



MEASURING THE INFORMATION SOCIETY



2013

EXECUTIVE SUMMARY



I n t e r n a t i o n a l T e l e c o m m u n i c a t i o n U n i o n

M E A S U R I N G T H E I N F O R M A T I O N S O C I E T Y

2013

EXECUTIVE
SUMMARY



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Foreword

I am pleased to present to you the 2013 edition of *Measuring the Information Society* (MIS). Now in its fifth year, this annual report identifies key ICT developments and tracks the cost and affordability of ICT services, in accordance with internationally agreed methodologies. Its core feature is the *ICT Development Index* (IDI), which ranks countries' performance with regard to ICT infrastructure and uptake. The report aims to provide an objective international performance evaluation based on quantitative indicators and benchmarks, as an essential input to the ICT policy debate in ITU Member States. The 2013 edition also presents the latest results of the *ICT Price Basket* (IPB), and the first complete price data set for mobile-broadband services; the first-ever model to measure the world's *digital native* population; and a quantitative assessment of recent digital TV broadcasting trends.



Over 250 million people came online over the last year, and almost 40 per cent of the world's population will be using the Internet by end 2013. Mobile technology and services continue to be the key driver of the information society, and the number of mobile-broadband subscriptions is close to 2 billion. Mobile-broadband networks are allowing more people to connect to high-speed networks and benefit from a growing number of applications and services. While both fixed- and mobile-broadband speeds continue to increase, the price of services is falling and ICTs are becoming more affordable: in the space of four years, fixed-broadband prices have dropped by an impressive 82 per cent.

At the same time, the report also shows that ICT uptake remains limited in many developing countries, and particularly in the world's least connected countries (LCCs) – a group of 39 countries (home to 2.4 billion people) with particularly low levels of ICT development. In this group of countries, ICTs can become key enablers for achieving international and national development goals and have the greatest development impact, and more policy attention needs to be directed towards them.

Young people all over the world are the most active users of ICTs. For the first time, a model has been developed to estimate the number of digital natives - the young people with solid ICT experience who are drivers of the information society. While 30 per cent of the youth population are digital natives today, the report shows that within the next five years, the digital native population in the developing world is expected to double.

The report also sheds new light on the latest digital TV broadcasting trends, another key driving force of the growing information society. The TV industry has undergone an important shift during the past few years and, in 2012, the number of households with digital TV overtook the number of households with analogue TV. This achievement reinforces the dual role of TV broadcasts: fulfilling some of the public services associated with communications and being a major market for private content creators, distributors and networks.

I trust that the data and analysis contained in this report will be of great value to the ITU membership, including policy-makers, the ICT industry and others working towards building an inclusive global information society.

A handwritten signature in black ink, appearing to read 'Brahima Sanou'.

Brahima Sanou
Director

Telecommunication Development Bureau (BDT)
International Telecommunication Union

Acknowledgements

The 2013 edition of *Measuring the Information Society* was prepared by the ICT Data and Statistics Division within the Telecommunication Development Bureau of ITU. The team included Susan Teltscher (Head of Division), Vanessa Gray, Esperanza Magpantay, Doris Olaya and Ivan Vallejo. The following consultants to ITU provided substantive inputs: Lisa Kreuzenbeck, Michael Best (Chapter 4), and Simon Murray (Chapter 5). Fernando Callorda, Diana Korka, Christoph Stork and Shazna Zuhely contributed to the compilation of data sets on prices. Helpful inputs and suggestions were received from the following ITU colleagues: Istvan Bozoski, Pham Hai, Aurora Rubio, Sameer Sharma, Anne Rita Ssemboga and Marcelino Tayob. The work was carried out under the overall direction of Cosmas Zavazava, Chief, Project Support and Knowledge Management Department, Telecommunication Development Bureau.

The report includes data from Digital TV Research, Eurostat, OECD, IMF, UNCTAD, the UNESCO Institute for Statistics, the United Nations Population Division and the World Bank, which is greatly acknowledged.

ITU also appreciates the cooperation of countries that have provided data included in this report.

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EXECUTIVE SUMMARY

Chapter 1. Introduction

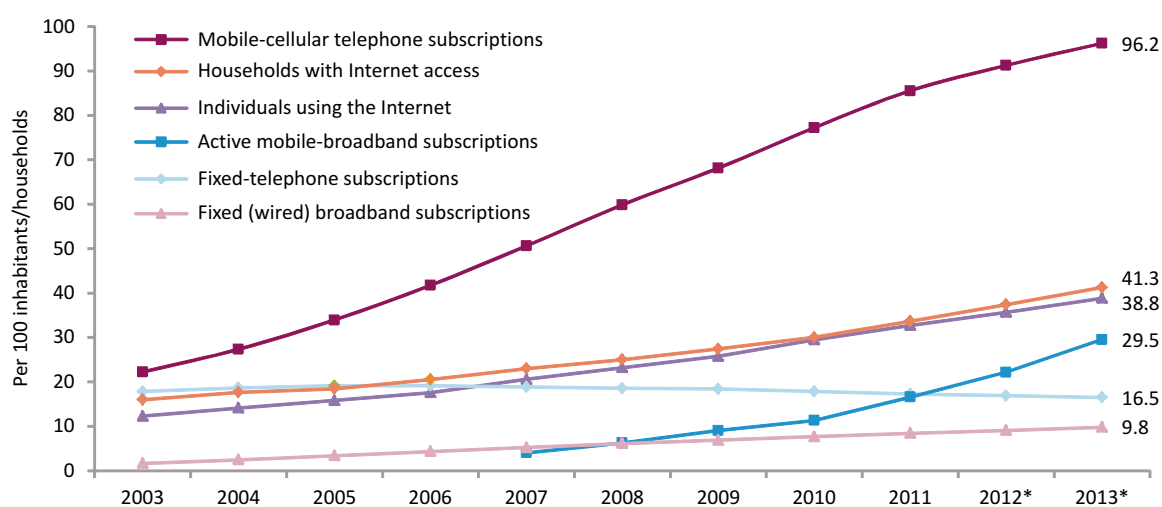
As more and more people join the global information society and high-speed communication networks become an indispensable infrastructure, the tracking and measurement of developments in information and communication technologies (ICTs) remain as relevant as ever. Over the past year, ICT deployment and uptake have continued to grow worldwide (Chart 1.1). According to ITU estimates, by end 2013 there will be 6.8 billion mobile-cellular subscriptions – almost as many as there are people on the planet; and there will be an estimated 2.7 billion people using the Internet worldwide. This means, however, that there are still 4.4 billion people who are not yet online. Priority attention needs to be given to the unconnected, and action needs to be taken to improve the accessibility and affordability of

broadband Internet services everywhere in order to usher in an inclusive information society.

Around half of the world's population lives within reach of a 3G network

Today, almost all people live somewhere within reach of a mobile-cellular signal. However, not all of these mobile networks have been upgraded to 3G technology, which is necessary to qualify as mobile broadband and provide high-speed access to the Internet. By end 2012, the proportion of the world's population covered by a 3G network stood at around 50 per cent. ITU estimates that, by end 2013, there will be some 2 billion mobile-broadband subscriptions, corresponding to a global penetration rate of almost 30 per cent (Chart 1.2). Mobile broadband has been the fastest growing market segment over the past few years, with

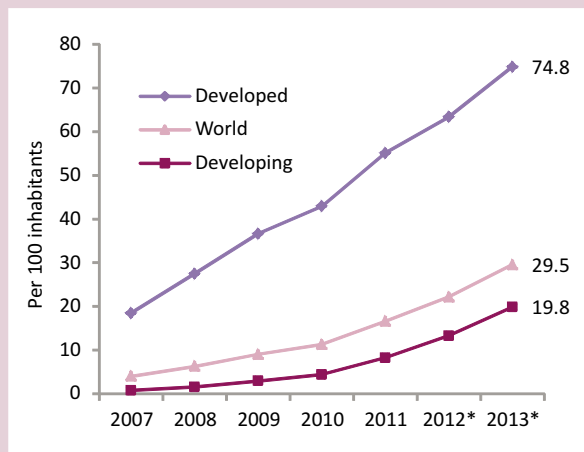
Chart 1.1: Global ICT developments, 2003-2013*



Note: * Estimate.

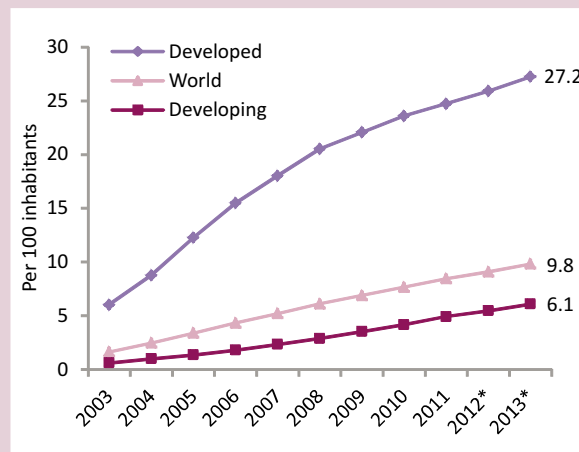
Source: ITU World Telecommunication/ICT Indicators database.

Chart 1.2: Active mobile-broadband subscriptions, world and by level of development, 2007-2013*



Note: * Estimate.
Source: ITU World Telecommunication /ICT Indicators database.

Chart 1.3: Fixed (wired)-broadband subscriptions, world and by level of development, 2003-2013*



Note: * Estimate.
Source: ITU World Telecommunication /ICT Indicators database.

a 40 per cent average annual growth rate (CAGR) since 2007. It is growing rapidly not only in developed but also in developing countries, where subscriptions doubled over the past two years and now outnumber subscriptions in the developed world. Differences between developed and developing countries remain substantial, however, with 75 per cent penetration in the former as against 20 per cent in the latter. A major difference between the developed and developing world is that, in developed countries, mobile broadband is often a complement to rather than a substitute for fixed-broadband access.

Growth in fixed (wired) broadband is slowing in developed countries

Fixed (wired)-broadband uptake continues to grow – albeit more slowly than mobile broadband – at around 10 per cent CAGR between 2010 and 2013. Overall, growth is slowing owing to reduced growth in developed countries over the past three years, whereas growth in developing countries continues at double-digit rates, reflecting the significant investments made in fibre-optic networks in many developing countries (Chart 1.3). Nevertheless, the fixed (wired)-broadband divide between developed and developing regions remains substantial. According to the latest ITU estimates, by end 2013 fixed (wired)-broadband

penetration will reach almost 10 per cent globally, 27 per cent in developed countries and around 6 per cent in developing countries.

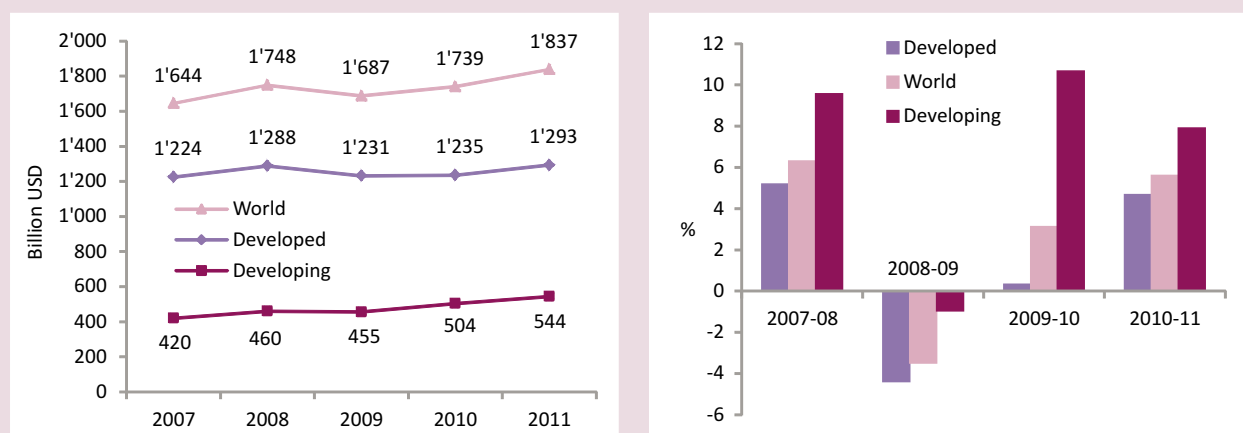
There is a strong link between broadband uptake and broadband affordability. ITU data show that the price of fixed-broadband, measured as a percentage of GNI per capita, has fallen by 82 per cent over the past four years. The drop is particularly remarkable in developing countries, partly due to very high initial values. Nonetheless, fixed-broadband services are still unaffordable for most people in developing countries, costing on average 30 per cent of GNI per capita.

Telecommunication revenues in developing countries were less affected by the financial crisis

From 2007 to 2011, total telecommunication revenues grew by 12 per cent, climbing to USD 1.8 trillion, or 2.6 per cent of world GDP (Chart 1.4). Over the same period, the developing countries’ share of total telecommunication revenues increased from 26 to 30 per cent, highlighting the growing importance of the telecommunication sector in its own right for the economic growth of the developing world.

There was a decline in revenues from 2008 to 2009, coinciding with the global financial crisis. While growth

Chart 1.4: Telecommunication revenues, world and by level of development, 2007-2011, total in USD (left) and annual growth (right)



Note: 'World' includes 82 countries accounting for 94 per cent of world GDP. 'Developed' includes 33 developed countries accounting for 99 per cent of total GDP in the developed world. 'Developing' includes 49 developing countries accounting for 86 per cent of total GDP in the developing world.

Source: ITU World Telecommunication/ICT Indicators database.

in developing countries immediately recovered in 2010, developed countries recovered only in 2011. These data suggest that the adverse financial situation did indeed have an impact on telecommunication spending, particularly in developed countries, whereas developing countries were less affected by the financial crisis. In both the developed and the developing world, subscriptions continued to grow between 2008 and 2009, thus proving to be resilient to adverse economic conditions, while telecommunication spending (and hence revenues) was more elastic.

Peak 2008 telecommunication investment levels have not yet been restored

Telecommunication operators' capital expenditure (CAPEX) peaked in 2008, with global investment totalling USD 290 billion, but this was followed by two consecutive years of decline (Chart 1.5). Despite the upturn in 2011, the 2008 investment levels have thus far not been restored. Developed countries experienced the highest contraction between 2008 and 2009, but also the strongest recovery in 2011. Investment in developing countries was more stable, with the highest decrease between 2008 and 2009, and a mild recovery in 2011.

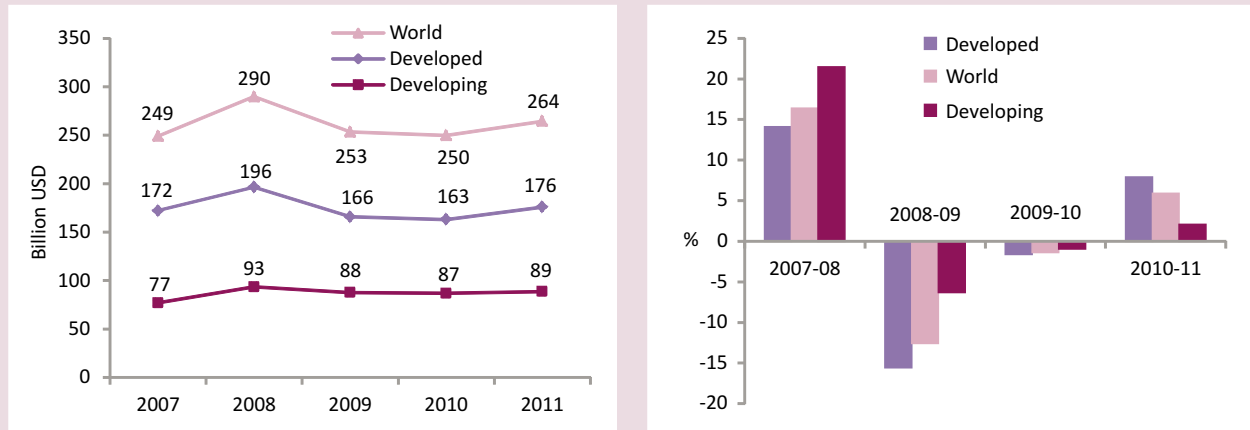
Sluggish investment levels after 2008 are consistent with an overall economic environment of restricted access to capital markets, which may limit the capacity of operators to raise funds for new investments. With the expansion of global operators into new markets, many operators are active in both developing and developed countries, and the adverse financial environment in the developed world has thus most probably also impaired investments in the developing world.

As many as 1.1 billion households worldwide are not yet connected to the Internet

The number of households with Internet access is increasing in all regions, but large differences persist between developed and developing countries, with penetration rates set to reach almost 80 per cent in the former compared with 28 per cent in the latter, by end 2013 (Chart 1.6). Nevertheless, in developing countries, the proportion of households with Internet access has increased from 12 per cent in 2008 to 28 per cent in 2013, which corresponds to a remarkable 18 per cent CAGR.

At the same time, the numbers also show that there are 1.1 billion households worldwide that are not yet connected to the Internet, and that 90 per cent of

Chart 1.5: Annual investment (CAPEX) of telecommunication operators, world and by level of development, 2007-2011, total in USD (left) and annual growth (right)

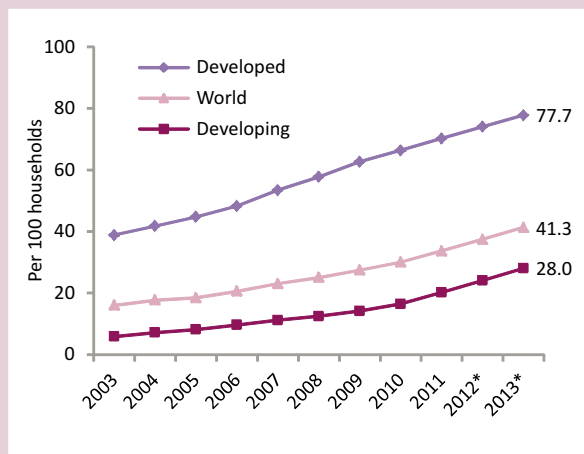


Note: 'World' includes 67 countries accounting for 87 per cent of world GDP. 'Developed' includes 31 developed countries accounting for 96 per cent of total GDP in the developed world. 'Developing' includes 36 developing countries accounting for 72 per cent of total GDP in the developing world.
 Source: ITU World Telecommunication/ICT Indicators database.

these are in the developing world. In order to meet the target set by the Broadband Commission for Digital Development,¹ 40 per cent of households in developing countries should have access to the Internet by 2015. If growth rates continue at the same pace as during the past couple of years, there is a realistic chance that

the target will be achieved. With 53 per cent of the population in developing countries living in rural areas, the infrastructure challenge to connect all of these people to high-speed Internet is enormous. With the continuous increase in wireless-broadband deployment and services, coupled with falling prices, however, Internet access in households in developing regions is expected to improve over the next few years.

