

INTERNATIONAL TRADE IN A DIGITAL AGE

Digital technology is shaping the future of global trade and investment. One aspect of the adoption of digital technology by global exporters and importers is the purchase and sale of goods and services online, which is part of what is broadly understood as “e-commerce”. The use of automated data exchange systems, cloud computing, big data and open source operating systems can help businesses run international supply chain management more efficiently. However, the use of digital technology in trade activities can, in fact, go beyond online buying/selling; in this chapter, the term “digital trade” refers to the use of digital technologies to facilitate businesses without limiting it to just online sales or purchases.

The impact of digital technology on global trade has attracted public attention worldwide with the discussions mainly focused on online sales. The rising importance of digital trade was already noted by international organizations in the late 1990s. For example, in 1999, UNCTAD stated that “electronic commerce has the potential to be a major engine for trade and development on the global scale” (UNCTAD, 1999, p. 1). WTO work in the same period stated that “the value of electronic commerce has catapulted from virtually zero to a predicted \$300 billion in the 10 years up to the turn of the century” (WTO, 1998, p. 1). A decade later, OECD (2012) indicated that more than 95% of all companies in OECD countries use Internet in doing their business. According to the most recent estimates made by UNCTAD (2016a), “e-commerce includes both business-to-business (B2B) and business-to-consumer (B2C), valued respectively at around \$19.9 trillion and \$2.2 trillion each...This trade is mostly domestic, but is becoming more and more international.”

Despite worldwide recognition of its importance, there are no official statistics on e-commerce or digital trade. Without proper valuation, there is also an absence of systematic discussion that can lead to evidence-based policy formulation in digital trade issues. Existing studies, mainly based on private data sources, are difficult to generalize because the data are often not comparable across countries, and are subject to variation in definitions and collection methods. Relative to the OECD countries, the dearth of data and analysis on digital trade issues is especially evident in developing countries. Without an internationally comparable measurement of digital trade, key questions for proper policy design and regulation remain unanswered. For example, “how large is cross-border e-commerce in comparison with domestic e-commerce?”, “which sectors are involved in digital trade?”, “how is the economy performing under these modern business models?”, or “what does a digital value chain look like?”

Using the official statistics available, this chapter aims to contribute towards closing the knowledge gap by highlighting major trends and policy implications within cross-border digital trade. In doing so, it also focuses on a factual exploration of digital trade at the global and Asia-Pacific levels.

The chapter comprises four sections. Section A provides an overview of how digital technology has affected global trade. Section B highlights issues related to quantitative assessment and proposes an analytical framework that can be used to estimate

relevant indicators for digital trade. Section C applies the framework with international statistics in order to provide a preliminary assessment of digital trade at the global and Asia-Pacific levels. Assuming that digital trade is becoming the mainstream of global trade in the future, section D suggests some recommendations for building supportive environment for the digital age of global trade. Although main policy implications are considered, recommending comprehensive policy actions is beyond the scope of the chapter.

A. BACKGROUND OF DIGITALIZATION OF TRADE

Underlying the rapid growth in digital trade is the revolution in computer and software technology, telecommunications technology and the expansion of Internet access. Since the mid-2000s, Internet access has greatly increased globally. According to the United States International Trade Commission (2013), while only 5.9% of the world’s population had Internet access in 2000, the number had grown to an estimated 34.3% by 2012. Internet access has expanded greatly, both in developed and developing economies. For example, the Internet penetration rate, which is measured by the share of Internet users in total population, more than doubled from 37.3% in Japan and 33.8% in the United States of America to 79.5% and 78.1%, respectively, during 2000 to 2012 (USITC, 2013). However, it is in emerging economies, such as Brazil, China and India, where Internet penetration has rocketed from 2.9%, 1.8%, 0.5%, respectively, to 45.6%, 40.1% and 11.4% (USITC, 2013).

According to the International Telecommunications Union (2013), 2.3 billion people have access to the Internet and this figure is expected to grow to 5 billion by 2020. For Asia and the Pacific, the growth of ICT connectivity over the past decade has been leading the world average. A report prepared by ESCAP (2016a), reveals that more than 52.3% of the global fixed broadband subscribers are in the Asia-Pacific region; however, this impressive number is mainly driven by China and a few countries in East and North-East Asia (ESCAP, 2016).¹ Online connectivity has been greatly improved as a result of the increase in mobile telephones and social media activity, and the deployment of national and international fibre-optic networks (UNCTAD, 2015). As Internet accessibility expands, trade transactions are moving from physical interactions between sellers and buyers, to cyberspace – with the marketplace being based on online activities without requiring direct interactions.

For example, the virtual marketplace has proliferated in forms of websites and through the use of social media such as eBay and Craigslist. In this process, the widespread lowering cost of mobile phones and tablets has been an important means for digital trade, especially in developing countries (UNCTAD, 2015).

According to OECD (2012), the number of mobile phone subscriptions worldwide has more than doubled since 2005 and tripled in non-OECD countries. According to Ahmed and Andolas (2015, p. 1), mobile devices “will account for four out of five broadband connections by 2016”. The latest statistics, released in June 2016 by ITU, indicate that the global mobile-broadband penetration rate was 49.4% while the penetration rate of fixed broadband was only 11.9%. The expansion of mobile broadband, in particular, is reducing the digital gap for developing economies whose access to fixed-broadband (8.2%) is much more limited than access to mobile broadband (40.9%). Therefore, it is not surprising that a survey by Fedrikkson (2013) found that 90% of online consumers in Latin America use smartphones to do online shopping. In China, “almost half of all online shopping is carried out on smartphones” (Wilson, 2016). Similarly, the survey by USITC (2013, p. 12) showed that “portability and wireless broadband, particularly when accessed via tablets, were key drivers of the increase in United States demand for digital content”.

While the development of ICT hardware and infrastructure contributed greatly to the expansion of digital trade in the past decade, new ways of using technology and the information it generates, including big data, social networking and cloud computing, has increasingly become an important element of digital trade. Social networks, such as Facebook and Twitter, have become a standard means of communication between businesses and consumers.

B. TOWARDS THE QUANTITATIVE ASSESSMENT OF DIGITAL TRADE

1. Problems in measuring digital trade

Apart from the comprehensive quantitative analysis of digital trade in the United States by USITC (2013), there are few studies for other markets. The reasons behind this void in quantitative analysis are linked to limited data on digital trade or even e-commerce specifically. As noted by UNCTAD (2015, p. 12), “only a few countries – mainly developed ones – compile data on e-commerce revenue.” The work on ICT for development done in partnership between UNCTAD

and ITU suggest core indicators of digital trade; however, the indicators that measure the readiness of countries to engage in digital trade do not lend themselves well to measuring the value of such transactions. The problem is compounded when trying to separate domestic and cross-border digital trade. Without official statistics, previous studies have generally been based on private data sources, followed varying methodologies, and have limited geographical coverage (mainly OECD countries).

