innovations in digital applications suitable for rural areas, such as Internet plus agriculture and Internet plus tourism.

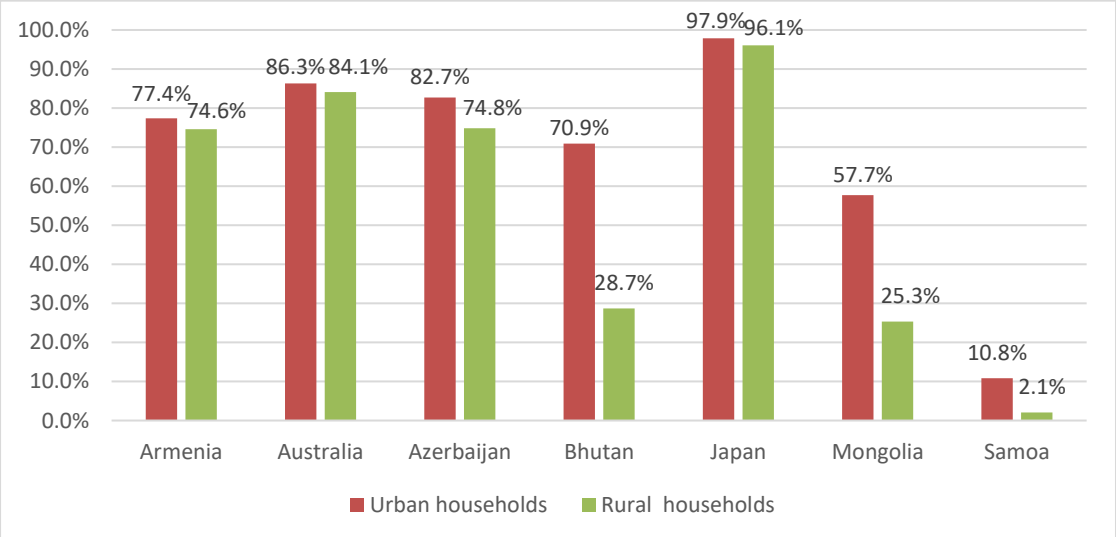
3.3 People in rural areas are less likely to use the Internet compared with those living in urban areas, but in most countries, the gap is insignificant.

Although 94 per cent of the world's population lives in areas with mobile-broadband network coverage, only 51 per cent of the world's population is using mobile Internet.[37] This means, 43 per cent of the world's population is not using the Internet in spite of living in areas with mobile broadband. Given that the coverage gap continues to decline and with almost 75 per cent of those not using the Internet living in areas covered by mobile broadband, addressing the usage gap is the primary challenge.

Figure 3-1 shows that the percentages of households with Internet in rural areas are lower than that of urban areas in the selected countries. In Bhutan, Mongolia and Samoa, there is a significant gap between rural and urban areas, while in Armenia, Australia and Japan, the percentage of households with Internet is almost the same in rural and urban areas.

The situation of individuals using a smartphone (Figure 3-2) is similar to households with Internet connectivity in the selected countries where those living in rural areas are less likely to use a smartphone than those in urban areas. A GSMA report also presented similar conclusions with results demonstrating some progress being made in bridging the rural-urban digital divide, but a significant rural-urban gap persists in mobile Internet use, especially in Bangladesh, India and Pakistan.

