

Technical Notes

General methodology

The compound annual growth rate (CAGR) is computed by the formula:

$$[(P_v / P_0)^{(1/n)}] - 1$$

where P_v = Present value

P_0 = Beginning value

n = Number of years

The result is multiplied by 100 to obtain a percentage.

United States dollar figures are calculated by applying the average annual exchange rate (from the International Monetary Fund, IMF) to the figure reported in national currency, unless otherwise noted. For economies where the IMF rate is unavailable or where the exchange rate typically applied to foreign exchange transactions differs markedly from the official IMF rate, a World Bank conversion rate is used. For the few economies where neither the IMF nor World Bank rates are available, a United Nations end-of-period rate is used.

Group figures are either totals or weighted averages depending on the indicator. For example, for main telephone lines, the total number of main telephone lines for each grouping is shown, while for main lines per 100 inhabitants, the weighted average is shown. Group figures are shown in bold in the tables. In cases of significant missing data and country rankings, group totals are not shown. Group growth rates generally refer to economies for which data is available for both years. Data was collected and updated on an ongoing basis up to the date of publication; different collection times and dates may account for slight discrepancies between individual entries.

1. Digital Opportunity Index 2006

The Digital Opportunity Index 2006 is calculated according to the methodology described in the Annex to Chapter Three for 181 economies (including Serbia and Montenegro separately), ranked in alphabetical order. Index values are calculated for each indicator by calculating the data value as a proportion of the reference values in the Annex (usually 100 per cent for per capita penetration, household penetration rates and broadband ratios). This gives an index value for the eleven indicators. A simple average of these index values is taken to give values for the DOI sub-indices of Opportunity, Infrastructure and Utilization, which are averaged to obtain a country's overall Digital Opportunity Index (DOI) score. World rank 2005/2006 shows the relative position of each economy in terms of its overall DOI score, on a scale of 1 to 181, where 1 represents the highest overall DOI score.

2. Regional Tables of Digital Opportunity Index 2006

This data presents the Digital Opportunity Index (DOI) 2006 for 181 countries in regional order, with the DOI sub-indices of Opportunity, Infrastructure and Utilization. World rank shows the relative position of each economy in terms of its overall DOI score, on a scale of 1 to 181, where 1 represents the highest overall DOI score. Regional ranking gives the relative ranking of the country within each region:

Africa – between 1 and 51;

Americas – between 1 and 35;

Asia-Pacific – between 1 and 54;

Europe – between 1 and 41;

Where 1 is the highest Digital Opportunity Index score achieved within the region.

3. Digital Opportunity Index over Time, 2001-2006

This table presents the Digital Opportunity Index (DOI) for 2001, 2002, 2003, 2004, 2005 and 2006, where such values exist. World rank 2005/2006 shows the relative position of each economy in terms of its DOI score, on a scale of 1 to 181, where 1 represents the highest overall DOI score.

4. Composite ICT Indices

This table presents the various composite indices that have been prepared by different organizations to measure the Information Society, including the Digital Opportunity Index, the Global IT Readiness Index (data provided by the World Economic Forum), the ICT Opportunity Index and the UNCTAD ICT Diffusion Index (data provided by UNCTAD). The table details the scores and ranks of each index, as well as world and regional averages.

5. Key indicators

The data for Population are mid-year estimates from the United Nations (UN). National statistics have been used for some countries. The data for gross domestic product (GDP) are from the IMF, the Organisation for Economic Co-operation and Development (OECD) or the World Bank. They are current price data in national currency converted to United States dollars by the method identified above. GDP per capita is calculated by dividing total GDP by total population. Readers are advised to consult the publications of the international organisations listed in Sources for precise definitions of the demographic and macro-economic data. Fixed telephone subscribers refers to the total number of mainlines in operation within each country and Mobile cellular telephone subscribers refers to

total people subscribing to a cellular mobile service. Effective teledensity per 100 capita is calculated by dividing the total number of fixed or cellular mobile subscribers (whichever is greatest) by the total population and multiplying by 100 to give the penetration rate per 100 inhabitants. The last column indicates whether fixed (f) or mobile (m) teledensity is higher.

6. Cellular Mobile subscribers

Cellular mobile telephone subscribers refers to the total number of users of portable telephones subscribing to an automatic public mobile telephone service using cellular technology that provides access to the PSTN, for both 2000 and 2005. The Compound Annual Growth Rate (CAGR) refers to the average annual growth rate in the total number of cellular subscribers over the period shown, computed by the formula above. Per 100 inhabitants is obtained by dividing the number of cellular subscribers by the population and multiplying by 100. As a percentage (%) of total telephone subscribers is obtained by dividing the number of cellular subscribers by the total number of telephone subscribers (sum of the fixed telephone lines and the cellular subscribers) and multiplying by 100.

