



**EMBARGO**

The contents of this Report must not be quoted or summarized in the print, broadcast or electronic media before **2 October 2017, 17:00 hours GMT**



INFORMATION ECONOMY REPORT **2017**

DIGITALIZATION, TRADE AND DEVELOPMENT

OVERVIEW





# INFORMATION ECONOMY REPORT 2017

DIGITALIZATION, TRADE AND DEVELOPMENT

OVERVIEW



## NOTE

Within the UNCTAD Division on Technology and Logistics, the ICT Analysis Section carries out policy-oriented analytical work on the development implications of information and communications technologies (ICTs) and e-commerce. It is responsible for the preparation of the *Information Economy Report*. The ICT Analysis Section promotes international dialogue on issues related to ICTs for development, and contributes to building developing countries' capacities to measure the information economy and to design and implement relevant policies and legal frameworks. The Section is also managing the *eTrade for all* initiative.

In this Report, the terms country/economy refer, as appropriate, to territories or areas. The designations employed and the presentation of the material do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. In addition, the designations of country groups are intended solely for statistical or analytical convenience, and do not necessarily express a judgement about the stage of development reached by a particular country or area in the development process. The major country groupings used in this Report follow the classification of the United Nations Statistical Office. These are:

Developed countries: the member countries of the Organisation for Economic Co-operation and Development (OECD) (other than Chile, Mexico, the Republic of Korea and Turkey), plus the European Union member countries that are not OECD members (Bulgaria, Croatia, Cyprus, Lithuania, Malta and Romania), plus Andorra, Liechtenstein, Monaco and San Marino. Countries with economies in transition refers to those in South-East Europe and the Commonwealth of Independent States. Developing economies in general are all the economies that are not specified above. For statistical purposes, the data for China do not include those for Hong Kong Special Administrative Region of China (Hong Kong, China), Macao Special Administrative Region of China (Macao, China) or Taiwan Province of China. An excel file with the main country groupings used can be downloaded from UNCTADstat at: <http://unctadstat.unctad.org/EN/Classifications.html>.

Reference to companies and their activities should not be construed as an endorsement by UNCTAD of those companies or their activities.

---

The following symbols have been used in the tables:

Two dots (..) indicate that data are not available or are not separately reported. Rows in tables have been omitted in those cases where no data are available for any of the elements in the row;

A dash (–) indicates that the item is equal to zero or its value is negligible;

A blank in a table indicates that the item is not applicable, unless otherwise indicated;

A slash (/) between dates representing years, e.g. 1994/95, indicates a financial year;

Use of an en dash (–) between dates representing years, e.g. 1994–1995, signifies the full period involved, including the beginning and end years;

Reference to “dollars” (\$) means United States dollars, unless otherwise indicated;

Annual rates of growth or change, unless otherwise stated, refer to annual compound rates;

Details and percentages in tables do not necessarily add up to the totals because of rounding.

The material contained in this study may be freely quoted with appropriate acknowledgement.

UNITED NATIONS PUBLICATION

UNCTAD/IER/2017 (Overview)

Copyright © United Nations, 2017

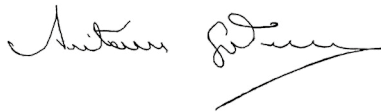
All rights reserved. Printed in Switzerland

## PREFACE

These are still the early days of the digital economy. But already it is clear that it has had, and will continue to have, globally transformative impacts on the way we live, work and develop our economies. As the world strives to implement the 2030 Agenda for Sustainable Development – our universal blueprint for building peaceful, prosperous societies on a healthy planet – harnessing the great power of information and communications technologies can be one of the keys to success, including by opening new pathways of development and helping countries gain access to the global store of knowledge. The developing world itself is showing great leadership in technological innovations that can spur their own growth while benefiting the world.

At the same time, we know that large parts of the developing world remain disconnected from the Internet, and many people lack access to high-speed broadband connectivity. Policymaking at the national and international levels needs to mitigate the risk that digitalization could widen existing divides and create new gaps. Moreover, since increased reliance on digital technologies, such as cloud computing, three-dimensional printing, big data and “the Internet of things”, is certain to influence most industries and global value chains, it is essential to start assessing opportunities and pitfalls alike, and to prepare for what is coming.

