



5.10 The information age

	Daily newspapers	Radios	Television ^a		Fax machines ^a	Personal computers ^a	Internet			Information and communications technology expenditures % of GDP 1999		
	per 1,000 people 1996	per 1,000 people 1999	Sets per 1,000 people 1999	Cable subscribers per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	Hosts per 10,000 people ^b July 2000	Users thousands ^a 1999	Monthly access charges ^a Service provider charge \$ 1998 Telephone call charge \$ 1998 Secure servers 2000			
Albania	36	217	113	..	4.8	5.2	0.35	3	..	..	1	..
Algeria	38	241	107	..	0.2	5.8	0.01	20	..	..	..	..
Angola	11	62	15	..	..	1.0	0.01	10	..	..	..	..
Argentina	123	681	293	163.2	2.4	49.2	47.34	900	30	11	219	3.41
Armenia	23	224	238	0.4	0.3	5.7	3.13	30	..	..	2	..
Australia	293	1,378	706	30.3	48.6	469.2	683.26	6,000	22	6	3,207	8.85
Austria	296	753	516	138.8	..	256.8	431.74	1,840	23	29	554	4.82
Azerbaijan	27	23	254	0.1	..	..	0.23	8	..	..	1	..
Bangladesh	9	50	7	..	..	1.0	0.00	50	..	..	1	..
Belarus	174	296	322	..	2.3	..	1.06	50	..	..	3	..
Belgium	160	792	523	369.6	..	315.2	352.15	1,400	23	20	310	5.88
Benin	2	110	11	..	..	1.5	0.04	10	..	..	1	..
Bolivia	55	676	118	5.1	..	12.3	1.73	78	..	..	5	..
Bosnia and Herzegovina	152	245	112	..	..	..	1.84	4	..	..	..	..
Botswana	27	156	20	..	2.3	31.0	14.63	12	..	..	..	..
Brazil	40	444	333	15.5	3.1	36.3	38.97	3,500	33	3	923	5.82
Bulgaria	257	543	408	28.8	..	26.6	18.80	235	..	..	19	1.76
Burkina Faso	1	33	11	..	..	1.0	0.19	4	..	..	..	..
Burundi	3	152	15	..	..	..	0.00	2	..	..	..	..
Cambodia	2	128	9	..	0.3	1.2	0.18	4	..	..	1	..
Cameroon	7	163	34	..	..	2.7	0.01	20	..	..	..	..
Canada	159	1,047	715	273.2	35.8	360.8	590.37	11,000	12	0	4,530	8.52
Central African Republic	2	83	6	..	0.1	1.4	0.02	1	..	..	..	..
Chad	0	242	1	..	0.0	1.3	0.01	1	..	..	..	..
Chile	98	355	240	44.9	2.7	66.6	33.78	700	32	7	112	5.74
China	..	334	292	47.2	1.6	12.2	0.69	8,900	39	26	171	4.86
Hong Kong, China	792	678	434	68.0	58.0	297.6	182.92	2,430	18	5	475	8.31
Colombia	46	560	199	15.5	4.6	33.7	10.15	664	..	..	54	8.85
Congo, Dem. Rep.	3	375	2	..	..	..	0.00	1	..	..	..	..
Congo, Rep.	8	124	13	..	..	3.5	0.01	1	..	..	..	..
Costa Rica	94	776	229	19.1	2.3	101.7	24.33	150	..	..	48	..
Côte d'Ivoire	17	164	70	0.0	..	5.5	0.37	20	..	..	1	..
Croatia	115	336	279	42.4	11.2	67.0	42.61	200	..	..	44	..
Cuba	118	355	246	..	..	9.9	0.33	35	..	..	2	..
Czech Republic	254	803	487	89.7	9.9	107.2	134.39	700	25	15	232	8.49
Denmark	309	1,318	621	250.5	..	414.0	692.29	1,500	23	27	332	6.94
Dominican Republic	52	178	96	..	..	..	9.16	25	..	..	8	..
