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DIGITALISATION OF SERVICES: WHAT DOES IT IMPLY TO TRADE AND DEVELOPMENT?

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ABBREVIATIONS AND ACRONYMS

BPO	Business process outsourcing
DDS	Digitally deliverable services
DITC	Division on International Trade and Commodities
FDI	Foreign direct investment
GATS	General Agreement on Trade in Services
GDPR	The European Union's General Data Protection Regulation
ICTs	Information and Communications Technologies
ITC	International Trade Centre
ITU	International Telecommunication Union
LDCs	Least developed countries
MOOC	Massive Open Online Course
SDGs	Sustainable Development Goals
TNCDB	Trade Negotiations and Commercial Diplomacy Branch
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organisation

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1. Introduction

Digital technologies have driven a paradigm shift in how services are supplied and consumed across borders.

On the supply side, new data networks, digital tools, and platforms enable services providers to transform the modes of services supply and expand their customer base beyond their national boundaries. Using online marketplace platforms such as Amazon, Alibaba, and eBay, firms of all sizes can reach out to potential customers and suppliers worldwide (ITC, 2018; UNCTAD 2015, 2017). Digital tools and platforms also help firms access online resources, such as training and government services, and attract a wide range of qualified workers with reduced recruitment time and hiring costs (Miroudot & Cadestin, 2017).

On the demand side, digital technology allows access to more variety and choices of services at lower costs. It also provides convenience as well as customized or personalized services. Consumers may further benefit by getting services quicker due to fewer intermediaries. As digitalization of services can reduce transaction costs compared to the analogue world, it allows consumers worldwide to have better access to good quality services at a competitive price.

International trade in digitally deliverable services (DDS), or services that can be delivered over information and communication technologies (ICT) networks, include ICT services themselves, sales and marketing services, insurance and financial services, professional services, back-office services, research and development (R&D), and education and training services, among others (UNCTAD, 2015b).[1]

The digitalization of services embodied in a production value chain can increase efficiency and productivity in the manufacturing and agricultural sectors (European Union, 2015). It also promotes productivity growth in the agricultural sector. In addition, digital tools and platforms facilitate the outsourcing of professional services, including customer services, human resources management services, and administrative services, which generates job opportunities for a broad segment of the working population in developed

and developing countries. Digital platforms facilitate innovation and collaborations, reducing the barriers posed by geographical distance (Miroudot & Cadestin, 2017).

The COVID-19 pandemic has further deepened the trend and accelerated digital transformation (OECD, 2019; Fu, 2020), and restrictions on mobility have triggered a surge in digital service delivery. As businesses and consumers adapted to the new normal during the lockdown, daily activities and economic transactions quickly moved online. Innovations in digital technologies have made it possible for the electronic delivery of public and private services, which has been vital in enabling global collaboration in response to the pandemic (United Nations, 2021; UNIDO, 2020; Fu, 2020).

At the same time, the pandemic has laid bare the highly uneven nature of digital transformation across the globe. Many low-income developing countries face persistent challenges such as underdeveloped digital infrastructure, limited digital competencies among workers and consumers, inadequate financial supports, weak regulatory framework, and low levels of trust in digital transactions among consumers, businesses, and governments. (UNCTAD, 2021a).

Against this background, the objective of this study is to investigate the rising phenomena of DDS from a development perspective. The study is structured as the following. Chapter II examines the growth pattern of DDS in international trade and selected sectors where digitalization massively transformed the supply and the demand of services. Chapter III discusses major opportunities arising from DDS, particularly for developing countries, as well as challenges. In Chapter IV, the study discusses approaches that a government may take when formulating policy towards maximising the developmental gains from DDS.

II.

The latest trends in trade and application of digitally deliverable services

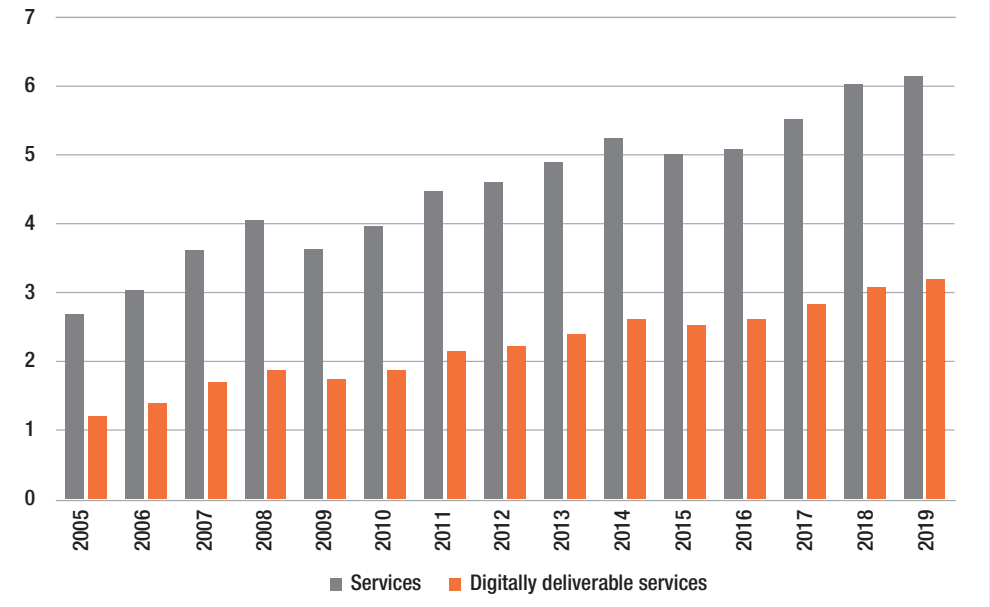
This chapter first investigates the salient features of DDS in international trade, then discusses selected services areas — education, health, and agriculture — that have experienced significant transformation in the way they are supplied and consumed.

A. Salient features of trade in digitally deliverable services[2]

World exports of digitally deliverable services have grown faster than the total services exports

In the past 15 years, the total value of global DDS has almost tripled since 2005 from US$ 1.2 trillion in 2005 to US$ 3.2 trillion in 2019. During the period, the share of DDS in all services trade rose from 45 per cent to 52 per cent (Figure 1).