The enormous scope and considerable uncertainty associated with the next digital shift call for more facts, dialogue and action by all stakeholders. The analysis contained in the *Information Economy Report 2017: Digitalization, Trade and Development* contributes to this process and proposes ways in which the international community can reduce inequality, enable the benefits of digitalization to reach all people and ensure that no one is left behind by the evolving digital economy.



António Guterres  
Secretary-General  
United Nations

---

## FOREWORD

The world is at the dawn of the next technological revolution. It will be multifaceted and its implications transformational. Digitalization will create opportunities for entrepreneurs and businesses, while also bringing enormous benefits to consumers. However, at the same time it will disrupt existing practices, expose incumbents to competition, change skills requirements of workers and result in job losses in some countries and sectors.

The *Information Economy Report 2017* looks at some of these trends, and examines how information and communications technologies are having an increasing impact on global trade and development.

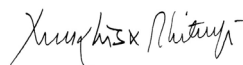
Like previous large-scale economic transitions, the benefits will be immense, but they will not materialize through a smooth, cost-free process. The net outcome will depend on policies undertaken at both national and international levels to build countries' capabilities to take advantage of these transformations.

The international community has a huge responsibility to ensure that no one is left behind in this transformation process. Given the very rapid evolution of the digital economy, many developing countries will need to develop or strengthen their capabilities in a wide range of policy areas, including in all key aspects of e-trade readiness: connectivity, payment solutions, trade logistics, Internet security and legal frameworks.

This year's *Information Economy Report* aims to augment our collective understanding of the way the digital economy works and its implications. It aims to help intensify policy dialogue and peer learning about the issues involved among developing and developed countries alike. And countries with more resources will need to reach out and assist those with less; current efforts are inadequate.

UNCTAD is committed to playing a constructive role in this context. We do this through in-depth research, as evidenced in this *Report*. In addition, our new Intergovernmental Group of Experts on E-Commerce and the Digital Economy will provide a new forum for policy dialogue, and our eTrade-for-all initiative can be leveraged to ensure that technical assistance is offered in more effective ways through smart partnerships and enhanced transparency.

It is my hope that this holistic approach will help us to respond to the desire of people in developing countries to connect to the new world of technological progress, and to benefit from the prosperous future they deserve.



Mukhisa Kituyi  
Secretary-General of UNCTAD

## ACKNOWLEDGEMENTS

The *Information Economy Report 2017* was prepared by a team comprising Torbjörn Fredriksson (team leader), Cécile Barayre, Pilar Fajarnes, Scarlett Fondeur, Sabrina Ielmoli, Diana Korke, Smita Lakhe, Marta Pérez Cusó and Marian Pletosu under the supervision of Angel Gonzalez Sanz, Chief, Science, Technology and ICT Branch, and the with overall guidance of Shamika N. Sirimanne, Director of the Division on Technology and Logistics.

The report benefited from major substantive contributions by Anupam Chander, William Drake, Christopher Foster, Mark Graham, Michael Minges, Timothy Sturgeon, Kati Suominen and Desirée van Welsum. Additional inputs were provided by Hassiba Benamara, Katia Cerwin, Claudia Contreras, Poul Hansen, Jan Hoffmann, Martin Labbé, Teresa Moreira, William Natta, Maria Prieto, Félipe Sandoval and Frida Youssef.

Valuable comments on a draft version of the report were received from experts attending a peer review meeting in Geneva in July 2017, including Nick Ashton-Hart, Dimo Calovski, Paul Donohoe, Mohamed Es Fih, Christopher Foster, James Howe, Marie Humeau, Michael Kende, Min Jae Kim, Michael Lim, Andreas Maurer, Susan Schorr, Marie Sicut, David Souter, Thomas van Giffen, Felix Weidenkaff and Anida Yupari. Additional comments were received at various stages of production of the report from Mario Acunzo and Simone Sala.

UNCTAD is grateful to national statistical offices for their sharing of data and for responses received to UNCTAD's annual survey questionnaire on ICT usage by enterprises, and on the ICT sector. Eurostat, GSMA Intelligence, the International Labour Organization, the International Telecommunication Union, the Oxford Internet Institute and the Universal Postal Union also shared data for this report, which is highly appreciated.