Ecuador	70	420	205	16.4	..	20.1	1.67	35	..	..	9	..
Egypt, Arab Rep.	40	324	183	..	0.5	12.0	0.85	200	..	..	12	3.32
El Salvador	48	478	191	45.0	..	16.2	1.62	40	..	..	9	..
Eritrea	..	484	16	..	0.4	..	0.02	1	..	..	..	..
Estonia	174	966	555	75.9	..	135.2	249.29	200	..	..	70	..
Ethiopia	1	196	6	..	0.1	0.7	0.01	8	..	..	1	..
Finland	455	1,563	643	180.5	38.4	360.1	1,358.99	2,143	9	18	414	5.88
France	218	937	623	43.4	47.5	221.8	167.11	5,370	17	26	1,446	5.96
Gabon	29	500	251	8.3	0.4	8.4	0.21	3	..	..	..	..
Gambia, The	2	394	3	..	1.0	7.9	0.12	3	..	..	..	..
Georgia	..	555	474	2.8	..	..	2.06	20	..	..	13	..
Germany	311	948	580	226.3	79.1	297.0	233.29	14,400	23	28	4,441	5.27
Ghana	14	680	115	..	..	2.5	0.06	20	..	..	1	..
Greece	153	478	480	1.2	..	60.2	100.38	750	21	7	106	5.51
Guatemala	33	80	61	28.5	..	9.9	2.54	65	..	..	10	..
Guinea	..	49	44	0.0	0.4	3.4	0.00	5	..	..	..	..
Guinea-Bissau	5	44	0.4	..	0.11	2
Haiti	3	55	5	0.00	6	1	..
Honduras	55	395	95	8.1	..	9.5	0.19	20	4	..



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			Sets per 1,000 people 1999	Cable subscribers per 1,000 people 1999			Hosts per 10,000 people ^b July 2000	Users thousands ^a 1999	Monthly access charges ^a		Secure servers 2000	
	per 1,000 people 1996	per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	per 10,000 people ^b July 2000	Users thousands ^a 1999	Service provider charge \$ 1998	Telephone call charge \$ 1998	Secure servers 2000	% of GDP 1999
Hungary	186	687	448	159.0	17.6	74.7	129.30	600	24	20	100	6.42
India	..	121	75	37.1	0.2	3.3	0.32	2,800	13	0	85	3.46
Indonesia	24	157	143	..	0.9	9.1	1.15	900	9	6	54	1.39
Iran, Islamic Rep.	28	264	157	..	..	52.4	0.11	100	..	..	..	..
Iraq	19	229	83	..	..	..	0.00	..	..	..	..	..
Ireland	150	699	406	171.2	27.4	404.9	227.43	679	21	14	290	6.48
Israel	290	519	328	188.5	..	245.7	260.58	800	25	3	..	7.36
Italy	104	880	488	2.8	31.4	191.8	272.96	7,000	23	14	940	4.72
Jamaica	62	795	189	98.8	..	43.0	2.26	60	..	..	5	..
Japan	578	960	719	125.4	127.0	286.9	269.25	27,060	41	14	4,139	7.06
Jordan	58	288	83	0.1	8.4	13.9	1.45	120	..	..	2	..
Kazakhstan	..	395	238	..	0.1	..	2.82	70	..	..	17	..
Kenya	9	104	22	..	..	4.2	0.32	35	..	..	..	..
Korea, Dem. Rep.	199	147	55	..	..	..	..	..	..	..	..	..
Korea, Rep.	393	1,033	361	150.1	..	181.8	100.65	10,860	12	14	313	4.42
Kuwait	374	632	480	..	31.6	121.3	23.15	100	..	..	3	..
Kyrgyz Republic	15	112	47	..	..	..	6.18	10	..	..	1	..
Lao PDR	4	143	10	..	..	2.3	0.00	2	..	..	..	..