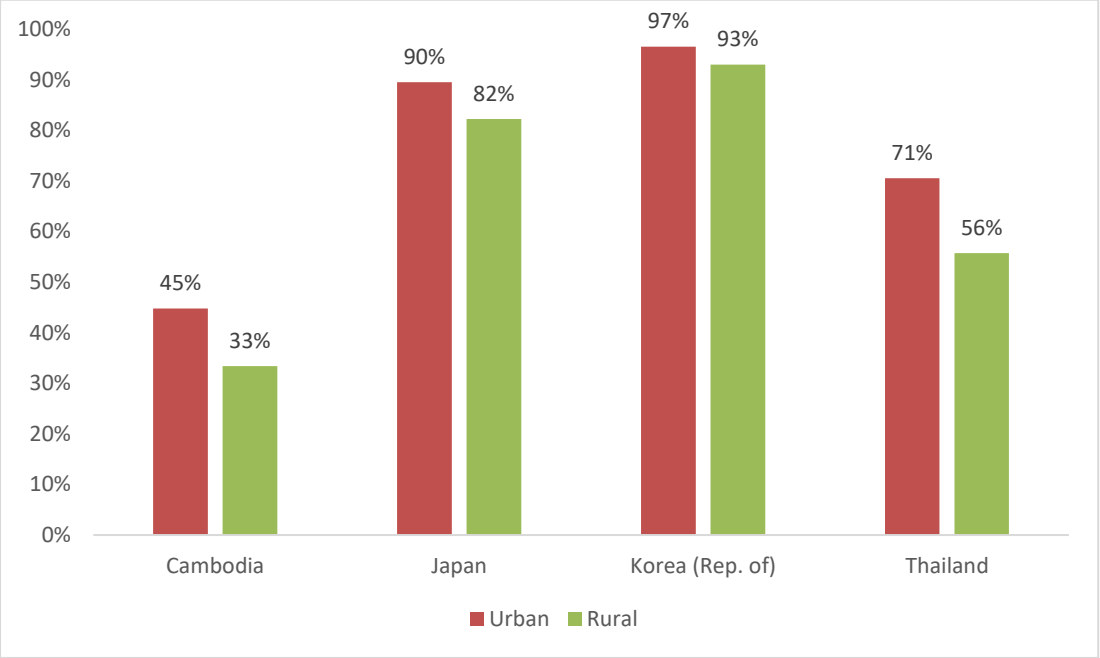
Figure 3-1: Comparison of households with Internet connectivity in rural and urban areas



Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database 2021", July 2021.

Figure 3-2: Comparison of individuals using a smartphone in rural and urban area

[37] Ibid.



Source: Produced by ESCAP using ITU, "World Telecommunication/ICT Indicators Database 2021", July 2021.

3.4 Key Findings

The digital divide between rural and urban areas is mainly related to network coverage and Internet usage.

a.The network coverage

In terms of network coverage, the gap between rural and urban areas is narrowing, and more than 94 per cent of the world's population lives in areas with 3G and 4G networks. Some countries promote network coverage in rural and remote areas by establishing universal service funds to bridge the gap between rural and urban areas. However, the construction of 5G networks in rural areas have not been able to keep pace with urban areas.

b. The usage

In terms of usage, people in rural areas are less likely to use the Internet compared with those living in urban areas, but in most countries, the gap is insignificant.

4.The Digital Divide and Enterprises

4.1 SMEs and Traditional Manufacturing Companies Have Been Adversely Affected by the Pandemic.

Almost all enterprises have used digital technologies and services to enhance their operations and management, improve product quality, and promote marketing during the COVID-19 pandemic. The pandemic has accelerated the digitalization process of enterprises to cope with various challenges it brought. However, not all enterprises have the same resources to face the challenges.

It seems clear that SMEs have been adversely affected by the pandemic, since they tend to have fewer resources and less capacity to cope with abrupt economic shocks, compared with large enterprises. An UNCTAD report[38] showed that a greater share of SMEs experienced year-on-year decreases in demand for products or services, supply of inputs and liquidity or cash flow availability after the start of the pandemic.

Traditional manufacturing companies have also been adversely affected by the pandemic since these companies need employees on-site working. A survey [39] which is conducted by China Enterprise Confederation, which focused on the impact of COVID-19 on manufacturing companies in China, showed that 53.28 per cent of their operating income decreased significantly, 82.12 per cent of their operating costs increased, 97.08 per cent of their profits declined, and 61.96 per cent of their employment decreased in the first quarter of 2020 when the COVID-19 pandemic situation was worst in China. Another market survey[40] conducted by Control Engineering China in April 2020 showed similar results with 46 per cent of manufactures in China severely impacted by COVID-19. One of the reasons was the dramatic shrinkage in demand, which led to the reduction in new export orders.[41]

4.2 Enterprises that successfully adopted digitalization have been less affected by the COVID-19 pandemic

During the COVID-19 pandemic, manufacturing companies tried to balance between pandemic prevention and stable production. Companies embracing digital transformation have generally performed well, especially those companies that started the digitalization process before COVID-19. These companies have been less affected by the pandemic because they are well-equipped with many digital tools to support their operations during movement restrictions.