7. Mobile prices

The table shows the costs associated with cellular mobile telephone service. Where possible, the prices of the incumbent and/or major operator were taken, from operators' websites or by correspondence - this may not necessarily be the most cost-effective connection, but rather a representative package on offer to consumers in August 2006. Connection charge refers to connection charges for basic telephone service in USD, using average annual exchange rates for 2006. Offers of free local calls on connection were not taken into account. Per minute local call refers to the average cost of a one-minute mobile call to within the same network, off-net and to a fixed line during Peak and Off-peak hours. Any taxes involved in these charges are included to improve comparability. Cost of a local SMS is the charge to the consumer of sending a single short messaging service (SMS) text within the local exchange area. The OECD low-user basket gives the price of a standard basket of monthly mobile usage in USD determined by the OECD for 25 outgoing calls per month (on and off the network and to fixed line) in predetermined ratios, as well as thirty SMS messages. For more details on the OECD Teligen methodology, see www.oecd.org. As a percentage (%) of monthly income is the price of the OECD low-user mobile basket divided by per capita monthly income (World Bank, Atlas method, no PPP).

8. Information technology

Internet hosts refers to the number of computers in the economy that are directly connected to the world-

wide Internet. Note that Internet host computers are identified by a two-digit country code or three-digit generic top-level domain reflecting the nature of the organization using the Internet computer. The numbers of hosts are assigned to countries based on the country code, although this may not necessarily indicate that the host is physically located in the country. In addition, all other hosts for which there is no country code identification (e.g. generic top-level domains such as .edu or .com) are assigned to the United States. Therefore, the number of Internet hosts shown for each country can only be considered an approximation. Data on Internet host computers come from Internet Software Consortium (<http://www.isc.org>) and RIPE (<http://www.ripe.net>). Internet users gives reported estimates and derivations based on reported Internet access provider subscriber counts or calculated by multiplying the number of hosts by an estimated multiplier. Estimated PCs shows the number of personal computers (PCs) in use, both in absolute numbers and in terms of PCs per 100 inhabitants. These numbers are derived from the annual ITU questionnaire, supplemented by other sources.

9. Internet prices

This table gives a representative selection of the cheapest offers for 20 hours of commercial Internet access in each country (or the cheapest commercial package most closely approximating to this, whether through broadband or dial-up access). The cost of 20 hours of dial-up access is calculated. For dial-up, the cost is assumed to spread across 10 hours of peak usage and 10 hours of off-peak usage. The cost of dial-up also includes telephone usage charges, based on twenty hours of local calls of one-hour duration, with twenty connection charges. If operators offer a special Internet dial-up tariff, this is used. Where countries have a flat rate telephone usage charge (per call rather than per minute), calls are assumed to last one hour. Note that the monthly rental for the telephone line is not included. If there is a specific 20 hour package (i.e. 20 hours included in the subscription price), this is assumed to be the cheapest. Where broadband is available, the cost of a monthly broadband subscription is compared to the cost of dial-up, since in some countries, broadband may be cheaper. (Where broadband is used, telephone usage charges are not included).

10. Fixed broadband subscribers

Although various definitions of broadband exist, the statistics here exclude services offering a combined throughput of less than 256 kbit/s in one or both directions. DSL subscribers refers to the total number of digital subscriber lines. Cable modem Internet subscribers refers to Internet subscribers via a cable TV network. Other refers to other known values for DSL,

broadband access technologies that are not related to DSL or cable modem. Examples may include fibre-optic, fixed wireless, apartment LANs or satellite connections. Total fixed broadband subscribers refers to the sum of the last known values for DSL, cable modem and other broadband subscribers. As a result, the Total broadband subscribers figure may combine data from different years. Total broadband subscribers per 100 inhabitants is calculated by dividing the total number of broadband subscribers by the population and multiplying by 100. The Growth Rate refers to the annual growth rate in the number of broadband subscribers from 2004-5, calculated by the formula above. Fixed broadband subscriber data originate from various sources, including: ITU research, OECD, the Arab Advisors Group and other sources.