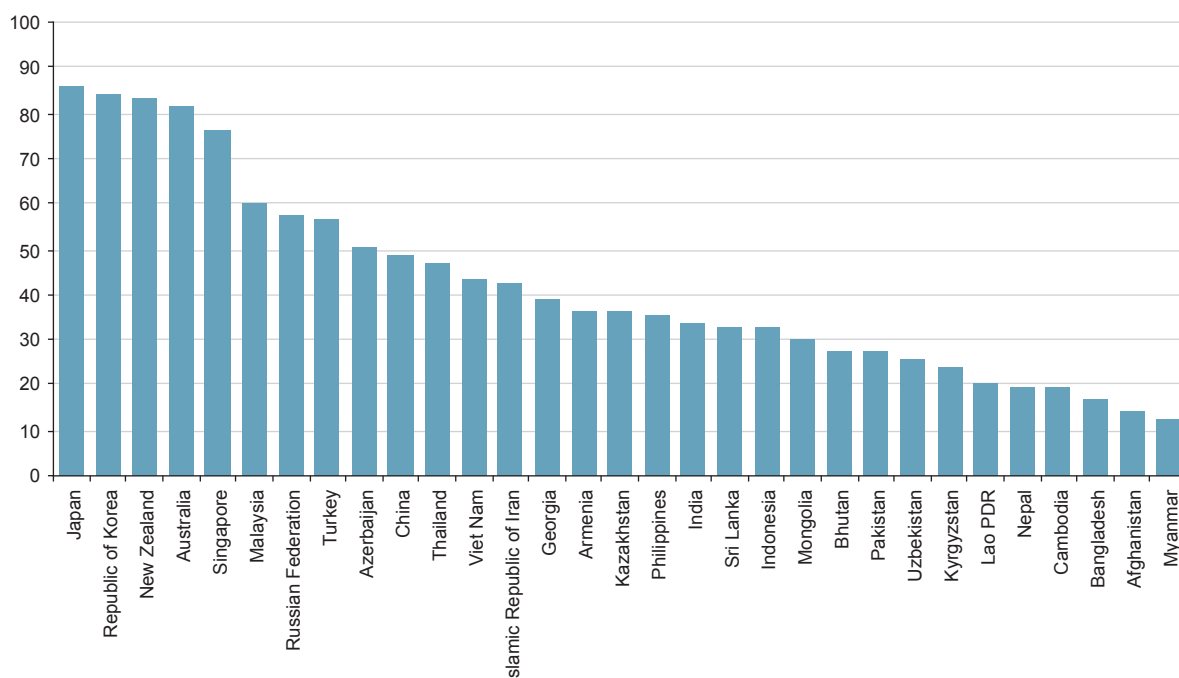
In trying to measure e-commerce, UNCTAD (2015) categorizes e-commerce into four types based on electronic relationships between governments, enterprises and consumers: (a) B2B (business-to-business); (b) B2C (business-to-consumer); (c) B2G (business-to-government); and C2C (consumer-to-consumer). Among these categories, B2B – which is the digital trade between businesses, such as between a wholesaler to a retailer – is dominant (UNCTAD, 2015; Asian Development Bank, 2015). An estimate of worldwide B2B e-commerce amounted to \$19.9 trillion in 2015 and for global B2C about \$2.2 trillion (UNCTAD, 2016a), while estimates for the e-commerce of the other categories are not available. The Asian Development Bank estimated that B2B transactions accounted for 90% of total e-commerce transaction value in Asia (ADB, 2015).

However, these estimates are based on limited data and depend very much on the method of measurement. Despite accounting for a smaller share in total digital trade globally, the previous studies used estimates based on B2C e-commerce statistics (such as online shopping) to discuss trends and developments in digital trade due to the fact that data on B2C are relatively more available. Overall, it is estimated that B2C e-commerce is growing faster than B2B, and with Asia and the Pacific seemingly growing faster than the rest of the world (UNCTAD, 2016b). Figure 7.1 shows the values of the B2C e-commerce index provided by UNCTAD for selected Asia-Pacific countries. It is important to note that indices such as this one measure e-commerce readiness from the capability or infrastructure perspective, and not actual trade flows. Even so, information is useful especially for countries aiming at strengthening their e-commerce enabling infrastructure.

Despite those efforts, there is still no official definition of e-commerce, which makes it difficult to do a cross-country analysis on digital trade (box 7.1). Instead, there are various working definitions of e-commerce, which may result in different value and growth rate estimates. For example, WTO (1998, p. 1) defined

Figure 7.1

UNCTAD B2C E-commerce Index, 2016



Source: UNCTAD (2016b).

e-commerce as “the production, advertising, sale and distribution of products via telecommunication networks”. OECD (2013) defined e-commerce as “the sale or purchase of goods or services, conducted over computer networks specifically designed for the purpose of receiving or placing of order. The goods or services are ordered by those methods, but the payment and the ultimate delivery of the goods or services do not have to be conducted online”. UNCTAD (2015, p. 3) defined e-commerce as “purchases and sales conducted over computer networks, using multiple formats and devices, including the web and electronic data interchange, using personal computers, laptops, tablets and mobile phones of varying levels of sophistication. E-commerce can involve physical goods as well as intangible (digital) products and services that can be delivered digitally”.

Digital trade also has implications for the improvement of existing systems of international trade statistics. One aspect of this is the need for the improvement of trade statistics to catch up with the fundamental changes in trade. The growing digitalization of trade is blurring the boundary between trade in goods and trade in services. For example, the digital purchase and delivery of books, films or music have increasingly replaced physical transactions. In some manufacturing industries, 3-D printing is transforming the shipment of physical goods into the online transfer of a digital

file that can be used to produce the good at its point of consumption. Digitization in trade has also turned part of non-tradeable services to become tradeable. For example, most of the medical and educational services were previously seen as difficult to trade across borders but today are almost a standard part of tradeables taking the form of Telehealth or online courses.

Current international trade statistics has not been able to track digital trade properly. The need for service trade statistics at the disaggregated level has become greater than ever. For example, trade in products that can be digitized is increasingly shifting from trade in physical products such as DVD books or films to trade in services such as in the subcategory of personal and recreational services. In addition, conducting digital trade depends on inputs from computer and information services, telecommunications services, and professional services such as web design, data engineers, IT professionals etc. Unfortunately, tracking trade in services is highly limited due to the lack of comprehensive data. For example, unlike statistics on trade in goods, there are still no official statistics providing bilateral trade in services. Data on international trade in services is available for broad categories under the sixth edition of the IMF Balance of Payments and International Investment Position Manual (BPM6) from the WTO database.² However,

Box
7.1

The definition and scope of digital trade used by some organizations

Without a common definition, the discussions and measurements of digital trade or e-commerce are fragmented and the approaches followed in previous studies vary. Overall, the scope and definitions of digital trade vary across countries and organizations. The narrowest definition is defining digital trade as trade in digitized products, while a broader definition of digital trade seems to be the use of digital technologies (ICTs) to conduct business. The definition and scope of the term “digital trade” or “e-commerce” used by some organizations is summarized below:

- **World Trade Organization** – In WTO the term “electronic commerce” has generally been employed rather than “digital trade”. The WTO Work Programme on e-Commerce was launched in 1998. Under this programme the term “electronic commerce” is understood to mean “the production, distribution, marketing, sale or delivery of goods and services by electronic means” (WTO, 2016). Despite the efforts to date, WTO members have, so far, failed to agree on a new multilateral regime for digital trade or electronic commerce; WTO does not report separate trade statistics in this area. However, WTO members have agreed to continue the practice of not imposing customs duties on electronic transmissions for the time being. In addition, the WTO Information Technology Agreement lowers tariffs on ICT goods, and was renegotiated in 2015 to expand and update product coverage; however, given the constant pace of new product creation in the sector, the agreement is likely to necessitate further updating in future. Likewise, digital services are only partially covered in the specific General Agreement on Trade in Services (GATS) commitments by WTO members because the “positive list” approach requires active national commitments with regard to newly developed services (Weber, 2010).
- **Organisation for Economic Co-operation and Development** – An OECD (2013) study discussed some of the issues related to measuring the Internet economy in general, within which cross-border digital trade would be a subcategory. It noted that most existing industrial classification systems were too broad to identify relevant digital trade-related activities and that new composite approaches might be needed to gain a good understanding of the rapidly evolving digital economy.
- **United Nations Conference on Trade and Development** – UNCTAD (2015) defines e-commerce as purchases and sales conducted over computer networks. To UNCTAD, e-commerce can involve physical goods as well as intangible (digital) products and services that can be delivered digitally.
- **United States International Trade Commission** – USITC (2013) has adopted a relatively narrow definition of digital trade as the delivery of products and services over either fixed-line or wireless digital networks. It excludes commerce in most physical products, such as goods ordered online and physical goods that have a digital counterpart such as books and software, music and films sold on CDs or DVDs.
- **European Union** – The European Union has set a target of creating a “digital single market”. This is defined operationally as “an area where individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, irrespective of their nationality or place of residence” (European Commission, 2016). This initiative goes beyond reforms to improve the environment for digital trade; it embraces increasing competition in the telecoms sectors, and improvements to data protections and privacy provisions.
- **McKinsey Global Institute** – McKinsey (2014) studies have used the volume of cross-border data flows as a primary measure of trends in digital trade. This broad measure encompasses the direct exchange of digital goods, and digitally enabled exchanges of services or labour. However, it also captures a huge range of cross-border data flows that would not normally be considered as “trade”, such as personal communications. Other technical shortcomings include the likely overestimation of traffic as Internet hubs route data across multiple borders to connect two endpoints (Lund and Manyika, 2016).

Source: ESCAP compilation from various sources.

comparability of service trade data across countries is limited, especially when going into the level of service subcategory. Measurement problems surrounding service trade statistics include the differences between countries in terms of data collection methodology and the level of data disaggregation.