For example, Baoshan Iron and Steel (Baosteel), a 40-year-old factory, started digitalization since 2014, digitalizing their production lines and establishing several digital and intelligent products and services for marketing and sales, research and development, manufacturing, logistics, and finance in its Shanghai base. The digital production lines greatly reduced the demand for labour, for instance, one fully automated 200-metre-long major production line needs just two or three workers for inspection. Baosteel has maintained steady outputs during the pandemic by using digital technologies and tools in manufacturing and logistics. Moreover, the digitalization of Baosteel improved their planning efficiency by 83 per cent and their labour efficiency by 70 per cent, saving USD 27 million in logistics costs.[42]

4.3 Digital technology and service providers have grown rapidly during the COVID-19 pandemic

With the surge in demand for digital tools during the

[38] UNCTAD, "Impact of the COVID-19 pandemic on trade and development: Recovering, but unevenly – Situation as at 31 March 2021". Available at https://unctad.org/programme/COVID-19-response/impact-on-trade-and-development-2021#COVIDCases.

[39] Beijing Institute of Electronics, "Analysis report of China's top 500 manufacturing enterprises affected by the epidemic", The Paper, 24 April 2020. Available at https://www.thepaper.cn/newsDetail_forward_7144917.

[40] Aileen Jin, "Market survey: COVID-19 impact on China's manufacturing industry", Control Engineering China, 14 May 2020. Available at https://www.controleng.com/articles/market-survey-COVID-19-impact-on-chinas-manufacturing-industry/.

[41] China Internet Information Center, "COVID-19's impact on China's industries". Available at http://www.china.org.cn/business/covid-19-economic-impact/node_8018307.html.

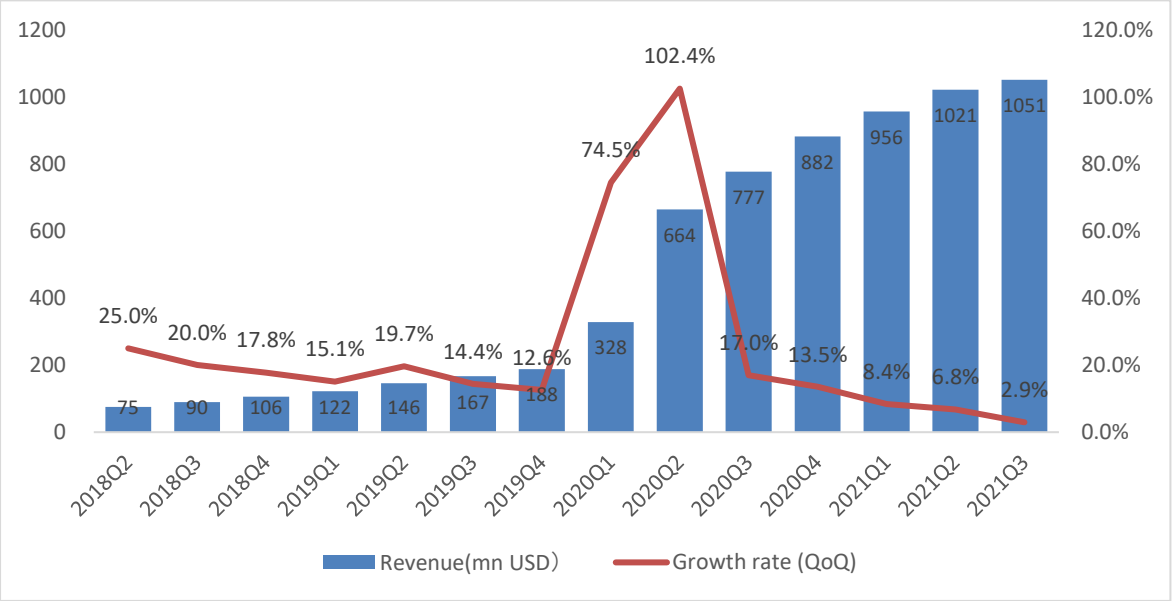
[42] World Economic Forum, "Global Lighthouse Network: Insights from the Forefront of the Fourth Industrial Revolution", December 2019. Available at https://www.weforum.org/whitepapers/global-lighthouse-network-insights-from-the-forefront-of-the-fourth-industrial-revolution/.

pandemic, the revenue and profit of digital service providers, such as Alibaba, Amazon and Microsoft, increased rapidly through the provision of cloud and online products and services.