Figure 1. Exports of services and digitally deliverable services (in US$ trillions), 2005–2019

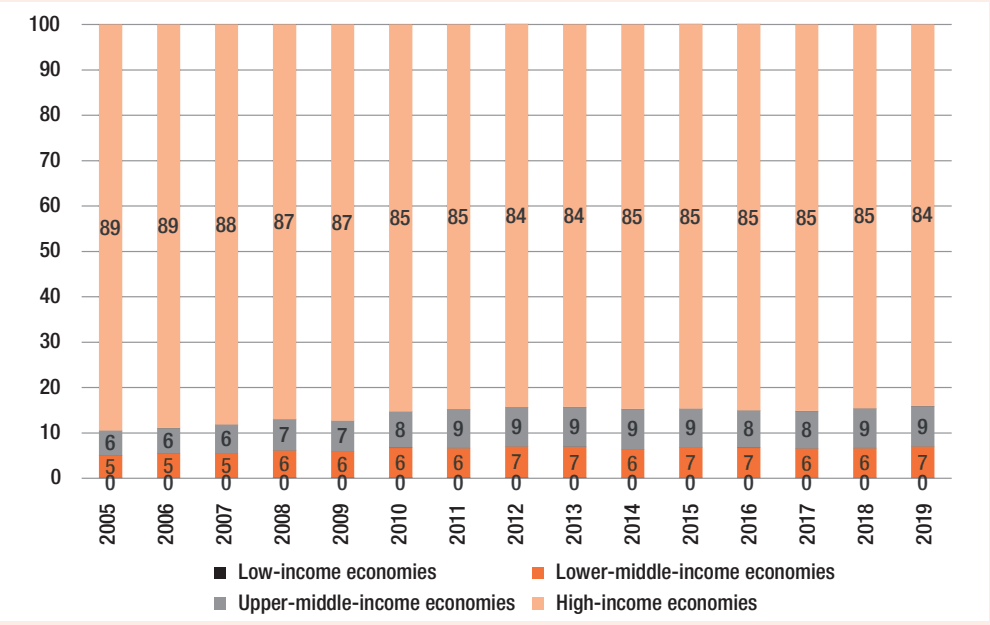


Source: https://unctadstat.unctad.org

High-income economies dominate digitally deliverable services exports

Since 2005, high-income countries have accounted for around 85 per cent of global DDS exports, while low-income economies accounted only for 0.1 per cent of the world's total (Figure 2).

Figure 2. Share of digitally deliverable services exports by income levels (as % of trade in total services), 2005–2019



Source: UNCTADStat. Available at: https://unctadstat.unctad.org

As shown in Table 1, which lists the top 20 DDS exporting economies and their corresponding shares, much of global DDS exports between 2015 and 2019 came from North America and Europe. The European Union, the United States and the United Kingdom accounted for 34 per cent, 17 per cent and 10 per cent, respectively. A group of Asian countries (India, China, Japan, Republic of Korea, Singapore) accounted for 18 per cent. India was the only country from the lower-middle-income group in the top 20 list, whereas China was the only upper-middle-income economy.

Table 1. Top 20 economies with the highest share of global digitally deliverable services (average %), 2015–2019

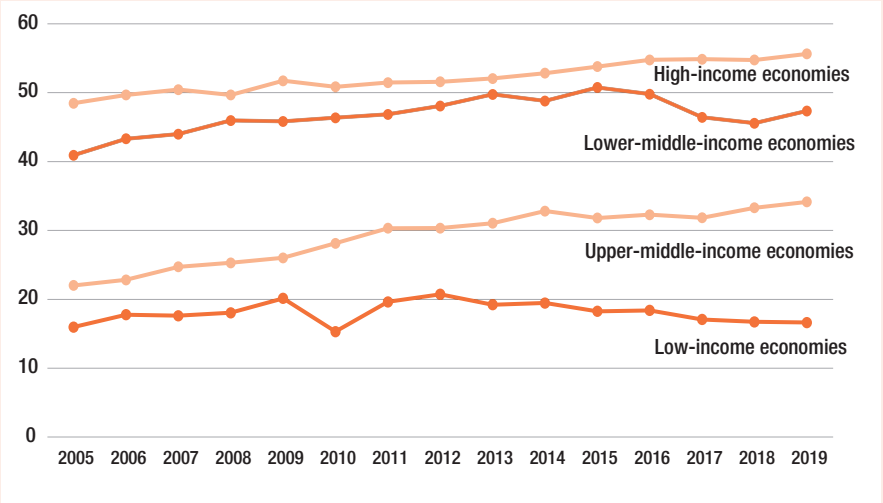
Ranking	Economies	% Share	Ranking	Economies	% Share
1	United States	17.3	11	Luxembourg	3.3
2	United Kingdom	10.0	12	Switzerland	2.9
3	Germany	6.6	13	Belgium	2.5
4	Ireland	5.9	14	Canada	1.8
5	Netherlands	5.3	15	Sweden	1.7
6	France	5.0	16	Italy	1.6
7	India	4.5	17	Spain	1.6
8	China	4.0	18	Hong Kong (China)	1.4
9	Japan	3.6	19	Republic of Korea	1.3
10	Singapore	3.4	20	Israel	1.1

Source: UNCTADStat. Available at: https://unctadstat.unctad.org

Low-income countries have not picked up the wave of digitally deliverable services

Figure 3 compares the changes in the share of the DDS exports in the total services exports of each income group. From 2015 to 2019, DDS export share has increased in high-income economies (from 50 to 56 per cent) and upper-middle-income economies (from 31 to 34 per cent). Only in low-income economies has the DDS percentage in total services exports declined from 19 per cent in 2015 to 17 per cent in 2019. The DDS share also fell in lower-middle-income countries during the same period, from 50 to 47 per cent.

Figure 3. Digitally deliverable services exports (as a percentage of total trade in services), 2005–2019



Source: UNCTAD data on international trade in digitally delivered services. Available at: https://unctadstat.unctad.org

Digital divide prevents low-income countries from participating in trade in digitally deliverable services

The divergence of the DDS trends across different income groups may be explained by the difference in countries' digital readiness. Countries with adequate ICT infrastructure and overall digital readiness are more capable of taking advantage of the opportunities arising from the digitalization of services (UNCTAD, 2021a).

The extent of a country's export volumes of goods and services is positively associated with its internet connectivity (United Nations, 2016).with supporting infrastructure and extending digital literacy. Figure 4 presents the number of individuals using the internet across different levels of development and selected regional groups. By 2019, nearly 87 out of 100 inhabitants in developed countries were internet users. The corresponding ratio in developing countries had grown more than four-fold from less than 10 in 2005 to 44 out of 100 inhabitants in 2019. The lowest ratio in 2019 was found among least-developed countries (LDCs), at around 20 out of 100 inhabitants. A digital divide also exists within a developing country. A study conducted by GSM Association revealed that people in rural areas across developing countries are 40 per cent less likely to use the internet compared to urban populations (ITU, 2021). The following box provides some examples of the many facets of digital divides.