2. Suggested analytical framework

The analysis in this chapter is based on the concept proposed by the Markle Foundation (2005) in a report on *WTO, e-commerce and information technologies: from the Uruguay Round through the*

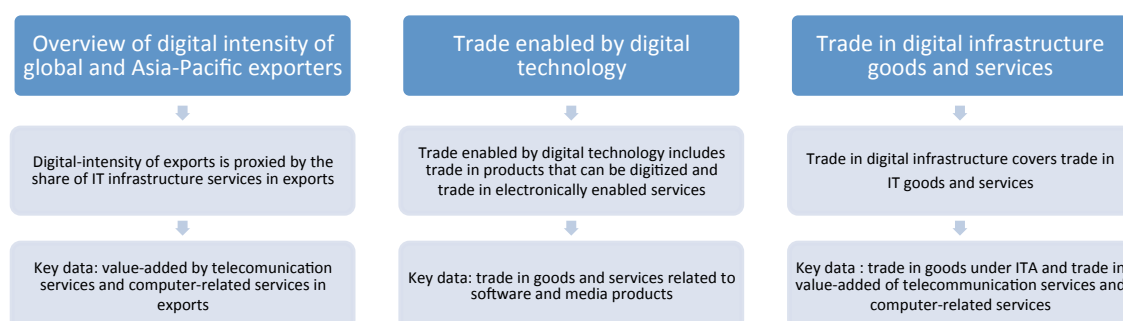
Doha Development Agenda, prepared for the United Nations ICT Task Force. The report, which gives an overview and discusses how WTO members can apply the WTO rules-based trading system to promote the development of the physical, human and legal infrastructure for e-commerce, suggests that discussions on policy issues in digital trade should consider four groups:

- (a) Group 1 – Digital-infrastructure goods, i.e. IT goods providing hardware to conduct digital trade. Examples include computers, network devices, mobile phones, etc. that are the part of physical infrastructure needed to conduct digital trade. The Markle Foundation (2005) suggests that products under the Information Technology Agreement (ITA) can be a representation of this group;
- (b) Group 2 – Digital-infrastructure services, i.e. services providing virtual infrastructure for conducting digital trade. According to the Markle Foundation (2005), these include basic and value-added telecommunications services, and computer and related services;
- (c) Group 3 Digitized products – “Content” products, such as software, books, music, films and games that can be traded in a physical form on a carrier medium such as video tape or CDs, but are now traded electronically via the Internet and which may then fall into the services category, such as personal cultural and recreational services.³
- (d) Group 4 – Electronically enabled service, which cover services that have adopted digital technologies to sell e-services. This is a large category because most services nowadays have adopted digital technologies and are selling e-services to varying degrees.⁴

The data analysis in this chapter follows the framework shown in figure 7.2. The first part of the quantitative analysis is looking at the digital intensity of exports at the global and Asia-Pacific levels. As there is no direct measure of this intensity, this chapter uses the share of services that are digital infrastructure (computer and related services, and telecommunication services) embedded in exports of a country as a proxy.⁵ These services are highly relevant to digital technology and digital trade. For example, the emergence of Internet telephone and other Internet services such as e-mail, video conferencing etc., in particular, have enhanced and accelerated the developments of digital trade. Voice-over Internet Protocol (VoIP) has generated a surge in global cross-border telephone calls. Cross-border computer-to-computer Skype-calling has generated a torrent of cross-border data flows. People and companies are using digital and mobile connections to share ideas, collaborate and make social connections. These platforms range from e-commerce sites, including Amazon, Alibaba and Airbnb, to the G-Cloud of the Government of the United Kingdom, which provide electronic channels of distribution to small businesses providers of goods and service.

This analysis relies on an input-output approach to the classification of the analytical framework (figure 7.2). The data source is the OECD-WTO Trade in Value-Added (TiVA) database (October 2015 version).⁶ Where relevant, international statistics on trade in services and goods have been used. Data on international trade in services are from the WTO database under the sixth edition of the IMF Balance of Payments and International Investment Position Manual (BPM6).⁷ Data on trade in goods are based on HS classifications from the United Nations COMTRADE database which are available from the World Bank World Integrated Trade Solution (WITS) platform.

Figure 7.2 Analytical framework



C. PRELIMINARY ESTIMATES OF ELECTRONIC CONTENT IN EXPORTS BY ASIA AND THE PACIFIC

1. Digital technology used by Asia-Pacific exporters

Measured by the share of telecommunications⁸ and computer-related services embedded in total exports there is a rise in digital intensity in total exports at the global and Asia-Pacific levels. The value added by telecommunications and computer-related services in world exports grew by 8.8% annually from 1995 to 2011.⁹ The growth rate is higher than the growth of world gross exports of 7.6% during the same period, causing the share of value-added by telecommunications and computer-related services in total export value to increase from 2.7% in 1995 to 3.3% in 2011. Similar to the global trend, the share of value added by telecommunications and computer-related services in total exports of Asia and the Pacific economies increased from 2.1% in 1995 to 2.6% in 2011.¹⁰ The smaller share in the Asia-Pacific region's exports compared with world exports, which may also be related to the lack of ICT infrastructure in the region as pointed out in ESCAP (2016b). It indicates that the region still has a great deal of latent potential for expanding the use of digital technology. Although developing Asia-Pacific economies are still considered to be latecomers to digital trade, they are catching up rapidly. The value of telecommunications and computer-related services rooted in total exports by the Asia-Pacific region grew by 11.1% annually from 1995 to 2011, while that of

non-Asia-Pacific exporters was only 7.9%. Specifically, the use of computer technology by exporters in the Asia-Pacific region grew quickly at 14.6% per year, while the growth rate was only 11.1% for exports by the rest of the world.

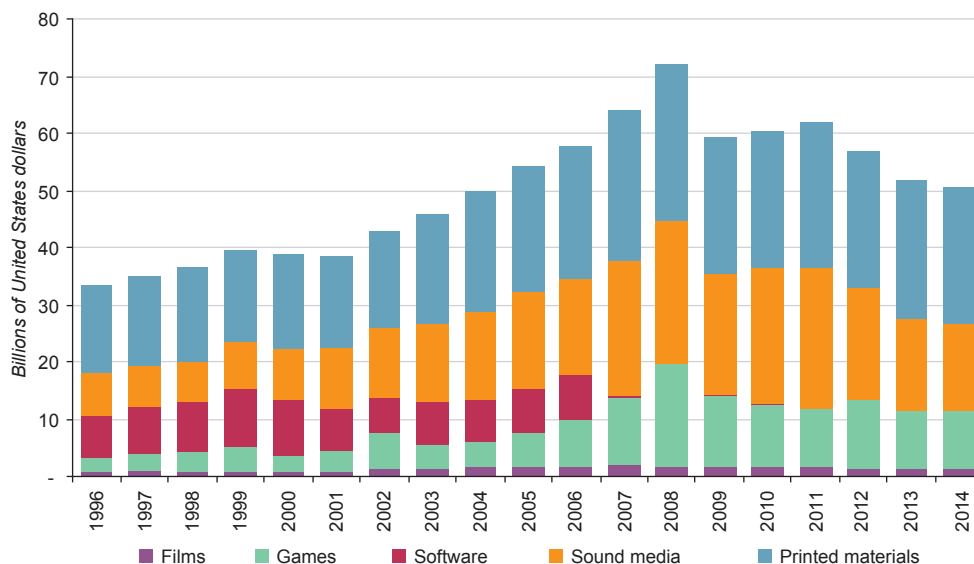
2. Trade enabled by digital technology

The advancement of Internet and computer technologies has directly transformed the patterns of trade in goods that can be digitized. Goods that can be digitized are essentially software and media products, including films, various types of printed materials, video games and various types of recorded information on carrier media.¹¹ Cross-border merchandise trade in products that can be digitized was equivalent to 0.3% of world merchandise trade in 2014. Exports of printed books accounted for nearly half of this number (figure 7.3). Based on merchandise trade data, exports by Asia-Pacific economies account for about 30% of world exports of products that can be digitized. China dominates the region's exports of games and printed books, while Singapore leads the region's exports of software and sound media. The major Asia-Pacific exporter of films is Japan, followed by the Republic of Korea.