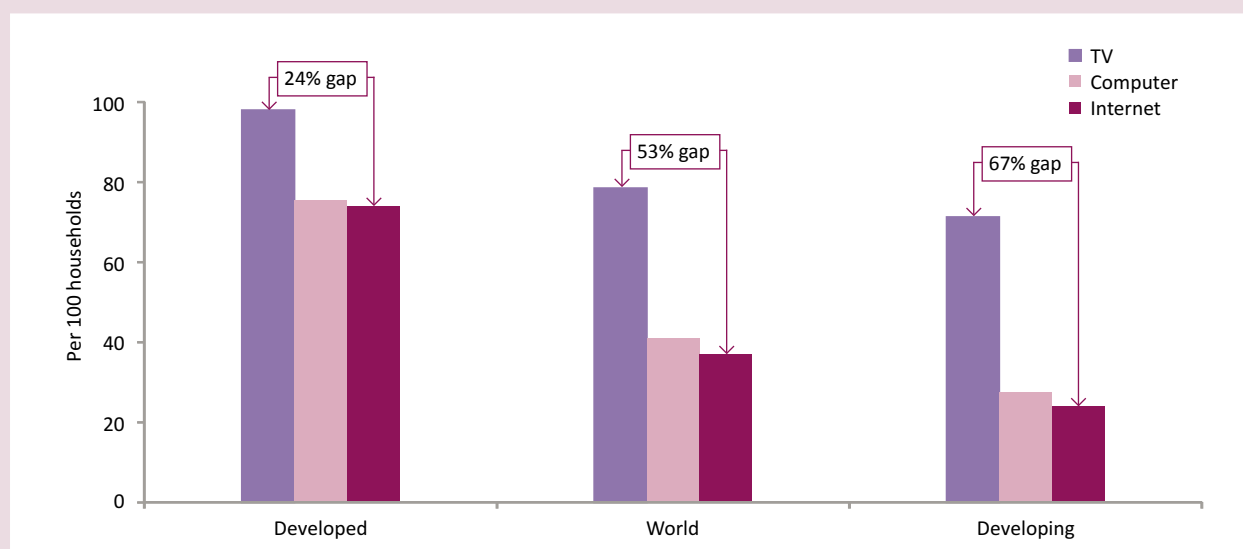
Chart 1.6: Households with Internet access, world and by level of development, 2003-2013*



Note: * Estimate.
 Source: ITU World Telecommunication /ICT Indicators database.

In developing countries, almost three times as many households have a TV than have a computer or Internet

An interesting comparison is the proportion of households with a computer and Internet access and the proportion of households with a television (Chart 1.7). Both require access to electricity in order to function properly, and both represent an expense for household budgets for acquiring the equipment/service and/or for the monthly subscription charges. As at end 2012, almost 80 per cent of households globally had a TV, compared with 41 per cent of households with a computer and 37 per cent with Internet access. The gap between households with a TV on the one hand, and households with a computer and Internet, on the other, is much bigger in developing countries than in developed countries. In the former, there are almost three times as many

Chart 1.7: Households with a TV, computer and Internet, by level of development, 2012

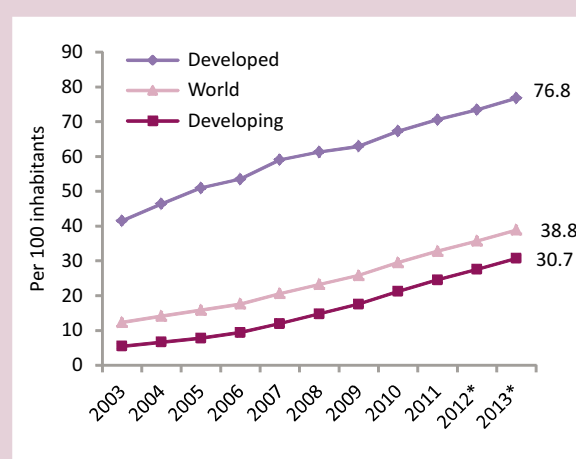
Source: ITU World Telecommunication/ICT Indicators database.

households with a TV than households with a computer or Internet (a gap of 69 percent), while in the latter there are 1.3 times as many (a gap of 25 per cent).

At current growth rates, it is unlikely that the Broadband Commission's Internet user target for 2015 will be achieved

ITU estimates that, by end 2013, almost 40 per cent of the global population, and 31 per cent of the population in developing countries, will be online (Chart 1.8). Internet user penetration has been growing on average at double-digit rates over the past ten years, but is slowing in developed countries, where penetration rates will reach almost 77 per cent by end 2013, compared with 31 per cent in developing countries. In the world's least developed countries (LDCs), the estimate is for fewer than one in ten people to be using the Internet by end 2013.

On the basis of the target set by the Broadband Commission for Digital Development, by 2015 at least 60 per cent of the world population should be online, 50 per cent in developing countries and 15 per cent in LDCs. The target was meant to be ambitious and, indeed, at current growth

Chart 1.8: Individuals using the Internet, world and by level of development, 2003-2013*

Note: * Estimate.

Source: ITU World Telecommunication /ICT Indicators database.

rates it is unlikely to be achieved. Major efforts will have to be deployed in developing countries to make Internet more accessible and affordable to low-income groups, which account for the large majority of consumers in the developing world.

As many as 146 governments have adopted a national broadband plan

National ICT/broadband policies can stimulate the market, expand services and bring down prices. Governments can therefore play an important role by providing an enabling environment for the development of the ICT market and the deployment of broadband infrastructure. Today, of the 146 governments that have adopted or are planning to adopt a national policy, strategy or plan to promote broadband, 70 per cent are from developing countries. Furthermore, around 35 per cent of countries have included broadband in their universal access/service definitions – and these numbers are expected to increase further.² Many of these broadband policies and plans focus on building nationwide broadband infrastructure and connecting households, but also on stimulating demand through the adoption of online services and applications such as e-business, e-education, e-health and e-government.

The main target groups of the post-2015 development goals will be among the 4.4 billion unconnected people

There is no doubt that ICTs continue to be a key enabler for social and economic development. Access to new technologies is important for ensuring full participation by all in new opportunities related to employment, education, health, governance or peace-building. There is a real danger that while the world is transforming into an information society based on high-speed, always-on connections, there is no equal access to ICTs for all. The main target groups of the MDGs and post-2015 development goals will have to be sought precisely among those 4.4 billion people who are not yet connected to the Internet. People living outside major cities in developing countries are those for whom ICTs can have the greatest development impact. The divide between those who are part of the global information society and those who are not is liable to deepen, as the latter are left behind and face little progress.

Continuous monitoring and measurement of information-society developments will be required in order to identify progress and gaps and to ensure equal access, use and impact of ICTs. It is essential to have the national and international statistical community on board early on in the process of

formulating targets and indicators in the field of ICT for development. ITU, jointly with its partners, is working actively to establish a bridge between these debates and promote an active role for the statistical community in the process of developing future ICT-related development frameworks.

Chapter 2. The ICT Development Index (IDI)

The ICT Development Index (IDI) is a composite index combining 11 indicators into one benchmark measure (presented on a scale from 0 to 10) that monitors and compares developments in information and communication technology (ICT) across countries. The main objectives of the IDI are to measure:

- the level and evolution over time of ICT developments in countries and relative to other countries;
- progress in ICT development in both developed and developing countries;
- the digital divide, i.e. differences between countries with different levels of ICT development.

The IDI is divided into three sub-indices: the access sub-index, the use sub-index and the skills sub-index, each capturing different aspects and components of the ICT development process. This report presents IDI results for 2012 in comparison with 2011, for 157 economies.

The Republic of Korea and Europe's Nordic countries maintain their positions at the top of the IDI

The Republic of Korea, followed by Sweden, continues to lead the world in terms of ICT developments. The other Nordic countries Iceland, Denmark, Finland and Norway follow closely. The Netherlands, the United Kingdom, Luxembourg and Hong Kong (China) also rank in the top ten. A comparison with the 2011 ranking shows little change in terms of the countries with the highest ICT levels. The United Kingdom joined the top ten group, up from 11th position in 2011. Almost two-thirds of the top 30 IDI economies are

Table 2.1: ICT Development Index (IDI), 2011 and 2012

| Economy | Rank 2012 | IDI 2012 | Rank 2011 | IDI 2011 |
|-------------------------|-----------|----------|-----------|----------|
| Korea (Rep.) | 1 | 8.57 | 1 | 8.51 |
| Sweden | 2 | 8.45 | 2 | 8.41 |
| Iceland | 3 | 8.36 | 4 | 8.12 |
| Denmark | 4 | 8.35 | 3 | 8.18 |
| Finland | 5 | 8.24 | 5 | 7.99 |
| Norway | 6 | 8.13 | 6 | 7.97 |
| Netherlands | 7 | 8.00 | 7 | 7.85 |
| United Kingdom | 8 | 7.98 | 11 | 7.63 |
| Luxembourg | 9 | 7.93 | 9 | 7.76 |
| Hong Kong, China | 10 | 7.92 | 10 | 7.66 |
| Australia | 11 | 7.90 | 15 | 7.54 |
| Japan | 12 | 7.82 | 8 | 7.77 |
| Switzerland | 13 | 7.78 | 12 | 7.62 |
| Macao, China | 14 | 7.65 | 13 | 7.57 |
| Singapore | 15 | 7.65 | 14 | 7.55 |
| New Zealand | 16 | 7.64 | 18 | 7.31 |
| United States | 17 | 7.53 | 16 | 7.35 |
| France | 18 | 7.53 | 19 | 7.26 |
| Germany | 19 | 7.46 | 17 | 7.33 |
| Canada | 20 | 7.38 | 20 | 7.14 |
| Austria | 21 | 7.36 | 21 | 7.10 |
| Estonia | 22 | 7.28 | 25 | 6.74 |
| Ireland | 23 | 7.25 | 22 | 7.10 |
| Malta | 24 | 7.25 | 24 | 6.85 |
| Belgium | 25 | 7.16 | 23 | 6.85 |
| Israel | 26 | 7.11 | 26 | 6.70 |
| Spain | 27 | 6.89 | 27 | 6.65 |
| Slovenia | 28 | 6.76 | 28 | 6.60 |
| Barbados | 29 | 6.65 | 36 | 6.01 |
| Italy | 30 | 6.57 | 29 | 6.43 |
| Qatar | 31 | 6.54 | 30 | 6.41 |
| Greece | 32 | 6.45 | 33 | 6.21 |
| United Arab Emirates | 33 | 6.41 | 45 | 5.68 |
| Czech Republic | 34 | 6.40 | 31 | 6.30 |
| Latvia | 35 | 6.36 | 37 | 6.00 |
| Portugal | 36 | 6.32 | 35 | 6.07 |
| Poland | 37 | 6.31 | 32 | 6.22 |
| Croatia | 38 | 6.31 | 34 | 6.14 |
| Bahrain | 39 | 6.30 | 42 | 5.79 |
| Russian Federation | 40 | 6.19 | 38 | 5.94 |
| Belarus | 41 | 6.11 | 46 | 5.57 |
| Hungary | 42 | 6.10 | 39 | 5.91 |
| Slovakia | 43 | 6.05 | 40 | 5.85 |
| Lithuania | 44 | 5.88 | 41 | 5.79 |
| Cyprus | 45 | 5.86 | 43 | 5.71 |
| Bulgaria | 46 | 5.83 | 47 | 5.50 |
| Uruguay | 47 | 5.76 | 50 | 5.38 |
| Kazakhstan | 48 | 5.74 | 49 | 5.41 |
| Antigua & Barbuda | 49 | 5.74 | 44 | 5.70 |
| Saudi Arabia | 50 | 5.69 | 48 | 5.46 |
| Chile | 51 | 5.46 | 52 | 5.08 |
| Lebanon | 52 | 5.37 | 61 | 4.62 |
| Argentina | 53 | 5.36 | 53 | 5.06 |
| Oman | 54 | 5.36 | 58 | 4.80 |
| Romania | 55 | 5.35 | 54 | 5.05 |
| Serbia | 56 | 5.34 | 51 | 5.38 |
| TFYR Macedonia | 57 | 5.19 | 55 | 4.93 |
| Brunei Darussalam | 58 | 5.06 | 56 | 4.93 |
| Malaysia | 59 | 5.04 | 57 | 4.81 |
| Costa Rica | 60 | 5.03 | 65 | 4.47 |
| Azerbaijan | 61 | 5.01 | 60 | 4.62 |
| Brazil | 62 | 5.00 | 62 | 4.59 |
| St. Vincent and the Gr. | 63 | 4.81 | 59 | 4.71 |
| Seychelles | 64 | 4.75 | 70 | 4.36 |
| Moldova | 65 | 4.74 | 67 | 4.46 |
| Trinidad & Tobago | 66 | 4.73 | 63 | 4.54 |
| Bosnia and Herzegovina | 67 | 4.71 | 64 | 4.49 |
| Ukraine | 68 | 4.64 | 69 | 4.38 |
| Turkey | 69 | 4.64 | 66 | 4.47 |
| Panama | 70 | 4.61 | 68 | 4.38 |
| Georgia | 71 | 4.59 | 73 | 4.24 |
| Mauritius | 72 | 4.55 | 74 | 4.23 |
| Maldives | 73 | 4.53 | 71 | 4.31 |
| Armenia | 74 | 4.45 | 75 | 4.18 |
| Saint Lucia | 75 | 4.43 | 72 | 4.28 |
| Jordan | 76 | 4.22 | 77 | 3.90 |
| Colombia | 77 | 4.20 | 78 | 3.89 |
| China | 78 | 4.18 | 79 | 3.86 |
| Venezuela | 79 | 4.17 | 76 | 4.00 |

| Economy | Rank 2012 | IDI 2012 | Rank 2011 | IDI 2011 |
|----------------------|-----------|----------|-----------|----------|
| Albania | 80 | 4.11 | 80 | 3.80 |
| Ecuador | 81 | 4.08 | 83 | 3.73 |
| Fiji | 82 | 3.99 | 81 | 3.79 |
| Mexico | 83 | 3.95 | 82 | 3.78 |
| South Africa | 84 | 3.95 | 85 | 3.67 |
| Mongolia | 85 | 3.92 | 90 | 3.59 |
| Egypt | 86 | 3.85 | 87 | 3.65 |
| Suriname | 87 | 3.84 | 84 | 3.73 |
| Viet Nam | 88 | 3.80 | 86 | 3.65 |
| Morocco | 89 | 3.79 | 89 | 3.59 |
| Iran (I.R.) | 90 | 3.79 | 88 | 3.61 |
| Tunisia | 91 | 3.70 | 92 | 3.58 |
| Peru | 92 | 3.68 | 91 | 3.58 |
| Jamaica | 93 | 3.68 | 93 | 3.54 |
| Dominican Rep. | 94 | 3.58 | 95 | 3.36 |
| Thailand | 95 | 3.54 | 94 | 3.42 |
| Cape Verde | 96 | 3.53 | 96 | 3.18 |
| Indonesia | 97 | 3.43 | 97 | 3.14 |
| Philippines | 98 | 3.34 | 98 | 3.14 |
| Bolivia | 99 | 3.28 | 102 | 3.08 |
| El Salvador | 100 | 3.25 | 103 | 3.06 |
| Tonga | 101 | 3.23 | 101 | 3.09 |
| Syria | 102 | 3.22 | 99 | 3.13 |
| Paraguay | 103 | 3.21 | 100 | 3.10 |
| Uzbekistan | 104 | 3.12 | 104 | 3.02 |
| Guyana | 105 | 3.08 | 106 | 2.96 |
| Algeria | 106 | 3.07 | 105 | 2.98 |
| Sri Lanka | 107 | 3.06 | 107 | 2.92 |
| Botswana | 108 | 3.00 | 108 | 2.83 |
| Namibia | 109 | 2.85 | 111 | 2.60 |
| Honduras | 110 | 2.74 | 109 | 2.70 |
| Cuba | 111 | 2.72 | 110 | 2.66 |
| Gabon | 112 | 2.61 | 112 | 2.46 |
| Ghana | 113 | 2.60 | 114 | 2.30 |
| Nicaragua | 114 | 2.54 | 113 | 2.39 |
| Zimbabwe | 115 | 2.52 | 119 | 2.16 |
| Kenya | 116 | 2.46 | 116 | 2.23 |
| Swaziland | 117 | 2.44 | 115 | 2.27 |
| Bhutan | 118 | 2.40 | 117 | 2.19 |
| Sudan | 119 | 2.33 | 118 | 2.19 |
| Cambodia | 120 | 2.30 | 121 | 2.05 |
| India | 121 | 2.21 | 120 | 2.13 |
| Nigeria | 122 | 2.18 | 123 | 1.96 |
| Lao P.D.R. | 123 | 2.10 | 122 | 1.99 |
| Senegal | 124 | 2.02 | 125 | 1.88 |
| Solomon Islands | 125 | 1.97 | 124 | 1.91 |
| Lesotho | 126 | 1.95 | 126 | 1.84 |
| Yemen | 127 | 1.89 | 129 | 1.76 |
| Gambia | 128 | 1.88 | 127 | 1.79 |
| Pakistan | 129 | 1.83 | 128 | 1.78 |
| Uganda | 130 | 1.81 | 130 | 1.72 |
| Djibouti | 131 | 1.77 | 131 | 1.71 |
| Zambia | 132 | 1.77 | 137 | 1.64 |
| Mauritania | 133 | 1.76 | 133 | 1.70 |
| Myanmar | 134 | 1.74 | 132 | 1.70 |
| Bangladesh | 135 | 1.73 | 139 | 1.62 |
| Cameroon | 136 | 1.72 | 136 | 1.66 |
| Côte d'Ivoire | 137 | 1.70 | 135 | 1.66 |
| Comoros | 138 | 1.70 | 134 | 1.68 |
| Angola | 139 | 1.68 | 138 | 1.63 |
| Congo | 140 | 1.66 | 140 | 1.58 |
| Rwanda | 141 | 1.66 | 143 | 1.54 |
| Tanzania | 142 | 1.65 | 141 | 1.57 |
| Benin | 143 | 1.60 | 142 | 1.57 |
| Mali | 144 | 1.54 | 144 | 1.43 |
| Malawi | 145 | 1.43 | 145 | 1.41 |
| Liberia | 146 | 1.39 | 148 | 1.27 |
| Congo (Dem. Rep.) | 147 | 1.31 | 146 | 1.30 |
| Mozambique | 148 | 1.31 | 149 | 1.26 |
| Madagascar | 149 | 1.28 | 147 | 1.28 |
| Guinea-Bissau | 150 | 1.26 | 152 | 1.19 |
| Ethiopia | 151 | 1.24 | 150 | 1.22 |
| Guinea | 152 | 1.23 | 151 | 1.20 |
| Eritrea | 153 | 1.20 | 153 | 1.15 |
| Burkina Faso | 154 | 1.18 | 154 | 1.11 |
| Chad | 155 | 1.01 | 156 | 0.94 |
| Central African Rep. | 156 | 1.00 | 155 | 1.00 |
| Niger | 157 | 0.99 | 157 | 0.93 |

Source: ITU.

from Europe, where a shared regulatory framework and a clear set of priority areas, goals and targets have helped countries evolve into advanced information economies. Also among the top 30 are a number of high-income economies from Asia and the Pacific (Australia, Macao (China), Singapore and New Zealand) as well as the United States, Canada and Barbados from the Americas region (Table 2.1).

ICT levels are maturing at similar speeds across countries, but little progress has been achieved in closing the digital divide

The IDI results demonstrate that ICT levels continue to mature throughout the world, insofar as almost all countries increased their IDI values between 2011 and 2012. At the same time, huge differences in ICT access, use and skills remain, and in 2012 IDI values ranged from a low of 0.99 (Niger) to a high of 8.57 (Republic of Korea) – within the possible (theoretical) range of 0 to 10. The average 2012 IDI value in developed countries is twice as high as the developing-country average (Table 2.2).

A comparison between 2011 and 2012 shows that, over this time period, both the maximum and minimum IDI values increased, meaning that ICT levels are maturing not only in countries at the top but also in those at the very bottom. Globally, the range between the lowest and the highest IDI values has not changed, suggesting that, overall, the ICT development gap between countries at the very top and at the very bottom has not altered over the year. The coefficient of variation (CV), which measures the dispersion of all IDI values relative to the average IDI values, decreased slightly between 2011 and 2012 for both the developed and

developing countries, suggesting that both groups became slightly more homogeneous.