The many facets of digital divides

The rapid acceleration of digital transformation and the COVID pandemic have greatly amplified the scale and level of our dependence on the internet. According to recent statistics (ITU, 2021), the estimated number of internet users had reached 4.8 billion by the beginning of 2021. There were 265 billion emails, 794 million tweets, 7.5 billion YouTube videos, and 453 million skype video calls daily among internet users.

Internet traffic increased by around 40 per cent worldwide when the lockdown was in place under the COVID-19 pandemic. But the increase is not spread evenly across countries. The digital divide in digital infrastructure and the quality of internet connectivity, is widening across regions and user groups (ITU, 2021).

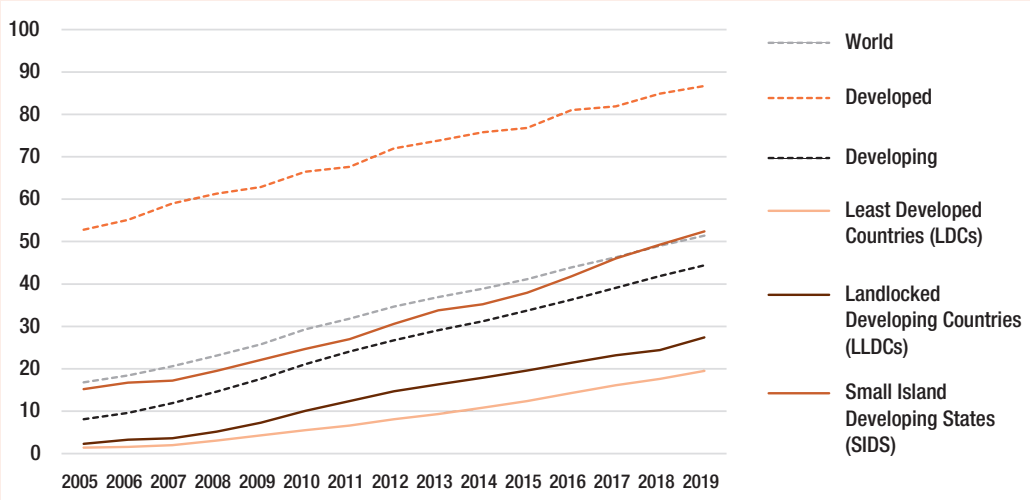
In Africa, 23 per cent of the population remain offline from a mobile-broadband network. About a quarter of the population in LDCs had no access to a mobile-broadband network by 2020 despite the SDG Target 9.c calling for striving to "provide universal and affordable access to the internet in LDCs by 2020" (ITU, 2021). Within a country, similar gaps exist between urban and rural areas regarding mobile coverage. While nearly all urban areas in the world can access a mobile-broadband network, 17 per cent of rural populations across LDCs remain offline from mobile-broadband and 19 per cent of those connected still use a low quality 2G network (ITU, 2021).

The digital divide is also gender biased. In 2019, 55 per cent of the male population was estimated to have internet connection, compared to 48 per cent of the female population (ITU, 2021). The internet gender gap is wider in developing countries where 49 per cent of males and 40 per cent of females were connected online. In LDCs, the corresponding figures were 28 per cent and 15 per cent respectively for male and female groups.

Even before the COVID-19 pandemic, female entrepreneurs were unequally represented in the digital economy and digital services (Ismail *et al*., 2020; Mbogori, 2020; UNCDF, 2020; World Bank, 2020). The pandemic has exacerbated the obstacles, affecting women's economic and productive lives disproportionately and differently from men, given their greater vulnerability to economic shocks (WTO, 2020; Afsar, 2020). A majority of small businesses led by female entrepreneurs in Sub-Saharan Africa have been forced to shut down (Gathii & Gaitha, 2020).

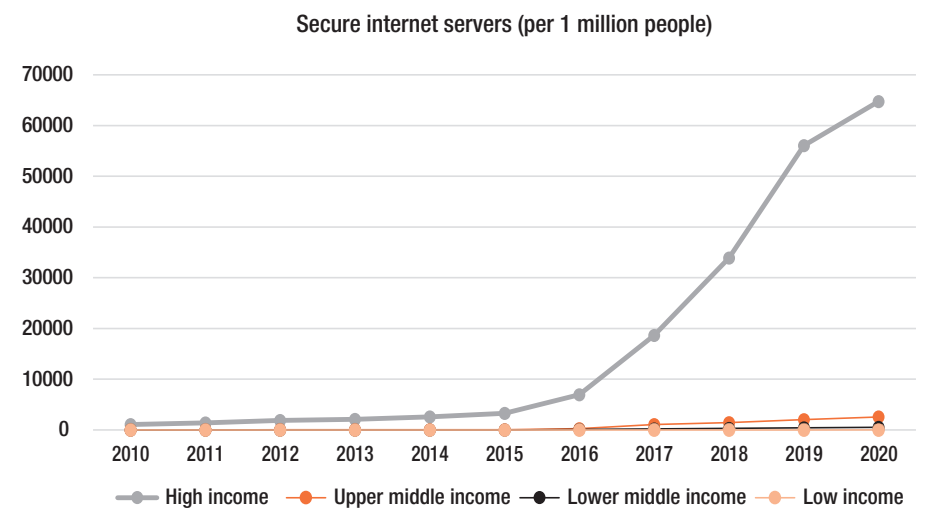
In addition to internet access, low-income countries are disadvantaged in terms of the quality of internet access. As shown in Figure 5, as of 2016 onwards, the number of secure Internet servers in high-income economies rapidly rose to reach 64,751 per million people in 2020. In the rest of the world, the number has not changed significantly since the 2010 level: the corresponding numbers for upper-middle-income, lower-middle-income, and lower-income economies were 2,557, 523, and 14, respectively.

Figure 4. Individuals using the internet (per 100 inhabitants), 2005–2019



Source: ITU (2021).

Figure 5. Secure internet servers (per 1 million people), 2010–2020



Source: ITU (2021).

The cost of infrastructure is another important factor affecting the competitiveness in DDS. The high cost of connectivity is an obstacle to the digital delivery of services. It also limits access to information for services providers and customers. The Broadband Commission for Sustainable Development recommends the cost of entry-level broadband services to be less than two per cent of gross national income per capita. Yet the cost of data rates across the most middle- and low-income economies exceed that threshold. The region with the highest cost is Sub-saharan countries (ITU, 2021).

