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**Discussion regarding the development dimension of e-commerce
and the digital economy, addressing associated opportunities and challenges**

Maximizing the development gains from e-commerce and the digital economy

Note by the Secretariat

Executive summary

This note provides background information on the first meeting of the Intergovernmental Group of Experts on E-commerce and the Digital Economy. It highlights features of the evolving digital economy, especially e-commerce, and discusses possible development implications. The note addresses three questions identified by member States: What do developing countries need in order to build competitive advantages through e-commerce and the digital economy? What can developing countries do to strengthen their physical and technology infrastructure? How can developed countries partner in the most impactful way with developing countries to maximize opportunities and address challenges relating to e-commerce and the digital economy?



Introduction

1. Information and communications technologies (ICTs) are playing an increasingly important role in the implementation of the 2030 Agenda for Sustainable Development. In its overall review of the implementation of the outcomes of the World Summit on the Information Society, the General Assembly of the United Nations committed to harnessing the potential of ICTs to achieve the 2030 Agenda, noting that such technologies could accelerate progress in achieving all 17 Sustainable Development Goals. The digitalization of economic activities and trade is of direct relevance to several of these Goals, as highlighted in various reports.¹

2. E-commerce and various digital applications can be leveraged to promote the empowerment of women as entrepreneurs and traders (Goal 5.b). They can support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro, small and medium-sized enterprises, including through access to ICT-enabled financial services (Goal 8.3). Digital solutions can be leveraged to increase access of such enterprises in developing countries to financial services and markets and enable their integration into value chains (Goal 9.3). Moreover, e-commerce will become increasingly important in achieving Goal 17.11, to significantly increase the exports of developing countries and double the share of global exports of the least developed countries (LDCs) by 2020.

3. In the Nairobi Maaifikiano, adopted at the fourteenth session of the United Nations Conference on Trade and Development, member States highlighted the growing importance of the digitalization of the economy, including e-commerce (paragraph 52). They called on UNCTAD to strengthen its work on these issues (paragraph 55 (u)) and to assist developing countries in this regard (paragraph 55 (v)). In addition, member States decided that the Trade and Development Board would operationalize the creation of two new intergovernmental groups of experts, one of which focused on e-commerce and the digital economy (paragraph 100 (r)).

4. In the terms of reference for the new Intergovernmental Group of Experts on E-commerce and the Digital Economy, agreed upon by the Trade and Development Board on 5 April 2017, member States decided that its policy focus would be on maximizing the development gains from e-commerce and the digital economy, and addressing associated challenges, and thus strengthening its development dimension.

5. With regard to expected outcomes, the Intergovernmental Group of Experts should produce agreed policy recommendations drawn from the discussions for the consideration of the Board; a report produced under the responsibility of the Chair of the Group of Experts, to inform discussions at the Board; and a decision on topics and guiding questions for subsequent sessions, including the provisional agenda.

6. At its first meeting, the Intergovernmental Group of Experts should also decide on appropriate organizational and working modalities.

7. This note has been prepared in view of the agreed terms of reference. It seeks to provide a basis for the deliberations during the inaugural, first session of the new Intergovernmental Group of Experts and is divided into three substantive sections: trends in e-commerce and the digital economy, the development dimension of e-commerce and the digital economy, and policy implications and guiding questions.

8. The note draws on research conducted for the Information Economy Report 2017: Digitalization, Trade and Development (forthcoming), discussions during UNCTAD E-commerce Week 2017 (24–28 April 2017), the UNCTAD contribution to the Aid for

¹ See, for example, E/CN.16/2016/3 and A/71/67-E/2016/51.

Trade Review report,² as well as on activities related to the UNCTAD-led eTrade for All initiative.

I. Trends in e-commerce and the digital economy

A. The digital economy is evolving

9. The digital economy is evolving in all parts of the world, but at different speeds. On the one hand, the digitalization of economic activities and transactions can help to overcome barriers to more inclusive development. On the other hand, significant divides in the readiness of countries to engage in and benefit from the digital economy enhance the risk of the gaps becoming even wider, with greater income inequality as a result.

10. E-commerce is a fairly well-defined concept. According to the OECD definition of the term, e-commerce refers to purchases and sales conducted over computer networks, using multiple formats and devices, including the web and electronic data interchange and the use of personal computers, laptops, tablets and mobile phones of varying levels of sophistication.³ E-commerce may involve physical goods, as well as intangible (digital) products and services that can be delivered digitally.⁴ Payments and delivery can be made offline or online.

11. E-commerce is part of the broader concept of the digital economy, for which there is still no internationally agreed definition. However, in this context, it refers to the application of digital technologies for the conduct of economic activities within or between national economies. The digital economy encompasses both the production and use of digital technologies, goods and services.

12. The evolving digital economy is emerging from a combination of technologies, which are beginning to become more pervasive across various parts of the economy. These include improved broadband connectivity, cloud computing, advanced robots, big data and the Internet of Things. The underlying technologies and processes have far-reaching implications for the organization of work, production and trade, extending the organizational and geographic fragmentation into formerly indivisible knowledge-intensive business functions and job categories. At the same time, the new digital economy is only in its infancy. It will only fully arrive if and when all of these features mature, become integrated and are widely used. Moreover, various factors, such as data security risks, data localization pressures, and data collection and privacy concerns may slow or even derail its development.

B. Digital divides remain

13. Digital divides remain wide. Figure 1 compares the 2016 figures for key ICT penetration indicators by country group. Developing countries and LDCs lag behind in terms of fixed-broadband penetration, household access to ICT and Internet use. While mobile-cellular penetration reached over 90 per cent in developing countries, mobile broadband stood at just above 40 per cent, and fixed broadband was still below 10 per cent. Moreover, only 40 per cent of the people in developing countries in 2016 used the Internet, compared with more than 80 per cent in developed countries. In LDCs, connectivity has improved. Mobile cellular subscriptions, in particular, soared from an average of only 5 per 100 people in 2005 to as much as 73 in 2016. Among world Internet users, LDCs also saw improvement, from 0.6 per cent in 2005 to 3.7 per cent in 2015.

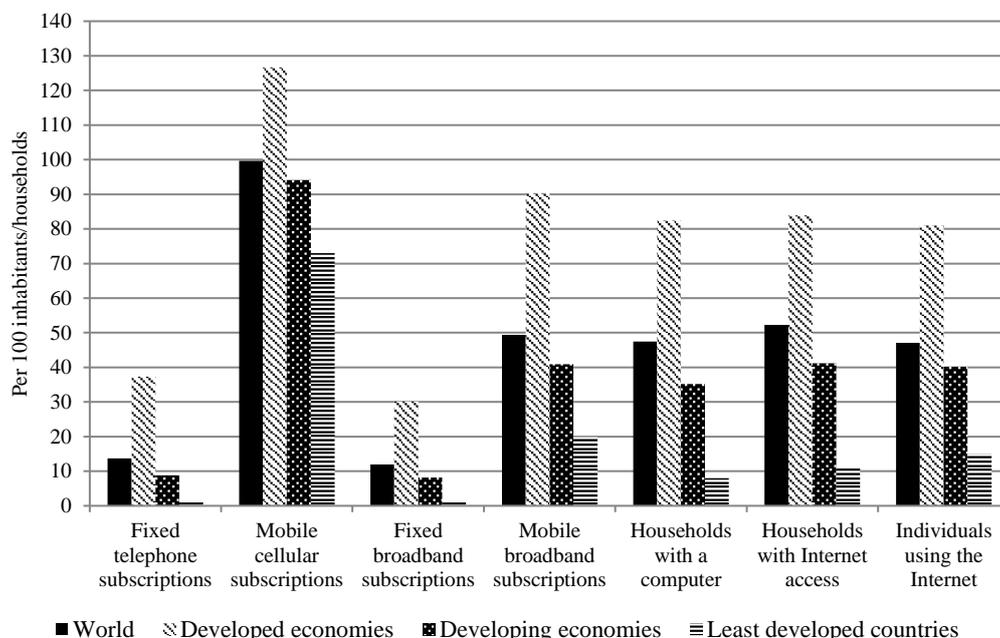
² Organization for Economic Cooperation and Development (OECD) and World Trade Organization, 2017, *Aid for Trade at a Glance 2017: Promoting Trade, Inclusiveness and Connectivity for Sustainable Development* (World Trade Organization and OECD Publishing, Geneva and Paris).