Online meeting services have rapidly increased since many countries imposed lockdown and home quarantine measures. Since digital applications and platforms allow people to stay in touch, they have become essential for daily life during the lockdown period. Google opened its premium paid features of Hangouts Meet for free, Zoom offered students free access and Microsoft offered a free six-month subscription to Microsoft Teams as a result of increasing work-from-home policies.[43]

For example, Zoom has maintained steady growth since its inception in 2013, but its performance increased sharply after the outbreak of COVID-19. The Zoom Cloud Meetings application was downloaded 14 times more than the weekly average during the fourth quarter of 2019 in the United States of America, and 20 times more in the United Kingdom during the week of 15-21 March 2020. Zoom was seeing 300 million daily meeting participants in 2020 compared to 10 million in December 2019. From Figure 4-1, it can be seen that Zoom experienced explosive growth with a quarterly growth rate of 102.4 per cent in the second quarter of 2020, and has become a leader in video conferencing.

Figure 4-1: Zoom quarterly revenue and growth rate



Source: Produced by ESCAP using data from Macrotrends.

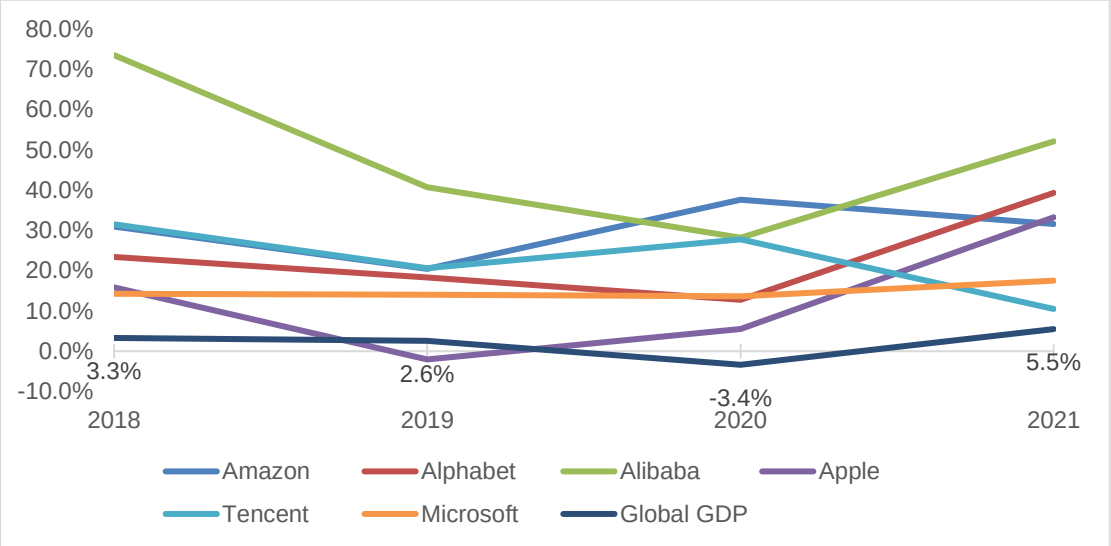
Online shopping is another sector that got a boost from quarantine restrictions imposed in many countries because people could not go to stores to purchase their daily necessities. Overall, retail sales declined by 1 per cent in selected countries in 2020 while online retail grew by 22 per cent. Online retail sales as a share of total retail sales jumped by 3 percentage points in 2020 (from 16 to 19 per cent) compared to a two-percentage point rise between 2018 and 2019.[44]

The revenue growth of e-commerce companies, such as Amazon and Alibaba, have increased significantly since the pandemic. Amazon's revenue increased from USD 280.52 billion in 2019 to USD 386.06 billion in 2020, and its stock price more than doubled from USD1,600 in March 2020 to USD 3,676 in November 2021. Figure 4-2 shows that Internet companies have kept rapid growth at rates higher than global GDP, and the COVID-19 pandemic has had little impact on them.