B. Transformative impact of digitally deliverable services on the "modes" of supply of services

Beyond the magnitude of trade in DDS, one notable impact of digitalization of services is a change in the composition of the "modes" of international supply of services. Under to the World Trade Organisation (WTO), the General Agreement on Trade in Services (GATS)[3] distinguishes international services supply by the following four "modes":

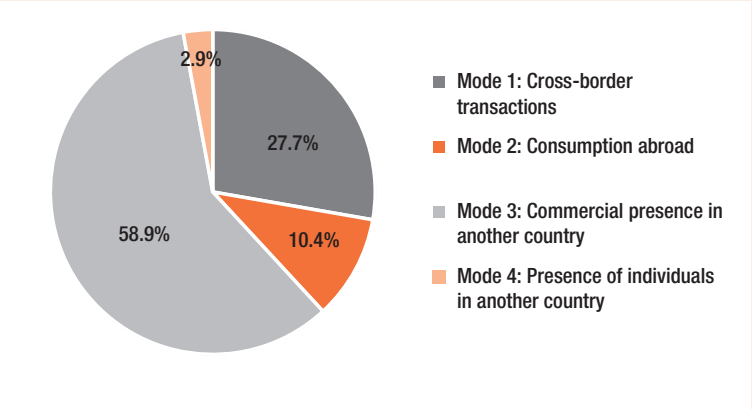
Mode 1 (Cross-border supply) covers services that flow from the territory of one country into the territory of another country, such as distribution services.

Mode 2 (Consumption abroad) refers to cases where a service consumer moves to another country to obtain a service, such as tourism.

Mode 3 (Commercial presence) refers to cases where a service supplier of one country provides a service to consumers in another country by establishing a presence, including through ownership or lease of premises, such as branches of foreign banks or international hotel chains.

Mode 4 (Presence of natural persons) refers to cases where persons of one country, such as medical doctors and nurses, provide services directly to consumers in another country by entering the territory of another country (*e.g.*, accountants, doctors, or teachers).

Figure 6. Commercial services trade by modes of supply (estimated %), 2017



Source: Wettstein *et al.* (2019).

Mode 3 has been the dominant mode of services supply. Using aggregated statistics of 2005-2017, Wettstein *et al*. (2019) show that Mode 3 has dominated the global services trade. In 2017, for example, Mode 3 accounted for nearly 60 per cent of the international commercial services trade (Figure 6). This was because the presence of a service provider at the point of most service transactions, *i.e.*, in close physical proximity to the services consumers, was necessary.

With digital platforms and telecommunications, many types of services today can be ordered and delivered promptly and without being constrained by geographical boundaries. The growing trend of service digitalization as a result has had a transformative impact via reinforcing the useability of specific modes of services or increasing complementarity between different modes of services (Table 2).

First, digital platforms can make cross-border marketing and transactions more efficient and cost-effective than before, resulting in significant increases in the flow of Mode 1 (Cross-border supply) services. Digital platforms may simplify the accommodation search and reservation process for consumers, which may have encouraged more consumption abroad (Mode 2).

Further, digitalization reduces the need for physical presence to provide certain services. Services that used to be provided by a subsidiary office in a consuming country (Mode 3) can be supplied from the service-supplier's country (Mode 1) via online platforms or digital tools. This trend may be reflected in the downward trend in global foreign direct investment in recent years (UNCTAD, 2021e).

Second, video coding and streaming technologies may have encouraged specific services to switch from physical delivery to digital delivery. This may have resulted in the shift from Mode 4 (cross-border individual professional service providers) or Mode 2 (consumption abroad) services to Mode 1 services. For example, the increased availability of video-conferencing services reduces the need for experts or professionals to travel to deliver Mode 4 services directly to consumers. Video-conference services are now widely used for business meetings, education, training, and other social purposes. The dramatic rise in demand for video-conferencing has led to the boom of some of the companies providing such services.[4]

Third, the progress in artificial intelligence, robotics, and fifth generation (5G) technology has significantly influenced medical services. Robotic surgeries, for example, could reduce the need for medical tourism (Mode 2) or flying surgeons (Mode 4). E-health company Lindbergh provides robotic surgery solutions (Mode 1) for patients worldwide (Cernat, 2021).

Table 2. Examples of services trade changed by digitalization

Digital technology & tools (In addition to ICT technology)	Example	Shifts between Modes of Supply
Digital (e-commerce) platforms: e-commerce platform, data processing tools, blockchain, virtual assistants	Amazon, Alibaba, Booking, Airbnb Virtual assistants for customer service, AI integration in automotive industry	From Mode 3 to Mode 1
Video Coding and streaming: video conferencing, online education, market information	Massive Open Online Courses (MOOC) Online agricultural extension and market information services	From Mode 2/Mode 3 to Mode 1
Artificial intelligence, robotics: telemedicine	AI Robotics in medical services	From Mode 2/Mode 4 to Mode 1

Source: Author.

C. Digital transformation of services in education, health, and agricultural sectors

Digital transformation of services can significantly impact sectors that are of particular importance to the achievement of the Sustainable Development Goals (SDGs), such as education, health, and agriculture.[5]

1. Online education services

The rapid progress in ICTs and digital technology has enabled education and training services to be provided online, allowing people to have new ways of learning at their own pace and with their choice of location and mode. For example, Chinese universities expanded tertiary education access for diverse learners via Massive Open Online Courses (MOOCs) (Li, 2013). South Africa adopted the technology-based Bridges to the Future Initiative to increase linguistic inclusion through mother-tongue literacy learning (Castillo *et al*., 2015).

The development of online education services gained speed when schools were closed during the COVID-19 crisis. The leading MOOC providers have experienced significant growth in registrations in 2020 (Classcentral, 2020).[6]

The advantage of online education services to learners is that they can enjoy cost-effective learning, at their own pace, without the limitation of geographic boundaries (Sigama & Kalema, 2018). Online educational services have provided children from remote or rural areas with access to quality education resources just as children living in urban areas or big cities. Universities and research institutions are moving research collaborations to digital platforms. Also, an increasing number of international students can now enrol in universities outside their countries via digitally deliverable education services (Castillo *et al*., 2015; United Nations, 2021).

Digitalization has triggered new business models in education services. For example, course providers on YouTube (*e.g.*, sports, cooking, various hobbies, etc.) do not earn from fees paid by the services users but from advertisers, depending on the number of clicks and subscribers (Gil *et al*., 2020; Priyono *et al*., 2020).

However, previous studies suggest that online education does not automatically democratise educational opportunities across different gender and ethnicity groups (Chamberlin & Parish, 2011). There is evidence that MOOC users tend to have certain characteristics, such as being well-educated and young (Christensen *et al*., 2013; Emanuel, 2013). Digital literacy and linguistic constraints can also be significant barriers to access to online education services for disadvantaged communities and individuals.

