

Technical notes

General methodology

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

$$[(Pv / P0) (1/n)]^{-1}$$

where Pv = Present value

P0 = Beginning value

n = Number of periods

The result is multiplied by 100 to obtain a percentage.

United States dollar figures are reached 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 were 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 in the Tables and the text of the report.

1. Digital Opportunity Index 2005

The *Digital Opportunity Index 2005* is calculated according to the methodology described in Chapter two of this Report for 180 economies. In Table 1, these are 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 Methodological Note in Chapter two (usually 100 per cent for per capita penetration, household penetration rates and broadband ratios). This gives an index value for the eleven indicators shown in Figure 2.2. A simple average of these index values is taken to give values for the DOI sub-indices of *Opportunity, Infrastructure and Utilization*, which are in turn averaged to obtain a country's overall *Digital Opportunity Index (DOI)* score. *World rank* shows the relative position of each economy in terms of its overall DOI score, on a scale of 1 to 180, where 1 represents the highest overall DOI score.

2. Regional Tables of Digital Opportunity Index 2005

This data presents the *Digital Opportunity Index (DOI)* score for 180 countries in regional order, with the same 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 180, where 1 represents the highest overall DOI score. *Regional ranking* gives the relative ranking of the country within each region:

2a Africa – between 1 and 51;

2b Americas – between 1 and 35;

2c Asia-Pacific – between 1 and 54;

2d Europe – between 1 and 40;

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

3. Basic indicators

The data for *Population* are mid-year estimates from the United Nations (UN). National statistics have been used for some countries. *Population Density* is based on land area data from the UN: the land area does not include any overseas dependencies, but does include inland waters. The data for *gross domestic product (GDP)* are generally 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. Readers are advised to consult the publications of the international organisations listed in Sources for precise definitions of the demographic and macro-economic data. *Total telephone subscribers* refer to the sum of main telephone lines and cellular mobile subscribers. *Total telephone subscribers per 100 inhabitants* is calculated by dividing the total number of telephone subscribers by the population and multiplying by 100.

4. Mobile subscribers

Cellular mobile telephone subscribers refers to users of portable telephones subscribing to an automatic public mobile telephone service using cellular technology that provides access to the PSTN. *Per 100 inhabitants* is obtained by dividing the number of cellular subscribers by the population and multiplying by 100. *% digital* is the number of mobile cellular subscribers who use a second-generation digital cellular service (e.g. GSM, CDMA, DAMPS, PCS, PHS, W-CDMA) or a third generation one (e.g., CDMA 1x, CDMA 1x EV-DO, CDMA 1x EV-DV, TD-SCDMA, W-CDMA) by the total number

of mobile subscribers. As a % of total telephone subscribers is obtained by dividing the number of cellular subscribers by the total number of telephone subscribers (sum of the main telephone lines and the cellular subscribers) and multiplying by 100.

5. Mobile tariffs

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 with service providers. This may not necessarily be the most cost-effective connection, but rather a representative package on offer to consumers at the time of the survey, in August 2005. *Connection charge* refers to connection charges for basic telephone service in USD, using exchange rates as at 5 September 2005. 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 mobile usage monthly usage in USD determined by the OECD for 25 outgoing calls per month (on and off the network and to a fixed line) in predetermined ratios (based on typical usage patterns) plus 30 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).

6. Information technology

Internet hosts refers to the number of computers in the economy that are directly linked to the worldwide Internet network. Note that Internet host computers are identified by a two digit country code or a three digit generic top-level domain generally 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 does not necessarily indicate that the host is actually physically 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 (www.isc.org) and RIPE (www.ripe.net). *Internet Users* is based on reported estimates, 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 PC ownership *per 100 inhabitants*. These numbers are derived from the annual questionnaire, supplemented by other sources.

7. Internet tariffs

This table gives a representative selection of the cheapest prices commercially available for 20 hours per month of Internet access for each economy (or the commercial package most closely approximating to this), whether it is through dial-up or broadband access. The cost of a 20 hour dial-up package 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 set-up charges. Where countries have a special Internet dial-up tariff, this is used. Where countries have a flat rate telephone usage charge (per call rather than per minute), a call of duration one hour per session is assumed. 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, even for low usage levels. Where broadband is used, telephone usage charges are not included. Average exchange rates for 2005 were used.

8. Broadband subscribers

Although various definitions of broadband exist, the statistics here exclude services offering a combined throughput of less than 256 kbit/s in both directions. *DSL* 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 broadband access technologies that are not related to DSL or cable modem. Examples may include fibre-optic, fixed wireless, apartment LANs, satellite connections etc. Broadband subscribers refer to the sum of DSL, cable modem and other broadband subscribers. *Broadband subscribers per 100 inhabitants* is calculated by dividing the total number of broadband subscribers by the population and multiplying by 100. Total broadband subscribers sums the latest known values for DSL, cable modem, and other technologies. As a result, the *Total broadband subscribers* figure may combine data from different years. Broadband subscriber data originate from various sources, including: ITU research, OECD, the Arab Advisors Group and other sources.

9. Broadband tariffs

The prices gathered for the Broadband tariffs table are meant only as 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 do not necessarily represent the least expensive, fastest or most cost-effective connections in a particular economy. Rather, they give a small sample of the typical offers available to consumers. All prices were gathered during March 2006, with exchange rates valid as of mid-March 2006. Broadband offers are usually residential offerings unless only business connections are available from the ISP. 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 since they represent

replacements for leased lines (indicated by the abbreviation LL), 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\$ at the exchange rate on 5 September, 2005. 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 between 256 - 1'024 kbit/s download speed and is meant to show an example of a typical "entry-level" broadband offer in the economy. The monthly charge reflects the ISP charge for one month of service. It does not include installation fees or modem rental charges if they are charged separately. *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. It is not necessarily from the same provider as the Lower speed offering. Again, charges do not include installation fees or modem rentals. *Download speeds* are theoretical maximums. *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 samples for that economy.

10. Fixed lines

This table shows the number of *Fixed lines* (or main telephone lines) and *Fixed lines per 100 inhabitants* (or teledensity) for the years indicated and corresponding annual growth rates. *Fixed telephone lines* refer 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. *Fixed telephone lines per 100 inhabitants* is calculated by dividing the number of main lines by the population and multiplying by 100.

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

The telecommunications data are obtained via an annual questionnaire. Depending on the economy, the questionnaire is sent to the government ministry responsible for telecommunications, to the telecommunications regulator or to the 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 with service providers. 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.