However, part of the declining merchandise trade value of goods that can be digitized after the peak in 2008 was replaced by the potential growth of trade in their digital counterparts. Digital downloads of these products (films, sound media, software etc.) may be classified as part of trade in services,

Figure 7.3

World exports of goods that can be digitized, 1996-2014



Source: ESCAP calculation using data from United Nations COMTRADE downloaded from WITS, accessed August 2016.

such as under the personal and recreational service subcategory. The change in trade classification has led to the interpretation of merchandise trade data for those products to potentially be misleading. For example, software trade has not been reported under merchandise trade for many countries since 2006. In addition, switching towards digital downloads may be a factor in explaining why merchandise exports of films by Japan were three times larger than the export of the same item from the United States (considering its strong motion picture industry) in 2014.

Using statistics on trade in services shows that the value of world exports of personal and recreational services increased steadily from \$25 billion to \$40 billion between 2006 and 2015. This suggests that the underestimation of trade in products that can be digitized is far beyond 50% of the value based on the merchandise statistics above.

Yet analysis using trade statistics for services is not fully possible due to complicated issues in recording those transactions. For example, an intuitive way of thinking about digital trade in books, films or music tends to be in terms of transactions that an individual might make in purchasing an e-book, film or sound recording from an online store or in subscribing to a service that provides on-demand access to a catalogue of printed materials, films or music. However, those types of transactions may not be registered as cross-border transactions due to the geographically-specific intellectual property rights protection of the content. There will only be the exchange of money from a firm in the importing country to a firm in the exporting country for the right to sell content that is protected by intellectual property laws in a given geographical area, but not the value of the e-product delivered to consumers in the importing countries. Furthermore, services trade statistics appear to be patchy across countries. For example, some countries report trade in computer-related information and telecommunication services while a number of countries still report only business services in general but not the data on those service subcategories.

Digital technology does not only affect trade in personal, cultural and recreational services; the supply of most services has also been affected. For example, in the tourism industry, booking and payment for airline tickets, hotels, tours etc. are increasingly carried out over the Internet. Electronic banking and online insurance provision have taken an important share of the financial and insurance services. Professional services, such as accounting, legal or medical, are

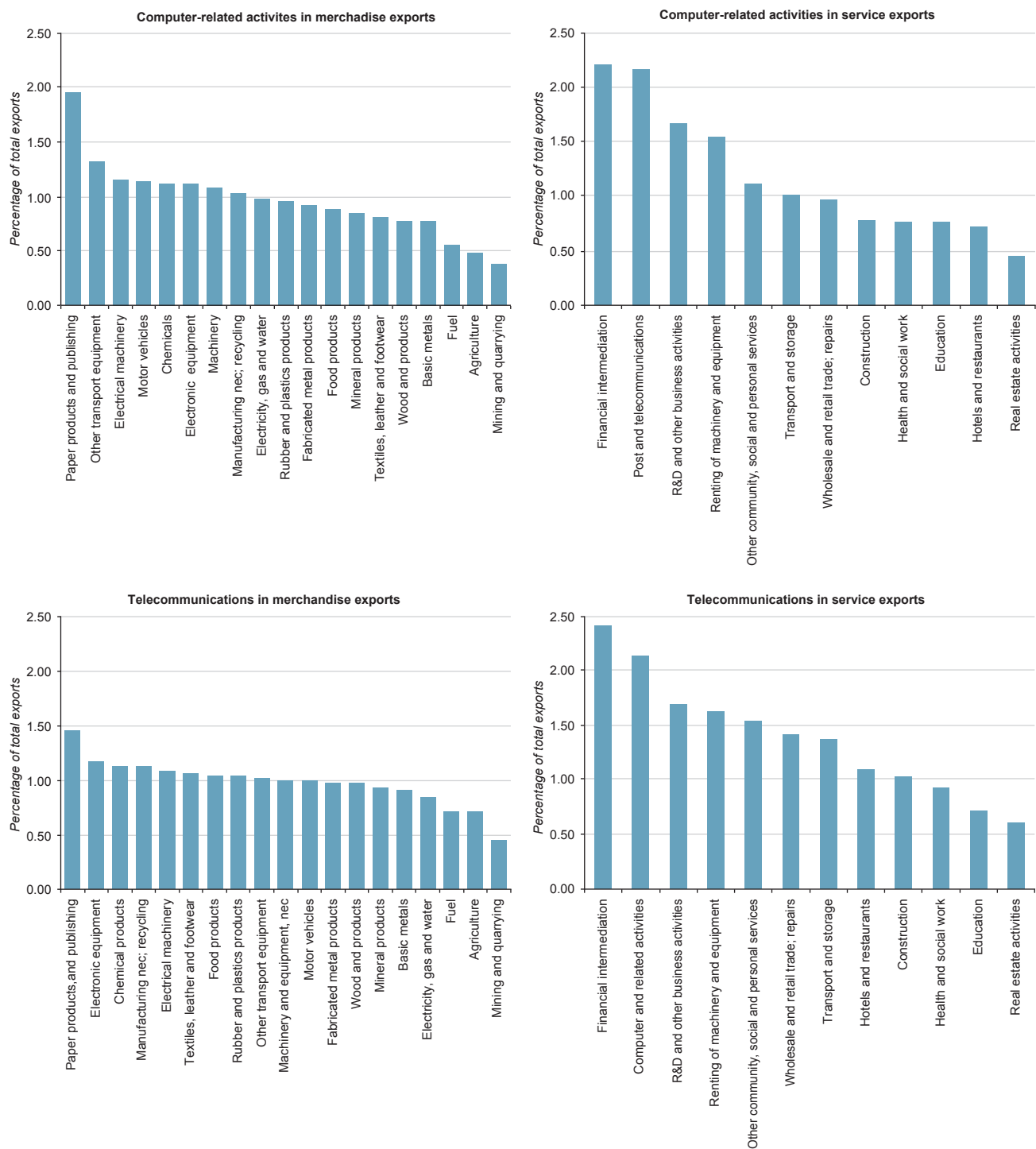
increasingly based on Internet-based communications; news services transmitted by digital networks, together with Internet telephone, e-mail, voice mail etc., constitute a majority of the communication services provided. Furthermore, in the sectors where the supply of certain services across borders appear to be unfeasible, digital technology has allowed new forms of supply, such as Telehealth.¹² As the scope of Internet-enabled services is large, it then follows that cross-border trade in these sectors accounts for 88% or more of total world trade in commercial services. Digital technology is having an increasing impact on those services, but measuring it remains difficult. As explained above, the best that can be achieved is some estimation or approximation of the digital intensity of exports by using the proxy based on trade in value-added data. Therefore, any impact analysis is bound to be biased by having no exact data on the digital content in overall trade flows.

Trade in value-added data indicates that the growth of digital trade has a relatively stronger impact on service trade than merchandise trade. Measured by the use of computers and telecommunication services in export value addition, digital technology in general plays a larger role in the export of services than in the export of goods (figure 7.4). Among others, the sectors with high digital intensity include financial services (for example, Internet banking, although it is not possible to say how much of it is cross-border), telecommunication services, research and development and business services, and renting of machinery and equipment (car rental services etc.). In the case of exports of goods, the publishing industry – which involves digital trade of e-books, e-magazines, online newspapers etc. – has the highest degree of digital intensity. It is followed by relatively high-tech industries that use digital and telecommunication technologies to facilitate their operations and participation in global value chains (e.g. chemical products, computer equipment, and electrical machinery and transport machinery).

Education services lead the way in terms of the speed of growth of digital content in the exports by Asia and the Pacific. The increase of digital content in educational exports by Asia and the Pacific was nearly 200% from 1995 to 2011 (figure 7.5). Overall, there are 11 Asia-Pacific industries where the digital content in exports more than doubled from 1995 to 2011. For non-Asia-Pacific economies, it appears that the rate of digitization is relatively slower except in the case of printing, telecommunications and machinery-renting businesses.