The most dynamic countries in terms of improved IDI are mainly from the developing world

The report identifies a number of “dynamic” countries that recorded above-average positive changes in their IDI rank and/or IDI value over the 12-month period. This group of dynamic countries predominantly includes developing countries from all regions³. In developed countries, IDI values are generally high and growth is more moderate (Table 2.3).

An analysis of the most dynamic countries highlights that, although there is a strong link between ICT levels and income levels, governments are able to foster ICT growth and uptake, inter alia by creating an open regulatory framework that promotes competition and brings down prices and by encouraging private-sector investment. In a number of cases, government-driven programmes or initiatives have also helped to boost ICT access and use. Finally, strong growth in the number of wireless- and fixed-broadband subscriptions is enabling more and more countries to increase household ICT access and use, and to bring more people online.

Developing countries are catching up in the IDI use sub-index

A comparison of IDI values between 2011 and 2012 shows that the developing-country average IDI value is growing faster, at a rate of 5.8 per cent, as against 3.5 per cent for developed countries. While developed countries are starting to reach saturation levels, in particular in terms of mobile-

Table 2.2: IDI by level of development, 2011 and 2012

| | IDI 2012 | | | | | | IDI 2011 | | | | | | Change in average value 2011-2012 |
|------------|----------------|------|------|-------|-------|-------|----------------|------|------|-------|-------|-------|-----------------------------------|
| | Average value* | Min. | Max. | Range | StDev | CV | Average value* | Min. | Max. | Range | StDev | CV | |
| World | 4.35 | 0.99 | 8.57 | 7.58 | 2.19 | 50.28 | 4.15 | 0.93 | 8.51 | 7.58 | 2.13 | 51.32 | 0.20 |
| Developed | 6.78 | 4.11 | 8.45 | 4.34 | 1.14 | 16.82 | 6.55 | 3.80 | 8.41 | 4.61 | 1.16 | 17.66 | 0.23 |
| Developing | 3.44 | 0.99 | 8.57 | 7.58 | 1.75 | 50.79 | 3.25 | 0.93 | 8.51 | 7.58 | 1.67 | 51.26 | 0.19 |

Note: * Simple average. StDev: Standard deviation, CV: Coefficient of variation.
Source: ITU.

Table 2.3: Most dynamic countries – changes between IDI 2011 and 2012

| Change in IDI ranking | | | Change in IDI value (absolute) | | |
|-----------------------|----------------------|-----------------|--------------------------------|----------------------|------------------|
| IDI rank 2012 | Country | IDI rank change | IDI rank 2012 | Country | IDI value change |
| 33 | United Arab Emirates | 12 | 52 | Lebanon | 0.75 |
| 52 | Lebanon | 9 | 33 | United Arab Emirates | 0.73 |
| 29 | Barbados | 7 | 29 | Barbados | 0.65 |
| 64 | Seychelles | 6 | 54 | Oman | 0.56 |
| 41 | Belarus | 5 | 60 | Costa Rica | 0.56 |
| 60 | Costa Rica | 5 | 41 | Belarus | 0.55 |
| 85 | Mongolia | 5 | 22 | Estonia | 0.54 |
| 132 | Zambia | 5 | 39 | Bahrain | 0.51 |
| 11/135 | Australia/Bangladesh | 4* | 26 | Israel | 0.41 |
| 54/115 | Oman/Zimbabwe | 4* | 62 | Brazil | 0.41 |

Note: * Australia, Bangladesh, Oman and Zimbabwe all went up four places in the IDI rankings between 2011 and 2012.

Source: ITU.

cellular subscriptions and household ICT access, developing countries, where penetration levels remain much lower, continue to have ample potential for growth (Chart 2.1).

The difference between developed and developing countries in the access sub-index, which measures ICT infrastructure and readiness, is smaller than the difference in the use sub-index, thus confirming that developing countries have been able to make greater progress in providing basic ICT access. Progress has been achieved particularly through mobile-cellular technology, but also through an increase in household access to ICTs and increased availability of international Internet bandwidth.

The divide is largest in terms of the use sub-index, which measures the uptake and intensity of ICT use. Here, developed countries have reached over three times the average 2012 use sub-index value of developing countries. This gap points to the considerable differences that exist between the developed and developing world in terms of Internet users and fixed (wired)-broadband and wireless-broadband subscriptions. In many developing countries, broadband access remains very limited, and still today some countries have not yet launched 3G mobile-broadband networks, effectively limiting the potential to bring more people online. At the same time, however, the use sub-index is growing at twice the speed in developing countries. This

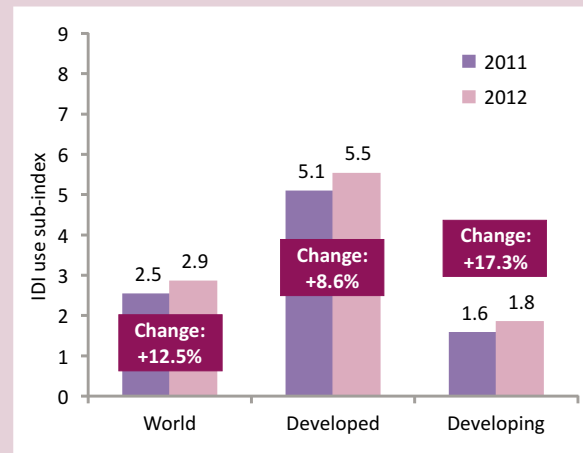
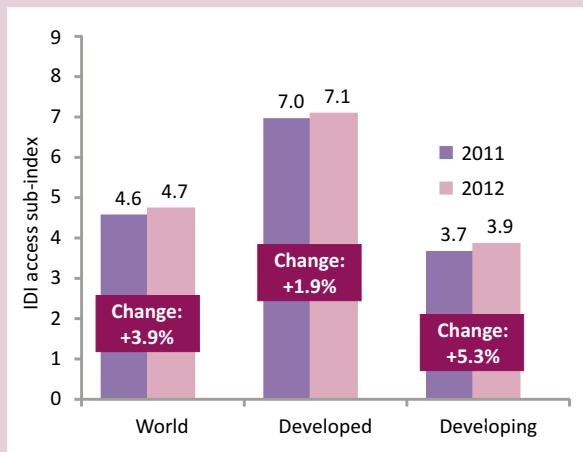
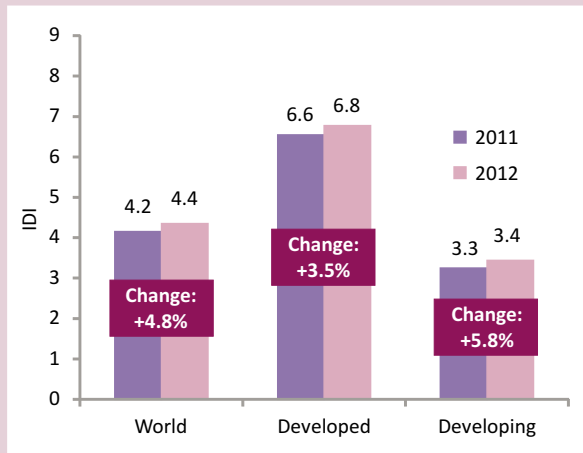
is a positive development, suggesting that developing countries are catching up.

Some 2.4 billion people – a third of the world's total population – live in the least connected countries, where ICT levels remain very low

Besides analysing the gap between developed and developing countries, the IDI can be used to monitor and analyse the digital divide by grouping countries on the basis of their levels of ICT development, i.e. their IDI values. To this end, four groups/quartiles were formed, reflecting four different levels of ICT development: high, upper, medium and low.

This exercise shows that the group with low levels of ICT development (i.e. with an IDI value below or equal to 2.33), which includes a total of 39 countries, is not making enough progress to catch up in terms of ICT developments. Indeed, this group of countries, referred to as the least connected countries (LCCs), has very low levels of ICT uptake and use, and recorded the smallest increase in the average IDI value between 2011 and 2012. Home to 2.4 billion people – almost one-third of the world's population – these countries have only limited access to advanced ICT services, including broadband Internet access. In the majority of LCCs, Internet access is limited, hardly ever high-speed, very expensive,

Chart 2.1: IDI, IDI access sub-index and IDI use sub-index, world and by level of development



Note: Simple averages.
Source: ITU.

late. The LCCs include many of the world's least developed countries (LDCs), and the majority are in Africa, but they also include some highly populated countries that are not LDCs, such as India, Nigeria and Pakistan (see Figure 2.1).

The LCCs are the countries that could potentially derive great benefits from better access to and use of ICTs, including in areas such as health, education and employment. Most of the countries on the list of LCCs are also those that are lagging behind with respect to the Millennium Development Goals (MDGs). This highlights the need to give special attention to these countries and to adapt national policies so that they can make the most of ICTs in order to help foster development and achieve the MDGs.

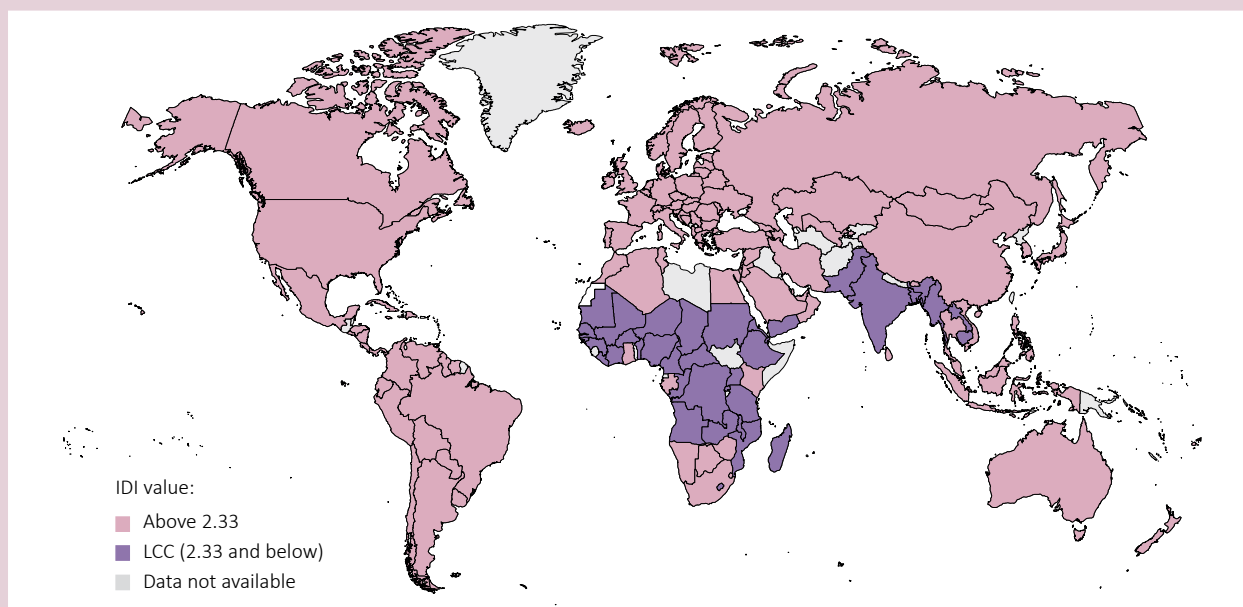
The regional digital divide within Africa and the Arab States is widening

A regional analysis of the IDI highlights that Europe leads the way in terms of ICT developments, followed by the Commonwealth of Independent States (CIS) and the Americas.³ The IDI value of the Asia and the Pacific region is close to the global average, while the Arab States regional IDI is slightly below the global average. Africa has the lowest regional IDI of 2.0, which is just half that of the Arab States average and less than one-third of the European regional average (Chart 2.2).

Europe is not only the region boasting the highest average IDI, at 6.73; it is also the most homogeneous. Furthermore, both the range and CV continued to decrease during the period 2011 to 2012, indicating a narrowing of the regional digital divide. While Asia and the Pacific and the Americas both display the largest regional disparities in ICT development – reflecting their diversity in terms of development and income levels – their regional digital divide is also narrowing.

The opposite is true in Africa, the Arab States and the CIS region, where differences in ICT development increased between 2011 and 2012. Africa was the region where the CV value increased the most, implying a widening of the regional digital divide. The region's top IDI countries (including Seychelles, Mauritius, South Africa and Cape Verde) continue to make good progress in terms of ICT development, while the countries at the bottom (including Central Africa Republic, Burkina Faso, Guinea and Ethiopia)

Figure 2.1: Least connected countries (LCCs), 2012

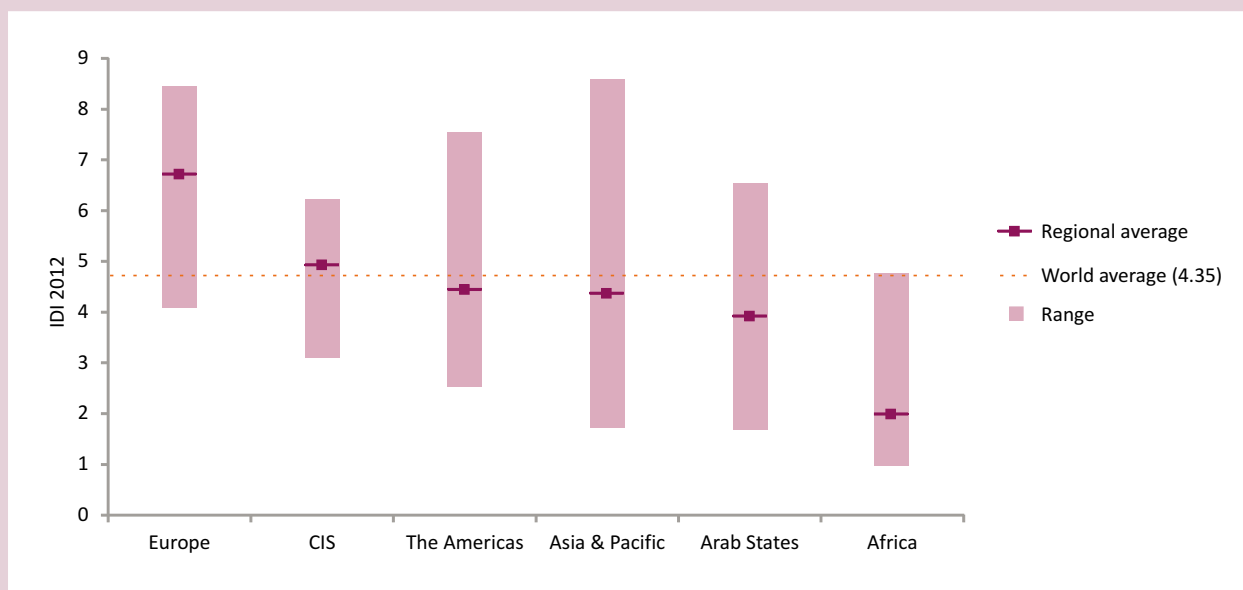


Source: ITU.

are failing to keep pace both regionally and globally. On the other hand, Seychelles, Zambia and Zimbabwe were among the most dynamic countries in the IDI.

A number of countries from the Arab States region with relatively high IDI values continue to make great progress in ICT development, and four out of the regional top six –

Chart 2.2: IDI ranges and averages, by region, 2012



Note: Simple averages.
Source: ITU.

Table 2.4: The top five economies in each region and their ranking in the global IDI, 2012

| Regional IDI rank | Europe | Global IDI rank | Asia & Pacific | Global IDI rank | The Americas | Global IDI rank | Arab States | Global IDI rank | CIS | Global IDI rank | Africa | Global IDI rank |
|-------------------|---------|-----------------|------------------|-----------------|-------------------|-----------------|----------------------|-----------------|--------------------|-----------------|--------------|-----------------|
| 1 | Sweden | 2 | Korea (Rep.) | 1 | United States | 17 | Qatar | 31 | Russian Federation | 40 | Seychelles | 64 |
| 2 | Iceland | 3 | Hong Kong, China | 10 | Canada | 20 | United Arab Emirates | 33 | Belarus | 41 | Mauritius | 72 |
| 3 | Denmark | 4 | Australia | 11 | Barbados | 29 | Bahrain | 39 | Kazakhstan | 48 | South Africa | 84 |
| 4 | Finland | 5 | Japan | 12 | Uruguay | 47 | Saudi Arabia | 50 | Azerbaijan | 61 | Cape Verde | 96 |
| 5 | Norway | 6 | Macao, China | 14 | Antigua & Barbuda | 49 | Lebanon | 52 | Moldova | 65 | Botswana | 108 |

Source: ITU.

Bahrain, Lebanon, Oman and the United Arab Emirates – are among the most dynamic countries in the IDI 2012.

In the CIS region, although the CV increased slightly from 2011 to 2012, it is still the second lowest globally after Europe. Yet there is a quite a divide in terms of ICT development between countries such as the Russian Federation, Belarus and Kazakhstan, which feature in the global top 50, and, for example, Uzbekistan, which comes in 104th position in the IDI 2012.

A comparison of the global and regional ranking of the top five countries in each region further highlights global differences in ICT development and regional divides (see Table 2.4).

Chapter 3. Measuring the cost and affordability of broadband

The national and international policy agendas have witnessed an increased focus on broadband, highlighting its importance for development and the need to recognize broadband as a critical infrastructure for a country's social and economic development. Given the strong link between broadband uptake and the price and affordability of broadband services, the Broadband Commission for Digital Development identified a specific target on broadband affordability: "By 2015, entry-level broadband services should

be made affordable in developing countries through adequate regulation and market forces (amounting to less than 5% of average monthly income)".

In view of the significance and spread of broadband, therefore, it is important to analyse both fixed- and mobile-broadband prices and affordability. To that end, in 2012, alongside its collection of price data on the traditional components of the ICT Price Basket (IPB), i.e. fixed telephony, mobile-cellular and fixed broadband, ITU also completed the first comprehensive survey of globally harmonized mobile-broadband prices.

One-third of developing countries offer fixed-broadband services at prices below 5 per cent of GNI per capita

The results of the 2012 fixed-broadband price analysis, which includes 169 economies, show significant differences in the price and affordability of fixed-broadband subscriptions. The cost of an entry-level fixed-broadband subscription ranges from 0.21 per cent of gross national income per capita (GNI p.c.) in Macao (China) to 386.9 per cent of GNI p.c. in Cuba. In ten countries, for the most part LDCs, fixed-broadband prices actually exceed countries' average monthly GNI p.c. In 28 per cent of developing countries, fixed-broadband prices represent more than 20 per cent of GNI per capita. Nonetheless, by 2012, the majority of countries, including one-third of all developing countries, have achieved the Broadband Commission's target of offering broadband services at prices below 5 per cent of GNI p.c. (see Table 3.1).