³ OECD, 2011, *OECD Guide to Measuring the Information Society 2011* (Paris).

⁴ UNCTAD, 2015, *Information Economy Report 2015: Unlocking the Potential of E-commerce for Developing Countries* (United Nations publication, Sales No. E.15.II.D.1, New York and Geneva).

14. Nevertheless, the prominence of developing countries in the online world is significant and growing. As much as 70 per cent of the world’s Internet users in 2015 lived in developing and transition economies. Nearly 90 per cent of the 750 million people that came online for the first time between 2012 and 2015 were from developing economies.

Figure 1
Estimated penetration of information and communications technologies by level of development, 2016



Source: International Telecommunication Union (ITU), *Measuring the Information Society Report 2016* (Geneva).

15. Large divides remain between and within countries, such as between rural and urban areas, women and men, young and old. Similar divides exist between firms of different size and in different industries. Particularly large divides remain in access to and use of broadband. Developing countries, especially LDCs, are at a disadvantage in several ways. First, broadband penetration is generally low. Second, those with broadband access tend to enjoy relatively low download and upload speeds, limiting the kind of activities that can be used productively over the Internet. Third, taking into account income levels, the use of broadband services tends to be more costly than in more advanced economies. To achieve a more inclusive digital economy, renewed efforts will therefore be needed to bridge these divides.

C. E-commerce is expanding quickly, but the e-commerce divide is considerable

16. The growth of global e-commerce is an illustration of how increased ICT use is re-shaping production and trade, with significant implications for developing countries. Official statistics relating to the leading e-commerce markets, including both business-to-business and business-to-consumer e-commerce, suggest that global e-commerce reached \$25.3 trillion in 2015. Business-to-consumer sales amounted to just over \$2.9 trillion, about 10 per cent of the overall global estimate. In turn, business-to-business sales exceeded \$22 trillion, almost eight times the business-to-consumer value. China boasted the world’s largest business-to-consumer e-commerce market (\$617 billion), followed closely by the United States of America (\$612 billion). The United States, however, reported the largest business-to-business market, worth more than \$6 trillion, well ahead of Japan (\$2.4 trillion). Except for China, no developing or transition economies were featured among the top 10 e-commerce markets in 2015 (see table).

Top 10 economies by business-to-business and business-to-consumer e-commerce sales, 2015

Country	Total		Business-to-business market		Business-to-consumer market
	Billion dollars	Percentage of gross domestic product	Billion dollars	Percentage of all e-commerce	Billion dollars
1 United States	7 055	39	6 443	91	612
2 Japan	2 495	60	2 382	96	114
3 China	1 991	18	1 374	69	617
4 Republic of Korea	1 161	84	1 113	96	48
5 Germany (2014)	1 037	27	944	91	93
6 United Kingdom of Great Britain and Northern Ireland	845	30	645	76	200
7 France (2014)	661	23	588	89	73
8 Canada (2014)	470	26	422	90	48
9 Spain	242	20	217	90	25
10 Australia	216	16	188	87	28
Total	16 174	34	14 317	89	1 857
World	25 293		22 389		2 904

Source: UNCTAD, adapted from data from the United States Census Bureau; Ministry of Economy, Trade and Industry (Japan); National Bureau of Statistics (China); Statistics Korea [Republic of]; Eurostat (for Germany); Office for National Statistics (United Kingdom); National Institute of Statistics and Economic Studies (France); Statistics Canada; Australian Bureau of Statistics; and National Institute of Statistics (Spain).

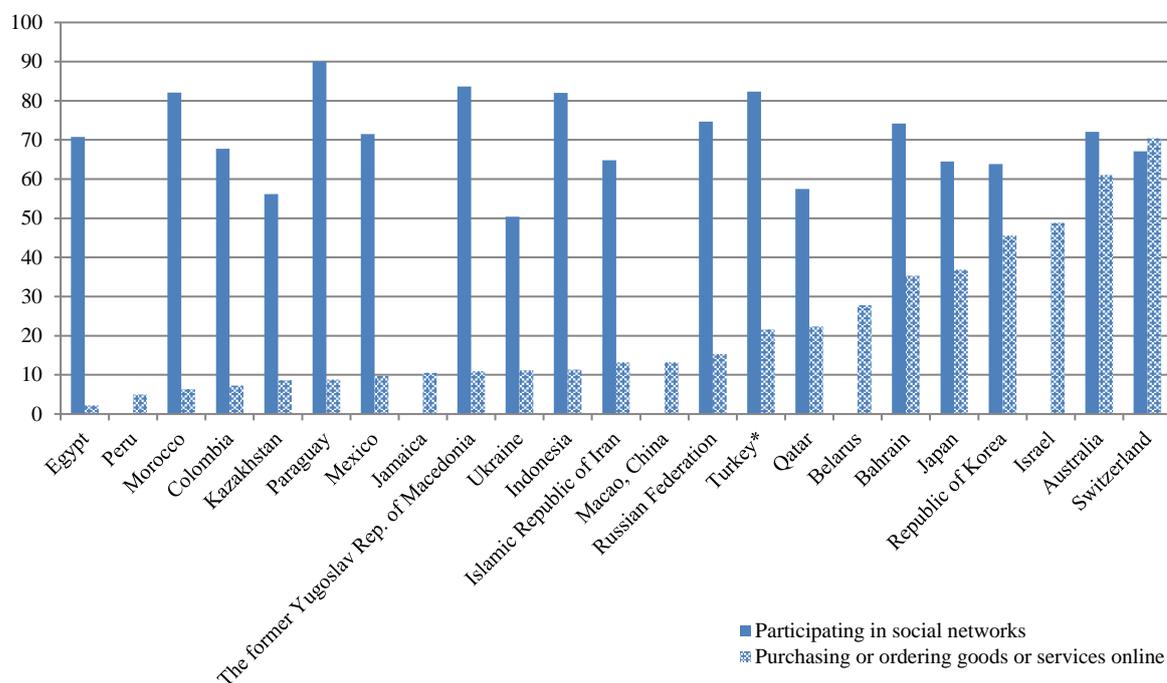
Note: Figures in italics are estimates. Missing data were estimated based on average ratios. Figures were converted to dollars using annual average exchange rates.

17. While the business-to-business market represents the largest share of e-commerce, the business-to-consumer market appears to be expanding fast.⁵ Although global e-commerce is dominated by the developed countries and China, the highest growth is observed in the developing regions, especially in Asia.

18. In most developing and transition economies, people buying online form a relatively small proportion of all Internet users, ranging from below 3 per cent in many LDCs, to 60 per cent in Singapore in 2015. Unlike social networking, where activity rates are relatively high among Internet users in developing countries, the percentage of Internet users that engage in online shopping is generally lower in developing countries than in developed countries (figure 2). This may reflect limited purchasing power but also other mitigating factors such as lack of trust; limited shopping options, including content in local languages; and poor delivery services.