Figure 4-2: Tech companies' revenue growth rate compared with global GDP

[43] Lexi Sydow, "Video Conferencing Apps Surge from Coronavirus Impact", data.ai, 30 March 2020. Available at https://www.appannie.com/en/insights/market-data/video-conferencing-apps-surge-coronavirus/.

[44] UNCTAD, "Estimates of Global e-Commerce 2019 and Preliminary Assessment of COVID-19 Impact on Online Retail 2020", UNCTAD Technical Notes on ICT for Development Issue No. 18, 2021. Available at https://unctad.org/system/files/official-document/tn_unctad_ict4d18_en.pdf.



Source: Produced by ESCAP using data from Macrotrends, CompaniesmarketCap and World Bank.

4.4 Key Findings

All enterprises have been affected by the COVID-19 pandemic, because of the decline in demand, supplier shortage, production lines halt and the imposition of social distancing measures, but the performances of enterprises have varied. SMEs and traditional manufacturing companies have been particularly affected. However, enterprises that have been able to successfully digitalize their businesses have been less affected. Digitalized enterprises have more digital tools and capacity to maintain stable production and operation with minimal on-site staff.

Digital adoption is one of the key factors in building the resilience of enterprises, enabling them to bounce back quickly from the pandemic.

COVID-19 underlined the important role of digitalization to support remote work. Digital technology and service providers have grown rapidly during the pandemic by providing digital services to the public. The uneven access to digital tools and capacity to use them, however, are creating a new divide between enterprises.

5. The Digital Divide and Economic Growth

5.1 The Digital economy has become a key to achieving economic recovery and promoting sustainable development.

The world is entering the era of digital economy and society in which digital technologies are increasingly integrated into all aspects of the economy and society. The digital economy has created many new economic opportunities, such as digital data driving innovation and productivity growth, platforms facilitating transactions, and digitalization opening new channels for value addition and broad structural change.[45] The COVID-19 pandemic reminds us how digital readiness can equip a country with resources to cope with crises and build resilience for future recovery.

During the pandemic, people's daily routines, such as shopping, entertainment, education and work, quickly shifted online. New digital modes of service such as online education and online shopping became more popular and accepted by people. On the supply side, many enterprises upgraded their services using cloud services, Internet of Things and big data to meet demands. The digital economy has made contributions to economies' sustainable development, as well as reduced the risk of COVID-19 by enabling contactless economic activities.

According to China Academy of ICT's Digital Economy Development Report[46], the average annual increase rate of 47 selected countries' GDP was -2.8 per cent. In 35 of 47 countries, their GDP declined, but their digital economy increased at 3.0 per cent in nominal terms in 2020. The total added value of the digital economy reached USD 32.6 trillion accounting for 43.7 per cent of GDP in 2020, which grew by 2.5 percentage points from 2019.

However, the contribution of the digital economy towards countries' GDP varies in Asia and the Pacific. In the Republic of Korea, the digital economy contributes to 52 per cent of GDP, and in China, Japan and Singapore, the contribution is above 30 per cent, while in Russia, Thailand, Turkey and Viet Nam the contribution is less than 20 per cent. In some countries, the digital economy is in the infancy stage, making limited contributions to GDP. These different stages of digital economy development represent a new digital divide among countries.

5.2 Case: The rapid growth of the digital economy increases the resilience of South-East Asia during the pandemic[47]

The COVID-19 pandemic has pushed millions of people online to purchase goods and services for the first time in South-East Asia. About 80 million new Internet users came online in the past two years in six South-East Asian countries, namely, Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam, resulting in an Internet penetration rate of 75 per cent in these countries. About 80 per cent of these new Internet users shopped online at least once. The COVID-19 pandemic has been a catalyst for people to try new online services. Besides e-commerce, transport and food delivery, online travel booking, online media, online financial services, online health consultation (telemedicine) and online education have grown rapidly.