The cover was done by Magali Studer. The graphics and desktop publishing were done by Stéphane Bothua. The infographics were done by Natalia Stepanova and the *Information Economy Report 2017* was edited by Praveen Bhalla.

Financial support from the Governments of Finland and the United Kingdom is gratefully acknowledged.

---

# OVERVIEW

## **Digital technologies are changing the economy, with implications for development**

The world is on the cusp of a new digital era. With dramatically reduced costs of collecting, storing and processing data, and greatly enhanced computing power, digitalization is transforming economic activities around the world. It is expected to affect value chains, skill requirements, production and trade, and will require adaptations of existing legal and regulatory frameworks in various areas. This has major implications for the implementation of the 2030 Agenda for Sustainable Development, presenting significant opportunities, but also challenges, for developing countries. The *Information Economy Report 2017* examines the evolution of the digital economy and its potential consequences for trade and development. Although the speed of digital transformation differs among countries, all of them will need to adapt policies in several areas.

The report shows that the digital economy is creating new opportunities for trade and development. It is helping smaller businesses and entrepreneurs in developing countries to connect with global markets more easily, and is opening up new ways of generating income. Information and communication technologies (ICTs), e-commerce and other digital applications are being leveraged to promote entrepreneurship, including the empowerment of women as entrepreneurs and traders, and to support productive activities, decent job creation, creativity and innovation. Furthermore, mobile and digital solutions are contributing to facilitating greater financial inclusion. And small firms in developing countries with sufficient connectivity may be able to access various cloud services and obtain crowd finance in online platforms.

However, such development gains are far from automatic, and there are certain development challenges associated with the evolution of digitalization. Many developing countries, especially the least developed countries (LDCs), are inadequately prepared to capture the many opportunities emerging as a result of digitalization. Moreover, there is a risk that digitalization will lead to increased polarization and widening income inequalities, as productivity gains may accrue mainly to a few, already wealthy and skilled individuals. Winner-takes-all dynamics are typical in platform-based economies, where network effects benefit first

---



movers and standard setters. Indeed, the world's top four companies by market capitalization are all closely linked to the digital economy: Apple, Alphabet (Google), Microsoft and Amazon.com. There are also concerns over how data flows can be harnessed while at the same time addressing concerns related to privacy and security.

The rapid pace at which the digital economy is evolving is a result of the technologies and innovations that were developed over several decades and that are becoming more pervasive. High-speed broadband access to increasingly powerful computing and storage capacity, and drastically reduced costs of ICT equipment and data management, have facilitated the process of digitalization. Key technologies underpinning the evolving digital economy include advanced robotics, artificial intelligence, the Internet of Things (IoT), cloud computing, big data analytics and three-dimensional (3D) printing.