⁵ UNCTAD, 2015.

Figure 2
Share of Internet users involved in online purchasing and social networking, selected countries, 2015
 (Percentage)



Source: Information provided by ITU.

* Data refer to 2016.

19. Most e-commerce is domestic in nature.⁶ Although few countries currently report official data on cross-border e-commerce, available information is relatively consistent. For example, in both Canada and Spain, about 80 per cent of measured e-commerce sales are made to domestic customers.⁷

20. According to UNCTAD estimates, the global value of cross-border business-to-consumer e-commerce amounted to \$189 billion in 2015, which is equivalent to about 7 per cent of domestic business-to-consumer e-commerce, based on the value of overseas online purchases by consumers in major countries. Other UNCTAD data for the same year show that some 380 million consumers made a purchase from overseas websites.

21. The level of digitalization of firms indicates the degree to which they have adopted and are making use of digital technologies. Technology absorption can be measured by indicators such as the availability of computers, the Internet and other ICTs.⁸ As more and more activities “go digital”, enterprises need an online presence to be visible for both consumers and other enterprises.

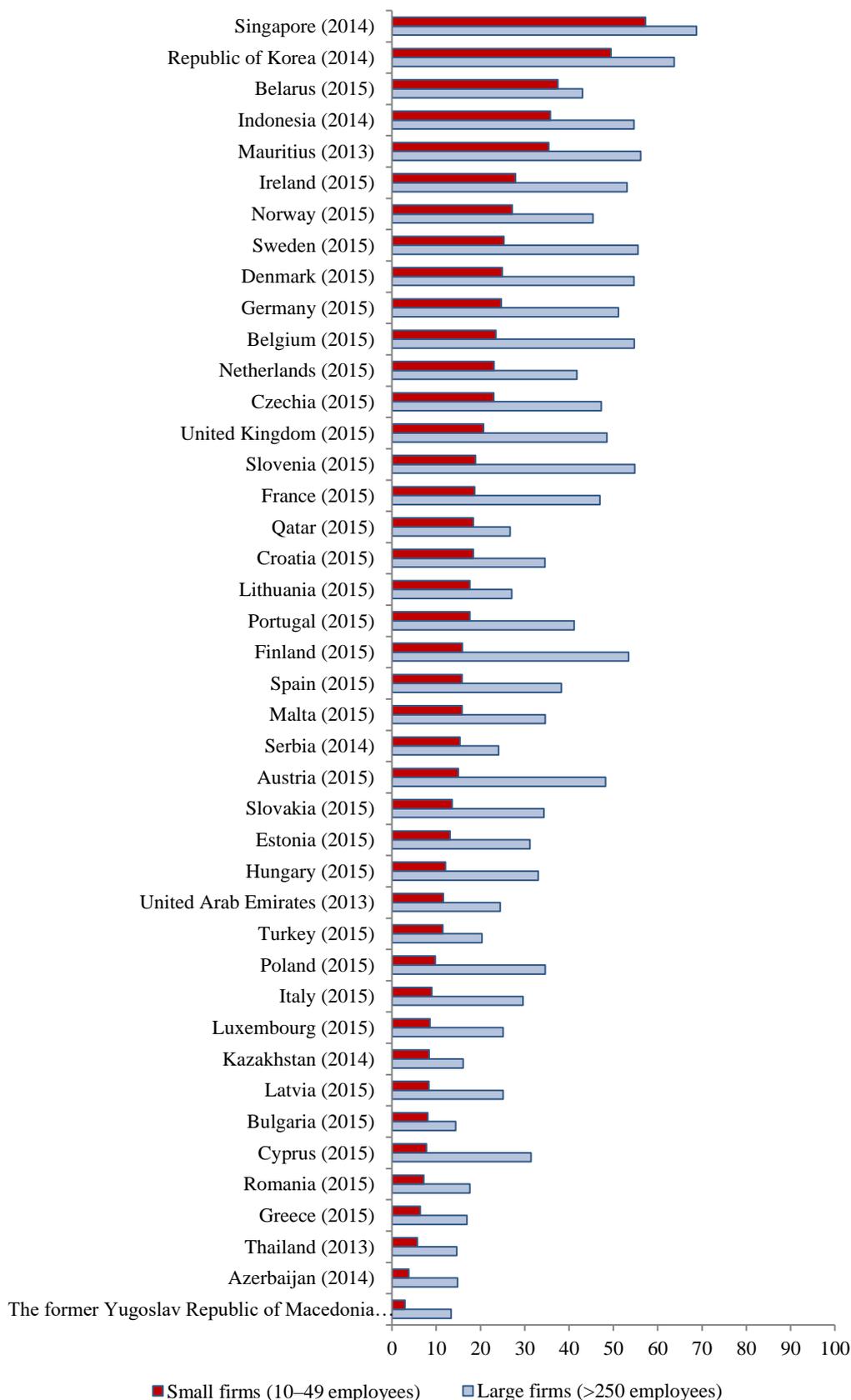
22. The proportion of firms engaging in e-commerce by either purchasing or selling goods and services, and the value thereof, are relevant to the purposes of this paper (figure 3). With regard to the share of firms receiving orders online, the shares of small firms are consistently smaller than those of large firms. Thus, an increase in the overall proportion of businesses that receive orders online does not guarantee that small and medium-sized enterprises will benefit equally.

⁶ In some developing countries, cross-border e-commerce appears to be significant (UNCTAD, 2015).

⁷ UNCTAD, Information Economy Report 2017: Digitalization, Trade and Development, forthcoming.

⁸ UNCTAD, 2009, *Manual for the Production of Statistics on the Information Economy* (United Nations publication, New York and Geneva).

Figure 3
Proportion of firms receiving orders online, latest year
 (Percentage)



Source: UNCTAD (data available online: <http://unctadstat.unctad.org/EN/>, accessed 18 July 2017).

D. Broader trends in the evolving digital economy

23. Various measures of the production and usage of digital technologies, goods and services show a growing importance of the digital economy in the overall economy.⁹

24. Global value added of the information and communications services sector grew by an estimated 12 per cent between 2010 and 2015 to \$3.4 trillion, equivalent to 4.6 per cent of global gross domestic product (GDP), and ICT goods manufacturing generated value added of about \$1.7 trillion in 2014. Thus, the combined information and communications services and ICT manufacturing sectors are responsible for an estimated 6.5 per cent of global GDP. Some 100 million people worldwide are employed in ICT services, representing about 1.5 per cent of total global employment.

25. Between 2010 and 2015, telecommunications, computer and information services exports grew by 40 per cent to \$467 billion, which corresponds to one tenth of all commercial services exports. Trade in ICT goods stood at just over \$2 trillion in 2015, amounting to 13 per cent of global merchandise trade.

26. The digital economy is also evolving, with new features assuming growing importance. Key technologies and applications that are of particular relevance to the organization of production and trade include advanced robotics, artificial intelligence, the Internet of Things, cloud computing, big data analytics and three-dimensional (3D) printing.

27. A key aspect of the new digital economy is the aggregation of data in the cloud. Big data is opening new doors for analysis, value creation and the application of artificial intelligence.¹⁰ Beyond storing data and running programs, the cloud can pull together computing power and store the huge new volumes of data flowing in autonomously from the Internet of Things. If the sensors and devices that make up the Internet of Things automatically feed data into the cloud, and the data arrive duly tagged with fine-grained meta-data, they can be “mined” for insights that enable data-driven decision-making by businesses, government agencies, and any person or organization with access to the data and the means to carry out further analysis.¹¹ This makes access to data and the ability to analyse them increasingly important.