As consumers shift online, more SMEs than ever have been adopting digital technologies, such as digital platforms, online financial services and digital tools, to support end-to-end online or digital services, which have helped ensure business continuity during movement restrictions. One in three SMEs believe that they would not have survived COVID-19 without digital platforms, and most people and enterprises have a positive view of digital platforms.
Despite the COVID-19 pandemic, South-East Asia's Internet sectors have experienced strong growth and

[45] UNCTAD, *Digital Economy Report 2019* (New York, 2019). Available at https://unctad.org/system/files/official-document/der2019_en.pdf.

[46] China Academy of ICT, "White Paper on Global Digital Economy", August 2021.

[47] Google, Temasek and Bain, "e-Conomy SEA 2020", 2020. Available at https://storage.googleapis.com/gweb-economy-sea.appspot.com/assets/pdf/e-Conomy_SEA_2020_Report.pdf; and Google, Temasek and Bain, "e-Conomy SEA 2021", 2021. Available at https://services.google.com/fh/files/misc/e_conomy_sea_2021_report.pdf.

their gross merchandize value hit USD 174 billion in 2021, with a 49 per cent year-on-year growth. The rapid growth of e-commerce has helped build the resilience of South-East Asian economies.

5.3 Case: The digital economy has helped China recover from the COVID-19 pandemic

At the onset of the COVID-19 pandemic in China at the beginning of 2020, the government and ICT sector stakeholders started to use ICTs to fight the pandemic.

Firstly, digital platforms and applications have been used to share COVID-19 information to the public. With the help of mobile Internet and smartphones, people can access various data and messages anytime and anywhere, including pandemic updates and scientific knowledge about pandemic prevention released by local governments on e-government applications and social networking platforms.

Secondly, big data technologies have helped government quickly track the trajectory of COVID-19 affected people. Pandemic prevention and control platforms have been used to collect and analyse data from telecom operators, Internet companies and transport departments, including from train stations and airports, to identify high-risk groups. Moreover, the Healthy QR Code and Travel Itinerary Card have been used to indicate the risk level of people who have travelled to pandemic-stricken regions in the last 14 days for people's attention.

Thirdly, e-commerce, online to offline services (O2O), and e-payment have supported the daily life of people during the lockdown period. Online shopping companies, such as Alibaba and JD, sell tons of goods including food, clothes, books and electrical appliances, while O2O companies provide fresh food delivery, medicine and other daily services to people. The logistics companies provide efficient delivery services, including same-day delivery services, and e-payment services, such as Alipay and WeChat Pay, are fundamental for contactless online activities.

Fourthly, cloud tools such as online meetings have supported the coordinated operations of governments, enterprises and schools. With positive progress made in the prevention and control of the pandemic, socioeconomic activities have resumed, yet, cloud tools, such as DingTalk, Tencent Meeting, WeLink and Zoom to support video conferencing, online learning and daily health check-ins, among others, remain essential for the continuous functioning of the economy and society.

5.4 Key Findings

The digital economy has become a driver for economic development. The global economy has declined under the influence of the COVID-19 pandemic, while the digital economy has grown rapidly. A new digital divide may appear between countries with different levels of digital economy development.

6. The Digital Divide and Regional Coordination and Cooperation

6.1 COVID-19 demonstrates cooperation is key to overcoming global challenges.

The United Nations and its agencies call for member countries to strengthen cooperation in addressing the COVID-19 pandemic and its extensive negative impacts. The United Nations General Assembly stresses that multilateral cooperation is the key to overcoming global challenges, and there is a need for collective action to tackle common threats and "vaccine multilateralism" to combat COVID-19.[48] The World Health Organization urges all countries to choose the path of cooperation and act to end the pandemic.[49] According to the United Nations International Children's Emergency Fund (UNICEF), China, France, Germany, Japan, Republic of Korea, United Kingdom and United States of America, among other countries, have donated 792.80 million doses of vaccines to developing countries by December 2021 through bilateral and multilateral supply agreements.[50] This is a good example of international cooperation to respond to and prevent COVID-19 outbreaks.

6.2 ESCAP and member countries are trying to bridge the digital divide and enhance connectivity by cooperation

The COVID-19 pandemic underlines the importance of ICT for development. As discussed in this paper, digital infrastructure, technologies and tools are key driver for socioeconomic development. However, there are still digital gaps between different groups of people, and among countries and regions. Fortunately, ESCAP and its partners have been taking actions to bridge the gap in Asia and the Pacific through enhanced cooperation.