### **The digital economy is evolving fast but at very different speeds**

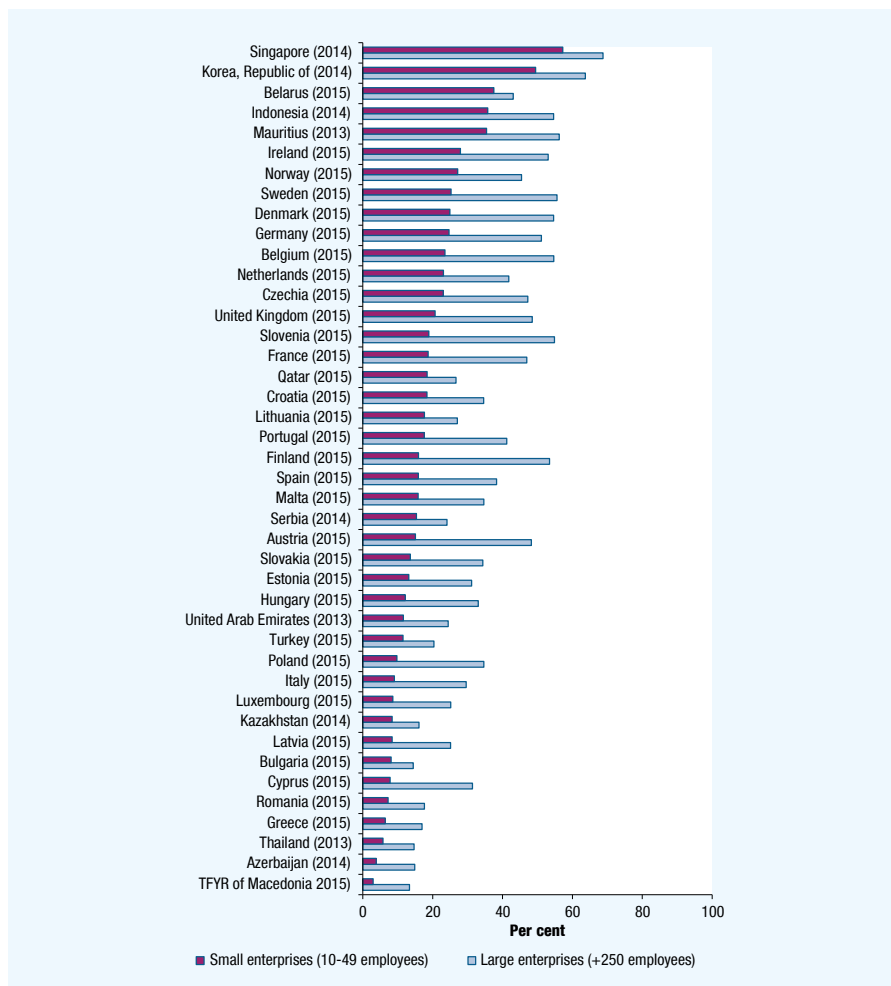
The digital economy is expanding in several ways. Global production of ICT goods and services now amounts to an estimated 6.5 per cent of global gross domestic product (GDP), and some 100 million people are employed in the ICT services sector alone. Exports of ICT services grew by 40 per cent between 2010 and 2015. Worldwide e-commerce sales in 2015 reached \$25.3 trillion, 90 per cent of which were in the form of business-to-business e-commerce and 10 per cent in the form of business-to-consumer (B2C) sales. UNCTAD estimates that cross-border B2C e-commerce was worth about \$189 billion in 2015, which corresponds to 7 per cent of total B2C e-commerce. Sales of robots are at the highest level ever, worldwide shipments of three-dimensional printers more than doubled in 2016, to over 450,000, and are expected to reach 6.7 million in 2020. And by 2019, the volume of global Internet traffic is expected to increase 66 times from what it was in 2005.

At the same time, monitoring the digital divide remains important. Although the number of Internet users grew by 60 per cent between 2010 and 2015, more than half of the world's population remains offline. Broadband connectivity in developing countries, when available, tends to be relatively slow and expensive, limiting the ability of businesses and people to use it productively. Only 16 per cent of the world's adult population uses the Internet to pay bills or purchase items. And while more than 70 per cent of the population in several developed countries already buys goods and services online, the equivalent share in most LDCs is less than

---

2 per cent. Meanwhile, most micro, small and medium-sized enterprises (MSMEs) in developing countries are ill-prepared to take advantage of the digital economy, and may thereby miss opportunities to boost their productivity and competitiveness. Small firms generally use the Internet much less than large ones for selling online

**Figure 1. Proportion of enterprises receiving orders over the Internet, latest year**



Source: UNCTADstat.

(figure 1). Only 4 per cent of all 3D printers are used in Africa and Latin America, and the use of robots is also very limited in most developing countries, with the exception of some countries in Asia where they are used quite extensively. As the digital economy evolves further, there is a greater need to ensure that as many people and businesses in developing countries as possible are able to engage in and benefit from it.

### **The digital economy is transforming trade, jobs and skills**

Digital technologies have a bearing on the prospects for MSMEs, especially those in developing countries, to participate in global trade. They allow enterprises to cut costs, streamline supply chains and more easily market products and services worldwide. Increased trade at reduced costs can have positive spillovers effects on the economy as a whole, for example through enhanced competition, productivity and innovation, as well as improved access to talents and skills. But to derive such benefits from digitalization, MSMEs will need to overcome various barriers.