28. The evolving nature of the digital economy can be seen from various metrics. Cisco forecasts that global Internet protocol traffic, a proxy for data flows, will grow at a compound annual rate of 23 per cent between 2014 and 2019, equivalent to 142 million people streaming Internet high-definition video simultaneously, all day, every day in 2019. By then, global Internet traffic will be 66 times the volume of the entire global Internet in 2005. The number of machine-to-machine systems, or M2Ms, such as automatic teller machines, Global Positioning Systems in vehicles, security monitors and wearables, is forecast to grow to 12.2 billion by 2020.¹²

29. Worldwide shipments of 3D printers more than doubled in 2016 to over 450,000 and are expected to reach 6.7 million in 2020.¹³ In terms of consumption of 3D printing, 40 per cent of such systems were installed in 2012 in North America, compared with

⁹ UNCTAD, Information Economy Report 2017: Digitalization, Trade and Development, forthcoming.

¹⁰ C Loebbecke and A Picot, 2015, Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda, *The Journal of Strategic Information Systems*, 24(3):149–157; M Kenney and J Zysman, 2015, Choosing a future in the platform economy: The implications and consequences of digital platforms, Discussion Paper, Kauffman Foundation New Entrepreneurial Growth Conference, 18 and 19 June, Amelia Island, Florida, United States.

¹¹ E Brynjolfsson, 2016, Massachusetts Institute of Technology Management Sloan School, How IoT [the Internet of Things] changes decision-making, security and public policy, 30 June, available at <http://mitsloanexperts.mit.edu/how-iot-changes-decision-making-security-and-public-policy/> (accessed 19 July 2017).

¹² Cisco, 2017, The zettabyte era: Trends and analysis,” 7 June 2016, available at <http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni-hyperconnectivity-wp.html> (accessed 19 July 2017).

¹³ Gartner, 2017, Gartner says worldwide shipments of 3D printers to grow 108 per cent in 2016, 13 October, available at <http://www.gartner.com/newsroom/id/3476317> (accessed 19 July 2017).

30 per cent in Europe, 26 per cent in the Asia–Pacific region and 4 per cent in the rest of the world.¹⁴ According to the International Federation of Robotics, sales of over 250,000 robots were at their highest level ever in 2015.

II. The development dimension of e-commerce and the digital economy

30. The trends described in chapter I illustrate the rapid pace at which the digital economy and e-commerce are evolving; the possible development implications of these trends are discussed below.

31. There is growing interest in the development implications of e-commerce and the digital economy. The impact of digitalization on industrial activities, foreign direct investment, trade and sustainable development is the focus of several international policy dialogues and processes. The decision by UNCTAD member States to set up – for the first time – an intergovernmental group of experts on e-commerce and the digital economy is illustrative of this. Also for the first time, the Group of 20 issued a ministerial declaration on the digital economy in April 2017.¹⁵ E-commerce is also featured at the World Trade Organization in discussions related to the next ministerial conference to be held in Buenos Aires, on 11–14 December 2017. In addition, OECD in 2016 launched a major horizontal initiative called “Going digital” to explore the development and policy implications of digitalization.¹⁶ E-commerce and e-business remain central aspects of the follow-up to the World Summit on the Information Society.¹⁷

32. A number of digital applications will be helpful in addressing various Sustainable Development Goals (box 1). However, as the rapid uptake of ICTs and e-commerce is transformational, the move towards the digital economy will create not only opportunities but also costs and risks for developing countries, including LDCs.

¹⁴ Wohlers Associates, 2014, *Wohlers Report 2014: 3D Printing and Additive Manufacturing State of the Industry – Annual Worldwide Progress Report*.

¹⁵ See http://unctad.org/meetings/en/Contribution/dtl_eWeek2017c02-G20_en.pdf (accessed 19 July 2017).

¹⁶ See <http://www.oecd.org/going-digital/> (accessed 19 July 2017).

¹⁷ See <http://www.itu.int/net/wsis/> (accessed 19 July 2017).

Box 1

Opportunities from the evolving digital economy

There are a number of promising digital solutions for use in agricultural and environmental applications. Drones, sensors, smartphones and data analytics can transform agriculture and help feed the world's growing population.^a The Food and Agriculture Organization of the United Nations (FAO) considers that greater ICT use will lead “to greater efficiencies in rural markets: lower transaction costs, less information asymmetries, improved market coordination and transparent rural markets”.^b Other experts also foresee opportunities in agriculture: “From managing agricultural production cycles, disease threats, and growing inputs through to automated harvesting, distribution logistics, and quality monitoring, Internet of Things-enabled ‘smart agriculture’ techniques are envisioned across the entire value chain to improve the sustainability and productivity of the food supply”.^c

The Internet of Things can help reduce waste and enhance food safety, allowing for monitoring of the supply chain to increase compliance with labour and environmental protections. It can improve responses to environmental issues, from creating early warning systems for tsunamis and fires, to air pollution monitoring systems.^d Intelligent sensors can also be used by farms in developing countries to monitor soil conditions and guide autonomous irrigation systems.^e

Customization inherent in 3D printing has the potential to revolutionize health care. China has already approved certain 3D printed implants and hip replacements.^f Such customization can also facilitate disaster relief efforts. For example, after an earthquake in Nepal destroyed water pipes in 2017, 3D printing was used to create new ones that fit in with the local infrastructure.^g

Source: UNCTAD.

^a New York Times, 2015, The Internet of Things and the future of farming, 3 August, available at https://bits.blogs.nytimes.com/2015/08/03/the-internet-of-things-and-the-future-of-farming/?_r=0 (accessed 19 July 2017).

^b FAO and ITU, 2016, *E-agriculture Strategy Guide: Piloted in Asia–Pacific Countries* (FAO, Bangkok).

^c Internet Society, 2015, The Internet of Things: An overview – Understanding the issues and challenges of a more connected world.

^d ITU and CISCO, 2016, *Harnessing the Internet of Things for Global Development* (ITU, Geneva).

^e World Bank, 2016, *World Development Report 2016: Digital Dividends* (Washington, D.C.)

^f 3D Printing Industry, 2015, China approves use of fully functioning 3D printed hip replacement, 4 September, available at <https://3dprintingindustry.com/news/china-approves-use-of-fully-functioning-3d-printed-hip-replacement-56935/> (accessed 19 July 2017).

^g *The Guardian*, 2015, When disaster strikes, it's time to fly in the 3D printers, 30 December, available at <https://www.theguardian.com/global-development/2015/dec/30/disaster-emergency-3d-printing-humanitarian-relief-nepal-earthquake> (accessed 19 July 2017).

A. Opportunities

33. In terms of opportunities for economic growth and development, the application of ICTs can bring down transaction costs and enable the remote delivery of more goods and services. For example, automating customs declarations has helped to reduce clearance and transit times. Access to ICT platforms and devices may enable a seller in a developing country to reach more potential customers in domestic and foreign markets in more targeted ways, often at lower cost than through traditional channels. In addition, suppliers that rely more on e-commerce may be able to reduce the delivery costs, especially for electronically-provided content. This has an impact on global value chains, as more inputs can be digitally delivered, which in turn facilitates the management of fragmented production networks.