Figure 7.4

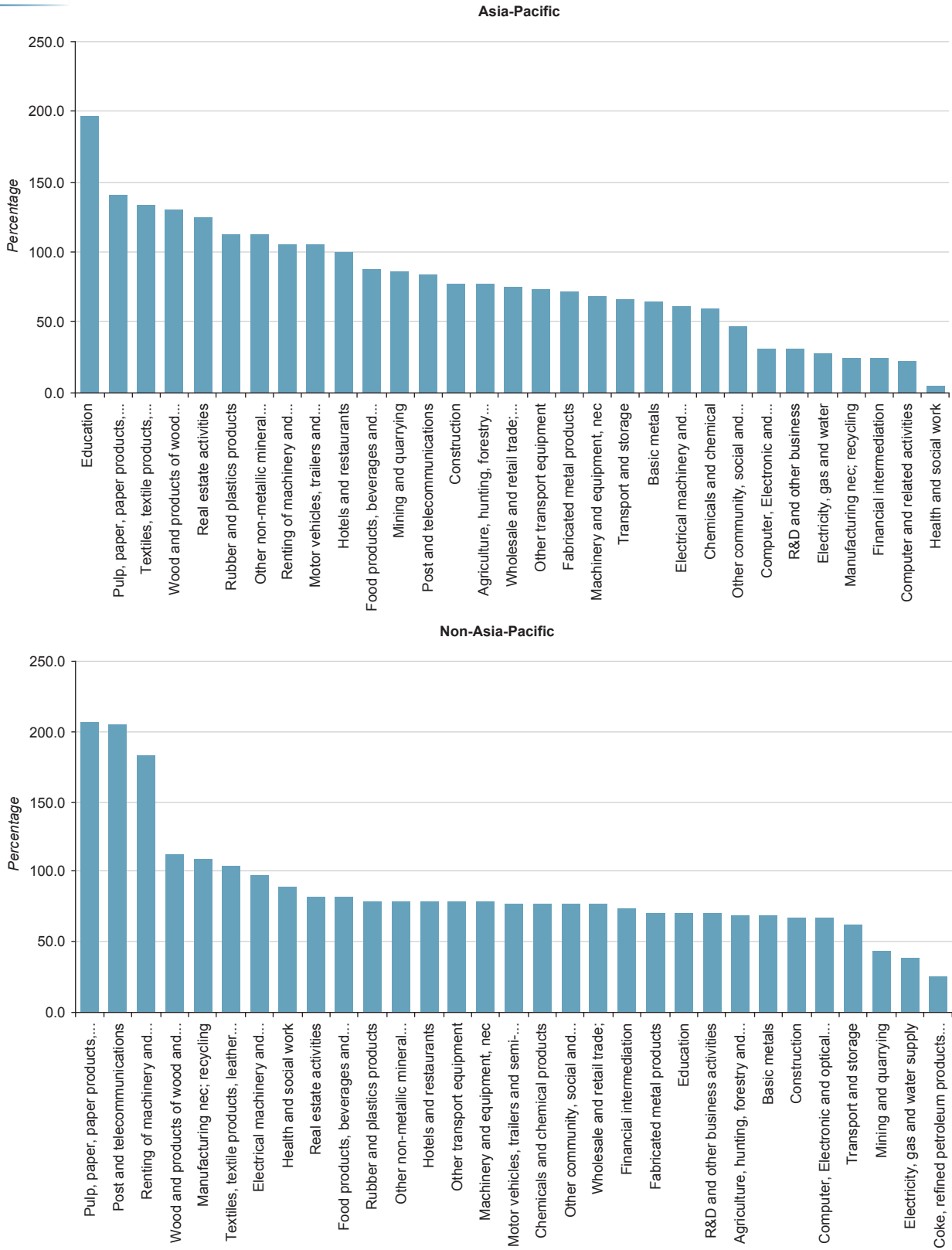
Value added by digital infrastructure services to merchandise and service exports, by sector, 2011



Source: ESCAP calculation using data from OECD-WTO TiVA, October 2015 version.

Figure 7.5

Change in the share of digital content in exports, by sector, 1995 to 2011



Source: ESCAP calculation using data from OECD-WTO TIVA, October 2015 version.

Note: Digital content in exports is proxied by the share of value-added by computer and related services.

3. Trade in infrastructure goods and services

The availability of digital infrastructure is important for the development of digital trade. Part of the investment in digital infrastructure is the import of infrastructure-related IT goods and services; however, the import intensity in each country differs, depending on various factors including domestic capacity to produce the digital infrastructure-related goods and services, and trade policy. Trade in value-added shows that the import share of digital infrastructure services in total exports globally increased from 14% in 1995 to 22% in 2011. In the case of Asia-Pacific exporters, the import share is higher than the world average. Since 1995, the share of imported telecommunication services has been 21% while the import intensity of computer and related services gradually increased from 23% in 1995 to 25% in 2011. The growing significance of digital infrastructure-related imports implies that there is a need for an open trade environment for the sake of

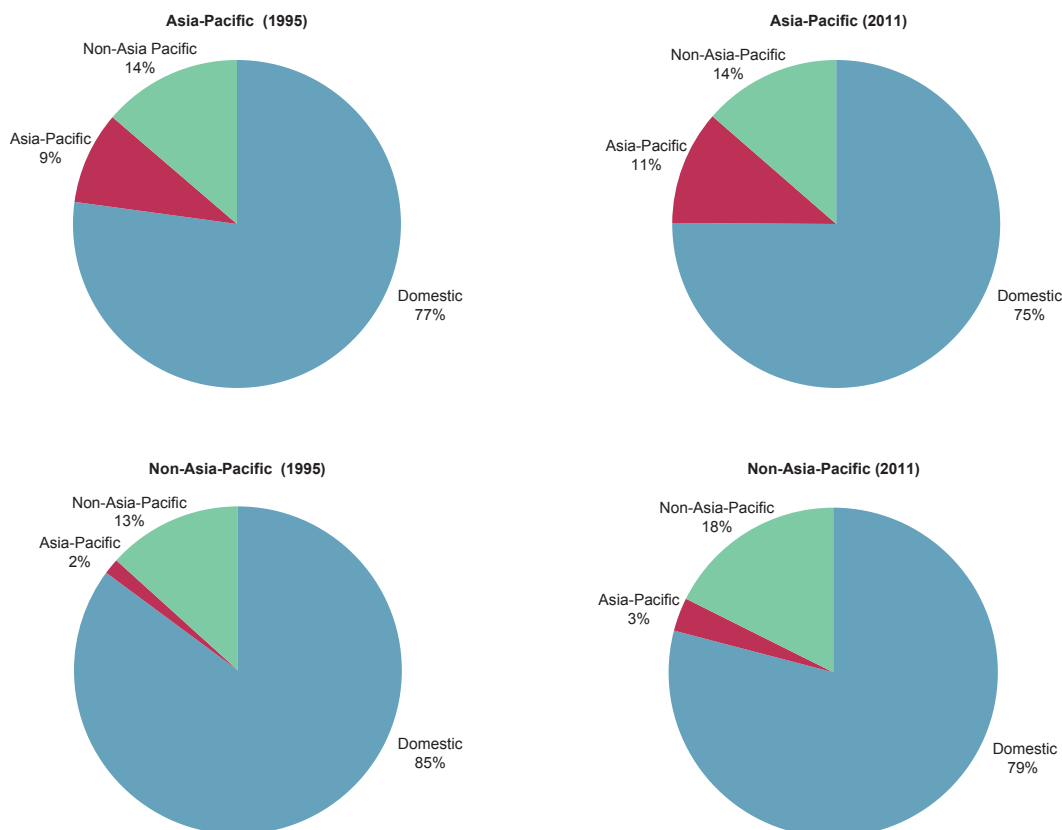
digital-trade development.

In addition, intraregional trade is growing together with the rising importance of digital trade, especially intraregional trade in computer and related services. From 1995 to 2011, intraregional imports of digital-infrastructure services grew faster than the imports from non-regional partners and domestic sourcing. As a result, the share of intraregional imports grew from 9% to 11% during those years (figure 7.6). In contrast, non-regional economies only source 2%-3% of the services from Asia and the Pacific.