The paucity of digital infrastructure and quality connections has been recognised as the major challenge of online education (Adomi & Kpangban, 2010; Castillo *et al*., 2015; United Nations, 2021). The success of online schooling critically depends on the availability of an internet-capable device and high-quality internet provision. Still, not every child had access to those, even in developed economies. The digital divide has been widening *within* a country when it comes to access to computers, internet, and broadband (United Nations, 2021).

A significant gender gap remains a problem. Women tend to be disadvantaged in mastering a broad range of ICT skills as they have less access than men to computers or other online tools. The gender gap is also prevalent among online education instructors and providers (Castillo *et al*., 2015). Most worryingly, the number of female students participating in education in general during the Covid-19 crisis has declined across countries with different levels of development (United Nations, 2021).

2. Digitalization of health services

The COVID-19 pandemic has accelerated the adoption of digital tools in medical and health care services, including remote diagnosis, medical training, and treatment services (Chamola *et al*., 2020; Wang *et al*., 2021). Digital medical consultation avoids direct physical contact and minimizes the risk of exposure to potentially transmissive diseases, ensuring the continuity of availability of medical care (UNCTAD, 2021b; Wang *et al*., 2021). Efficient online diagnosis and treatment, with the support of 5G technology that enables high-speed transmission and sharing of medical image data, can alleviate the lack of the allocation of medical resources to remote and underdeveloped regions (Song *et al*., 2020; Bokolo, 2020).

During the COVID-19 pandemic, digital medical services have been fast adopted in many parts of Europe, North America, and Asia. In Canada, online consultations grew from about 1,000 visits per day in February 2020 to approximately 14,000 per day in mid-May of the same year. Australia has launched an online service for vulnerable groups to order the delivery of prescription drugs without having to visit a pharmacy (Philips, 2020). In China, remote consultations were given to COVID-19 patients with severe and acute illnesses by medical teams located remotely via 5G dual gigabit networks (Xinhuanet, 2020).

Digital delivery of medical services such as virtual consultation, online self-examination, and remote medical guidance could provide patients and medical teams with more timely solutions than conventional face-to-face services. Digitally delivered medical services could also offer remote care for patients with other chronic diseases at home, increasing the reach and accessibility of medical services (Health Leaders, 2020). WeDoctor, a Chinese digital health platform that provides online and off-line medical services, has actively formed medical partnerships with hospitals across China. The partnership now covers more than 2700 hospitals and 240,000 doctors in 30 provinces and cities, with more than 160 million registered users by 2021 (Wang *et al*., 2021).

Big data collection and analysis enabled by the new generation of mobile internets such as 5G technology also improve health care quality. Online resources help consumers access detailed and updated medical explanations (*e.g.*, possible side-effects from medications) and ratings of clinics and hospitals.

Other technologies such as Global Navigation Satellite Systems (GNSS) also supported global public health during the COVID-19 pandemic (UNCTAD, 2021b). The GNSS helped monitor the spread of diseases by offering tracing cases, identifying risky locations, and mapping the environmental factors of the disease, among others. The use of remote sensing has greatly improved the potential to track and visualize the real-time evolution of local outbreaks and map their impact upon public health infrastructure.

Digital health services are a viable way to increase resilience to future health emergencies. To further promote digital health services, developing the workforce's digital skills in the health sector and a clear legal and regulatory framework in the field of digital health and consumer data security and data privacy (Greenleaf, 2017) become critical (Loncar-Turukalo, 2019). International cooperation and global solidarity are essential for this purpose are crucial.

3. Digitalization of services and agriculture

The increasingly improved ICT and digital connectivity directly impact agricultural productivity, farmers' economic well-being, and adaptation to climate change impacts (Duncombe, 2016). The technological advancements in ICTs have paved the way for the growing penetration of digital delivery of agriculture extension services in delivering and sharing agricultural information (Nakasone & Torero, 2016; Omulo & Kumeh, 2020), among others.

Production and market Information sharing: The access to the internet and other communication networks has revolutionised extension, marketing, and financial services in the region's agriculture sector (Williams & Agbo, 2013; Asongu, 2018). Farmers can engage with more information sources through various digital platforms, such as WeFarm in Kenya, Farmerline in Ghana, Market-Led, User-Owned ICT4Ag-Enabled Information Service (MUIIS) in Uganda, and Agricultural Commodities Exchange for Africa (ACE) in Malawi (World Bank, 2017; Asongu, 2018). The biggest worldwide farmer-to-farmer digital network, 'Wefarm', enables farmers in Kenya to acquire knowledge and exchange ideas with their peers and access customized support from different service providers (Kolk & Ciulli, 2020). It is built on a machine learning algorithm that allows those who register on the platform to acquire knowledge on the production systems and to receive feedback via short message services (SMS), as well as via online chat services (Munene & Kasamani, 2018). The digital platform has progressively attracted over 1.8 million registered farmers across Kenya, Uganda and Tanzania who have posed over 4 million questions and received over 9.6 million responses (Kolk & Ciulli, 2020). In the platform, farmers can interact with other farmers to source ideas, solutions and innovations for their agricultural production challenges (Ellis-Jones *et al*., 2017). Farmers nowadays can also exchange information with their peers online via mobile phone and other internet-based applications (World Bank, 2017).

Facilitating business transactions: The application of digital services in the agriculture sector extends to help farmers to develop business plans and improve record-keeping (Daum *et al*., 2018), as well as to assist monitoring services. For example, the cloud platform-enabled service is especially useful for collecting and utilizing cost-effective data solutions for monitoring and tracking the crop planting status at any time and in any place. CASEarth's Big Earth Data (United Nations, 2021) cloud platform provides an agricultural sampling system by using smart phones to collect data from more than 100,000 surveys on crop planting structures every year. The potential of such digitally enabled agriculture services is enhanced through cloud data storing and sharing.

Automating the irrigation: Another digitally enabled service in agriculture is smart irrigation, *e.g.*, LoRa (United Nations, 2021), which uses advanced technology to monitor moisture-related conditions on agricultural land and automatically adjust watering to optimal levels. Smart irrigation services are becoming increasingly popular as they provide wireless communication to secluded areas with no service coverage. One of the main obstacles to the application of smart irrigation is the limited capacity of the system in accommodating large volumes of dataflow. However, the development of 5G services has essentially provided solutions to tackle the high-volume dataflow issue. Trials have been undertaken in developed economies to connect the unconnected areas for smart irrigation by integrating the LoRa with a 5G wireless network. The extension of the application to irrigation practices in developing countries is yet to be exploited.

The potential of ICT based innovations in mitigating agricultural challenges and improving performance in low-income countries is still largely underutilized (Cole & Fernando, 2016; Camacho & Conover, 2019). To facilitate the application of DDS across the agriculture sector, countries need to have adequate scientific and technological capacity, favourable government policies, investment in telecommunication infrastructure, as well as underscoring farmers' needs (Kiiza & Pederson, 2012). The nature and content of information shared, ability to connect to the marginalized farmers, and the farmers' ability to internalize and respond to the shared information must be brought into consideration (Nakasone & Torero, 2016).