Table 3.1: Fixed-broadband prices, 2012

| Rank | Economy | Fixed-broadband prices | | | GNI p.c., USD, 2011 (or latest available) |
|------|------------------------|------------------------|--------|-------|--|
| | | as % of GNI p.c. | USD | PPP\$ | |
| 1 | Macao, China | 0.2 | 7.9 | 9.3 | 45'460 |
| 2 | Kuwait | 0.4 | 14.5 | 12.6 | 48'900 |
| 3 | United States | 0.4 | 15.0 | 15.0 | 48'450 |
| 4 | Switzerland | 0.6 | 38.3 | 23.4 | 76'380 |
| 5 | Luxembourg | 0.6 | 40.3 | 31.5 | 78'130 |
| 6 | Andorra | 0.6 | 21.8 | N/A | 41'750 |
| 7 | United Kingdom | 0.7 | 20.8 | 19.2 | 37'780 |
| 8 | Japan | 0.7 | 26.6 | 19.9 | 45'180 |
| 9 | Norway | 0.7 | 53.3 | 33.7 | 88'890 |
| 10 | Hong Kong, China | 0.7 | 21.6 | 31.3 | 35'160 |
| 11 | Qatar | 0.8 | 54.9 | 52.8 | 80'440 |
| 12 | France | 0.8 | 29.2 | 24.1 | 42'420 |
| 13 | Sweden | 0.8 | 36.8 | 26.7 | 53'230 |
| 14 | Singapore | 0.8 | 30.0 | 36.6 | 42'930 |
| 15 | Netherlands | 0.9 | 35.4 | 30.2 | 49'730 |
| 16 | Cyprus | 0.9 | 21.9 | 22.9 | 29'450 |
| 17 | Belgium | 0.9 | 34.7 | 28.8 | 46'160 |
| 18 | Denmark | 0.9 | 46.4 | 31.8 | 60'390 |
| 19 | Finland | 0.9 | 37.4 | 28.8 | 48'420 |
| 20 | Italy | 1.0 | 28.0 | 25.5 | 35'330 |
| 21 | Trinidad & Tobago | 1.0 | 12.3 | 19.2 | 15'040 |
| 22 | Austria | 1.0 | 41.6 | 35.3 | 48'300 |
| 23 | Canada | 1.1 | 40.4 | 32.4 | 45'560 |
| 24 | Ireland | 1.1 | 34.8 | 29.8 | 38'580 |
| 25 | Iceland | 1.1 | 31.8 | 26.1 | 35'020 |
| 26 | Germany | 1.1 | 41.7 | 37.3 | 43'980 |
| 27 | Greece | 1.1 | 23.7 | 24.2 | 25'030 |
| 28 | Lithuania | 1.2 | 12.1 | 18.4 | 12'280 |
| 29 | Russian Federation | 1.2 | 10.2 | 16.6 | 10'400 |
| 30 | United Arab Emirates | 1.2 | 40.6 | 42.9 | 40'760 |
| 31 | Malta | 1.2 | 19.3 | 24.8 | 18'620 |
| 32 | Spain | 1.3 | 33.5 | 33.6 | 30'990 |
| 33 | Latvia | 1.3 | 13.8 | 19.1 | 12'350 |
| 34 | Turkey | 1.4 | 12.5 | 20.8 | 10'410 |
| 35 | Romania | 1.4 | 9.5 | 17.2 | 7'910 |
| 36 | Czech Republic | 1.5 | 22.6 | 28.8 | 18'520 |
| 37 | Uruguay | 1.5 | 14.9 | 16.3 | 11'860 |
| 38 | Maldives | 1.5 | 8.2 | 11.5 | 6'530 |
| 39 | Venezuela | 1.5 | 15.4 | 18.3 | 11'920 |
| 40 | Korea (Rep.) | 1.6 | 27.1 | 36.5 | 20'870 |
| 41 | Israel | 1.6 | 38.3 | 34.0 | 28'930 |
| 42 | Australia | 1.6 | 61.9 | 38.4 | 46'200 |
| 43 | Oman | 1.6 | 26.0 | 29.8 | 19'260 |
| 44 | Bahamas | 1.6 | 30.0 | 43.0 | 21'970 |
| 45 | Croatia | 1.6 | 19.0 | 26.2 | 13'850 |
| 46 | Portugal | 1.6 | 29.2 | 33.1 | 21'250 |
| 47 | Seychelles | 1.8 | 16.3 | 36.7 | 11'130 |
| 48 | Estonia | 1.8 | 22.2 | 29.5 | 15'200 |
| 49 | Mauritius | 1.8 | 12.2 | 20.1 | 8'240 |
| 50 | Slovenia | 1.8 | 36.2 | 41.0 | 23'610 |
| 51 | Poland | 1.9 | 19.9 | 31.5 | 12'480 |
| 52 | Kazakhstan | 1.9 | 13.2 | 15.4 | 8'220 |
| 53 | Bulgaria | 1.9 | 10.5 | 21.5 | 6'550 |
| 54 | Brunei Darussalam | 1.9 | 51.7 | 77.6 | 31'800 |
| 55 | Brazil | 2.0 | 17.8 | 16.6 | 10'720 |
| 56 | Bahrain | 2.0 | 26.6 | 34.6 | 15'920 |
| 57 | Slovakia | 2.1 | 27.6 | 37.6 | 16'070 |
| 58 | Tunisia | 2.1 | 7.0 | 15.4 | 4'070 |
| 59 | Bosnia and Herzegovina | 2.1 | 8.3 | 15.7 | 4'780 |
| 60 | Sri Lanka | 2.1 | 4.5 | 8.9 | 2'580 |
| 61 | Panama | 2.1 | 14.0 | 25.5 | 7'910 |
| 62 | Mexico | 2.3 | 17.6 | 26.7 | 9'240 |
| 63 | Lebanon | 2.3 | 17.6 | 26.1 | 9'110 |
| 64 | New Zealand | 2.4 | 59.2 | 49.0 | 29'350 |
| 65 | Belarus | 2.5 | 11.9 | 30.9 | 5'830 |
| 66 | Costa Rica | 2.5 | 15.8 | 22.3 | 7'660 |
| 67 | Chile | 2.5 | 25.8 | 31.1 | 12'280 |
| 68 | Saudi Arabia | 2.7 | 39.7 | 47.3 | 17'820 |
| 69 | Azerbaijan | 2.9 | 12.7 | 18.6 | 5'290 |
| 70 | Ukraine | 2.9 | 7.5 | 15.1 | 3'120 |
| 71 | Hungary | 2.9 | 31.0 | 47.8 | 12'730 |
| 72 | Malaysia | 3.1 | 21.6 | 34.8 | 8'420 |
| 73 | Montenegro | 3.3 | 19.5 | 36.8 | 7'060 |
| 74 | TFYR Macedonia | 3.4 | 13.5 | 32.1 | 4'730 |
| 75 | Egypt | 3.5 | 7.6 | 17.2 | 2'600 |
| 76 | St. Kitts and Nevis | 3.5 | 36.7 | 41.6 | 12'480 |
| 77 | Albania | 3.6 | 11.9 | 26.4 | 3'980 |
| 78 | Colombia | 3.7 | 18.7 | 26.7 | 6'110 |
| 79 | Algeria | 3.8 | 14.1 | 23.4 | 4'470 |
| 80 | Peru | 3.9 | 18.0 | 30.9 | 5'500 |
| 81 | Libya | 4.0 | 40.8 | 67.5 | 12'320 |
| 82 | Barbados | 4.3 | 45.2 | 66.1 | 12'660 |
| 83 | Armenia | 4.3 | 12.1 | 21.3 | 3'360 |
| 84 | Serbia | 4.5 | 21.2 | 40.8 | 5'680 |
| 85 | Argentina | 4.5 | 36.5 | 58.7 | 9'740 |
| 86 | Iran (I.R.) | 4.7 | 17.8 | 48.6 | 4'520 |
| 87 | Gabon | 4.8 | 31.8 | 45.7 | 7'980 |
| 88 | South Africa | 4.8 | 28.1 | 38.4 | 6'960 |
| 89 | Grenada | 4.9 | 29.4 | 42.2 | 7'220 |
| 90 | Morocco | 4.9 | 12.2 | 20.0 | 2'970 |
| 91 | Georgia | 5.0 | 11.9 | 20.4 | 2'860 |
| 92 | Jordan | 5.1 | 18.7 | 24.0 | 4'380 |
| 93 | India | 5.1 | 6.0 | 14.4 | 1'410 |
| 94 | Mongolia | 5.3 | 10.3 | 16.0 | 2'320 |
| 95 | Dominican Rep. | 5.3 | 23.3 | 41.6 | 5'240 |
| 96 | Antigua & Barbuda | 5.5 | 54.9 | 70.3 | 12'060 |
| 97 | Dominica | 5.6 | 33.0 | 58.6 | 7'090 |
| 98 | Thailand | 5.6 | 20.7 | 36.2 | 4'420 |
| 99 | China | 5.6 | 23.2 | 36.1 | 4'940 |
| 100 | Ecuador | 5.8 | 20.2 | 37.4 | 4'140 |
| 101 | Bhutan | 6.2 | 10.7 | 27.2 | 2'070 |
| 102 | Fiji | 6.4 | 19.5 | 21.3 | 3'680 |
| 103 | Saint Lucia | 6.5 | 36.2 | 48.5 | 6'680 |
| 104 | Suriname | 6.6 | 41.9 | 47.4 | 7'640 |
| 105 | St. Vincent | 6.6 | 33.6 | 57.8 | 6'100 |
| 106 | El Salvador | 7.0 | 20.3 | 37.8 | 3'480 |
| 107 | Jamaica | 7.0 | 29.2 | 42.2 | 4'980 |
| 108 | Bangladesh | 7.3 | 4.7 | 11.8 | 770 |
| 109 | Moldova | 7.7 | 12.8 | 22.0 | 1'980 |
| 110 | Syria | 7.9 | 18.1 | 38.9 | 2'750 |
| 111 | Guatemala | 8.6 | 20.6 | 32.1 | 2'870 |
| 112 | Paraguay | 8.8 | 21.8 | 32.6 | 2'970 |
| 113 | Sudan | 9.0 | 9.7 | 16.9 | 1'300 |
| 114 | Indonesia | 9.1 | 22.2 | 29.7 | 2'940 |
| 115 | Uzbekistan | 9.1 | 11.5 | 21.2 | 1'510 |
| 116 | Botswana | 9.2 | 57.3 | 97.4 | 7'480 |
| 117 | Guyana | 10.1 | 24.5 | 28.2 | 2'900 |
| 118 | Turkmenistan | 10.2 | 35.0 | 68.1 | 4'110 |
| 119 | Viet Nam | 11.3 | 11.8 | 26.2 | 1'260 |
| 120 | Cape Verde | 11.3 | 33.3 | 36.2 | 3'540 |
| 121 | Honduras | 12.1 | 19.9 | 36.2 | 1'970 |
| 122 | Philippines | 12.4 | 22.9 | 39.9 | 2'210 |
| 123 | Micronesia | 13.7 | 33.0 | 39.8 | 2'900 |
| 124 | Bolivia | 14.4 | 24.5 | 51.9 | 2'040 |
| 125 | Marshall Islands | 15.3 | 50.0 | N/A | 3'910 |
| 126 | Pakistan | 15.5 | 14.5 | 33.8 | 1'120 |
| 127 | Angola | 15.7 | 53.2 | 61.3 | 4'060 |
| 128 | Samoa | 16.1 | 42.7 | 55.3 | 3'190 |
| 129 | Belize | 16.3 | 50.0 | 81.3 | 3'690 |
| 130 | Kyrgyzstan | 16.3 | 12.5 | 28.2 | 920 |
| 131 | Yemen | 16.5 | 14.7 | 25.4 | 1'070 |
| 132 | Namibia | 17.5 | 68.7 | 88.6 | 4'700 |
| 133 | Nepal | 17.8 | 8.0 | 16.6 | 540 |
| 134 | Tonga | 19.2 | 57.3 | 64.1 | 3'580 |
| 135 | Nicaragua | 22.8 | 22.2 | 52.5 | 1'170 |
| 136 | Mauritania | 26.8 | 22.3 | 49.8 | 1'000 |
| 137 | Swaziland | 27.5 | 75.7 | 124.0 | 3'300 |
| 138 | Djibouti | 29.9 | 31.6 | 60.2 | 1'270 |
| 139 | Uganda | 32.9 | 14.0 | 42.2 | 510 |
| 140 | Cambodia | 34.0 | 23.5 | 62.0 | 830 |
| 141 | Ghana | 36.6 | 43.0 | 51.6 | 1'410 |
| 142 | Nigeria | 39.0 | 39.0 | 68.0 | 1'200 |
| 143 | Tanzania | 42.4 | 19.1 | 54.9 | 540 |
| 144 | Senegal | 42.8 | 38.1 | 67.5 | 1'070 |
| 145 | Timor-Leste | 43.5 | 99.0 | 175.4 | 2'730 |
| 146 | Vanuatu | 44.0 | 105.2 | 158.7 | 2'870 |
| 147 | Kiribati | 44.0 | 77.4 | 111.2 | 2'110 |
| 148 | Côte d'Ivoire | 46.2 | 42.4 | 64.0 | 1'100 |
| 149 | Kenya | 49.3 | 33.7 | 71.6 | 820 |
| 150 | Zimbabwe | 56.3 | 30.0 | N/A | 640 |
| 151 | Cameroon | 61.0 | 61.5 | 115.2 | 1'210 |
| 152 | Ethiopia | 71.0 | 23.7 | 74.0 | 400 |
| 153 | Comoros | 81.5 | 52.3 | 72.2 | 770 |
| 154 | Benin | 81.5 | 53.0 | 107.6 | 780 |
| 155 | Haiti | 81.9 | 47.8 | 77.7 | 700 |
| 156 | Lesotho | 84.0 | 85.4 | 132.4 | 1'220 |
| 157 | Zambia | 85.1 | 82.3 | 0.1 | 1'160 |
| 158 | Burkina Faso | 98.2 | 46.6 | 101.7 | 570 |
| 159 | Mali | 98.4 | 50.0 | 82.2 | 610 |
| 160 | Togo | 101.2 | 47.2 | 84.3 | 560 |
| 161 | S. Tomé & Príncipe | 103.0 | 116.8 | 163.1 | 1'360 |
| 162 | Mozambique | 149.3 | 58.5 | 107.4 | 470 |
| 163 | Papua New Guinea | 150.5 | 185.6 | 271.1 | 1'480 |
| 164 | Madawi | 169.7 | 48.1 | 119.7 | 340 |
| 165 | Madagascar | 177.8 | 63.7 | 132.7 | 430 |
| 166 | Niger | 210.2 | 63.0 | 123.3 | 360 |
| 167 | Afghanistan | 221.3 | 53.5 | 129.0 | 290 |
| 168 | Solomon Islands | 280.2 | 259.2 | 502.6 | 1'110 |
| 169 | Cuba | 386.9 | 1760.4 | N/A | 5'460 |

Source: ITU. GNI p.c. and PPP\$ are based on World Bank data. USD exchange rates are based on IMF data.

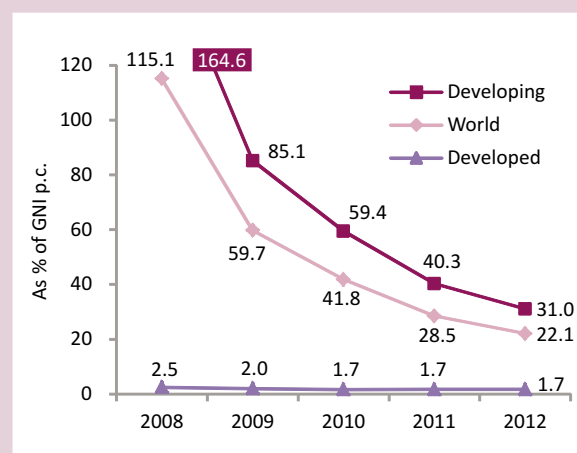
Between 2008 and 2012, fixed-broadband prices dropped by 82 per cent

A global trend analysis, which compares fixed-broadband prices over the period 2008-2012, shows that fixed-broadband services are becoming more affordable. Within the space of four years, fixed-broadband prices fell by 82 per cent overall, from 115.1 per cent of GNI p.c. in 2008 to 22.1 per cent in 2012. The biggest drop occurred in developing countries, where fixed-broadband prices fell by 30 per cent year on year between 2008 and 2011. In developed countries, fixed-broadband prices have stabilized at around 1.7 per cent of GNI p.c. (Chart 3.1). In some developed countries, fixed-broadband prices are actually increasing slightly, usually because of higher speeds or data allowances.

By 2012, a 2 Mbit/s connection had become the minimum speed in almost one-third of all countries

A comparison of minimum advertised fixed-broadband speeds shows that minimum speeds for fixed-broadband services increased between 2008 and 2012. While in 2008 a 256 kbit/s connection was the most popular offer, in 2012 only about one-fifth of countries offered plans at this speed. In almost one-third of all countries, the minimum advertised broadband speed was 2 Mbit/s or above (see Table 3.2). The price per unit of speed (Mbit/s) also decreased significantly between 2008 and 2012, and globally the median price was USD 19.5 per Mbit/s in 2012, almost a quarter of the price in 2008.

Chart 3.1: Fixed-broadband prices, as a percentage of GNI p.c.



Note: Simple averages. Based on 144 economies for which 2008, 2009, 2010, 2011 and 2012 fixed-broadband prices were available.

Source: ITU. GNI p.c. is based on World Bank data.

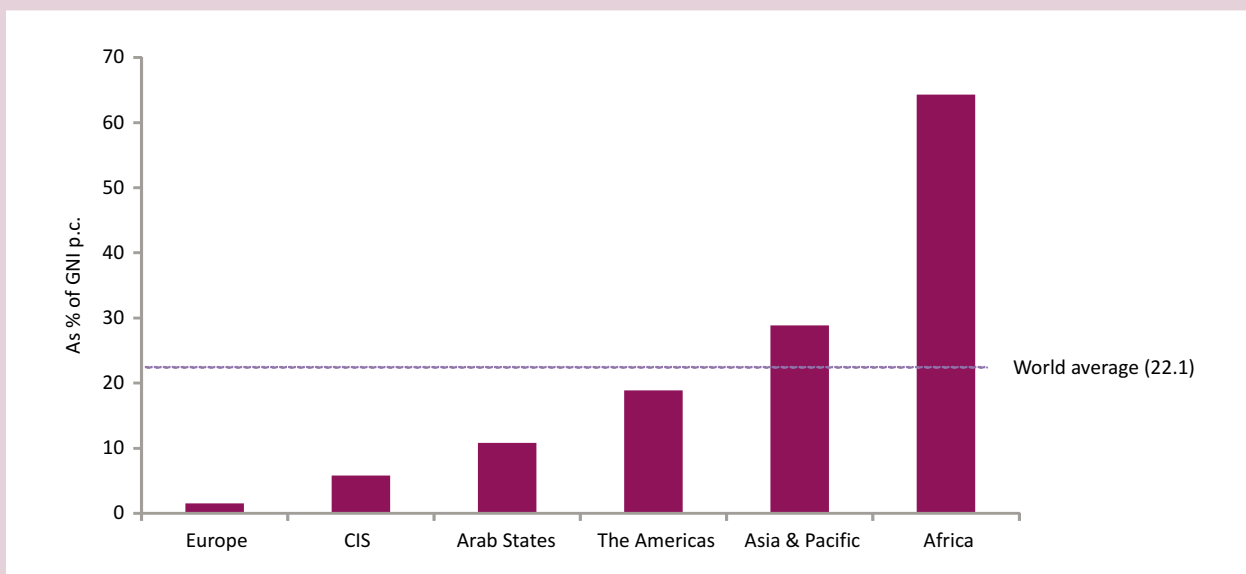
In one out of two African countries, fixed-broadband services correspond to over 40 per cent of GNI per capita

There are significant differences in affordability between and within the six ITU regions (Chart 3.2). Prices in Europe are very affordable throughout the region, with a maximum value of 4.5 per cent of GNI p.c. (in Serbia) and an average of just 1.5 per cent of GNI p.c. The differences in affordability of fixed-broadband Internet access are also relatively small in the CIS, where prices range from 1.2 per cent of GNI p.c. in the Russian

Table 3.2: Minimum advertised fixed-broadband speeds, percentage of countries, 2008 and 2012

| Advertised speed (Mbit/s) | 2008 | 2012 |
|---------------------------|------|------|
| 0.256 | 45.1 | 20.8 |
| >0.256 - 0.512 | 18.8 | 16.0 |
| >0.512 - 1.024 | 17.4 | 18.1 |
| >1.024 - 2.048 | 7.6 | 13.9 |
| >2.048 - 10 | 9.0 | 20.1 |
| >10 - 50 | - | 6.9 |
| Speed not specified | 2.1 | 4.2 |

Note: Based on 144 economies for which 2008, 2009, 2010, 2011 and 2012 fixed-broadband prices were available.
Source: ITU.