11. Broadband prices

The prices gathered for the Broadband prices table give a broad representation of typical broadband offers available in an economy. Broadband is considered any dedicated connection to the Internet of 256 kbit/s or faster. They are not necessarily the cheapest, fastest or most cost-effective connections. Rather, they give a small sample of the offers available to consumers. All prices were gathered during March 2006 and translated into United States dollars using the average annual exchange rates for 2006. Broadband offers are usually residential offerings, unless ISPs offer only business packages. Since ADSL technologies are increasingly used to replace leased lines in businesses, the costs shown in the table may be very high in some developing economies and markets, as they represent replacements for leased lines (indicated by the abbreviation L), rather than residential broadband offers. In general, ISP choices do not necessarily reflect the dominant ISP in the market. Some ISPs place download limits on broadband connections and where applicable, the service offering closest to 1 Gigabyte of data per month is used. Other ISPs may put time restrictions on broadband usage. The service offering closest to 100 hours per month is selected. The prices included are those advertised and may or may not include ISP charges. Where ISP charges are known to be separate, they are included. Taxes may or may not be included in the advertised prices. All prices are gathered in local currency and converted to nominal US\$ using the average annual exchange rate for 2006. Most prices in the table are for DSL services. Cable modem prices are given if they are found to be lower or more prevalent. The prices shown do not include installation charges or telephone line rentals that are often required for DSL service. In most cases, two prices are gathered for each economy. Lower speed monthly charge refers to a lower-speed connection (typically at download speeds of 256 - 1'024 kbit/s) and gives an example of a typical "entry-level" broadband offer in the economy. The monthly charge reflects the ISP charge for one month of service. Charges do not include installation fees or modem rentals. Speed

(kbit/s) down represents the advertised maximum theoretical download speed and not speeds guaranteed to users. Higher speed monthly charge refers to a faster and typically more expensive offer available in the economy. This offer may be from a different provider other than the Lower speed offering. Download speeds are theoretical maxima. Lowest sampled cost US\$ per 100 kbit/s gives the most cost-effective subscription based on criteria of least cost per 100 kbit/s. This is calculated by dividing the monthly subscription charge in US\$ by the theoretical download speed, and then multiplying by 100. This figure is calculated for each recorded sample and the lowest cost per 100 kbit/s is given. Lowest sampled cost as a % of monthly income (GNI) is Lowest sampled cost US\$ per 100 kbit/s divided by per capita monthly income (World Bank, Atlas method, no PPP). The figure is then reported as a percentage (multiplied by 100). ISP lists the name of the Internet service provider whose sampled price was the lowest per 100 kbit/s over all the country samples.

12. Market growth

This table analyses growth in the cellular mobile and mainline telephone markets. Total Cellular Mobile Subscribers refers to the total number of users of portable telephones subscribing to an automatic public mobile telephone service using cellular technology that provides access to the PSTN for 2005. 'Lines' added or lost describes the total number of cellular mobile subscribers gained or lost between 2004-2005, obtained by subtracting the 2004 year total from the 2005 total. Growth rate presents the annual growth rate or percentage change (increase or decline) over this period. Total main telephone lines refers to telephone lines connecting a customer's equipment (e.g., telephone set, facsimile machine) to the Public Switched Telephone Network (PSTN) and which have a dedicated port on a telephone exchange. It includes ISDN subscribers but not broadband lines, even though these may be used for voice, to avoid double counting. Note that for most countries, main lines also include public payphones. Main telephone lines added or lost describes the difference in the number of telephone lines between 2004-2005, obtained by subtracting the 2004 year total from the 2005 total. Growth rate presents the annual growth rate or percentage change (increase or decline) over this period.

Sources

Demographic and economic

In addition to national sources, demographic and economic statistics were obtained from the following:

International Monetary Fund. Various years. International Financial Statistics. Washington D.C.

United Nations. Various years. Monthly Bulletin of Statistics. New York.

World Bank. Various years. World Development Indicators. Washington D.C.

Telecommunications

Telecommunication data are obtained through an annual questionnaire. The questionnaire is sent to the government Ministry responsible for telecommunications, the telecommunication regulator or telecommunication operator. Data is cross-checked and supplemented from reports issued by these organisations as well as regional telecommunication agencies. For pricing data, information is obtained from company websites or by correspondence. In a few cases, data are obtained from mission reports prepared by ITU staff or from other sources (see the Technical Notes). In some instances, estimates, generally based on extrapolation or interpolation techniques, are made by ITU staff.

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The full text for the report and Data Tables 1-3 are available at:
www.itu.int/wisr and www.unctad.org/wisr.

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