III.

Opportunities and challenges of digitally deliverable services to developing countries

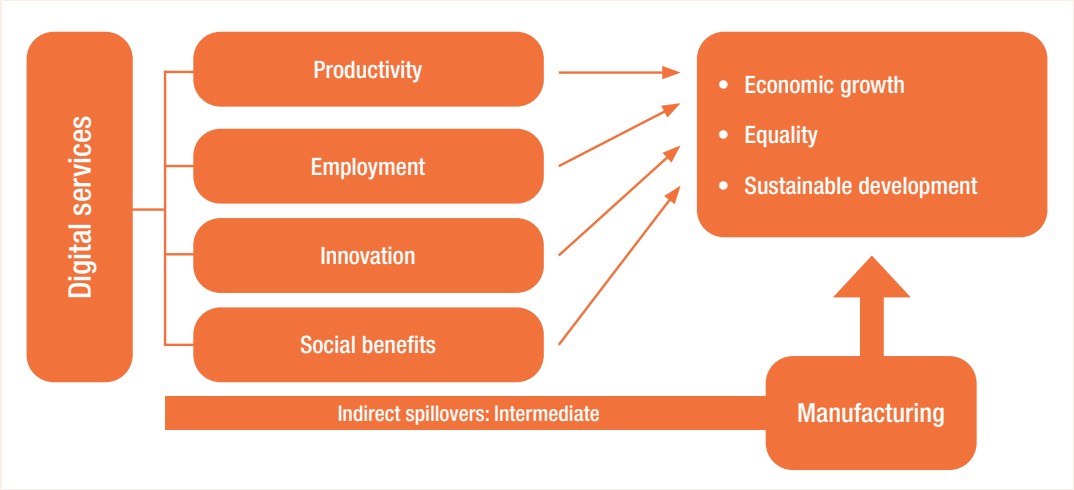
As discussed above, digital technology has had a significant impact on the ways services have been produced, delivered, and consumed. Such changes can contribute to socio-economic development by enhancing firms' competitiveness and employment. Although DDS remains a phenomenon in high-income economies, the digitalization of services can change productive activities in developing countries, opening new channels for structural transformation and socio-economic development.

A. Opportunities arising from digitally deliverable services

There are various ways in which developing countries can benefit from DDS, such as improved productivity, expanded market opportunities, and expansion of job markets.

Digitalization of services enables service activities to be transferred across electronic networks, thereby increasing the speed of service delivery, defying location disadvantages, and reducing service costs. As various services are embodied or embedded in almost all productive activities, this can significantly increase the economy's productivity, innovation, and other social benefits such as better access to health and education services. For example, the AI-robot service messenger, embedded in service providers' websites or mobile applications, provides instant solutions to customer queries. Digitalization of services can also provide indirect spill-over effects on productive sectors such as agriculture and manufacturing. Transformation in these areas can pave the way for economic growth, enhanced inclusiveness, and sustainable development (Figure 7).

Figure 7. Channels of digitally deliverable services affecting growth, equality, and sustainable development

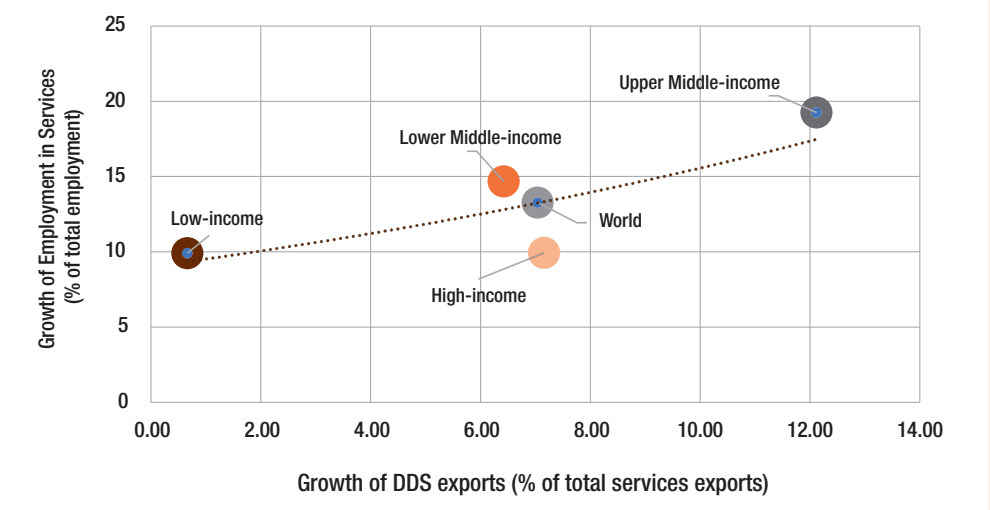


Source: Author.

The most direct channel through which services digitalization can influence socio-economic development is the job market. The digital transformation of services has stimulated employment in service-providing countries (European Union, 2015). Figure 8 plots the changes in the employment in services against the DDS export growth in different income groups between 2005 and 2019. The vertical axis measures the growth of service employment as a proportion of the total employment, and the horizontal axis captures the growth of DDS as a percentage of total services exports.

The plot suggests a positive association between the two variables. A fast expansion of employment in services is associated with a significant increase in DDS exports. The upper-middle-income economies reveal the most rapid average growth in service employment (around 20 per cent) and DDS exports (12 per cent). In contrast, low-income economies experienced a relatively small expansion of service employment (10 per cent on average) and the lowest growth in DDS exports. As regards high-income economies, the relatively fast growth of DDS exports was associated with the lowest increase growth in services employment since the services sector has already absorbed a significant share of workers.[7]

Figure 8. Growth of digitally deliverable services exports (% of total services exports), and growth of services employment (% of total employment), 2005–2019



Source: UNCTAD, World Bank Data.

In addition to job increases, digitalization has transformed the nature of work and labour markets worldwide (UNCTAD, 2017). "Digital work", *i.e.*, tasks that are digitally transported but performed locally, can generate jobs for the untapped labour force, including women and migrants (Altenried, 2020; Anwar & Graham, 2020; Rani & Furrer, 2020; Dunn, 2020; Lehdonvirta *et al*., 2019; Graham *et al*., 2017).