34. Greater ICT use can enhance the productivity of enterprises (box 2). The potential for such productivity gains remains far from fully exploited in most developing countries. In addition, the digital economy offers opportunities for entrepreneurship, innovation and new job creation. For example, there are thousands of e-commerce start-ups throughout developing countries. However, many of them have yet to become profitable and reach significant scale. Across developing countries and LDCs, a range of e-commerce players have emerged in recent years, offering new payment solutions (Alipay, JamboPay), e-commerce platforms (MercadoLibre, Zoom Tanzania [United Republic of], TriniTrolley, Kapruka) and innovative logistics (Giao Hang Nhanh and Grasshoppers).

35. Digitalization can help enterprises, in particular small and medium-sized ones, overcome barriers to their expansion. It can enable small businesses to engage in peer-to-peer collaboration in innovation and use alternative funding mechanisms such as crowdfunding. New cloud-based solutions can reduce the need for enterprises to invest in information technology equipment and corresponding in-house expertise.¹⁸ Furthermore, e-commerce can facilitate the scale-up of small and medium-sized enterprises by providing vehicles to build verifiable online transaction records that may help attract new customers and business partners, as well as financing opportunities.

36. E-commerce may also support rural development. In China, for example, several villages have successfully sold local products online on the country's leading e-commerce sites.¹⁹ A positive side effect has been the rise of a supporting ecosystem of logistics, crop revitalization, and processing and packaging industries.

37. Consumers stand to benefit from the digital economy in numerous ways, both in monetary and in non-monetary terms. Internet browsing, email inquiries and social networking allow them to compare prices and features of products more easily. Buyers may read reviews conducted by other consumers and make their purchases at times that are convenient to them or from online discounters. Consumer choice is expanded when products from far afield can be discovered, ordered and delivered over long distances.

¹⁸ UNCTAD, 2013, *Information Economy Report 2013: The Cloud Economy and Developing Countries* (United Nations publication, New York and Geneva).

¹⁹ UNCTAD, 2015.

Box 2

Measuring productivity effects of information and communications technology use and digitalization

According to the *Information Economy Report 2015*, selling online has been found to boost the productivity of enterprises, with the greatest impact on small enterprises and in services. In a study of Vietnamese companies, total factor productivity growth of enterprises that sold online was 1.7 percentage points higher than that of those that used the Internet but did not sell online.^a Other studies highlight the importance of scale and network effects, as well as of complementary factors.^{b c} For example, ICT investments and use need to be complemented by investments in intangible assets such as skills and organizational change.^d

Some studies have failed to find strong productivity effects of ICT and take a more pessimistic view, arguing that the world may be witnessing a return of the productivity paradox.^e In one study, more rapid growth of labour productivity in information technology-intensive industries was associated with declining output and even more rapidly declining employment.^f The effects of the “new” digital economy appear so far to have shown up most clearly in falling prices of ICT assets and increased spending on ICT services rather than investment in ICT assets.^g

Van Ark, 2016 states that current statistics may be underestimating the true impact of ICT use and digitalization, owing to measurement challenges and gaps. For example, official prices used in analysis may significantly understate the improvements in the performance of many ICT products and systems.^h Moreover, the use of financial transactions to quantify the digital economy may give only a partial view due to a growing amount of “free” Internet services and applications.ⁱ

It also takes time for technologies to diffuse and for benefits to become visible and measureable. Only a limited number of enterprises have fully embraced digitalization so far, with micro and small enterprises in developing countries lagging behind the most. Thus, the full productivity effects will only show up in statistics once countries and firms transition from the installation phase to the deployment phase of the digital economy.

Source: UNCTAD.

^a World Bank, 2016.

^b CA Corrado, 2011, Communication capital, Metcalfe’s law, and United States productivity growth, Social Science Research Network.

^c C Corrado, J Haskel, C Jona-Lasinio and M Iommi, 2012, Intangible capital and growth in advanced economies: Measurement methods and comparative results, Discussion Paper No. 6733, Institute for the Study of Labour.

^d European Union, 2013, Unlocking the ICT growth potential in Europe: Enabling people and businesses – Using scenarios to build a new narrative for the role of ICT in growth in Europe.

^e “You can see the computer age everywhere except in the productivity statistics.” (R Solow, 1987, “We’d better watch out”, *The New York Times*, Book Review, 12 July).

^f D Acemoglu, D Autor, D Dorn, GH Hanson and B Price, 2014, Return of the Solow paradox? IT [Information technology], productivity, and employment in United States manufacturing, Working Paper No. 19837, National Bureau of Economic Research.

^g B van Ark, 2016, The productivity paradox of the new digital economy, *International Productivity Monitor*, 31:3–18.

^h DM Byrne and CA Corrado, 2016, ICT asset prices: Marshalling evidence into new measures, Economics Programme Working Paper Series No. 16-06, The Conference Board, New York.

ⁱ C Bean, 2016, *Independent Review of UK [United Kingdom] Economic Statistics*, available at <https://www.gov.uk/government/publications/independent-review-of-uk-economic-statistics-final-report> (accessed 19 July 2017).

B. Challenges

38. The roll-out of the digital economy also poses a number of potential challenges, costs and risks. Digital divides and uneven access to affordable ICTs can lead to an inequitable distribution of the benefits from e-commerce, which may bypass people with little education and/or literacy; micro, small and medium-sized enterprises; people in rural areas and those with limited ability or rights to connect.

39. Other challenges to maximizing the benefits of e-commerce are as follows:

- (a) Unreliable and costly power supply;
- (b) Limited awareness of how to implement and use ICTs;
- (c) Insufficient or inconsistent laws and regulations;
- (d) Limited or deficient transport and logistics infrastructure;
- (e) Inexistence of online or alternative payment facilities;
- (f) Limited purchasing power;
- (g) Cultural preferences for face-to-face interaction;
- (h) Reliance on cash in society.

40. Increased digitalization is likely to have disruptive effects on jobs and skills. It may lead to new types of jobs and employment, change the nature and conditions of work, alter skills requirements and affect the functioning of the labour markets, as well as the international division of labour. In addition, whenever the pace of technological innovation increases, so does the strategic importance of skills.²⁰

41. There is concern that widespread use of new technologies, automation and greater reliance on online platforms will lead to job losses, growing income inequalities and greater concentration of market power and wealth. Increased scope for computerization, automation and the use of artificial intelligence in both manufacturing and knowledge-intensive services exposes more occupations and tasks to the risk of disappearing, even as output and productivity rise, and bring relatively greater returns to capital, potentially driving further job losses. The effects of the digital economy are expected to disrupt complete industries, as well as the ways firms are organized. For example, ride sharing is already transforming individual mobility, and autonomous vehicles may become part of the mainstream market in the near future (some are already on the road in some developed countries). Services from help desks to education and training, and payments and banking can already be delivered with automated systems and mobile applications.

42. For consumers, there are also potential risks from automation, big data and artificial intelligence. The analysis of prior shopping and purchasing histories, in the context of millions of prior purchases from shoppers with similar habits, can give firms a high level of detailed information with potentially negative impacts on consumers' bargaining power.²¹

43. For users of connected applications that transmit data to various online platform owners, the loss of privacy and bargaining power constitutes an added risk. While many smartphone applications – for example, easy-to-use map navigation, music streaming services and online purchase and reservations services – are free to use, the price consumers have to pay is giving firms and application developers detailed information about their whereabouts, preferences, relationships and personal habits, sometimes without knowing it. Companies can combine information and assumptions about users collected from their online activity with information from public sources and data brokers to assemble dossiers

²⁰ D Acemoglu, 2002, Technical change, inequality, and the labour market, *Journal of Economic Literature*, 40(1):7–72.