Many small firms in developing countries remain limited in their digital involvement in relevant value chains, reflecting inadequate connectivity, limited awareness of the benefits of digitalization, skills gaps and other barriers. It will be important for digital systems to be designed in ways that facilitate the effective integration of smaller firms in value chains. The use of online platforms is growing, especially in sectors facing strong global competition and involving many buyers and sellers. Smaller producers are more likely to benefit from participating in global platforms if they serve a well-defined niche market rather than competing in mass markets.

The evolving digital economy has been accompanied by the rise of “trade in tasks” mediated by online labour platforms. This is creating new income-generating opportunities for people in developing countries who have adequate connectivity and relevant skills. These platforms are enabling web designers, coders, translators, marketers, accountants and many other types of professionals to sell their services to clients abroad. Annually, some 40 million users access these platforms looking for jobs or talent. However, at the same time, a large oversupply of job-seekers on such platforms may weaken their bargaining power, and thus may create tendencies towards a race to the bottom in terms of wages and other working conditions. Some experts caution against the risk of “cloud work” and “gig work” leading to the commodification of work. Further research and policy dialogue will be important to ensure that this expanding segment of the economy provides quality and decent jobs.

---

Increased digitalization and automation is leading to new types of jobs and employment, changing the nature and conditions of work and altering skills requirements, as well as affecting the functioning of labour markets and the international division of labour. The ability of countries and enterprises to exploit new digital resources will become a key determinant of competitiveness. The overall effects of digitalization remain uncertain; they will be context-specific, differing greatly among countries and sectors. This makes it increasingly important for countries to ensure they have an adequate supply of skilled workers with strong cognitive, adaptive and creative skills necessary for “working with the machines”.

### **Rapid technological change presents a multifaceted policy challenge covering many areas**

Policymakers are facing a bold task in keeping up with the rapid pace of technological change amidst a high degree of uncertainty about the shape of the future. The policy challenge is also contextual, varying greatly in terms of countries’ readiness to engage in and benefit from the digital economy, with LDCs being the least prepared. For these countries, formulating relevant policies and implementing adequate measures will be particularly important, not least to avoid falling behind even further as the digital economy evolves, as well as to seize new opportunities. Countries also vary in their capacity to formulate, implement and monitor policies related to the digital economy. Ensuring that no one is left behind in the digital economy therefore necessitates a much expanded global effort to provide adequate support to these countries in particular.

The policy challenge is multifaceted. First, there is a wide spectrum of policy areas that should be addressed in a holistic manner, such as infrastructure, education and skills development, the labour market, competition, science, technology and innovation and fiscal issues, as well as trade and industrial policies. This requires effective cross-sectoral collaboration both within the government and with other stakeholders. Governments should seek to seize opportunities presented by the digital economy in support of relevant sustainable development objectives. Coordinating cross-sectoral policies is challenging for any country, but especially for those with very limited resources. Second, in order to formulate evidence-based policies and strategies, there is a need to help developing countries, and especially LDC, build their capacity for collecting more and better data on relevant aspects of the digital economy. Third, formulating policies for the digital economy is most urgently needed for those countries that currently are at a relatively low level of readiness to engage in it, and have limited experience with digitalization.

---

The *Information Economy Report 2017* touches upon a number of policy areas, one of which relates to connectivity. In many developing countries, adequate and affordable ICT connectivity is still insufficient for MSMEs to compete effectively online. Policy measures needed to address this situation, both at the national and international level, include efforts to ensure that policy frameworks and regulations secure an open, transparent and fair telecommunications market to attract additional investment. Measures to make broadband use more affordable include infrastructure sharing, effective spectrum management and the avoidance of high taxes and import duties on telecom/ICT equipment and services.

Another critical area concerns education and training. All countries will need to adjust their education and training systems to deliver the skills required in the digital economy. This is vital not only for young people entering the labour market, but also for existing workers who need to be retrained and prepared for a future of lifelong learning that equips them for jobs and provides skills flexibility and adaptability. Priorities may vary by country. For instance, LDCs may need to focus on promoting digital literacy among a growing number of students and workers, as well as on building a base of ICT specialists. Policies should also expand the opportunities for workers and teachers to upgrade their skills, promote alternative means of developing non-cognitive skills, adapt teaching methodologies and capabilities, and seek to make future skills more attractive to students and workers. In addition, attention should be given to the social and political dimension of technological change, innovation and job creation. Proactive redistribution policies could help mitigate the risk of increased polarization and income inequality. Social protection systems that support workers when they are between jobs or not working regularly are currently available only to about a quarter of the world's population.