In the past, the rapid expansion of ICT services worldwide has increased the outsourcing of customer and business services, including call centres, insurance claims, network data centres, and software support, among others (Dasgupta & Singh, 2005; Baldwin, 2016; Heeks, 2019). Such business process outsourcing (BPO) has generated new job opportunities for women and youth (Blum & Goldfarb, 2006; Tambe & Hitt, 2008; Alaveras & Martens, 2015; Lendle *et al*., 2016). Such a job increase has happened in India, followed by countries such as Kenya and the Philippines (Dasgupta & Singh, 2005; Waema *et al*., 2009; Kariuki, 2010; Holtgrewe, 2014; Taylor *et al*., 2014; Flecker, 2016; Kleibert & Mann, 2020; Melia, 2020). It has helped businesses in developed economies reduce operational costs while maintaining their global outreach of services to their customers worldwide via digital networks (Heeks, 2017; Baldwin, 2019).

During 2021, the global BPO market size is expected to have grown by 6 per cent in a year, from US$ 232 billion in 2020 to US$ 246 billion (Grand View Research, 2021).

More services categories may be offshored to developing countries with improved internet connectivity (Melia, 2020). Economic opportunities arising from services delocalisation also increase incentives to invest in hard and soft infrastructure and digital and language skills development (Waema *et al*., 2009).

B. Challenges in promoting digitally deliverable services

There may also be severe challenges when promoting DDS, particularly to developing countries.

Digital divide: As explained in greater detail elsewhere, the continued persistence of digital divides between and within countries remains a key challenge.

- The majority of approximately 3 billion people without access to the internet live in low-income developing countries (United Nations, 2021). The absence of access to the internet means these populations are further deprived of the opportunities to benefit from new modes of education,

health care, or agricultural extension services. In the least developed countries (LDCs), only one in five people use the internet, while in developed countries, the proportion is four out of five (UNCTAD, 2021).

- Affordable and reliable digital connectivity is still a primary concern for many developing countries.[8] Mobile broadband is key to getting people online. A greater mobile penetration rate depends on a decrease in the cost of mobile devices and services, especially data use. The benefits of DDS are far from being evenly shared.
- The COVID pandemic has led to the increased use of digital solutions and tools in services. High-income countries made the best of digital technologies to minimise socio-economic disruption more effectively. As discussed in the previous chapter, low-income economies are facing the risk of falling further behind in the recovery due to underdeveloped digital infrastructure, lack of digital competencies, inadequate financial support, and weak regulatory frameworks (UNCTAD, 2021a).

Lack of skills: Workers' technical, cognitive, and social competencies essential for effectively participating in DDS are often in short supply in developing countries. For instance, in the tourism industry of some countries, the skills gap limits the extent to which small hotels could be integrated into the global system even when good Internet connectivity is available. In the agricultural sector, online platforms are only feasible when companies can obtain additional support in capacity building, training, or other technical assistance to obtain funding or meet quality standards (UNCTAD, 2020).

Baumol trap in the job market: An unwanted consequence of digitalization of services is that the productivity increase concentrates on the digitalized segment of a services value chain, often owned by transnational corporations. This may result in the "Baumol trap", where the relatively rapid growth of productivity in "progressive" digital services sectors leads to rising relative costs in "stagnant" analogue services sectors, such as warehouse and delivery personnel. This, in turn, leads to overall productivity stagnation (Archibald & Baumol, 1960).

Regulatory and institutional challenges in labour market: Policy, regulatory, and institutional frameworks have not kept pace with the rapidly evolving digitalization trends. Digitalization poses challenges to a variety of policy areas, including social welfare. A case in point is labour market regulations.

- Digital platforms are transforming the wage–labour nexus, capital-labour relationships, the nature of labour contracts, and firms' business models (Montalban *et al*., 2019; Jäger ., 2019). New forms of digital divisions of labour, and the ability to outsource bits and pieces of digital work are changing traditional ways of organizing labour into different economic spaces in real-time.
- There is increasing multiplication and heterogeneity of labour across productive activities and geographical space (Altenried, 2020; Graham *et al*., 2017). This has brought about growing inequalities and uncertainties regarding work (Stanford, 2017). For instance, platform workers commonly lack adequate social protection (Rani & Furrer, 2020). The lack of social protection is tightly linked to the business model of the gig economy, where workers are considered contractors and often paid the bare minimum wage. In developing countries, these pose challenges to the financing and sustainability of social security systems and paid leave (Kaine & Josserand, 2019).
- There is a challenge in enforcing labour laws regulating the relationship between employers and employees, as contracts of digital workers tend to be more informal and ambiguous as transactions take place across different territories (Graham *et al*., 2017). Digital workers in developing countries, where labour laws and regulations tend to be under-developed, probably face a more complex situation.

Digitalization is having a lasting impact on the speed of economic recovery. Countries with first-mover advantages would benefit more from trading DDS, thereby amplifying their comparative advantages. What can be done to level the playing field of DDS for low-income countries? The next chapter discusses approaches to DDS policymaking at the national level as well as among the international community.

IV.

Concluding remarks - Approaches to digitally deliverable services policy formulation

The transformative nature of DDS requires new thinking and approaches to policymaking at the national and international levels. As digitalization of services is happening today, it is not reasonable for this study to make prescriptive advice to policymakers. However, past experiences may be useful in discussing approaches towards sectoral development that can significantly impact sustainable development.

For example, UNCTAD has long advocated for a "whole-of-government approach" in policymaking for the services sector development.[9] Given the pervasive nature of digitalization, a whole-of-society approach for policy is warranted to promote trade in DDS. In this context, policy coherence and coordination between various aspects of economic and development policies, such as those covering ICT, trade, investment, competition, data, and consumer protection, become particularly important. The pursuit of balanced, people-centred digital development requires recognising and leveraging the vital roles of non-state actors and multi-stakeholder collaborations, which are essential to the policymaking process.

This concluding chapter discusses possible approaches to formulate policy on: (i) building trust in DDS; (ii) supporting DDS entrepreneurship; (iii) developing digital competencies; and (iv) promoting international dialogue on rules on trade in DDS. The digital divide is undoubtedly the most significant area of concern for national and international policymaking on DDS. However, discussing ways to redress the digital divide goes beyond the scope of this study. It is treated in greater detail in various essential reports, including the UNCTAD Digital Economy Report (UNCTAD, 2021c).

Building trust and confidence in trade in DDS: Trust is fundamental to the functioning of trade in DDS. Persistent gaps in the cybercrime landscape and legislation pose substantial challenges for legislation enforcement while conducting cross-border digital trade. Regarding security, privacy, and the movement and ownership of data, the current system for data protection is fragmented, and national data policy and legislation have not yet been developed in many developing countries (UNCTAD 2021).