While intraregional trade opportunity is growing, the major markets for digital-infrastructure services remain outside the region. At the global level, the United States is the largest user of computer technologies in terms of facilitating its exports, followed by Germany, the United Kingdom, France, Ireland and Italy (figure 7.7). China, the largest Asia-Pacific user of computer

Figure 7.6

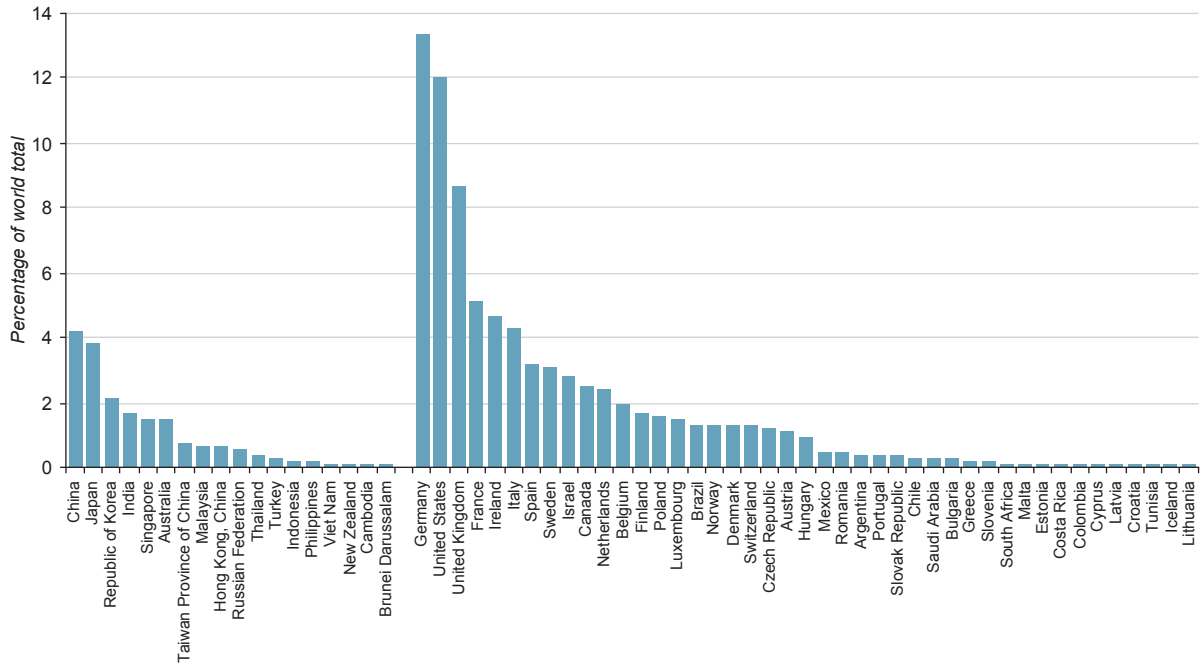
Sources of computer-related services used in exports, Asia-Pacific and rest of the world, 1995 and 2011



Source: ESCAP calculation using data from OECD-WTO TIVA, October 2015 version.

Figure 7.7

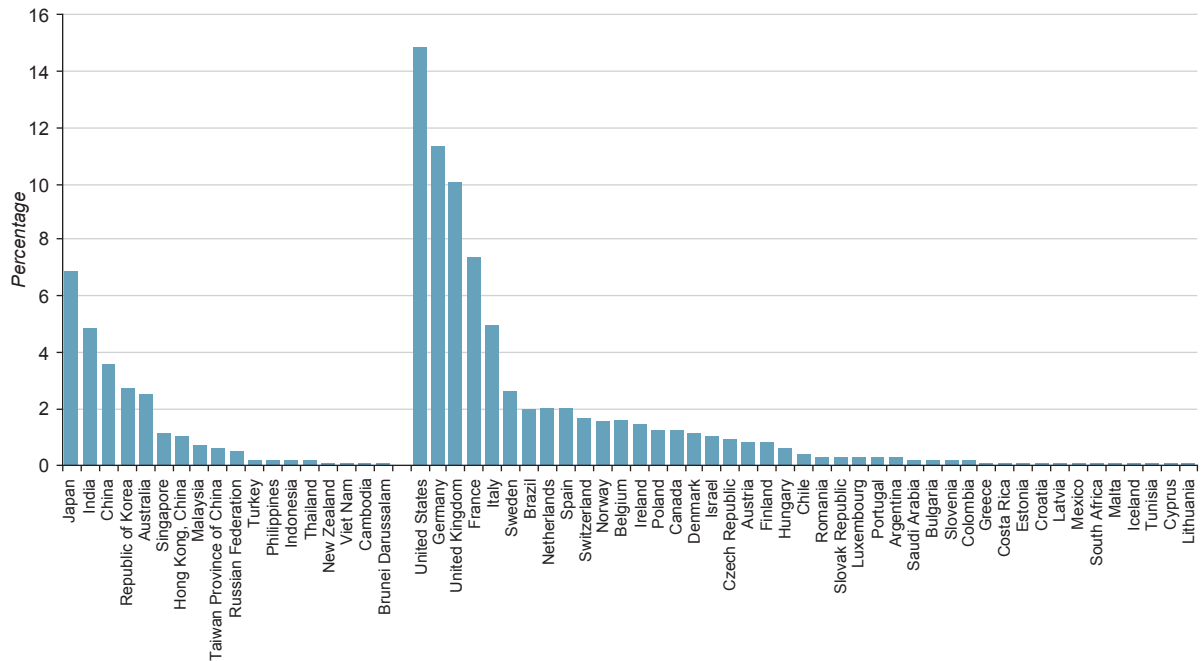
Important users of computer-related services for exports, by economy, 2011



Source: ESCAP calculation using data from OECD-WTO TIVA, October 2015 version.

Figure 7.8

Important providers of computer-related services embedded in exports, by economy, 2011



Source: ESCAP calculation using data from OECD-WTO TIVA, October 2015 version.

technologies in export processing, comes after Italy and is followed by Japan. The countries listed as the major users of computer technologies in their exports are also the major exporters of the computer-related services (figure 7.8). Thus, the figures indicate that an economy's competitiveness in digital-infrastructure services may be an important factor in export competitiveness in the modern trade environment, where the Internet network has become an important platform of global trade.

For telecommunication services, the share of intraregional imports of telecommunications by Asia and the Pacific decreased from 8% in 1995 to 4% in 2011 (figure 7.9). On the one hand, this decreasing share of intraregional imports may indicate that Asia-Pacific economies still have limited capacity to compete with global service providers in telecommunications. On the other hand, the trend of digital technology has allowed consumers to order goods or services

from suppliers operating outside the region, and thus cross-regional telecommunications is an important part of facilitating those cross-regional transactions.

However, the minimal share in overall telecommunication services of the Asia-Pacific region masks the distinct performance of China in comparison to other Asia-Pacific economies. In fact, China has caught up with the United States as an important user of telecommunication services to facilitate its export activities (figure 7.10). In addition, China has been the world number one in terms of indirectly exporting telecommunication services. This may indicate that the inputs from telecommunication services have contributed to the success story of China's exports during the past decade.

With regard to digital-infrastructure goods, based on the list of ITA products digital-infrastructure-related merchandise exports amounted to \$1,600 billion in

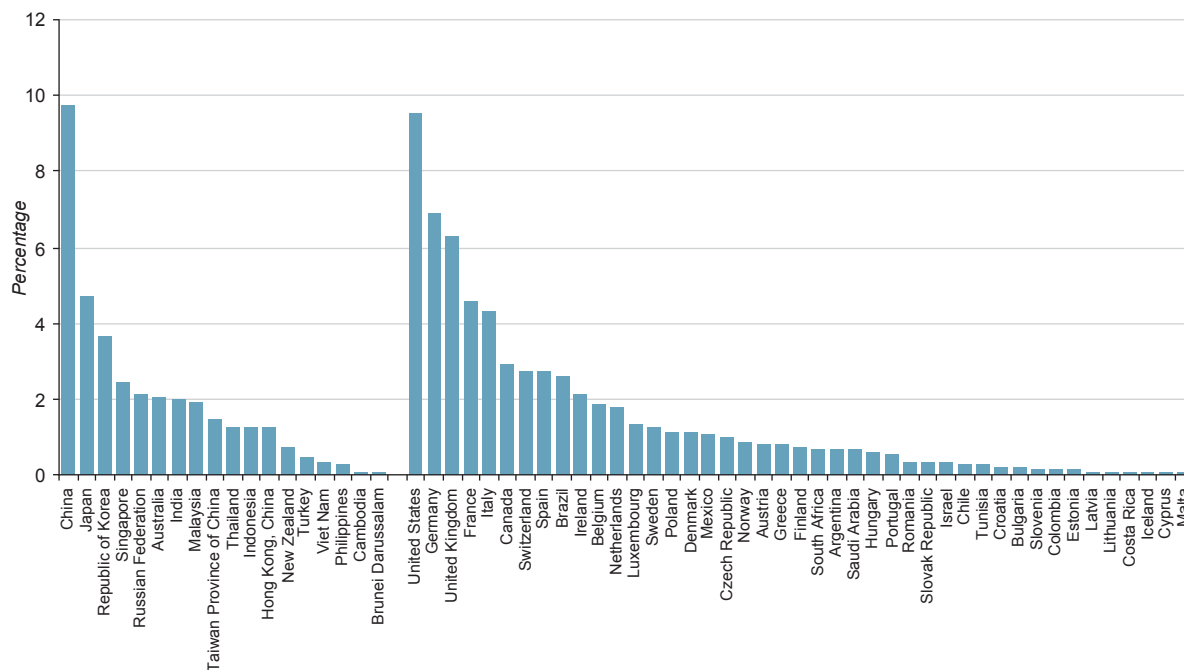
Figure 7.9 Sources of telecommunications services used in exports, Asia-Pacific and rest of the world, 1995 and 2011



Source: ESCAP calculation using data from OECD-WTO TiVA, October 2015 version.