Countries should also explore ways to integrate digital solutions in export promotion. In most countries, current export and trade promotion and capacity-building efforts are insufficiently adapted to help MSMEs engage in the digital economy. Trade promotion organizations (TPOs) should embed digital tools in their services offered to small businesses. For instance, online platforms could be better leveraged to present businesses internationally and reach desired communities, as well as to facilitate data collection and analysis, and assess customer needs. With the growing importance of online marketing channels, there should be a greater use of e-market solutions and social media platforms in events or trade shows, and in other efforts to facilitate e-commerce. Public-private partnerships (PPPs) can be useful in such a context.

---

Policymakers need to deepen their understanding of the issues at the interface of trade logistics, digitalization and e-commerce. An increasing number of products are delivered digitally, rather than physically, and the expansion of e-commerce in physical products implies rapid growth in shipments of small parcels and low-value goods, sometimes referred to as a “tsunami of parcels”. Policymakers should explore and harness relevant opportunities to embrace cross-border e-commerce, and create conditions (e.g. alignment of standards), procedures and resources that would enable e-commerce to thrive, keeping in mind the best interests of MSMEs. New technologies may help overcome some logistical bottlenecks. For example, they can help navigate traffic by calculating the fastest routes or identifying the most fuel/time-efficient pick-ups. Trade facilitation experts and city planners may leverage 3D printing in order to reduce the need for long-distance transportation of final products.

The digital economy relies increasingly on the generation, storage, processing and transfer of data, both within and across national boundaries. Access to data and its analysis are becoming strategically important to enhance the competitiveness of companies across sectors. Policymakers need to balance the need for companies to collect and analyse data for innovation and efficiency gains, on the one hand, and the concerns of various stakeholders with respect to security, privacy, and movement and ownership of data, on the other. In this context, they should work nationally, together with industry and consumer groups, as well as internationally. The current system for data protection is fragmented, with varying global, regional and national regulatory approaches. In addition, many developing countries still lack legislation in this area altogether. Instead of pursuing multiple initiatives, it would be preferable for global and regional organizations to concentrate on one unifying initiative or a smaller number of initiatives that are internationally compatible.

As trade in both goods and services is increasingly affected by digitalization and conducted over the Internet, it becomes important for trade policymakers to factor in how the Internet itself is governed and operated. The way in which trade policies are developed differs greatly from the manner in which Internet policies are governed. While the former involves State-to-State negotiations in closed rooms, Internet governance is characterized by multi-stakeholder dialogues in open settings. This report highlights different options for trade policymakers to engage with actors in the Internet community to ensure that future agreements influencing trade in the digital economy are operationally feasible and politically sustainable.

---

## International support and collaboration on a massive scale is needed

To prevent the evolving digital economy from leading to widening digital divides and greater income inequalities, and to ensure that more people and enterprises in developing countries have the capacity to participate effectively in it, the international community will need to expand its support on a massive scale. The current level of support is unsatisfactory. Indeed, the share of ICT in total aid for trade declined from 3 per cent in 2002–2005 to only 1.2 per cent in 2015. Proactive efforts are therefore warranted. One way to capitalize on existing knowledge and maximize synergies with partners is to tap into UNCTAD's eTrade for All initiative (figure 2). UNCTAD has also launched a project to help LDCs assess their readiness to engage in and benefit from e-commerce and other activities in the digital economy. This will also help them identify areas in which targeted support is needed the most.

**Figure 2. The seven policy areas of the eTrade for All initiative**



Source: UNCTADstat.

---

Given the transformative impact of the digital economy, both developed and developing countries will be looking for ways to adapt their policies and strategies. In this context, it is important to avoid reinventing the wheel, where possible. Instead, countries should seek to collaborate and exchange experiences about both the benefits they have reaped from digitalization and the costs and problems encountered. It is expected that the new UNCTAD Intergovernmental Group of Experts on E-Commerce and the Digital Economy will provide a valuable forum for member States to engage in such multilateral policy discussions and to explore good practices in relevant policy domains.

---