Chart 3.2: Fixed-broadband prices, as a percentage of GNI p.c., by region, 2012

Note: Simple averages.
Source: ITU.

Federation to 16.3 in Kyrgyzstan. The widest range is found in the Americas region, which contains not only countries with some of the most affordable 2012 fixed-broadband prices, such as the United States, but also the country with the least affordable prices (Cuba). The Asia and the Pacific region shows similar differences, with the region's high-income economies (Hong Kong (China), Macao (China) and Singapore) at the top, and Papua New Guinea, Afghanistan and Solomon Islands with unaffordable fixed-broadband prices of over 100 per cent of GNI p.c. On average, fixed-broadband prices are by far the least affordable in Africa, with an average regional value of 64.3 per cent of GNI p.c. Prices correspond to over 40 per cent of GNI p.c. in half of the African countries included in the analysis.

In developing countries, mobile broadband is more affordable than fixed broadband, but still much less affordable than in developed countries

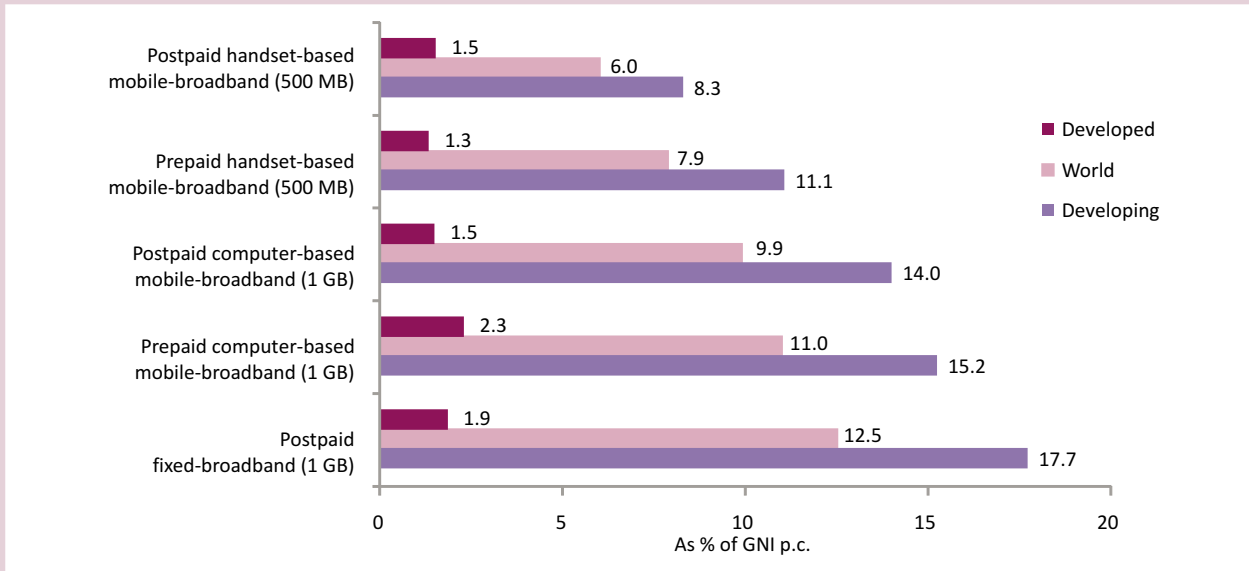
A first comprehensive price data collection exercise was carried out for four different types of mobile-broadband services: prepaid and postpaid handset-based and computer-based services. It revealed the following key findings (See Chart 3.3):

- Globally, mobile-broadband prices, like fixed-broadband prices, are on average relatively high, with only the postpaid handset-based plans representing less than 10 per cent of GNI p.c. on average.
- Prices are very affordable in the developed world, while services are much less affordable in the developing world.
- Prepaid computer-based mobile-broadband plans are the most expensive compared with all other plans, in both developing and developed countries.
- Data show that prepaid plans are on average more expensive than postpaid plans for the same usage.

The difference between comparable fixed- and mobile-broadband prices is relatively small, except in Africa

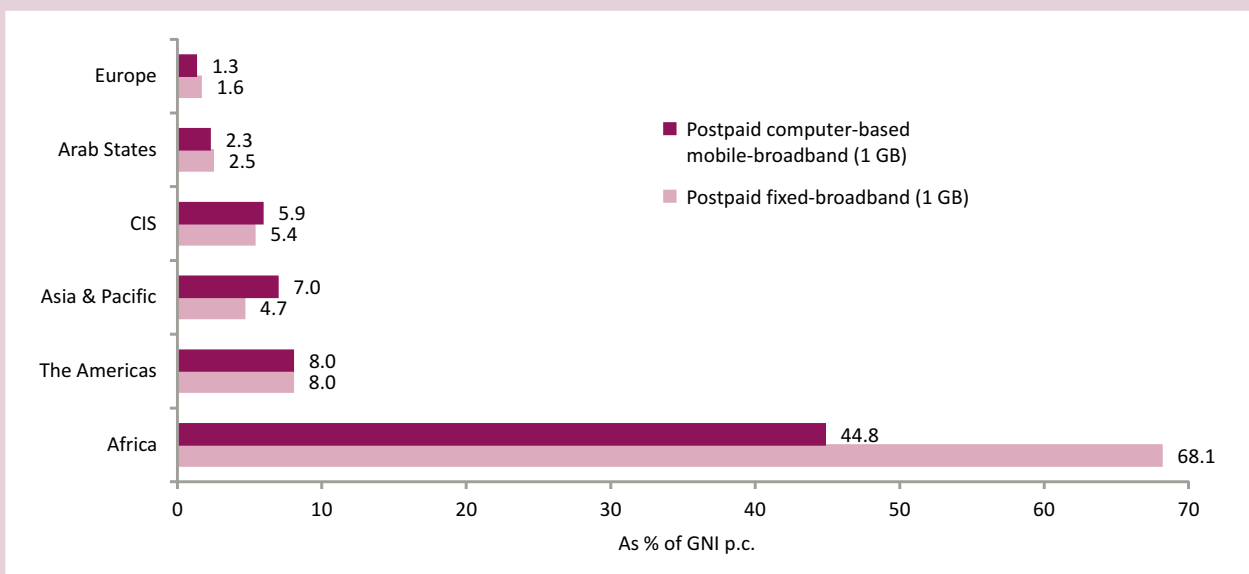
A regional comparison was made between postpaid fixed-broadband plans and postpaid computer-based mobile-broadband plans, since both are based on the same minimum monthly data consumption (1 GB) and subscription type (postpaid). Furthermore, both plans

Chart 3.3: Mobile-broadband and fixed-broadband prices, as a percentage of GNI p.c., world and by level of development, 2012



Note: Simple averages. The following numbers of countries are included per plan: prepaid handset-based (500 MB): 126; postpaid handset-based (500 MB): 124; prepaid computer-based (1 GB): 124; postpaid computer-based (1 GB): 127.
 Source: ITU. GNI values are based on World Bank data.

Chart 3.4: Postpaid fixed-broadband and postpaid computer-based mobile-broadband prices, as a percentage of GNI p.c., by region, 2012



Note: Simple averages. Averages include 97 countries for which postpaid computer-based mobile-broadband as well as postpaid fixed-broadband prices were available.
 Source: ITU.

Table 3.3: Mobile-broadband sub-basket and its components, 2012

| Economy | Mobile-broadband sub-basket | Prepaid handset-based prices (500 MB) as % of GNI p.c. | Postpaid computer-based prices (1 GB) as % of GNI p.c. | GNI p.c., USD, 2011 (or latest available) |
|----------------------|-----------------------------|--|--|---|
| Austria | 0.1 | 0.1 | 0.1 | 48'300 |
| Qatar | 0.4 | 0.4 | 0.4 | 80'440 |
| United Kingdom | 0.4 | 0.3 | 0.5 | 37'780 |
| Germany | 0.6 | 0.4 | 0.8 | 43'980 |
| Kuwait | 0.7 | 0.7 | 0.6 | 48'900 |
| France | 0.7 | 0.5 | 0.9 | 42'420 |
| Estonia | 0.7 | 0.7 | 0.7 | 15'200 |
| Norway | 0.7 | 1.0 | 0.5 | 88'890 |
| Belgium | 0.7 | 0.7 | 0.7 | 46'160 |
| Switzerland | 0.7 | 0.8 | 0.7 | 76'380 |
| Bahrain | 0.8 | 0.5 | 1.0 | 15'920 |
| Italy | 0.8 | 0.5 | 1.1 | 35'330 |
| Australia | 0.8 | 0.5 | 1.1 | 46'200 |
| Slovenia | 0.8 | 0.8 | 0.8 | 23'610 |
| United Arab Emirates | 1.0 | 0.8 | 1.2 | 40'760 |
| Macao, China | 1.0 | 1.0 | 1.0 | 45'460 |
| Kazakhstan | 1.0 | 1.0 | 1.0 | 8'220 |
| Netherlands | 1.0 | 1.0 | 1.0 | 49'730 |
| Portugal | 1.0 | 0.8 | 1.2 | 21'250 |
| Uruguay | 1.0 | 1.0 | 1.0 | 11'860 |
| Denmark | 1.1 | 1.8 | 0.4 | 60'390 |
| Hong Kong, China | 1.2 | 1.4 | 0.9 | 35'160 |
| Slovakia | 1.3 | 0.8 | 1.7 | 16'070 |
| New Zealand | 1.3 | 1.0 | 1.6 | 29'350 |
| Ireland | 1.3 | 1.3 | 1.3 | 38'580 |
| United States | 1.3 | 2.1 | 0.5 | 48'450 |
| Canada | 1.4 | 1.3 | 1.4 | 45'560 |
| Cyprus | 1.4 | 1.7 | 1.0 | 29'450 |
| Belarus | 1.4 | 1.1 | 1.7 | 5'830 |
| Greece | 1.4 | 1.8 | 1.0 | 25'030 |
| Hungary | 1.4 | 0.9 | 1.9 | 12'730 |
| Spain | 1.4 | 1.6 | 1.3 | 30'990 |
| Serbia | 1.5 | 1.8 | 1.2 | 5'680 |
| Trinidad & Tobago | 1.5 | 1.7 | 1.2 | 15'040 |
| Romania | 1.5 | 2.2 | 0.7 | 7'910 |
| Brunei Darussalam | 1.5 | 2.1 | 0.9 | 31'800 |
| Saudi Arabia | 1.5 | 1.3 | 1.8 | 17'820 |
| Sri Lanka | 1.5 | 1.5 | 1.5 | 2'580 |
| Malta | 1.6 | 1.8 | 1.3 | 18'620 |
| Tunisia | 1.6 | 1.0 | 2.1 | 4'070 |
| Venezuela | 1.6 | 1.4 | 1.9 | 11'920 |
| Turkey | 1.7 | 2.0 | 1.4 | 10'410 |
| TFYR Macedonia | 1.7 | 1.7 | 1.7 | 4'730 |
| Barbados | 1.8 | 1.8 | 1.8 | 12'660 |
| Mauritius | 1.8 | 1.8 | 1.8 | 8'240 |
| Czech Republic | 1.8 | 1.8 | 1.8 | 18'520 |
| Azerbaijan | 1.9 | 1.1 | 2.6 | 5'290 |
| Bulgaria | 1.9 | 2.6 | 1.3 | 6'550 |
| Russian Federation | 2.0 | 2.0 | 2.0 | 10'400 |
| Maldives | 2.0 | 2.0 | 2.0 | 6'530 |
| Poland | 2.0 | 0.8 | 3.2 | 12'480 |
| Chile | 2.3 | 2.0 | 2.6 | 12'280 |
| Peru | 2.4 | 3.2 | 1.6 | 5'500 |
| Bahamas | 2.5 | 3.0 | 1.9 | 21,970 |
| Mexico | 2.5 | 2.5 | 2.6 | 9'240 |

Source: ITU.

| Economy | Mobile-broadband sub-basket | Prepaid handset-based prices (500 MB) as % of GNI p.c. | Postpaid computer-based prices (1 GB) as % of GNI p.c. | GNI p.c., USD, 2011 (or latest available) |
|--------------------|-----------------------------|--|--|---|
| Indonesia | 2.6 | 2.3 | 2.8 | 2'940 |
| Panama | 2.7 | 2.3 | 3.0 | 7'910 |
| Libya | 2.7 | 4.1 | 1.2 | 12'320 |
| Argentina | 2.7 | 2.7 | 2.7 | 9'740 |
| Antigua & Barbuda | 2.8 | 2.8 | 2.9 | 12'060 |
| Costa Rica | 3.0 | 2.8 | 3.2 | 7'660 |
| Egypt | 3.1 | 3.9 | 2.2 | 2'600 |
| Jordan | 3.1 | 2.3 | 3.9 | 4'380 |
| Georgia | 3.1 | 2.5 | 3.7 | 2'860 |
| Albania | 3.3 | 1.5 | 5.1 | 3'980 |
| Ukraine | 3.5 | 2.6 | 4.5 | 3'120 |
| Lebanon | 3.7 | 2.8 | 4.6 | 9'110 |
| India | 3.7 | 2.9 | 4.6 | 1'410 |
| Seychelles | 3.9 | 5.2 | 2.6 | 11'130 |
| Brazil | 4.2 | 4.0 | 4.3 | 10'720 |
| El Salvador | 4.3 | 3.4 | 5.2 | 3'480 |
| Cape Verde | 4.5 | 2.1 | 6.8 | 3'540 |
| Jamaica | 4.6 | 4.9 | 4.2 | 4'980 |
| Colombia | 4.6 | 5.8 | 3.4 | 6'110 |
| South Africa | 4.8 | 3.8 | 5.9 | 6'960 |
| Moldova | 5.2 | 5.2 | 5.2 | 1'980 |
| Mongolia | 5.3 | 5.7 | 4.9 | 2'320 |
| Suriname | 5.3 | 4.7 | 6.0 | 7'640 |
| Uzbekistan | 5.6 | 4.8 | 6.4 | 1'510 |
| Fiji | 6.0 | 4.5 | 7.4 | 3'680 |
| Ecuador | 6.2 | 6.3 | 6.2 | 4'140 |
| Paraguay | 6.7 | 7.7 | 5.8 | 2'970 |
| Guatemala | 7.8 | 7.8 | 7.8 | 2'870 |
| Armenia | 8.0 | 4.8 | 11.2 | 3'360 |
| Bolivia | 8.2 | 6.4 | 10.1 | 2'040 |
| Namibia | 8.6 | 8.8 | 8.4 | 4'700 |
| Philippines | 9.4 | 6.3 | 12.5 | 2'210 |
| Ghana | 10.1 | 9.0 | 11.3 | 1'410 |
| Botswana | 11.6 | 9.0 | 14.1 | 7'480 |
| Honduras | 11.8 | 16.1 | 7.4 | 1'970 |
| Kenya | 12.4 | 8.2 | 16.5 | 820 |
| Morocco | 12.5 | 20.0 | 4.9 | 2'970 |
| Pakistan | 14.6 | 3.1 | 26.1 | 1'120 |
| Bangladesh | 14.7 | 16.8 | 12.6 | 770 |
| Samoa | 15.0 | 17.9 | 12.2 | 3'190 |
| Nicaragua | 15.3 | 18.3 | 12.3 | 1'170 |
| Nigeria | 16.2 | 13.0 | 19.5 | 1'200 |
| Kyrgyzstan | 18.5 | 15.8 | 21.2 | 920 |
| Viet Nam | 21.5 | 2.0 | 40.9 | 1'260 |
| Tajikistan | 21.8 | 21.8 | 21.8 | 870 |
| China | 23.9 | 3.8 | 44.0 | 4'940 |
| Mali | 25.4 | 19.6 | 31.3 | 610 |
| Lesotho | 32.5 | 29.8 | 35.2 | 1'220 |
| Dominican Rep. | 36.9 | 26.1 | 47.7 | 7'090 |
| Haiti | 42.3 | 16.9 | 67.7 | 700 |
| Madagascar | 49.3 | 35.1 | 63.4 | 430 |
| Mozambique | 65.9 | 65.9 | 65.9 | 470 |
| S. Tomé & Príncipe | 100.0 | 156.5 | 110.3 | 1'360 |
| Zimbabwe | 100.0 | 101.3 | 168.8 | 640 |
| Congo (Dem. Rep.) | 100.0 | 126.4 | 316.0 | 190 |

are used on the same end device: a laptop or desktop computer.

Although, globally, postpaid fixed-broadband plans are more expensive than postpaid computer-based mobile-broadband plans, there are regional differences. The difference in affordability between the two plans is largest in Africa: a postpaid computer-based mobile-broadband subscription costs 44.8 per cent of GNI p.c., while a postpaid fixed-broadband subscription is significantly more expensive, at 68.1 per cent of GNI p.c. Both plans are a lot more affordable in Europe and the Arab States, where differences in price between the two plans are also minimal. In the Americas, there is no difference in price in terms of GNI p.c. between fixed broadband and mobile broadband. In the CIS and Asia and the Pacific regions, in contrast to the global trend, postpaid computer-based mobile broadband is on average more expensive than postpaid fixed broadband. While the difference is small in the CIS, fixed broadband is somewhat more affordable in Asia and the Pacific, at 4.7 per cent of GNI p.c. compared with 7 per cent of GNI p.c. for mobile broadband (see Chart 3.4).

In the developing countries, mobile data is 40 per cent more expensive than mobile voice

Following the 'mobile miracle' and the unprecedented spread of mobile-cellular subscriptions, mobile broadband has been called upon to take the baton in the ICT development race. Since the affordability of mobile-cellular services has played an important role in making mobile so widely available, it is interesting to compare mobile-cellular (voice) and mobile-broadband (data) prices. The results show that, in developing countries, prepaid handset-based mobile broadband is 40 per cent more expensive in terms of GNI p.c. than a mobile-cellular monthly offer. In developed countries, on the other hand, prepaid handset-based mobile-broadband prices are actually less expensive than mobile-cellular prices.

In more than half of the developing countries, the price of mobile broadband corresponds to less than 5 per cent of GNI p.c.

A newly developed mobile-broadband sub-basket (which reflects the four different mobile-broadband plans and was

calculated for 110 economies) reveals major differences among countries (see Table 3.3). Values range from a low (i.e. very affordable) 0.1 in Austria, to a maximum of 100 (i.e. the cost of mobile-broadband is equal to or above the average GNI p.c., and therefore unaffordable to a majority of the population) in Sao Tomé and Príncipe, Zimbabwe and the Democratic Republic of the Congo.

The countries at the top of the mobile-broadband sub-basket (i.e. those with most affordable prices) are economies with high GNI p.c. levels from the Europe and Arab States regions – including Qatar, the United Kingdom, Germany, Kuwait and France. However, several countries with lower income levels, such as Estonia, Bahrain or Kazakhstan, also feature in the top 20 of the mobile-broadband sub-basket, with mobile-broadband prices below 1 per cent of monthly GNI p.c. This shows that, although income matters, other factors such as competition and regulation may play a relevant role in making mobile broadband affordable.