Figure 7.10

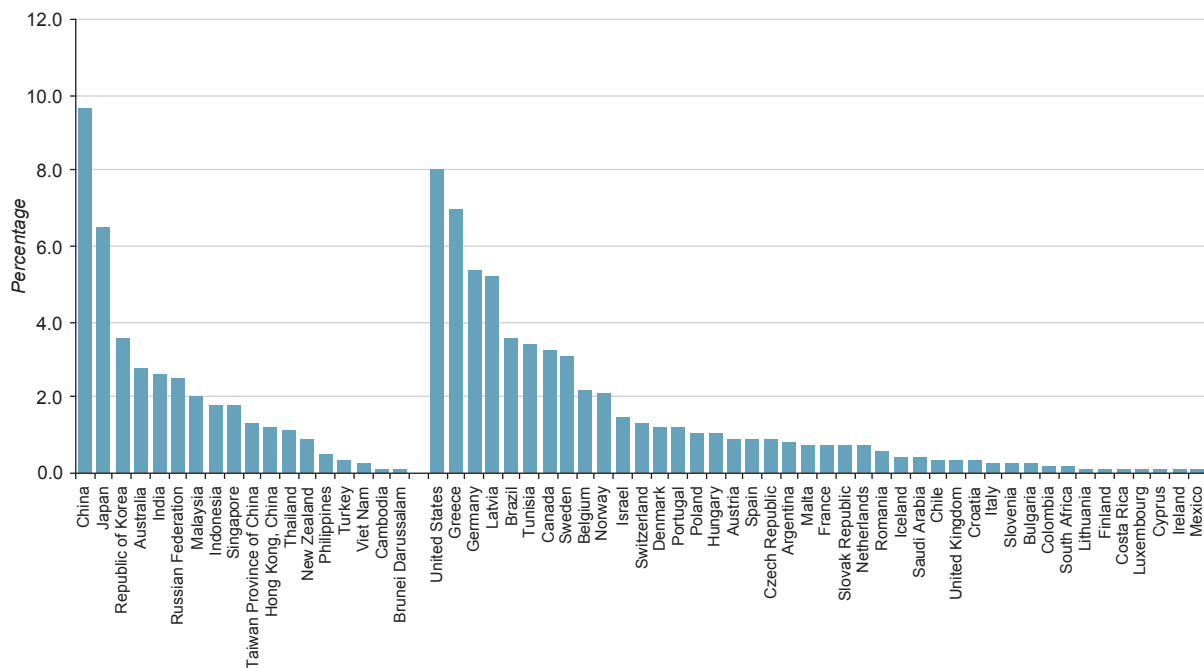
Important users of telecommunications for exports, by economy, 2011



Source: ESCAP calculation using data from OECD-WTO TiVA, October 2015 version.

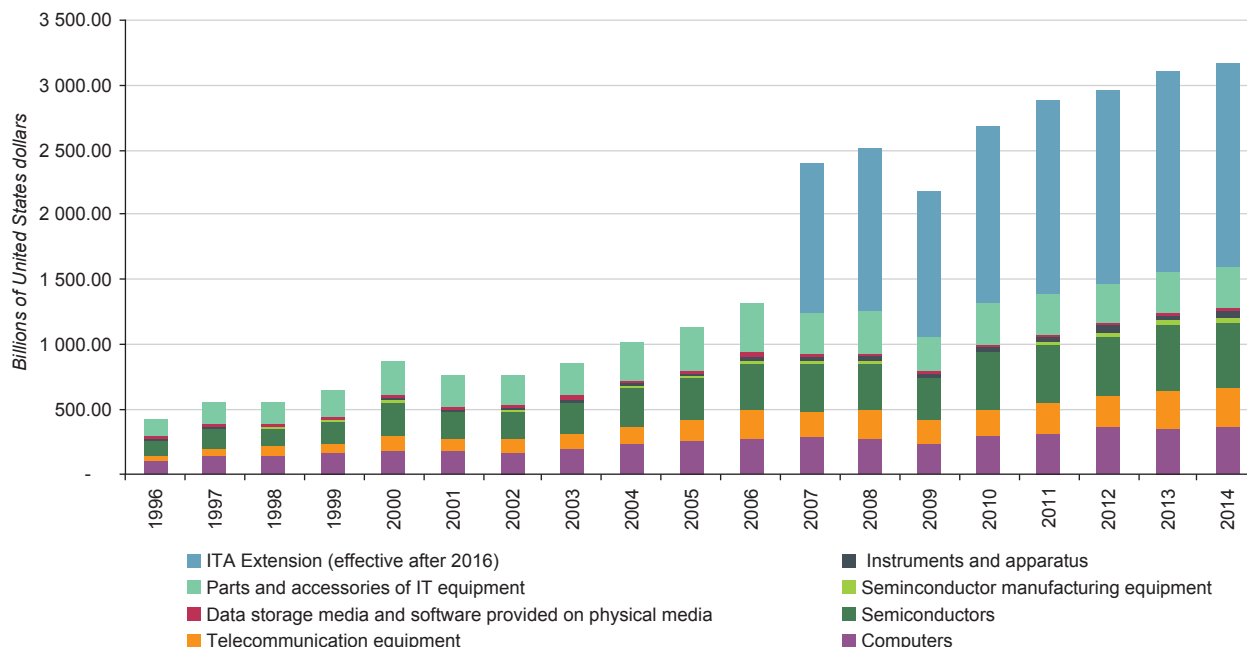
Figure 7.11

Important providers of telecommunications embedded in exports, by economy, 2011



Source: ESCAP calculation using data from OECD-WTO TiVA, October 2015 version.

Figure 7.12 World exports of digital-infrastructure goods



Source: ESCAP compilation, using data from United Nations COMTRADE, downloaded from WITS.

Note: Only product items that are identified in terms of HS are covered.

2014, which was equivalent to 9.2% of world exports. The extension of the ITA product list agreed upon in July 2016, covering the new generation of information technology equipment, will double the trade coverage of ITA (figure 7.12). Based on the share in 2014, the coverage of ITA will reach 18% of world merchandise exports if 201 new products of the ITA extension are included.

With the dominance of exports from China and East Asian economies, the Asia-Pacific region accounts for more than 64% of the world exports on the original ITA product list. The region represents slightly less for the new generation products, of which the technology is still new and owned by developed economies. However, the region is an important exporter, at least as a final assembler, with a share of 57.5% of world exports of products covered by the extension of ITA.

D. CONCLUSION

The growing digital intensity has caused fundamental changes in trade; as a result, there is the need for the improvement of trade statistics to catch up with this process. Official and market research on cross-

border digital trade is starting to emerge; however, of particular concern with regard to measuring digital trade is the quality, methodology and transparency differences that inhibit cross-country benchmarking. The case studies tend to overstate the perception of B2C e-commerce, which in fact is not a good representation of cross-border digital trade in goods and services whereas B2B e-commerce is likely to be much more significant. Although cross-border data flows have been seen as an attractive proxy, they suffer from the same issues as any web-based indicators – the fact that not all data transfers are the result of digital trade. In addition, a number of other technical issues and regulations complicate comparability and ability to map the flows of data with regard to sources and destinations of international trade goods and services.