For safe and secure trade in DDS, regulations at the national level are insufficient. Harmonising regulatory measures and legal frameworks at national, regional, and multilateral levels is important for facilitating trade in digital services. In this context, greater cooperation is needed to develop coherent strategies for digital security and privacy and implement privacy and security risk management frameworks. Policymaking needs to strike a balance between the need to collect data for innovation and efficiency gains and privacy concerns.

The European Union's General Data Protection Regulation (GDPR), enacted in May 2018, is currently the most comprehensive approach to data protection. A growing number of countries have adopted the GDPR as a baseline setting to develop their national data law. Developing economies may adopt a similar approach as several digital giants have also begun standardising their practices across the world. They also need to build capacity to deal with online fraud, cybercrime, and privacy abuse as limited regulatory and enforcement capacity risk consumers and businesses.

Policy measures to redress demand-side constraints would be helpful. The policymakers may consider improving consumers' financial literacy and inform them on consumer protection, as outlined in the United Nations guidelines for consumer protection.

Promoting entrepreneurship and multi-stakeholder collaboration: Entrepreneurship is central to promoting the development of DDS. A new incentive structure in taxation, financing, industry, and labour market policies, among others, can help encourage and facilitate investment and labour participation to support the digitalization of services. Such incentives may include, for example, tax cuts, low-interest rate bank loans, digital small and medium service enterprise support funds, or migration policies for digital talents.

The development of DDS requires a local business ecosystem. It is not possible to set up at once the business ecosystem to support the operation of the entire DDS, but there is a starting point. The above incentive structure may first focus on alleviating entrepreneurs' financial and human resource limitations which serve as a barrier affecting their selling and buying activities in a digital world.

Appropriate institutions are needed to set rules to promote investment in digital competencies and to create incentive structures that motivate workers, management, ad firms to develop the necessary skills to benefit from DDS opportunities. In this context, collaboration with, and support to, public- and private-sector education and training institutions would be essential through public-private partnerships.

Promoting digital competencies through public-private partnership: The growth of DDS has led to an increasing demand for digital competencies to use, adapt, develop, and create digital technologies. Countries that have invested in developing digital competencies are better positioned to take advantage of opportunities in the digitalization of services. India, for example, had the second-largest share of global ICT services exports in 2019 (UNCTAD, 2019), providing more than 10 per cent of the global ICT services exports. India's rapid upshifting in global IT services can be credited to its considerable investments in digital education, training, and skills updating.

One approach is to integrate digital competencies into the formal education curriculum. Such efforts may be accompanied by initiatives that promote entrepreneurship in the digital economy and international collaboration to facilitate knowledge exchange and capacity building. Given the rapid pace of technical change, retraining and life-long learning would be pertinent to continually update the working population's digital skills. In this regard, public-private partnerships could effectively support infrastructure development, digital skills training, and data facility building. Such alliances also hold the potential to connect digital education with employment by guiding well-trained and new graduates into promising industries and fields (European Union, 2015).

Promoting international dialogue on trade rules: As services become increasingly delocalized, the benefits of trade in DDS may be hindered by existing and emerging trade rules. These are barriers that may hold back innovation and create obstacles to the movement of DDS across borders. Empirical analysis shows that average services trade restrictions represent up to a 14 per cent additional tariff on small firms' exports compared to large firms that can absorb trade costs more easily (OECD, 2017).

As digitalization has reinforced a shift of modes of services supplies, there is reason to believe barriers to trade in services have shifted from restrictions on foreign ownership (Mode 3) and market access to restrictions on digital free flow. As discussed in Chapter II, digitalization of services has led to changes in service delivery methods: Mode 3 (commercial presence) declined, and Mode 1 (cross-border supply) increased.

At the same time, it stands to reason that exiting trade-related measures, or arbitrary new measures, may be applied to influence different facets of trade in DDS, such as infrastructure and connectivity, electronic transactions, payment systems, and intellectual property rights (Table 3). Among these, issues concerning the opening of the data market or the free flow of data will become a central point of contention between countries.[10] Successful cross-border transaction of digitally deliverable service requires trade agreements with partner countries under which standards and trade requirements are specified and strengthened international dialogue and cooperation.

Table 3. Legal and institutional measures relevant to digitally deliverable services trade

Measures	May be applied to:
Mandatory localization requirements	Increase the need to set up local representative office/branch, or to set up data centre locally Call for special standards for digital service equipment or services
Market entry restrictions	Limit digital service providers or digital platforms to operate in a country's jurisdiction
Consumer rights protection	Restrict the cross-border movement of data
Intellectual property protection	Ensure application of service-importing country's privacy protection rules Protect digital copyright, digital trademark rights
Unclear legal responsibilities	Control cross-border fraud
Content inspection	Ensure privacy protection

Source: Author.

Taken together, international cooperation is crucial to improving infrastructure, accelerating the development of digital skills, and facilitating digitally deliverable services. Such collaboration plays a vital role in capacity building and regulations in data collection, data usage, and promoting open access to data.

There is also a need to better understand the implications of trade rules upon promoting developing countries' participation in trade in DDS. International organizations such as UNCTAD are well-positioned to provide a forum to exchange good practices and lessons learned in promoting digital competencies and facilitating collaboration between countries and stakeholder groups. It is crucial that all countries, especially those trailing the furthest behind, are part of multilateral multi-stakeholder dialogue such as those under the UNCTAD Multi-year Expert Meetings on Trade Services and Development.

ENDNOTES

1 For details, see UNCTAD 2015(b).

2 Digitally deliverable services data are available from UNCTAD Data on '*Digitally deliverable services*'. Available at: https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=158358.

3 WTO, The General Agreement on Trade in Services (GATS): objectives, coverage and disciplines.

4 For example, the share price of a United States-based supplier of video-conference service Zoom® has gone up by fivefold in a year, from US$67 per share in January 2020 to US$ 337 in December 2020.

5 Development in these sectors is particularly important for the achievement of the SDG 2 (Zero hunger), SDG 3 (Good health and well-being), and SDG 4 (Quality education).

6 For example, Coursera received nearly 20 million new registered learners in 2020 (compared to 8 million in 2019) to reach 65 million users in total. Similarly, edX received 8 million new registrations in 2020 and achieved 32 million e-learners by 2020.

7 According to ILOSTAT, the share of employment in services in 2019 was 74 per cent in high-income economies, compared to 47 per cent in upper-middle-income economies, 40 per cent in lower-middle-income economies, and 30 per cent in low-income economies.

8 Even when service networks are established, it is still necessary to ensure sufficient fixed network backhaul via intermediate links.

9 See reports on Multi-year Expert Meetings on Trade Services and Development, various years, available at: https://unctad.org/meetings-search?f[0]=sitemap%3A808

10 For an in-depth discussion on data, see UNCTAD (2021c).

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