The Asia-Pacific Information Superhighway (AP-IS) initiative, a region-wide intergovernmental platform, was proposed by ESCAP and member States in 2016, which aims to bridge the digital divide and accelerate digital transformation by promoting digital connectivity, digital technology applications and digital data use in the Asia-Pacific region.[51] China proposed the Belt and Road Initiative to promote connectivity by collaboration and cooperation in six corridors, of which ICT or digital silk road is one of the most important. The Republic of Korea partnered with ESCAP to study and analyse the feasibility of establishing Internet exchange points in Cambodia, Lao PDR, Myanmar and Viet Nam to reduce data transit cost and network latency, and help increase Internet uptake and quality of service.[52]

Azerbaijan proposed the Trans-Eurasian Information Super Highway (TASIM) project, a major regional initiative to build a transnational fibre-optic backbone targeting primarily the countries of Eurasia from Western Europe to Eastern Asia.[53] Bangladesh, Bhutan, India and Nepal in partnership with the Asian Development Bank implemented the South Asia Subregional Economic Cooperation Information Highway project in 2014

[48] United Nations, "COVID-19 Pandemic Demonstrates Multilateral Cooperation Key to Overcoming Global Challenges, President Stresses as General Assembly Concludes Annual Debate", 29 September 2020. Available at https://www.un.org/press/en/2020/ga12273.doc.htm.

[49] World Health Organization, "Global cooperation is our only choice against COVID-19, says WHO chief", 6 August 2020. Available at https://news.un.org/en/story/2020/08/1069702.

[50] UNICEF, "COVID-19 Vaccine Market Dashboard". Available at https://www.unicef.org/supply/COVID-19-vaccine-market-dashboard (accessed on 23 December 2021).

[51] ESCAP, "ICT and Disaster Risk Reduction: The Asia-Pacific Information Superhighway Platform". Available at https://www.unescap.org/our-work/ict-and-disaster-risk-reduction/asia-pacific-information-superhighway-platform.

[52] Yeong Ro Lee and Chang Yong Son, "An In-Depth Study on the Design and Implementation Plan of Internet Exchange Points in CLMV Countries", ESCAP Working Paper Series No. 04/2021, January 2021. Available at https://www.unescap.org/kp/2021/depth-study-design-and-implementation-plan-internet-exchange-points-clmv-countries.

[53] AzInTelecom, "Trans-Eurasian Information Super Highway (TASIM)", presentation made in Bangkok, Thailand in December 2017. Available at https://www.unescap.org/sites/default/files/Trans-Eurasian%20Information%20Superhighway%20%28TASIM%29.pdf.

to deliver and facilitate modern broadband information, communications and knowledge services within and across borders to governments, businesses, research institutes, and rural and remote communities. [54] Cambodia, China, Lao PDR, Myanmar, Thailand and Viet Nam implemented the Greater Mekong Subregion Information Superhighway in 2008 to improve telecommunications linkages by cross-border fibre-optic cable backbone.[55]

However, some challenges remain, such as the low priority and lack of financial support for ICT projects, that need to be addressed. Some landlocked countries are still experiencing slow Internet speed and low-quality bandwidth, while international cooperation projects, especially for terrestrial cables, are often delayed. For example, the TASIM project has not yet started implementation after more than ten years since it was first proposed.

Moreover, according to an Alliance for Affordable Internet (A4AI) report [56], the financial support received by multilateral development banks for ICT projects is generally low compared with other sectors. From 2012 to 2016, multilateral development banks committed a cumulative USD525 billion to funding development projects in low- and middle-income countries worldwide, but just 1 per cent of these project funds were for ICT projects.

6.3 Key Findings

The COVID-19 pandemic has enhanced international collaboration and cooperation and demonstrated that cooperation is the key to overcoming global challenges. ESCAP and its member States have been actively promoting a number of regional connectivity and Internet management cooperation projects to bridge digital gaps. However, there are still some challenges that need to be addressed.