As discussed in this chapter, requirements for analyses of digital trade issues need a combination of data on trade in services, input-output linkages and merchandise statistics at the most detailed level that is comparable across countries. Without a unified definition, proper conceptual framework and systematic data collections, key questions concerning policy design and regulation remain inadequately answered.

Using the available official statistics, this chapter is aimed at contributing to closing the knowledge gap by suggesting proxies and a conceptual framework that can be indicative for highlighting major trends related to cross-border digital trade. The chapter focuses on a factual exploration of digital trade at the global and Asia-Pacific levels. In considering the use of digital technology and services in international trade in goods and services transactions as an attractive proxy, the study reveals that exporters in the Asia-Pacific region are rapidly increasing the use of digital technology to support their export activities, both directly and indirectly. The growth of digital trade is having a relatively stronger impact on service trade than on merchandise trade. The digital-intensive industries are relatively high-tech or high value-added. Digital-intensive services sectors include financial services (for example, Internet banking), telecommunication services, R&D and business services, and the renting of machinery and equipment (car rental services etc.). In the case of manufacturing, the publishing industry, chemical products, computer equipment, and electrical machinery and transport machinery are among the sectors with high digital intensity.

The availability of digital infrastructure is important to the development of digital trade. Imports of telecommunications and computer equipment play an important role in digital trade, especially that of Asia and the Pacific. This has opened intraregional trade opportunities as intraregional sourcing for those digital infrastructure products has been growing in recent years. However, the export opportunities are mainly clustered in large economies, especially China, Japan, India and the Republic of Korea.

The trends and developments discussed can shed light on a broader policy framework. The digitalization of international trade brings about a greater need for an open trade environment and international cooperation. Non-discriminatory principles and international harmonization of rules and regulation are essential. The concept of an open environment is not new; however, what is added is the fact that “openness” in the world of digital trade does not only mean free flows of goods or services, but also the need for the free flow of data across national borders. In addition, the growing importance of digital trade brings to the fore a greater need for international cooperation, as a supportive environment for digital trade is more dependent on multilaterally agreed policies than on unilateral ones.

Endnotes

- ¹ The report indicates that more than half of the broadband subscriptions in the Asia-Pacific region were registered in China, while broadband access is still largely unavailable and unaffordable in one third of the countries in the rest of the Asia-Pacific region, especially in least developed countries, landlocked developing countries and small island developing States.
- ² As per BPM6 definitions, telecommunication services encompass the broadcasting or transmission of sound, images, data or other information by telephone, telex, telegram, radio and television cable transmission, radio and television satellite, electronic mail, facsimile and so forth, including business network services, teleconferencing and support services. Computer-related services comprise hardware- and software-related services and data-processing services. (Data at the country and world levels, available from <http://stat.wto.org/StatisticalProgram/WSDDBStatProgramSeries.aspx?Language=E&subtopic=bp;bc>).
- ³ Hellerstein (2002), Makoni, Tsikirayi and Mandizha (2013), Ruffle (2001), Schuknecht and Pérez-Esteve (1999), and Teltscher (2001) identify products that can be digitized in a relatively consistent manner. The analysis detailed in this chapter used a combined list of electronically-enabled goods as shown in annex 7.1.
- ⁴ Annex 7.2 provides the lists of electronically-enabled services based on BPM6.
- ⁵ Although IT goods are part of the e-commerce infrastructure, this study does not include the value-added by IT goods in total exports as part of the e-commerce intensity. This is because most exporters use computers and electronics equipment in everyday business even if digital trade is not involved.
- ⁶ The database contains useful estimates on the value of inputs used in producing exports globally that can be broken down into 62 economies (61 economies and an aggregate for the rest of the world). These 61 economies cover nearly 95% of world trade. The annual coverage includes 1995, 2000, 2005, 2008, 2009, 2010 and 2011. Of the 61 economies, 18 are located in Asia and the Pacific (Australia; Brunei Darussalam; Cambodia; China; India; Indonesia; Japan; Republic of Korea; Malaysia; New Zealand; Philippines; Russian Federation; Singapore; Thailand; Turkey; Viet Nam; Hong Kong, China; and Taiwan Province of China). As these 18 economies accounted for 97% of merchandise exports and imports by Asia-Pacific economies they are taken as a representative sample of the Asia-Pacific region. Data are available at the country level for 34 industries

classified under 2 digit-ISIC Revision 3, including 19 merchandise sectors (agriculture, mining, food products, textiles and apparel, wood, paper and publishing, fuel, chemicals, rubber and plastic, non-metallic minerals, basic metals, fabricated metals, machinery, computers and electronics, electrical machinery, motor vehicles, transport equipment, other manufactures and utilities) and 16 service sectors (construction, wholesale and retail, hotels and restaurants, transport and storage, post and telecommunications, finance and insurance, real estate activities, renting machinery and equipment, computer-related activities, research and development, other business services, public administrative services, education, health and social work, personal services and private household services). In the analysis of e-commerce services in this chapter, the focus is on digital trade in commercial services. Therefore, the results represented in this chapter do not include public administration services.

¹¹ Newer items entering trade on an increasingly systematic basis, such as software, have been progressively included in the categorization list under a number of previously existing codes, in particular under recorder media (HS 8524).

¹² For more information, see UNCTAD-WHO, 1998.

⁷ As per BPM6 definitions, telecommunication services encompass the broadcasting or transmission of sound, images, data or other information by telephone, telex, telegram, radio and television cable transmission, radio and television satellite, electronic mail, facsimile and so forth, including business network services, teleconferencing, and support services. Computer-related services consist of hardware- and software-related services and data-processing services (Data at the country and world levels, available from <http://stat.wto.org/StatisticalProgram/WSDDBStatProgramSeries.aspx?Language=E&subtopic=bp;bc>).

⁸ Telecommunication services are the main carrier used for digital trade. The current version of OECD-WTO TiVA lists post and telecommunications as one industry. While it is not possible to separate them, this study assumes that telecommunication trends dominate. In addition, ADB (2015) indicated that postal service was important for conducting e-commerce, especially for B2C.

⁹ The number is based on compound annual growth rates.

¹⁰ The October 2015 version of the OECD-WTO TiVA database contains data for 17 regional members of ESCAP, including: Australia; Brunei Darussalam; Cambodia; China; India; Indonesia; Japan; the Republic of Korea; Malaysia; New Zealand; the Philippines; the Russian Federation; Singapore; Thailand; Turkey; Viet Nam; and Hong Kong, China. The database also includes Taiwan Province of China, which is not a member of ESCAP. These economies, including Taiwan Province of China, accounted for more than 97% of merchandise exports and imports by the Asia-Pacific region. Therefore, they are taken as a representative sample of Asia and the Pacific.

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ANNEXES

Annex 7.1. List of goods that can be digitized

HS code (1996)	Description
	Film (recorded)
3705	Photographic films
3706	Cinematographic films
	Printed matter-Books
4901	Newspapers
4902	Children's books
4903	Music
4904	Maps, atlases
4905	Plans (architectural, engineering, industrial, commercial)
4906	Postcards
4909	Calendars
4910	Commercial catalogues, pictures, designs
	Sound and media
852410	Records
852432	CDs
852439	CDs
852451	Tapes
852452	Tapes
852453	Tapes
852460	Cards
852499	Other (recorded disks)
	Software
852431	
852440	Software
852491	
	Games
950410	Video games

Source: Makoni, Tsikirayi and Mandizha (2013).

Annex 7.2. List of electronically-enabled services and product examples

Commercial services	Example of e-technology used	Example of e-products
Transport	Transport management systems Electronic data interchange Tracking technologies.	
Travel	Online-reservation and payment for hotels, car rental, tours	
Insurance services		Online insurance services
Financial services		Electronic banking services
Telecommunication services	Voice-over-the-Internet Protocol (VoIP) has generated a surge in global cross-border telephone calls.	Skype calling
Computer services		Customized software Remote data processing Web-site design Web-site hosting and maintenance IT/e-commerce solutions
Information services		On-line database services Social medias Cloud computing services
Other business services:		
• Wholesales and retails	Online search and shopping platform (B2C, B2B, B2G) Online customer services	Online legal advice and documentation, and e-taxation services e-Accounting services Online engineering services Tele-health services
• Professional services		
Personal, cultural and recreational services:		
• Audio-visual and related services		Digital transmission of books, games, films, music, Web-TV
• Education services		Online-training courses

Source: Compilation by ESCAP based on Ruffle (2001) and USITC (2013).

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