Chapter 4. Measuring the world's digital natives

For more than two decades, people have discussed and debated the emergence of a distinct and recognizable global population of young people who were born into the digital age and are growing up using information and communication technologies (ICTs) in their daily lives. This population of networked youth is often referred to as *digital natives*, and has been the subject of extensive research and significant academic discourse over the past two decades. While there is no consensus in the literature on the exact impact that ICTs have on young people, there is general agreement that digital media are changing the way they learn, play, socialize and participate in civic life. Furthermore, a review of the literature demonstrates how little research has been done so far on digital natives and networked youth in the developing countries. While this can be explained by a number of factors, including the fact that the information society, and especially Internet use, has emerged much later in those countries compared with the United States and Western Europe, there is an urgent need for further

research on how ICTs are used by, and impact on, young people in the developing world.

The first model to quantify the world's digital native population

For the first time, ITU has developed a model to estimate the size of the digital native population worldwide. The model defines digital natives as the population of networked youth – aged 15-24 years – with five or more years of online experience. The model is applied to available data, resulting in a country-by-country estimate of the number of digital natives in 2012. The report thus offers the first indicator, and the first quantified mapping, of the world's digital natives. These results are analysed by region, development level and income grouping, and through the lens of educational enrolment levels.

Just over 5 per cent of today's world population, or 30 per cent of the young population, are digital natives

According to the model, in 2012 there were around 363 million digital natives out of a world population of around 7 billion – or 5.2 per cent. This means that 30 per cent of the world's youth have been active online for at least five years. The digital natives are, globally speaking, a minority of today's youth. This is primarily due to relatively low Internet usage rates in many developing countries with large (youth) populations; but also to the fact that ICTs are a fairly new phenomenon and that, back in 2007, by which time young people had to be online in order to be considered digital natives today (needing at least five years of experience to qualify in this category), Internet penetration was relatively low: in 2007, only 21 per cent of the global population was online.

Figure 4.1 illustrates the distribution of digital natives by country across the globe, with countries listed in alphabetical order. A bigger box means more digital natives within that country. Not surprisingly, countries with very large populations, such as Brazil, China and India, are prominent in the figure, but highly networked countries with relatively smaller populations, including Canada, the Netherlands and the Republic of Korea, also stand out.

The proportion of digital natives varies from a low of 0.1 per cent in Timor-Leste to a high of 14 per cent in Iceland

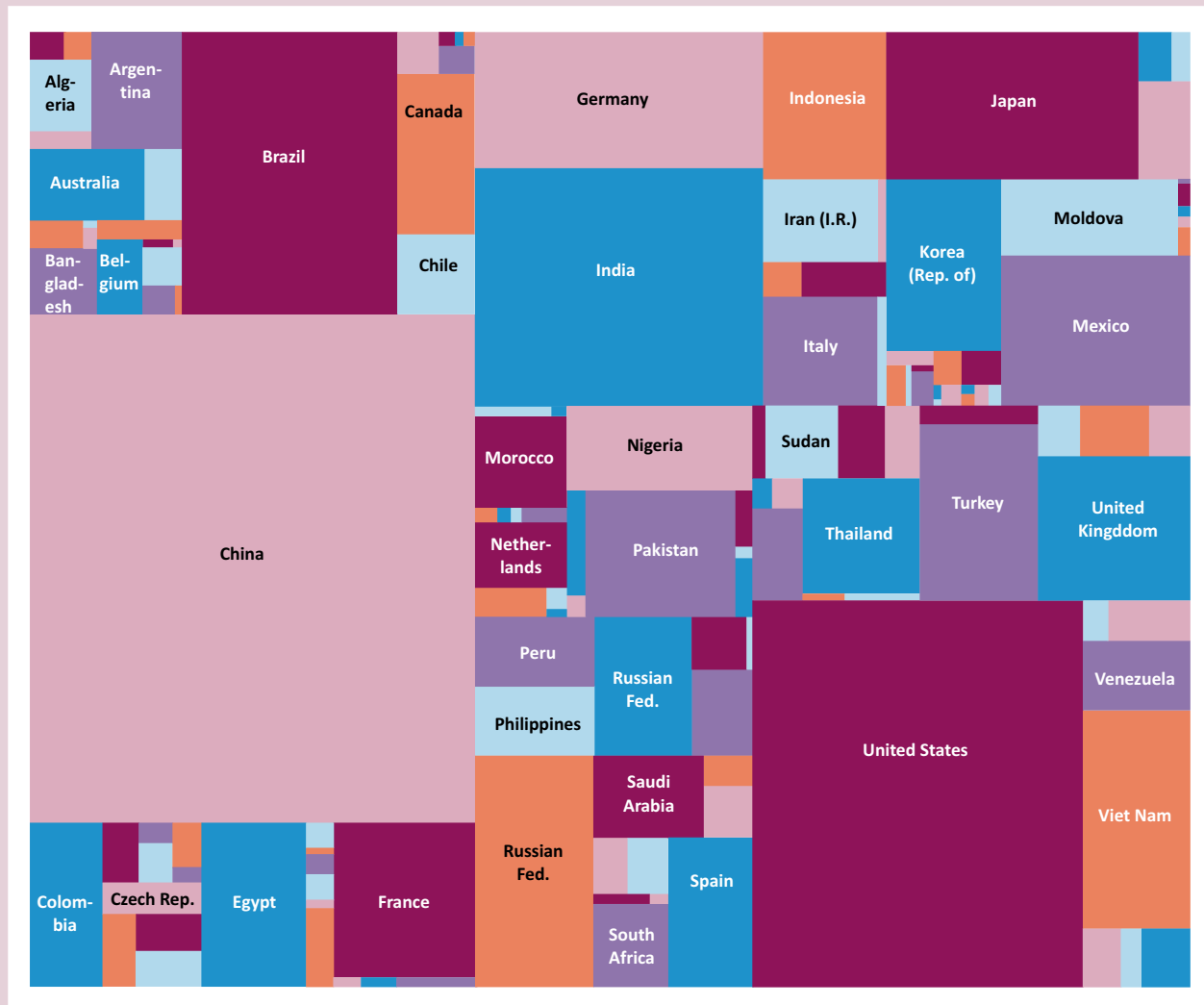
The estimated proportion of the total population that are digital natives varies between countries, from a low of 0.1 per cent in Timor-Leste to a high of 14 per cent in Iceland (Table 4.1). The countries at the median are Belarus and Syria, with 5.5 and 5.4 per cent digital natives, respectively. China, the country with the largest population of digital natives, is very close to the median, with digital natives representing 5.6 per cent of its population.

The results show that the countries with the highest proportions of digital natives are all high-income or upper-middle-income countries, and include countries with very high levels of overall Internet penetration, countries at the top of the ICT Development Index (IDI) and countries with relatively larger shares of youth population. High-population countries with medium or relatively high overall Internet penetration levels tend to have high absolute numbers of digital natives, and high-income countries (which usually display high overall levels of Internet use) tend to have relatively high proportions of their population categorized as digital natives. Iceland, New Zealand, the Republic of Korea and the United States, for example, are all countries with relatively high levels of ICT use that also have a high percentage of digital natives. Malaysia (ranked fourth in the proportion of the total population that are digital natives) is a country with a high estimated proportion of young people who have at least five years of experience in using the Internet.

The proportion of digital natives is more than twice as high in the developed regions

The proportion of digital natives in each region varies from a high of 10 per cent in the Americas to a low of 1.9 per cent in Africa. The Africa and Asia and the Pacific regions have relatively low levels of digital natives per capita compared with, for instance, Europe. A country's population of digital natives also resonates with its level of (economic) development. Some 4.2 per cent of the people residing in developing countries are digital natives, while in the developed countries digital natives account for 10 per cent of the population (Chart 4.1).

Figure 4.1: Distribution of digital natives across countries (absolute numbers), 2012



Note: Absolute number of digital natives in each country (listed alphabetically, top to bottom and left to right) indicated by relative size of box.
Source: ITU

The youth bulge in Africa and developing economies will be a core driver of the level of digital nativism

Many countries are known to have a “youth bulge” or, in other words, a large proportion of young people relative to their population as a whole. Youth bulges are particularly prevalent in developing nations and regions, in particular Africa. Regionally, the percentage of the population in the 15-24 age range varies from 20.1 per cent in Africa to 12.4 per cent in Europe. Looking at income categories, it is apparent that the youth bulge

is most significant among the low-income and lower-middle-income countries.

This also explains why some low-income countries, such as Kyrgyzstan and Zimbabwe, where 15-24 year olds represent 21.5 and 24.4 per cent of the population, respectively, have relatively high percentages of digital natives. Similarly, lower-middle-income countries Morocco, Egypt and Syria have relatively high proportions of digital natives, owing in part to a large young population group. The youth bulge in Africa and developing countries will be a core driver of the level of digital nativism in those countries.

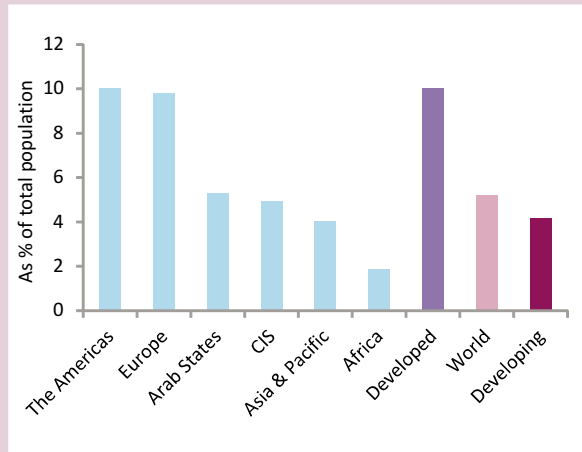
Table 4.1: Digital natives, 2012

| Rank | Economy | DN (total) | DN as a % of total population | DN as a % of total youth* | Share of youth population** |
|------|------------------------|------------|-------------------------------|---------------------------|-----------------------------|
| 1 | Iceland | 45'495 | 13.9 | 95.9 | 14.4 |
| 2 | New Zealand | 606'040 | 13.6 | 94.8 | 14.3 |
| 3 | Korea (Rep.) | 6'552'589 | 13.5 | 99.6 | 13.5 |
| 4 | Malaysia | 3'914'573 | 13.4 | 74.7 | 17.9 |
| 5 | Lithuania | 436'045 | 13.2 | 92.7 | 14.3 |
| 6 | United States | 41'322'288 | 13.1 | 95.6 | 13.7 |
| 7 | Barbados | 35'830 | 13.1 | 90.5 | 14.4 |
| 8 | Slovakia | 696'917 | 12.7 | 92.9 | 13.7 |
| 9 | Latvia | 275'036 | 12.3 | 97.0 | 12.7 |
| 10 | Denmark | 685'624 | 12.3 | 96.9 | 12.6 |
| 11 | Norway | 607'837 | 12.3 | 93.3 | 13.1 |
| 12 | Singapore | 643'589 | 12.2 | 88.4 | 13.8 |
| 13 | Brunei Darussalam | 50'049 | 12.1 | 73.7 | 16.5 |
| 14 | Finland | 645'961 | 12.0 | 98.3 | 12.2 |
| 15 | Netherlands | 1'993'587 | 11.9 | 98.4 | 12.1 |
| 16 | Israel | 915'636 | 11.9 | 80.0 | 14.9 |
| 17 | Canada | 4'124'622 | 11.9 | 90.1 | 13.2 |
| 18 | Poland | 4'538'102 | 11.8 | 89.4 | 13.3 |
| 19 | Estonia | 158'260 | 11.8 | 96.0 | 12.3 |
| 20 | Sweden | 1'110'582 | 11.7 | 89.4 | 13.1 |
| 21 | Hong Kong' China | 833'148 | 11.6 | 90.5 | 12.8 |
| 22 | Australia | 2'621'640 | 11.4 | 83.1 | 13.8 |
| 23 | Chile | 1'961'464 | 11.3 | 67.0 | 16.8 |
| 24 | Switzerland | 862'768 | 11.2 | 94.0 | 11.9 |
| 25 | United Kingdom | 6'992'034 | 11.1 | 85.9 | 13.0 |
| 26 | France | 6'982'540 | 11.0 | 90.7 | 12.1 |
| 27 | Malta | 45'548 | 10.9 | 79.8 | 13.6 |
| 28 | Luxembourg | 56'414 | 10.8 | 88.5 | 12.2 |
| 29 | Saint Lucia | 18'921 | 10.6 | 56.0 | 19.0 |
| 30 | Macao' China | 60'149 | 10.6 | 73.7 | 14.4 |
| 31 | Belgium | 1'139'462 | 10.6 | 91.3 | 11.6 |
| 32 | Austria | 886'475 | 10.5 | 87.7 | 12.0 |
| 33 | Saudi Arabia | 2'988'281 | 10.4 | 59.0 | 17.7 |
| 34 | Hungary | 1'018'863 | 10.2 | 84.9 | 12.1 |
| 35 | Trinidad & Tobago | 137'561 | 10.2 | 63.4 | 16.1 |
| 36 | Grenada | 10'702 | 10.2 | 48.4 | 21.0 |
| 37 | Brazil | 20'081'178 | 10.1 | 60.2 | 16.8 |
| 38 | Germany | 8'287'453 | 10.1 | 94.2 | 10.7 |
| 39 | Uruguay | 340'181 | 10.0 | 65.4 | 15.3 |
| 40 | Costa Rica | 479'028 | 10.0 | 54.7 | 18.3 |
| 41 | Slovenia | 202'731 | 9.9 | 92.3 | 10.8 |
| 42 | TFYR Macedonia | 205'166 | 9.9 | 67.5 | 14.7 |
| 43 | Czech Republic | 1'044'895 | 9.9 | 82.1 | 12.1 |
| 44 | Peru | 2'922'648 | 9.8 | 52.1 | 18.9 |
| 45 | Cyprus | 110'504 | 9.8 | 62.7 | 15.6 |
| 46 | Ireland | 447'888 | 9.8 | 78.4 | 12.5 |
| 47 | Japan | 12'200'091 | 9.6 | 99.5 | 9.7 |
| 48 | Croatia | 420'144 | 9.6 | 80.7 | 11.9 |
| 49 | Turkey | 6'933'267 | 9.3 | 53.7 | 17.3 |
| 50 | Bahamas | 32'393 | 9.2 | 53.3 | 17.3 |
| 51 | Portugal | 980'279 | 9.2 | 86.7 | 10.6 |
| 52 | Morocco | 2'829'799 | 8.7 | 45.8 | 19.0 |
| 53 | Argentina | 3'555'551 | 8.6 | 52.5 | 16.5 |
| 54 | Jamaica | 238'553 | 8.6 | 46.7 | 18.5 |
| 55 | Jordan | 542'817 | 8.4 | 40.4 | 20.8 |
| 56 | Viet Nam | 7'527'242 | 8.4 | 43.6 | 19.2 |
| 57 | Montenegro | 52'658 | 8.3 | 60.1 | 13.8 |
| 58 | Serbia | 819'138 | 8.3 | 62.8 | 13.2 |
| 59 | Spain | 3'887'992 | 8.3 | 84.6 | 9.8 |
| 60 | Colombia | 3'904'502 | 8.2 | 45.6 | 18.0 |
| 61 | Maldives | 26'444 | 8.2 | 35.4 | 23.0 |
| 62 | Kuwait | 234'242 | 8.1 | 55.8 | 14.5 |
| 63 | Venezuela | 2'366'932 | 7.9 | 43.5 | 18.2 |
| 64 | Panama | 285'298 | 7.9 | 46.0 | 17.1 |
| 65 | United Arab Emirates | 635'781 | 7.8 | 56.6 | 13.8 |
| 66 | Mexico | 9'086'114 | 7.8 | 43.3 | 18.1 |
| 67 | Bulgaria | 560'896 | 7.6 | 68.3 | 11.1 |
| 68 | Greece | 861'104 | 7.5 | 74.6 | 10.1 |
| 69 | Moldova | 263'203 | 7.5 | 45.6 | 16.4 |
| 70 | Romania | 1'584'515 | 7.4 | 60.1 | 12.3 |
| 71 | Bosnia and Herzegovina | 270'180 | 7.2 | 55.7 | 13.0 |
| 72 | Dominican Rep. | 733'019 | 7.2 | 38.8 | 18.5 |
| 73 | Lebanon | 306'940 | 7.2 | 40.1 | 17.8 |
| 74 | Micronesia | 8'013 | 7.1 | 32.2 | 22.2 |
| 75 | Mauritius | 92'113 | 7.0 | 42.3 | 16.6 |
| 76 | S. Tomé & Príncipe | 11'849 | 6.9 | 32.8 | 21.0 |
| 77 | St. Vincent and the G. | 7'335 | 6.7 | 36.5 | 18.4 |
| 78 | Italy | 4'065'346 | 6.7 | 67.8 | 9.8 |
| 79 | Egypt | 5'532'746 | 6.6 | 34.9 | 18.9 |
| 80 | Kyrgyzstan | 357'450 | 6.6 | 30.5 | 21.5 |
| 81 | Tunisia | 700'044 | 6.5 | 36.7 | 17.8 |
| 82 | Bahrain | 87'967 | 6.5 | 50.8 | 12.7 |
| 83 | Guyana | 48'049 | 6.3 | 32.4 | 19.6 |
| 84 | Russian Federation | 8'974'678 | 6.3 | 49.6 | 12.7 |
| 85 | Thailand | 4'387'062 | 6.3 | 42.3 | 14.8 |
| 86 | Albania | 198'333 | 6.1 | 34.1 | 18.0 |
| 87 | Zimbabwe | 796'166 | 6.1 | 25.1 | 24.4 |
| 88 | Azerbaijan | 551'410 | 5.9 | 30.9 | 19.0 |
| 89 | China | 75'210'372 | 5.6 | 34.7 | 16.0 |
| 90 | Belarus | 527'032 | 5.5 | 41.8 | 13.2 |
| 91 | Syria | 1'141'451 | 5.4 | 26.1 | 20.7 |
| 92 | Suriname | 28'450 | 5.3 | 31.6 | 16.8 |
| 93 | Belize | 16'847 | 5.2 | 24.4 | 21.3 |
| 94 | Bolivia | 500'185 | 4.9 | 24.2 | 20.1 |
| 95 | Qatar | 93'271 | 4.8 | 38.6 | 12.5 |
| 96 | Honduras | 362'189 | 4.6 | 21.6 | 21.2 |
| 97 | Ecuador | 671'850 | 4.5 | 24.6 | 18.4 |
| 98 | Cape Verde | 22'316 | 4.4 | 19.7 | 22.5 |
| 99 | Fiji | 38'639 | 4.4 | 24.7 | 17.9 |
| 100 | Oman | 126'663 | 4.4 | 26.0 | 16.7 |
| 101 | Iran (I.R.) | 3'188'749 | 4.2 | 21.6 | 19.5 |
| 102 | Algeria | 1'512'106 | 4.1 | 21.6 | 19.2 |
| 103 | Mongolia | 117'484 | 4.1 | 20.7 | 19.9 |
| 104 | Tajikistan | 280'152 | 4.0 | 17.2 | 23.0 |
| 105 | Sudan | 1'789'721 | 3.9 | 19.9 | 19.7 |
| 106 | Paraguay | 259'834 | 3.9 | 19.5 | 19.9 |
| 107 | Uzbekistan | 1'072'320 | 3.8 | 17.5 | 21.8 |
| 108 | Kenya | 1'596'013 | 3.7 | 18.5 | 20.2 |
| 109 | Senegal | 485'465 | 3.7 | 18.0 | 20.5 |
| 110 | Cuba | 414'580 | 3.7 | 26.7 | 13.8 |
| 111 | South Africa | 1'848'847 | 3.6 | 18.6 | 19.6 |
| 112 | Haiti | 369'222 | 3.6 | 17.3 | 20.8 |
| 113 | Guatemala | 528'839 | 3.5 | 17.2 | 20.4 |
| 114 | Tonga | 3'655 | 3.5 | 18.5 | 18.8 |
| 115 | Pakistan | 6'143'363 | 3.4 | 16.0 | 21.3 |
| 116 | Tanzania | 1'571'929 | 3.3 | 16.9 | 19.5 |
| 117 | El Salvador | 197'758 | 3.2 | 14.4 | 21.9 |
| 118 | Vanuatu | 7'909 | 3.1 | 15.8 | 19.9 |
| 119 | Nigeria | 5'154'598 | 3.1 | 16.0 | 19.3 |
| 120 | Georgia | 128'126 | 3.0 | 19.7 | 15.1 |
| 121 | Gambia | 53'912 | 3.0 | 14.4 | 20.5 |
| 122 | Gabon | 44'935 | 2.9 | 13.6 | 21.1 |
| 123 | Bhutan | 21'253 | 2.8 | 13.7 | 20.7 |
| 124 | Philippines | 2'699'063 | 2.8 | 14.1 | 19.8 |
| 125 | Ukraine | 1'231'068 | 2.7 | 21.4 | 12.8 |
| 126 | Botswana | 54'891 | 2.7 | 12.4 | 21.5 |
| 127 | Yemen | 665'487 | 2.6 | 12.0 | 21.8 |
| 128 | Samoa | 4'583 | 2.5 | 12.6 | 19.7 |
| 129 | Namibia | 57'556 | 2.4 | 11.5 | 21.2 |
| 130 | Swaziland | 29'692 | 2.4 | 9.9 | 24.5 |
| 131 | Armenia | 75'543 | 2.4 | 14.4 | 16.9 |
| 132 | Indonesia | 5'841'176 | 2.4 | 13.7 | 17.5 |
| 133 | Zambia | 324'758 | 2.3 | 11.8 | 19.8 |
| 134 | Nicaragua | 123'340 | 2.1 | 9.8 | 21.2 |
| 135 | Lesotho | 43'477 | 2.0 | 8.5 | 23.1 |
| 136 | Libya | 122'917 | 1.9 | 11.4 | 16.7 |
| 137 | Ghana | 468'171 | 1.8 | 9.3 | 19.7 |
| 138 | Uganda | 644'338 | 1.8 | 9.0 | 20.1 |
| 139 | India | 22'660'059 | 1.8 | 9.5 | 18.9 |
| 140 | Kazakhstan | 269'422 | 1.6 | 9.6 | 17.1 |
| 141 | Angola | 317'113 | 1.6 | 7.9 | 20.0 |
| 142 | Cameroon | 302'917 | 1.5 | 7.3 | 20.4 |
| 143 | Sri Lanka | 301'853 | 1.4 | 9.5 | 15.0 |
| 144 | Congo | 55'530 | 1.3 | 6.8 | 19.2 |
| 145 | Togo | 72'077 | 1.1 | 5.5 | 20.7 |
| 146 | Comoros | 8'701 | 1.1 | 6.3 | 17.9 |
| 147 | Guinea-Bissau | 17'710 | 1.1 | 5.6 | 19.9 |
| 148 | Rwanda | 118'691 | 1.1 | 5.4 | 19.6 |
| 149 | Afghanistan | 335'958 | 1.0 | 4.9 | 20.6 |
| 150 | Solomon Islands | 5'549 | 1.0 | 5.0 | 19.5 |
| 151 | Lao P.D.R. | 62'152 | 1.0 | 4.2 | 23.0 |
| 152 | Côte d'Ivoire | 195'380 | 0.9 | 4.7 | 20.4 |
| 153 | Bangladesh | 1'423'409 | 0.9 | 4.7 | 20.1 |
| 154 | Benin | 84'682 | 0.9 | 4.6 | 19.7 |
| 155 | Djibouti | 8'169 | 0.9 | 4.2 | 21.2 |
| 156 | Papua New Guinea | 62'852 | 0.9 | 4.6 | 19.3 |
| 157 | Turkmenistan | 39'693 | 0.8 | 3.7 | 21.0 |
| 158 | Nepal | 238'079 | 0.8 | 3.7 | 20.9 |
| 159 | Equatorial Guinea | 5'653 | 0.8 | 3.9 | 19.4 |
| 160 | Mauritania | 26'877 | 0.7 | 3.7 | 19.8 |
| 161 | Somalia | 56'955 | 0.6 | 3.1 | 18.7 |
| 162 | Malawi | 85'334 | 0.5 | 2.6 | 20.4 |
| 163 | Mozambique | 122'269 | 0.5 | 2.5 | 19.8 |
| 164 | Iraq | 166'937 | 0.5 | 2.5 | 19.6 |
| 165 | Chad | 55'872 | 0.5 | 2.4 | 19.8 |
| 166 | Mali | 73'385 | 0.4 | 2.3 | 19.6 |
| 167 | Guinea | 46'734 | 0.4 | 2.2 | 19.8 |
| 168 | Burundi | 38'081 | 0.4 | 2.0 | 21.9 |
| 169 | Burkina Faso | 74'860 | 0.4 | 2.1 | 20.0 |
| 170 | Madagascar | 83'190 | 0.4 | 1.9 | 20.2 |
| 171 | Cambodia | 50'145 | 0.3 | 1.6 | 21.8 |
| 172 | Liberia | 12'759 | 0.3 | 1.6 | 19.2 |
| 173 | Ethiopia | 229'727 | 0.3 | 1.2 | 21.6 |
| 174 | Central African Rep. | 11'713 | 0.3 | 1.2 | 20.6 |
| 175 | Eritrea | 14'180 | 0.3 | 1.3 | 19.5 |
| 176 | Congo (Dem. Rep.) | 175'259 | 0.3 | 1.2 | 20.4 |
| 177 | Niger | 40'436 | 0.2 | 1.3 | 18.5 |
| 178 | Sierra Leone | 11'034 | 0.2 | 0.9 | 19.5 |
| 179 | Myanmar | 76'302 | 0.2 | 0.9 | 18.2 |
| 180 | Timor-Leste | 1'495 | 0.1 | 0.6 | 21.2 |