²¹ B Shiller, 2014, First-degree price discrimination using big data, Working Paper No. 108, Brandeis University, Department of Economics and International Business School.

on users with nearly 100 variables (job title, parents' birthdays and so forth), for example to help them (sell) target advertisements.²²

44. For companies, organizations and Governments, increased vulnerability to hacking, identity or other personal and financial information theft, larceny and even industrial espionage and sabotage can result from connecting private communications networks, industrial systems and public infrastructure to the Internet and/or in the cloud. There is a trade-off: weighing the potential negative consequences from ignoring such risks against losing out on potential benefits when taking the risks seriously.²³

45. Against this background, it becomes increasingly important to enhance understanding of the enabling conditions and implications for the economy and society stemming from digitalization in order to maximize potential benefits and opportunities and cope with relevant challenges and costs. Given the anticipated transformative impact, effects will differ between countries at different levels of development, as well as between different stakeholders.

III. Policy implications and guiding questions

46. As more business activities are increasingly affected by digitalization, it becomes important for Governments to consider how to harness e-commerce and the broader digital economy for sustainable development. This section is structured along the lines of the three guiding questions included in the terms of reference for the Intergovernmental Group of Experts on E-commerce and the Digital Economy:

(a) What do developing countries need in order to build competitive advantages through e-commerce and the digital economy?

(b) What can developing countries do to strengthen their physical and technology infrastructure?

(c) How can developed countries partner, in the most impactful way, with developing countries to maximize opportunities and address challenges relating to e-commerce and the digital economy?

A. What do developing countries need in order to build competitive advantages through e-commerce and the digital economy?

47. An good starting point for developing a strategy towards harnessing the digital economy is to recognize the cross-cutting impact of digitalization. Seizing opportunities and addressing challenges requires the involvement of several different ministries and interaction with other, non-State stakeholders, such as the private sector, academia and civil society.

48. Governments have a central role in creating an environment that is conducive to maximizing sustainable development opportunities and in ensuring that the environment supports the relevant development objectives of a country. Informed decision-making is facilitated by a realistic assessment of where a country stands in terms of its domestic needs, strengths and weaknesses, and opportunities and threats.

²² See *Washington Post*, 2016, 98 personal data points that Facebook uses to target ads to you, 19 August.

²³ In a study of cyber risk in advanced manufacturing that included live interviews with 35 executives and 225 online surveys, 50 per cent of respondents said they lacked confidence that they were protected, 39 per cent said they had experienced a data breach in the last month, 48 per cent said they lacked funding for cybersecurity, 75 per cent said they lacked the in-house skills and resources to address the problem and only 55 per cent said they encrypted their data (Deloitte, 2016, Cyber risk in advanced manufacturing: Getting ahead of cyber risk, available at <https://www2.deloitte.com/us/en/pages/manufacturing/articles/cyber-risk-in-advanced-manufacturing.html#> (accessed 19 July 2017).

49. Digital policies should be coherent and well integrated with each country's national development agenda, as e-commerce and other digital applications may support different economic and social objectives, such as higher productivity, improved competitiveness, improved access to information, transparency of regulations, and more inclusive and equitable development. Clearly defined objectives and recognition of possible concerns are a first step to formulating relevant policies.

50. Assessing digital or e-commerce readiness is useful in formulating effective strategies and setting priorities. UNCTAD tools such as the *UNCTAD B2C* [Business-to-consumer] *E-commerce Index*, ICT policy reviews and rapid eTrade assessments can help develop an understanding of a country's domestic needs, strengths and weaknesses. Reports from other policy review mechanisms, such as the trade policy reviews of the World Trade Organization, Enhanced Integrated Framework diagnostic trade integration studies and World Bank poverty reduction strategy papers, may also provide helpful information. The monitoring exercise is likely to require data collection efforts.

51. Based on the *UNCTAD B2C E-commerce Index 2016*,²⁴ which covers 137 economies, e-commerce readiness varies by region (figure 4). Africa ranks the lowest in all the indicators.

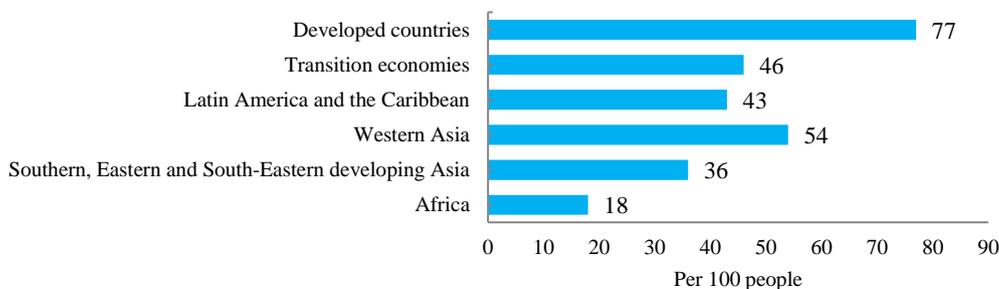
52. Beyond e-commerce, the evolving digital economy raises many policy issues that should be addressed. Governments need to consider the implications of digitalization for policies related to areas such as the labour market, education and skills development, innovation, sectoral development, competition, consumer protection, taxation, trade, environmental protection and energy efficiency.

53. The impacts of digitalization on skills needs, jobs and employment are challenging to address. Countries lacking relevant skills will be at a disadvantage in the evolving digital economy. A range of policy measures, including in the areas of education and skill development policies and labour market policy may need to be considered. They should be adapted to each country and take into account the present state of education, training and skills development, as well as the degree of digital connectivity and use. With improved access to digital resources, being able to exploit these resources becomes a more important determinant of the competitiveness of enterprises and locations.

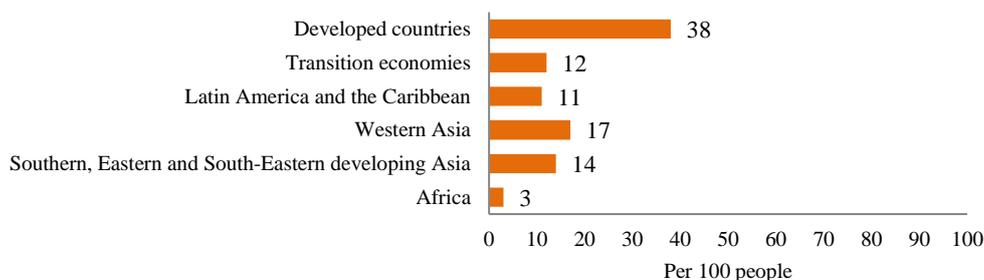
²⁴ UNCTAD, 2016, *UNCTAD B2C E-commerce Index 2016: UNCTAD Technical Notes on ICT for Development No. 7* (United Nations publication, Geneva)

Figure 4
UNCTAD 2016 business-to-consumer e-commerce index, by component indicators and geographical region: (a) Percentage of people using the Internet, (b) percentage of people (more than 15) holding a credit card, (c) secure servers per 1 million people and (d) Universal Postal Union postal reliability score

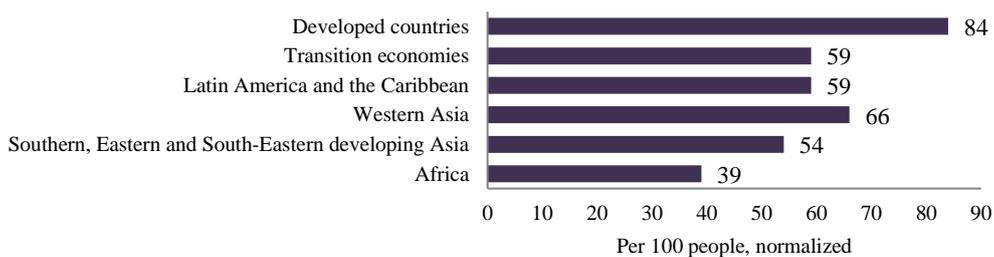
(a)