[54] ESCAP, "ICT Co-Deployment with the Electricity Infrastructure: The Case of Bhutan", AP-IS Working Paper Series, May 2019. Available at https://www.unescap.org/resources/ict-co-deployment-electricity-infrastructure-case-bhutan.

[55] ESCAP, "Research Report on the Network Planning for the Greater Mekong Subregion", AP-IS Working Paper Series, February 2020. Available at https://www.unescap.org/resources/research-report-network-planning-greater-mekong-subregion.

[56] Alliance for Affordable Internet, "Closing the Investment Gap: How Multilateral Development Banks Can Contribute to Digital Inclusion", April 2018. Available at https://webfoundation.org/research/closing-the-investment-gap-how-multilateral-development-banks-can-contribute-to-digital-inclusion/.

7.Policy Recommendations

The COVID-19 pandemic underlines the importance of ICT for economic and social development. Meanwhile, the pandemic has accelerated the process of countries' digital economy development, enterprises' digital transformation, and personal digital adoption and usage.

The digital divides between different groups of people are narrowing. But the gaps in smartphone ownership and employment still exist between females and males in some countries. There are digital skills and literacy gaps between older persons and the younger populations as well. The 3G/4G network coverage gap between rural and urban areas is shrinking with the implementation of universal service projects, but the construction of new generation networks, such as 5G and fibre-based fixed broadband, in rural areas, have not been able to keep pace with urban areas.

The digital divide between enterprises has widened during the COVID-19 pandemic. On the one hand, SMEs and enterprises in traditional industries without or with limited digital capacity have suffered heavy losses due to production and business halt caused by the lockdown. On the other hand, traditional companies that have completed their digital transformation have been less affected by the pandemic as they have many digital tools and measures in place to support their operations. Digital technology and service providers, especially tech giants, have achieved rapid growth during the COVID-19 pandemic.

Affected by the COVID-19 pandemic, the global economy has stepped into recession in the past two years, while the digital economy has maintained rapid growth. A new digital divide may emerge between countries with developed digital economies and those without or are in their infancy.

The COVID-19 pandemic promoted coordination and cooperation among countries. ESCAP and member States have been working together to enhance regional digital connectivity and bridge the digital divide, but there are still some challenges that need to be addressed.

Recommendations

As the COVID-19 pandemic steps into the new-normal, the ICT infrastructure plays an even more vital role in personal and national activities. Governments, international organizations, the private sector and other stakeholders should work together to bridge the digital divide and provide universal and affordable ICT services for sustainable socioeconomic development. We provide some recommendations for consideration:

a. ESCAP and Other International Organizations

- Support member States in raising the awareness of policymakers and stakeholders on the importance of digitalization through the steering committee, working groups, workshops and capacity building activities of the AP-IS platform. This is particularly important for countries that still do not regard ICT as a driver of socioeconomic development.
- Provide a platform to encourage member countries to share experiences and best practices on controlling the COVID-19 pandemic utilizing digital technologies, platforms and services.
- Contribute to regional ICT project coordination and cooperation to promote progress and success.

b. Member Countries

- Develop and update the digital transformation vision, strategy, policy and roadmap to promote digital economy development.
- Support ICT infrastructure development, including 5G, 4G, fixed broadband, data centre construction and fibre-optic network pre-deployment by creating a favourable policy environment that encourages ICT investment, including, sector tax reduction, spectrum fee reduction, new generation network subsidy, incentive for innovation and universal service fund.
- Spur Internet and online services development. The digital transformation of public sectors, such as transport, health and education has a good demonstration effect and can drive the digitalization process of all sectors.
- Prioritize ICT infrastructure projects in international cooperation and investment. Enhance bilateral and multilateral cooperation in cross-border connectivity, Internet management, cybersecurity and data flow to

bridge the digital divide.

c. Private Sector and Other Stakeholders

- Develop a set of measures to narrow digital gaps between different groups, such as affordable entry-level mobile data package, low-price handset and digital skills training for the public.
- Enlarge the network coverage and improve network quality in rural and remote areas through innovations in construction and operations.
- Accelerate digital transformation and enhance resilience during the pandemic by building online services, digitalizing manufacturing, transitioning to the digital economy, and cultivating ICT and innovation talents.