Note: DN: Digital natives. * Refers to population aged 15 to 24. ** Share of youth population (15-24) among the total population.

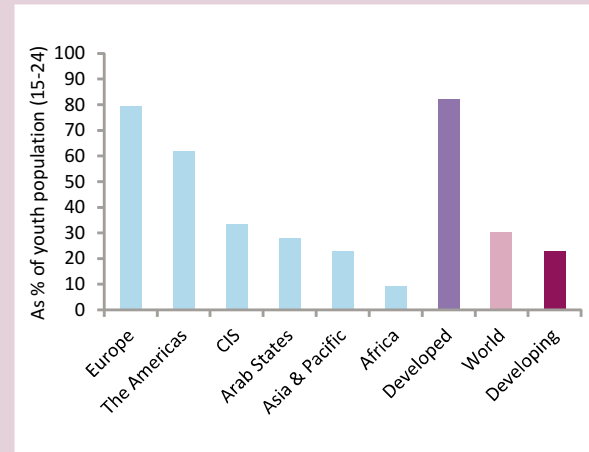
Source: ITU.

Chart 4.1: Digital natives as a percentage of total population, by region and level of development, 2012



Source: ITU.

Chart 4.2: Digital natives as a percentage of youth (15-24), by region and level of development, 2012



Source: ITU.

No fewer than 79 per cent of youth in Europe are digital natives, compared with only 9.2 per cent in Africa

Another way of looking at digital natives is by analysing their penetration as a percentage of the total youth population in a country. In the world as a whole, most young people (70 per cent) are not digital natives. The proportion of the youth population who are digital natives is not uniform, but ranges from a high of 99.6 per cent in the Republic of Korea to a low of 0.6 per cent in Timor-Leste. The figure varies significantly according to region and economic level, from 9.2 per cent in the Africa region to 79.1 per cent in Europe, and from 22.8 per cent in the developing world to 81.9 per cent in the developed world (Chart 4.2). A high degree of sustained youth Internet use drives the level of digital nativism, in particular in Europe, North America and the developed economies in general.

Within the next five years, the digital native population in the developing countries will more than double

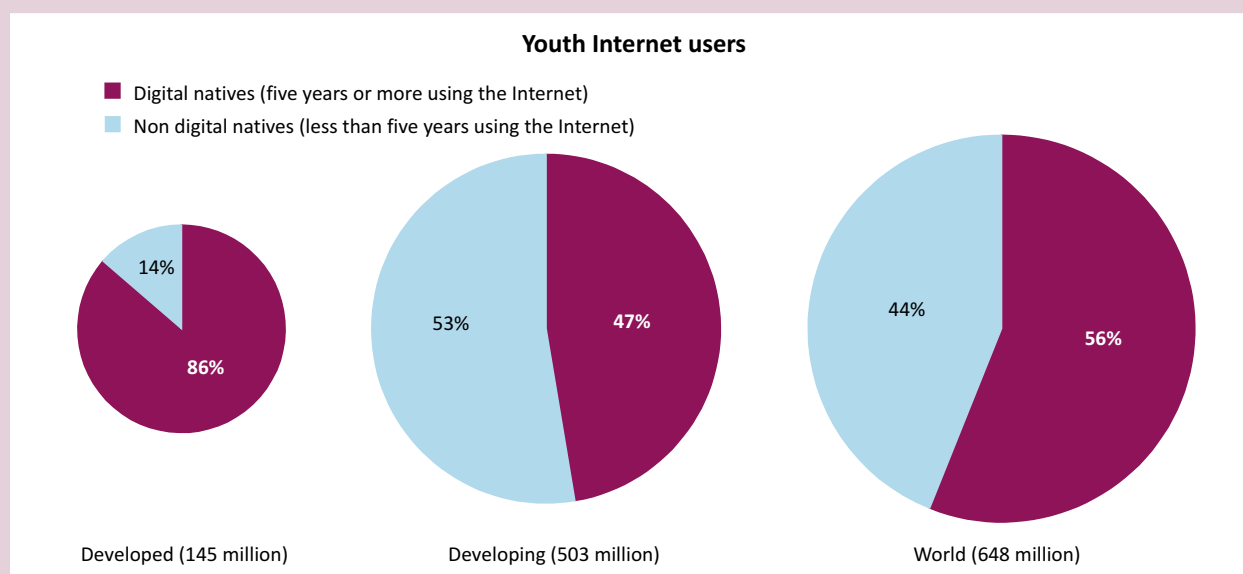
There are a large number of young people who started using the Internet only more recently (i.e. less than five years ago), particularly in the developing countries.

Out of a total of 145 million young Internet users in the developed countries, 86.3 per cent are estimated to be digital natives, compared with less than half of the 503 million young Internet users in the developing world. Looking at the world figure, slightly more than half (56 per cent) of young Internet users are considered digital natives. This means that there are around 285 million (44 per cent) of “newcomers” (young people with less than five years of experience in using the Internet) in the world in 2012 (see Chart 4.3).

Over the past five years, Internet usage has increased significantly in the developing world, from 11.9 per cent in 2007 to 30.7 per cent in 2012. The report shows that 53 per cent of today’s young Internet users in the developing world do not yet qualify as digital natives. Within the next five years, therefore, the digital native population in the developing countries will more than double, assuming no drop-outs from Internet usage among the youth population.

Young people are almost twice as networked as the global population as a whole

Another finding from the research shows that young people are more likely to be online than the general population as a whole. The ratios range from a high of

Chart 4.3: Percentage of digital natives among youth Internet users, 2012

Source: ITU.

2.8 in Eritrea (i.e. nearly three times as much Internet use among young people as compared with the population as a whole) to a low of 1.02 in Iceland (where nearly everyone, from all age groups, is an Internet user).

This ratio reveals a significantly higher relative level of Internet use among young people than in the population as a whole in most countries, albeit with variations between regions and according to economic level. Ratios range from 2.3 in Africa to 1.3 in Europe. Looking at variations across the four income categories, the ratio decreases significantly as we move from low-income to high-income countries. The global average is 1.8, demonstrating that, worldwide, youth are nearly two times more online than the global population as a whole. The average ratio for developing countries is 2 (i.e. twice as many young people are online than members of the population as a whole), while the average ratio for developed countries is 1.3. Therefore, the age gap is most salient in the developing world, where digital natives are vigorously leading their nation's use of the Internet (see Chart 4.4).

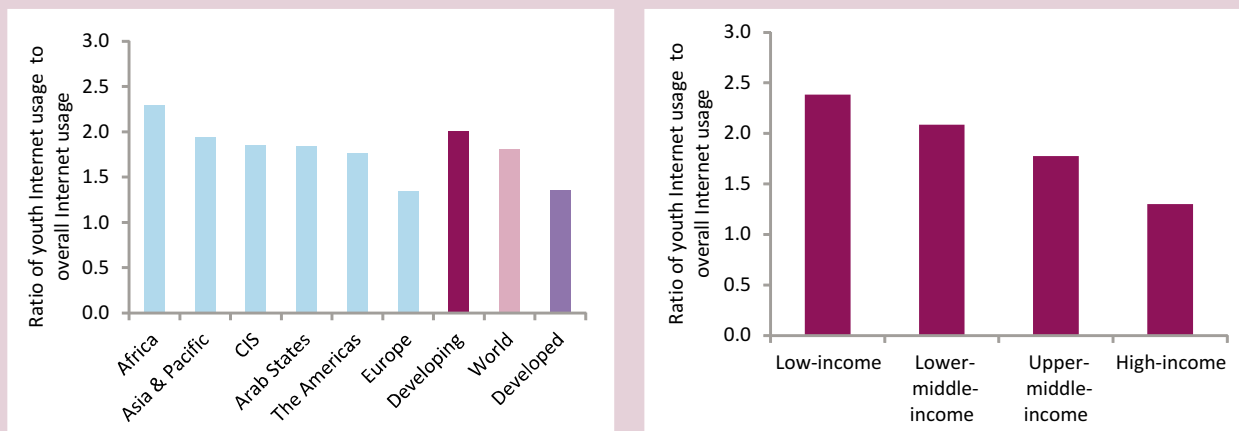
Developing countries are most impacted by their digital natives

These findings, combined with the additional youth bulge mentioned above, point to the significance, not just in number, but in importance, of digital natives especially in low-income and lower-middle-income countries and countries of Africa and Southern Asia. If youth are leading digital adoption within a country, then they are likely to:

- have an online life experience with which the rest of the country's population will not be so familiar;
- have higher levels of expertise and digital literacy compared with the population as a whole;
- have potentially adopted a more networked mindset than the wider population.

Indeed, it is a reasonable conjecture that, as the Internet user age gap increases, so too do the most dramatic properties ascribed to digital natives by some proponents – namely, that they think differently and are a breed apart. What this points to is that it is the countries with the biggest age

Chart 4.4: Ratio of youth (15-24) Internet usage to overall Internet usage, by region and level of development (left), and by income group (right), 2012



Source: ITU.

gaps (which are primarily in the developing world) that are liable to be those most impacted by their digital natives. Paradoxically, therefore, while most of the literature on digital natives focuses on high-income countries, the most important location for the application of this concept is likely to be the developing world. These findings also highlight the need for further research to analyse how digital natives think, work and do things differently, and whether this should have an impact on the way digital natives are taught or employed.

Enhancing ICT infrastructure and increasing school enrolment levels can increase the number of digital natives

There is a strong correlation between a nation's ICT infrastructure and uptake and secondary and tertiary education enrolments, on the one hand, and the percentage of the population that are digital natives, on the other. In particular, it emerges that the higher the enrolment of females in secondary and tertiary schools, the higher a country's share of digital natives.

The analysis points to some important policy conclusions. Sustained enhancement of ICT infrastructures, together with an increase in secondary and tertiary school enrolments, especially for girls, offer ways to boost levels of digital nativism, and to help drive countries' information societies.

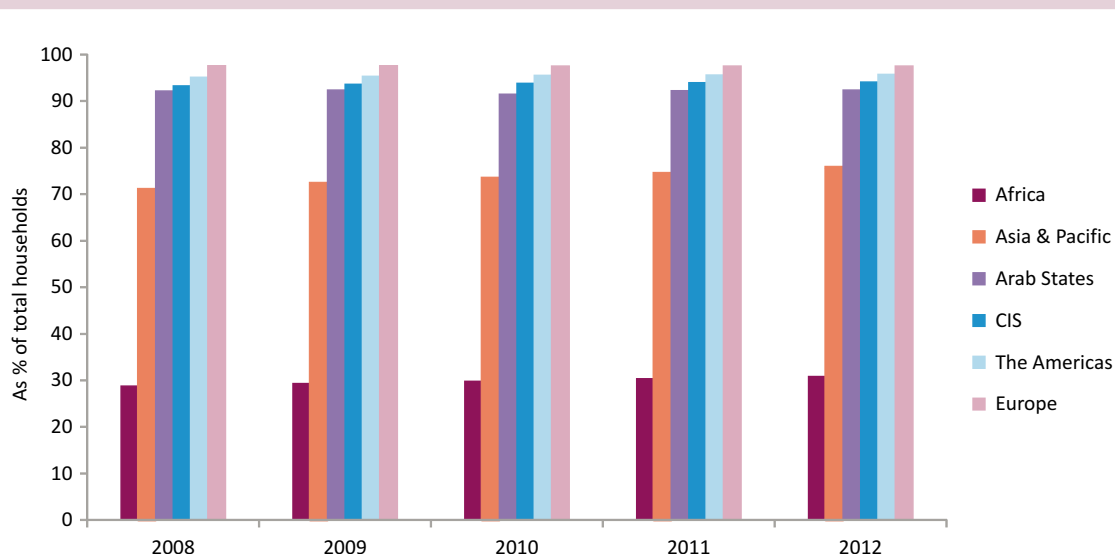
Chapter 5. Digital TV broadcasting trends

Television transmission has long been a regular electronic communication service and, although it has undergone several technological changes throughout its history, TV has seen no decline in penetration: almost 80 per cent of households worldwide had a TV by end 2012. This means that TV signals are received by a vast majority of the global population, making them much more pervasive than other ICTs.

By virtue of its vast coverage and high uptake, TV is well positioned to fulfil some of the public services associated with communications. At the same time, TV is a major market for private content creators, distributors and networks. These private stakeholders are key to driving TV uptake and underpinning developments in TV networks.

In 2012, no fewer than 72 per cent of households had a TV in developing countries, and 98 per cent in developed countries

Globally, there were an estimated 1.4 billion households with at least one TV set by end 2012. In the developed world, virtually all households had a TV by 2008, while in developing countries 69 per cent of households had a TV at

Chart 5.1: Households with a TV, by region, 2008-2012

Source: Estimates based on Digital TV Research and ITU data. Data cover 140 countries, accounting for 98 per cent of all households in the world.

that time. In the four-year period between 2008 and 2012, most growth took place in the developing world, with the addition of 87 million more households with a TV, thus reaching a penetration level of 72 per cent of households with a TV by 2012. In developed countries, the percentage of households with a TV remained stable during the four-year period, at 98 per cent.