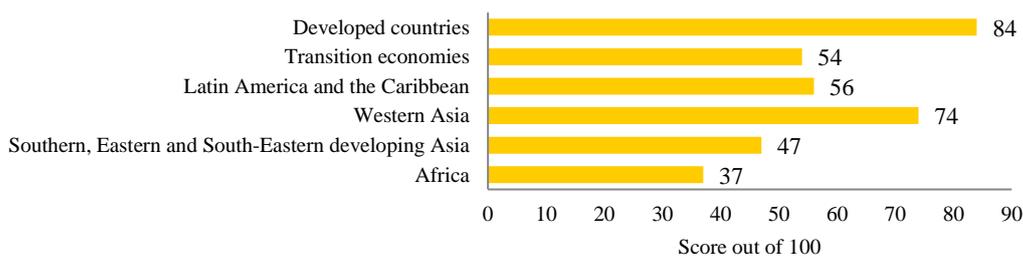
(b)



(c)



(d)



Source: Based on latest available data from UNCTAD (2016), ITU, World Bank and Universal Postal Union.

54. Therefore, effective multi-sectoral and inter-ministerial cooperation are important for strategy development and implementation. Examples of government ministries that might be interested include those responsible for justice, finance, science, technology and innovation, ICT, trade, rural development, employment, the post, and transportation and education. In addition, it is important to define clearly which ministry will take the lead in the work towards developing comprehensive strategies related to the digital economy.

55. A comprehensive assessment should include a review of trends related to e-commerce and the digital economy and take stock of the resources and capabilities that could contribute to further development. Direct consultations with relevant stakeholders have a key role in this process, especially given the fast changing nature of digital technologies.²⁵

56. Weak legal and regulatory frameworks can result in limited trust in online transactions. Such barriers can be particularly prohibitive for micro, small and medium-sized enterprises, which are usually less connected than large firms, especially in developing countries. With regard to e-commerce, UNCTAD publishes information on the availability of legal frameworks for electronic transactions, data protection and privacy online, consumer protection online and cybercrime prevention.²⁶ Other legal and regulatory frameworks of relevance include intellectual property rights protection, and trade, competition and taxation laws.

57. A lack of relevant statistics is a serious obstacle to mapping the use and impact of e-commerce and other aspects of the digital economy. The situation is particularly weak in developing countries, especially in LDCs. This makes it difficult for policymakers to formulate and implement evidence-based policies aimed at harnessing the digital economy. Improving data availability should be a priority for Governments.

58. The Intergovernmental Group of Experts may wish to explore the following issues:

(a) What are the most relevant indicators to measure the readiness of countries to engage in and benefit from e-commerce and the digital economy?

(b) What are best practices to engage all relevant stakeholders in developing policies for the digital economy?

(c) How can the Intergovernmental Group of Experts contribute to advancing consensus-building in relevant areas of law reform, such as data protection and privacy, and cybercrime?

(d) How can the Intergovernmental Group of Experts support the production of relevant statistics on the digital economy in developing countries?

B. What can developing countries do to strengthen their physical and technology infrastructure?

59. The second guiding question is related to the physical and technology infrastructure in developing countries, and what can be done to strengthen it. As observed in this note, there are still significant digital divides to be overcome. The areas of transportation and electricity are also part of the discussion on leveraging e-commerce and the digital economy for sustainable development.

60. The need for connectivity is explicitly specified in the 2030 Agenda for Sustainable Development. One of the targets of Goal 9 is that of significantly increasing access to ICTs and striving to provide universal and affordable access to the Internet in LDCs by 2020.²⁷

²⁵ Various organizations, including the International Trade Centre, UNCTAD, the World Bank and the World Trade Organization, can offer assistance to developing countries in carrying out such assessments.

²⁶ For more information, see http://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx (accessed 19 July 2017).

²⁷ See <http://www.un.org/sustainabledevelopment/infrastructure-industrialization/> (accessed 19 July 2017).

The low level of broadband penetration in many developing countries is particularly unsatisfactory. For example, in LDCs, only 15 per cent of the population enjoyed access to the Internet in 2016, and a much smaller proportion had access to broadband.²⁸

61. There are different ways for Governments to strengthen the digital infrastructure.²⁹ It is important to have a clear vision of what can be done with universal connectivity as a platform and to make connectivity a priority. Policy frameworks and regulations should secure an open, transparent and fair telecommunications market to enable more domestic and foreign investment. Measures to make broadband use more affordable may include infrastructure sharing, effective spectrum management and avoidance of high taxes and import duties on ICT equipment and services. It is also important that community networks reach people in rural or remote areas who are currently unconnected.³⁰ As suggested in UNCTAD (2013), Governments should improve the measurement of the quality of service of broadband networks in order to make informed decisions.

62. The establishment of Internet exchange points can help reduce the cost of Internet access and bring down latency. Public policy may focus on supporting an environment of fair competition and establishing a licensing structure that can enable Internet exchange points to succeed.³¹

63. In many countries the power infrastructure is a critical bottleneck to harnessing the digital economy and ICT resources, such as cloud computing and big data. To deal effectively with this bottleneck, it is necessary to ensure that electricity supply meets the needs of users in productive sectors and is moving towards universal access for households. This in turn makes it important to integrate energy strategies fully into overall development strategies. The existing infrastructure for electricity generation and distribution often needs to be upgraded and extended, especially in LDCs. In this context, countries may seek to harness renewable energy and mini-grid technologies for rural electrification. Furthermore, achieving transformative access to electricity within the timeframe of the 2030 Agenda for Sustainable Development requires planning and anticipating electricity demand stemming from expanding productive use. Considerable additional investment on the supply side will also be required. Financing will need to be provided to a large extent by official development assistance, other external official resources and the domestic public sector.³²

64. Smooth transport of goods is imperative for both domestic and cross-border e-commerce. Effective order fulfilment is facilitated by well-functioning road transport, land ports, postal delivery services and customs. Poor logistics remain a barrier to e-commerce in many developing countries, and investment in infrastructure is often sorely needed, especially outside the urban centres. There may be a lack of parcel delivery services – public and/or private – that can provide quick, traceable and reliable parcel deliveries and geographical coverage. In this context, initiatives to strengthen the capacity of the postal sector to support e-commerce can be relevant. Further issues to consider include the extent to which competition is permitted in the delivery market and the possibilities for partnerships between the private sector and local post offices.

65. Bottlenecks in land ports, customs-related problems, and complex export procedures and document requirements often pose daunting challenges to cross-border e-commerce of physical goods. Issues of international returns and tax refunds should also be addressed.

²⁸ ITU, 2017, *Connecting the unconnected: Working together to achieve Connect 2020 Agenda targets*, draft discussion paper prepared for the special session of the Broadband Commission and the World Economic Forum at Davos Annual Meeting 2017.

²⁹ See, for example, recommendations on broadband connectivity stemming from UNCTAD E-commerce Week 2017, available at http://unctad.org/en/PublicationsLibrary/dtlstict2017d7_en.pdf (accessed 19 July 2017).

³⁰ See Internet Society, 2017, *Supporting the Creation and Scalability of Affordable Access Solutions: Understanding Community Networks in Africa* (Geneva and Reston, Virginia, United States).

³¹ PS Ryan and J Gerson, 2012, *A primer on Internet exchange points for policymakers and non-engineers*, Scholarly Paper No. ID 2128103, Social Science Research Network, Rochester, New York.

³² UNCTAD, 2006, *The Least Developed Countries Report 2006: Developing Productive Capacities* (United Nations publication, Sales No. E.06.II.D.9, New York and Geneva); and UNCTAD, *The Least Developed Countries Report 2017*, forthcoming.

Efforts to improve trade facilitation, through the standardization, harmonization and simplification of trade procedures and documentation, can help developing countries, especially LDCs, to join global value chains, including through business-to-business e-commerce. Automating and modernizing customs procedures often improve revenue collection and reduce trade costs.³³

66. The Intergovernmental Group of Experts may wish to discuss the following points:

(a) How to accelerate the roll-out of relevant ICT connectivity, especially broadband connectivity, in developing countries, including in rural areas;

(b) How to enable more efficient logistics to enable e-commerce domestically and across borders.

C. How can developed countries partner, in the most impactful way, with developing countries to maximize opportunities and address challenges relating to e-commerce and the digital economy?

67. The third guiding question relates to the possibilities for partnerships between developed and developing countries. In view of the rapid pace at which the digital economy is evolving and the current major digital and other divides between, as well as within countries, more effective support to developing countries to engage in and benefit from the digital economy is urgently needed.

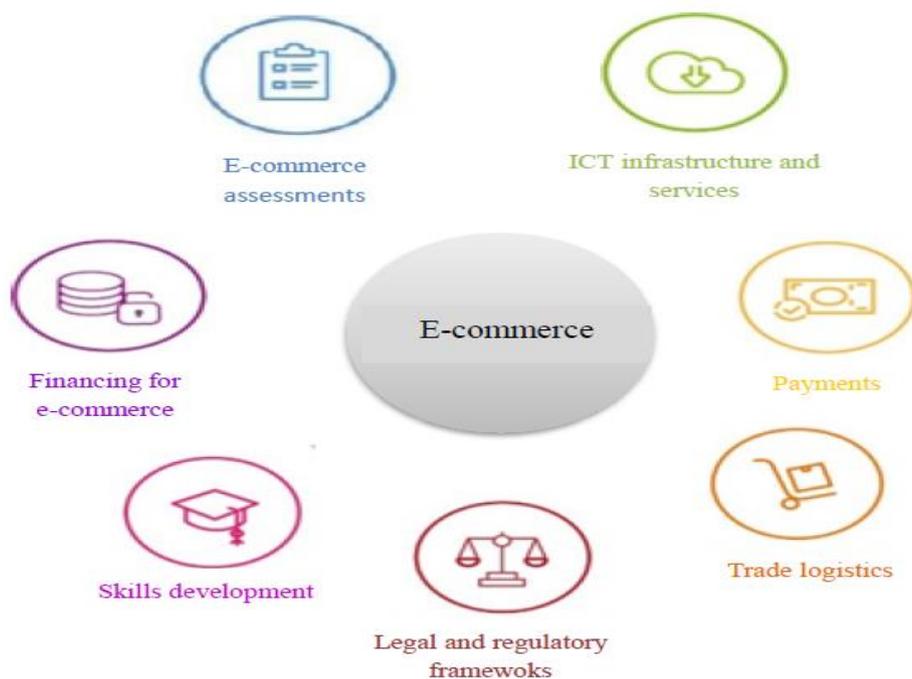
68. To scale up the contribution of e-commerce and the digital economy to sustainable development, a holistic, cross-sectoral and multi-stakeholder approach will be required. Numerous development partners, foundations and private sector actors offer various successful models for facilitating greater connectivity, lowering cost and addressing regulatory issues that can help unlock the development potential of digitalization. However, these are typically fragmented and of insufficient scales. A more concerted effort is needed to ensure that digitalization does not leave any person, enterprise or country behind.

69. One way to capitalize on existing knowledge and maximize synergies with development partners is to tap into the eTrade for All platform. Launched in Nairobi in July 2016 during the fourteenth session of the United Nations Conference on Trade and Development, the platform aims to enable more effective assistance to developing countries wishing to engage in e-commerce and the digital economy. The initiative brings together public and private parties that can contribute towards improving the ability of developing countries to use and benefit from e-commerce.³⁴ It seeks to raise awareness, enhance synergies and scale up existing and new efforts by the development community to strengthen the ability of developing countries to engage in and benefit from e-commerce by addressing seven policy areas, as illustrated in figure 5.

³³ For more information, see <http://www.asycuda.org/> (accessed 19 July) and The Least Developed Countries Report 2017, forthcoming.

³⁴ As of April 2017, eTrade for All has 24 official partners and 33 members of the Business for eTrade Development Council (see etradeforall.org, accessed 19 July 2017).

Figure 5
Policy areas of eTrade for All



Source: UNCTAD.

70. The eTrade for All initiative enables developing countries to find out more easily what kind of assistance that is available from the international community in seven policy areas. Member States, donors, international organizations and the private sector can all participate in and contribute to the resource. The description of different development solutions on the online platform can help development partners to identify specific projects and programmes from the 24 official eTrade for All partners that they may wish to support financially.

71. A spin-off from eTrade for All is the UNCTAD rapid eTrade readiness assessment for LDCs. Its objective is to enhance the capacity of countries to assess their current strengths, weaknesses, gaps and opportunities in the seven policy areas identified by eTrade for All. The resulting reports serve as valuable inputs to these countries' involvement in various discussions related to e-commerce and digital economy and help them identify concrete measures to take to enhance their readiness with the help of development partners. Several donors have pledged to fund such assessments, including Germany, Sweden and the Enhanced Integrated Framework. It is expected that some 15–20 assessments will have been conducted before the end of 2018. The assessments of Bhutan and Cambodia were the first to be completed.³⁵

72. Some initiatives have also been launched to improve the availability of statistics. One of them is a joint initiative of OECD, UNCTAD, the Universal Postal Union, the World Customs Organization and the World Trade Organization to improve measurement of cross-border e-commerce. Another is the Working Group on E-commerce, recently established by the World Customs Organization. Under the 2017 German presidency, the members of the Group of 20 have also focused their efforts to measure and understand e-commerce and its development dimension more effectively. Development partners can contribute by supporting capacity-building in these areas.

73. In addition to projects implemented by regional or international organizations, there are ample opportunities for developed countries to engage in bilateral collaboration with

³⁵ UNCTAD, 2017, *Bhutan: Rapid ETrade Readiness Assessment* (United Nations publication, New York and Geneva); UNCTAD, 2017c, *Cambodia: Rapid ETrade Readiness Assessment* (United Nations publication, New York and Geneva).

individual developing countries. There is a general need to scale up support in this area. For example, despite the growing importance of the digital economy for the achievement of the Sustainable Development Goals, and the huge digital divides that still exist, the share of ICT in total aid for trade declined from 3 per cent in 2002–2005 to only 1 per cent in 2015.³⁶

74. The Intergovernmental Group of Experts may wish to explore the following issues:

- (a) Best practices for developed countries to partner with developing countries to build the ability of the latter to engage in and benefit from e-commerce and the digital economy;
 - (b) How to enable adequate follow-up of rapid eTrade assessments in LDCs;
 - (c) How to best leverage eTrade for All to facilitate effective capacity-building in relevant areas in developing countries.
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³⁶ OECD and World Trade Organization, 2017, *Aid for Trade at a Glance 2017: Promoting Trade, Inclusiveness and Connectivity for Sustainable Development* (Paris and Geneva).