However, there is still room for further growth: around 350 million households in developing countries did not have a TV by end 2012. This is particularly true in Africa, where fewer than a third of households had a TV by end 2012. In contrast, the percentage of households with a TV in all other regions was above 75 per cent (Chart 5.1).

For the first time, in 2012 there were more households with digital TV than with analogue TV

Digital transmission is rapidly replacing analogue as the *de facto* technology on account of its robustness and efficient use of spectrum, which allow better quality and a greater choice of channels.

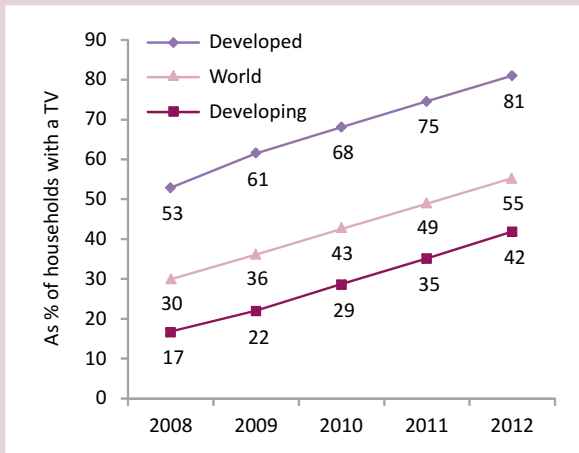
The world witnessed a massive shift from analogue to digital TV reception between 2008 and 2012. In 2012, a total of 55

per cent of households with a TV received digital TV signals, compared with 30 per cent in 2008 (Chart 5.2). The halfway mark was passed in 2012. The digital switchover is also taking place in the developing world, where the number of households receiving digital TV almost tripled in the four-year period. In developed countries, as many as 81 per cent of total households with a TV received the TV signal through digital technologies by end 2012.

National governments and international initiatives have helped this transition to digital TV reception. The ITU GE06 Agreement is an example of a major international initiative on the digital switchover: in 2006, governments from 120 countries in Europe, the Middle East and Africa agreed to several measures associated with the introduction of digital broadcasting, including deadlines for the analogue terrestrial television switchover. Further impetus has been provided by many pay-TV operators, which have encouraged their subscribers to convert to their digital offerings.

The proportion of households receiving digital TV signals out of total households with a TV varies substantially across regions (Chart 5.3). In the Americas, the Arab States and Europe, more than half of the households receiving TV

Chart 5.2: Households with digital TV, world and by level of development, 2008-2012



Source: Estimates based on Digital TV Research and ITU data. Data cover 140 countries, accounting for 98 per cent of all households in the world.

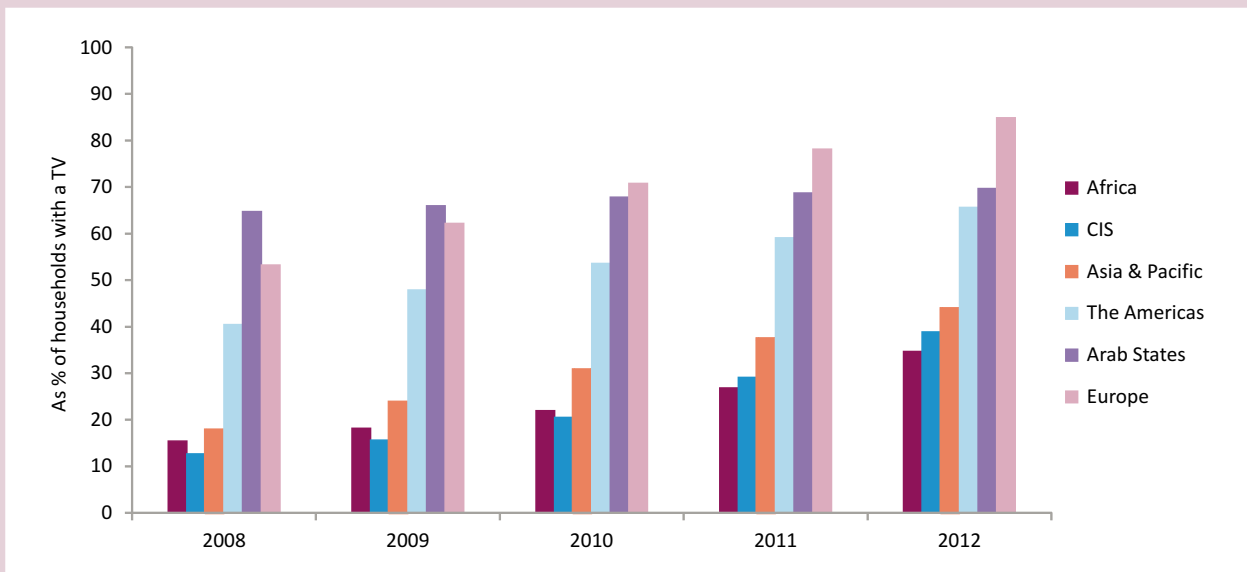
signals did so through digital technologies by end 2012. In the Arab States, this is due to the prevalence of satellite technologies (which are digital) as the main means of receiving TV signals. In the Americas, the growth in digital TV penetration is mainly explained by the conversion of cable-TV networks to digital technologies. Europe has reached first

position in terms of percentage of households with a TV that receive the signal through digital technologies thanks to the advances made in the switchover to digital terrestrial television (DTT).

On the other hand, the Africa, CIS and Asia and the Pacific regions are still short of the halfway mark in the TV digital switchover process. Nonetheless, all three regions have more than doubled the number of households receiving digital TV between 2008 and 2012. In the CIS region, growth is attributable to the conversion of households receiving analogue TV to digital technologies. In Africa, data suggest that many new households with a TV have directly adopted digital technologies. In Asia and the Pacific, it is both conversion to digital TV and new households directly adopting digital technologies that are driving digital TV uptake.

In order to further advance in the digital switchover process, a set of complex government actions are required (e.g. laws, technical decrees, spectrum reallocation, new authorizations, cross-border frequency coordination) before operators can effectively embark on the process and households can start adapting to the change. Governments should develop national strategies to coordinate all actions needed for the

Chart 5.3: Households with digital TV, by region, 2008-2012



Source: Estimates based on Digital TV Research and ITU data. Data cover 140 countries, accounting for 98 per cent of all households in the world.

digital switchover. These strategies should include clear targets and deadlines, and be monitored regularly. The population and all relevant stakeholders (including the private sector) should be informed in a transparent way of the progress achieved. This is particularly valid in developing countries, where the digital switchover is still in its early stages.

Digital cable and DTT uptake doubled between 2008 and 2012, and IPTV increased fourfold

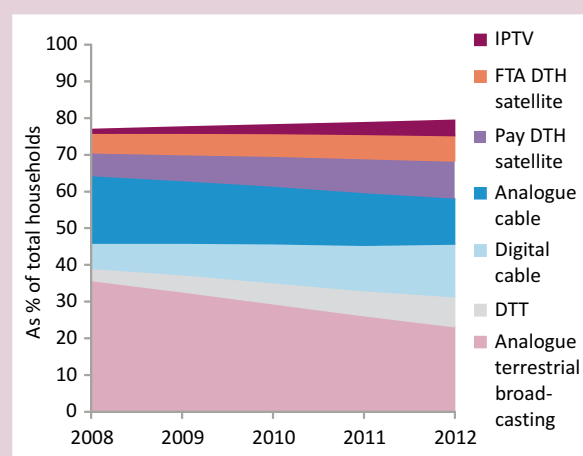
Traditional multichannel TV platforms, such as cable and direct-to-home (DTH) satellite, face increasing competition from IPTV service providers and even DTT channels. At the same time, the decrease in analogue TV technologies has been counterbalanced by the growth of digital technologies (Chart 5.4). Digital cable subscriptions more than doubled between 2008 and 2012, as did the number of households receiving DTT. The technology recording the highest relative growth was IPTV, with total subscriptions increasing more than fourfold.

In absolute terms, however, IPTV still represented only a marginal share of total households with a TV (5 per cent in 2012). Terrestrial broadcasting remained the most popular TV-distribution platform, although the number of households receiving terrestrial TV broadcasts declined significantly between 2008 and 2012 (from 51 to 39 per cent). Cable maintained its share in total households with a TV (34 per cent in 2012), while DTH satellite subscriptions experienced the highest increase in the four-year period (from 15 to 22 per cent).

While each country is different, with unique features when it comes to TV reception, there are some broad regional trends:

- **Africa:** Analogue terrestrial TV broadcasting is the dominant TV platform in the African region (20 per cent household penetration in 2012). Many countries are in the process of converting their terrestrial broadcasting networks to digital: DTT has been significant in the region since 2010, and reached 3 per cent household penetration by end 2012. Nearly all pay TV in the region corresponds to pay DTH satellite (6 per cent in 2012), with most pay-TV subscribers signing up to one of the pan-regional pay satellite TV platforms.

Chart 5.4: Households with a TV by type of technology, 2008-2012



Source: Estimates based on Digital TV Research and ITU data. Data cover 140 countries, accounting for 98 per cent of all households in the world.

- **Arab States:** About two-thirds of households with a TV in the Arab States region receive their TV signals via free-to-air (FTA) digital satellite, while the other third rely mainly on analogue terrestrial TV broadcasting. The abundance of FTA channels has dampened the impact of pay-TV services, and digital terrestrial TV broadcasting is still in its infancy in the region.
- **Asia and the Pacific:** Analogue terrestrial broadcasting remains the most popular TV platform in the Asia and the Pacific region, although it has lost a lot of market share (falling from 37 to 26 per cent household penetration between 2008 and 2012). In 2012, the number of households receiving cable TV (analogue plus digital) overtook those receiving only terrestrial TV broadcasting (analogue plus DTT). The massive task of converting homes away from cheap and rudimentary analogue cable networks is under way in the region. Except in developed countries, such as Australia and Japan, DTT is yet to make much of an impact in the region.
- **Commonwealth of Independent States:** The proportion of households with only analogue terrestrial TV broadcasting in the CIS region fell from

63 to 41 per cent in the period 2008-2012, although analogue terrestrial broadcasting remained the most popular TV platform there. Even though this downturn has been offset to some extent by the increase in households with only DTT (from less than 1 per cent in 2008 to 8 per cent in 2012), other TV platforms have also benefitted: pay DTH satellite subscriptions tripled in the four-year period, climbing to 12 per cent of households in 2012; and IPTV grew from virtually zero in 2008 to 4 per cent household penetration in 2012.

- Europe:** The Europe region boasts some of the most diverse and competitive TV markets, thanks to strong cross-platform competition and the advanced stage of the terrestrial TV switchover. Only 6 per cent of households in the region relied on analogue terrestrial broadcasting by end 2012, as compared with 25 per cent of households having only DTT. The same transition is taking place with cable, albeit at a slower pace. However, the most successful technology in attracting households switching to digital TV technologies has been IPTV, which reached 10 per cent household penetration in 2012. DTH satellite TV is standing its ground, and

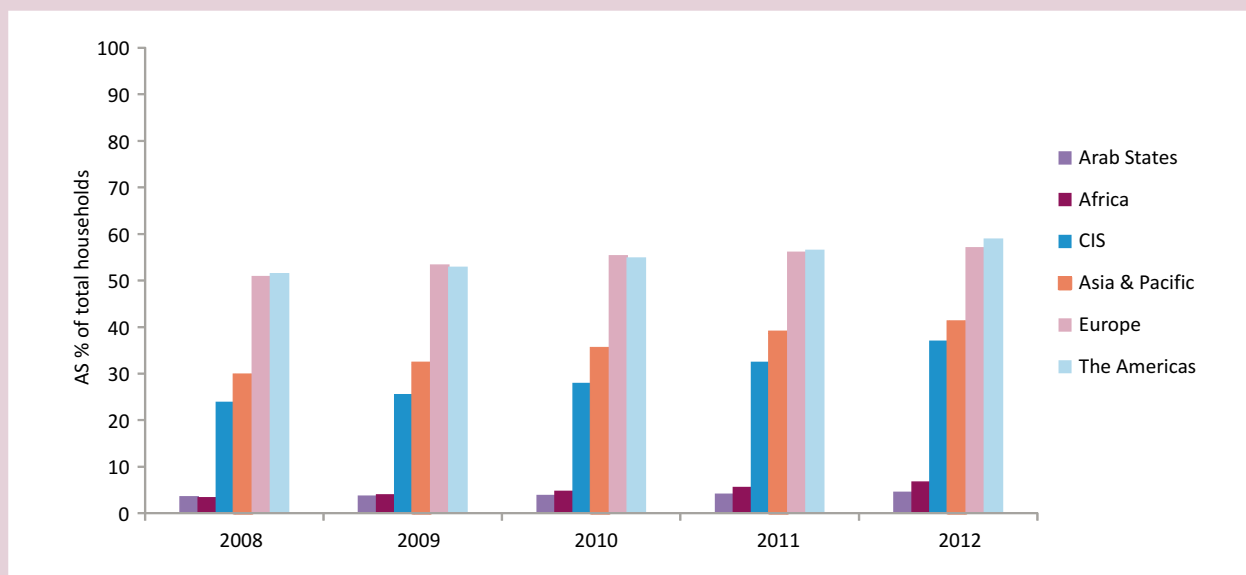
the penetration of both FTA and pay DTH satellite TV has even increased.

- Americas:** In 2012, digital cable TV overtook analogue terrestrial broadcasting as the most popular TV platform in the Americas region, both reaching almost a quarter of households in the region. Around 21 per cent of households in the region had pay DTH satellite services. DTT has been growing strongly, with the analogue terrestrial broadcasting switch-off being completed or well advanced in large countries such as Brazil, Canada and the United States. Differences between TV markets in North America and Latin America persist: digital TV reached 93 per cent of all households with a TV in North America by end 2012, as compared with 35 per cent in Latin America.

Since 2011, there are more households with pay TV than households with only free-to-air TV

The number of pay-TV subscriptions worldwide increased by 32 per cent between 2008 and 2012, overtaking free-to-air TV in 2011. There were a total of 728 million pay-TV subscriptions by end 2012, which means that 53 per cent of all households with a TV had a pay-TV subscription.

Chart 5.5: Households with pay TV, by region, 2008-2012



Source: Estimates based on Digital TV Research and ITU data. Data cover 140 countries, accounting for 98 per cent of all households in the world.

The Americas is the region displaying the highest pay-TV penetration: almost 60 per cent of households subscribed to pay-TV services by end 2012 (Chart 5.5). This is explained by the high uptake of cable TV and pay DTH satellite TV in the region, and the weight of the United States, where 85 per cent of households had pay-TV services.

Europe is the other region with more than 50 per cent of households with pay TV. The slightly lower pay-TV penetration compared with the Americas is explained by the development of FTA DTT in Europe: 25 per cent of households in Europe received only DTT, compared with only 12 per cent in the Americas. This finding suggests that DTT can compete with other multichannel platforms on an equal footing.

Africa and the Arab States were by far the regions with the lowest pay-TV penetration. Nevertheless, the number of pay-TV subscriptions doubled in Africa between 2008 and 2012, and 7 per cent of households in the region subscribed to pay TV by end 2012. This dynamism contrasts with the trend in the Arab States: the region experienced little growth in pay-TV subscriptions during the four-year period. This is consistent with the predominance of FTA satellite TV and analogue terrestrial

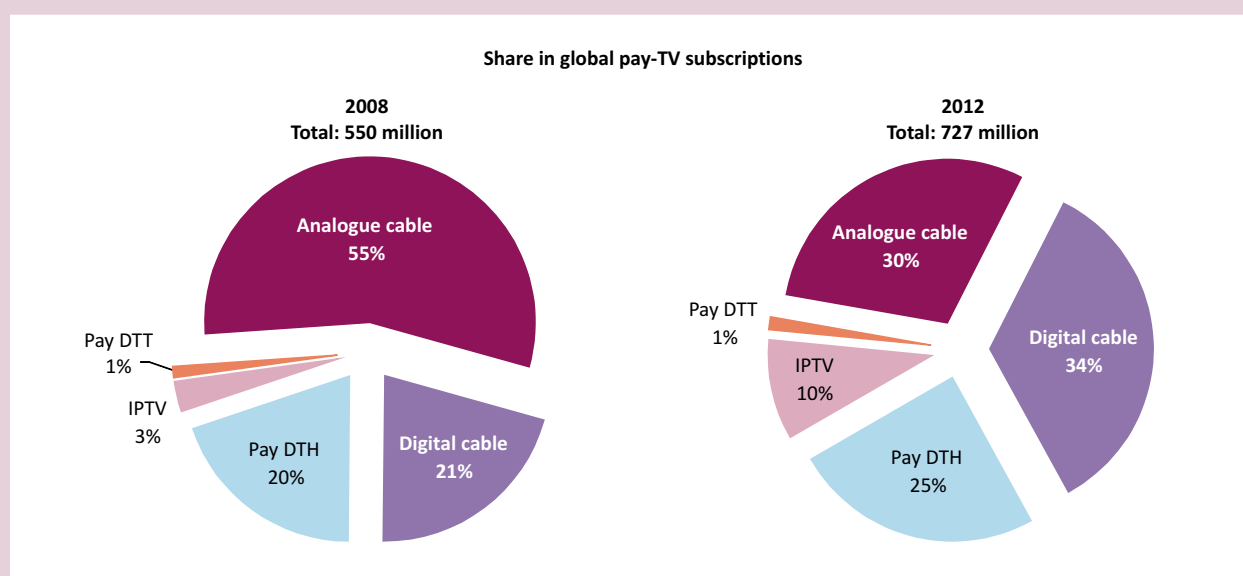
broadcasting in the region, both of which are free TV platforms.

Cable remains the main technology for pay-TV reception. However, the shares of pay DTH satellite and IPTV in total pay-TV subscriptions have increased significantly (Chart 5.6).

TV delivery over the Internet is becoming more and more popular

The Internet is starting to have an impact on the audiovisual sector, particularly through over-the-top (OTT) audiovisual content providers, such as YouTube, Netflix, the Chinese PPLive and many traditional broadcasting stations that offer streaming or downloading of TV and video content on the Internet. This adds to IPTV offers, which allow telecommunication operators to include TV services as part of their bundles (fixed telephony, Internet and TV), while ensuring that consumers have a guaranteed quality of service in the TV signal they receive. In parallel, an increasing number of TV sets, set-top boxes, game consoles and DVD players are equipped to be connected to the Internet, and include applications that link consumers to audiovisual content over the Internet.

Chart 5.6: Pay-TV subscriptions by technology, 2008 and 2012



Source: Estimates based on Digital TV Research and ITU data. Data cover 140 countries, accounting for 98 per cent of all households in the world.

Streaming OTT TV and video requires extensive broadband capacity: unlike IPTV, OTT TV and video is delivered on top of the Internet, and thus the quality of service depends on the capacity of each end-to-end connection. With

the exponential increase in Internet data traffic, driven by Internet video and TV, operators and regulators will need to face up to the challenge of catering for the increasing number of users and devices.

Endnotes

- ¹ In 2011, the Broadband Commission endorsed four targets to be achieved by 2015: (1) making broadband policy universal, (2) making broadband affordable, (3) connecting homes to broadband and (4) getting people online. See <http://www.broadbandcommission.org>.
- ² ITU World Telecommunication Regulatory Database.
- ³ The regions in this publication refer to the ITU/BDT regions, see <http://www.itu.int/ITU-D/ict/definitions/regions/index.html>.

The full version of the report, as well as the executive summary in all six official languages of the ITU, are available at:

<http://www.itu.int/go/mis2013>