Latvia	247	684	741	66.8	..	82.0	65.26	105	..	..	33	..
Lebanon	107	908	351	1.4	..	46.4	11.89	200	..	..	16	..
Lesotho	8	49	16	..	..	..	0.39	1	..	..	..	..
Libya	14	243	136	..	..	..	0.01	7	..	..	..	..
Lithuania	93	500	420	62.2	1.7	59.5	38.66	103	..	..	39	..
Macedonia, FYR	21	206	250	..	1.5	..	11.53	30	..	..	..	..
Madagascar	5	198	22	..	..	1.9	0.36	8	..	..	..	..
Malawi	3	250	3	..	0.1	0.9	0.00	10	..	..	..	..
Malaysia	158	419	174	5.2	8.1	68.7	27.55	1,500	1	8	128	5.20
Mali	1	54	12	0.0	..	1.0	0.05	10	..	..	1	..
Mauritania	0	151	96	..	1.3	27.2	0.20	13	..	..	..	..
Mauritius	75	368	230	..	26.1	95.7	27.70	55	..	..	11	..
Mexico	97	325	267	15.7	3.0	44.2	50.60	1,822	24	3	218	4.20
Moldova	60	742	297	17.8	0.2	8.0	4.02	25	..	..	3	..
Mongolia	27	151	61	10.8	3.0	9.2	0.70	6	..	..	1	..
Morocco	26	241	165	..	0.7	10.8	0.33	50	..	..	4	..
Mozambique	3	40	5	..	..	2.6	0.10	15	..	..	..	..
Myanmar	10	70	7	..	0.1	1.1	0.00	1	..	..	..	..
Namibia	19	144	38	..	..	29.5	19.76	6	..	..	2	..
Nepal	11	39	7	2.9	0.4	2.7	0.35	35	..	..	..	..
Netherlands	306	981	600	387.3	38.5	359.9	679.75	3,000	23	19	695	7.13
New Zealand	216	989	518	76.5	..	328.0	807.94	700	19	0	539	10.54
Nicaragua	30	277	69	40.5	..	8.1	2.18	20	..	..	4	..
Niger	0	66	27	..	..	0.4	0.12	3	..	..	..	..
Nigeria	24	224	68	..	..	6.4	0.01	100	..	..	1	..
Norway	588	916	648	184.3	50.0	446.6	1,121.12	2,000	13	22	318	6.93
Oman	29	598	575	..	2.7	26.4	3.00	50	..	..	1	..
Pakistan	23	104	119	0.1	2.0	4.3	0.40	80	..	..	6	..
Panama	62	300	192	..	..	32.0	10.21	45	..	..	25	..
Papua New Guinea	15	95	13	..	..	..	0.70	2	..	..	..	..
Paraguay	43	182	205	15.4	..	11.2	2.66	20	..	..	5	..
Peru	0	273	147	14.1	..	35.7	3.88	400	..	..	26	..
Philippines	79	159	110	9.4	..	16.9	2.21	500	31	0	59	2.71
Poland	113	522	387	122.0	..	62.0	67.14	2,100	14	20	251	4.90
Portugal	75	304	560	59.8	7.0	93.0	117.25	700	19	10	131	5.31
Puerto Rico	126	742	324	72.0	..	..	3.10	200	..	..	52	..
Romania	300	335	312	129.5	..	26.8	13.23	600	40	1.78
Russian Federation	105	418	421	23.1	0.4	37.4	19.50	2,700	20	0	242	1.55



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Rwanda	0	102	0	..	0.1	..	0.42	5	1	..
Saudi Arabia	57	321	263	57.4	1.53	300	9	..
Senegal	5	142	41	15.1	0.51	30
Sierra Leone	4	274	13	0.0	0.5	..	0.16	2	..	..	1	..
Singapore	360	682	308	53.2	25.8	436.6	385.73	950	15	5	483	7.67
Slovak Republic	185	967	417	122.3	10.0	109.7	58.78	600	..	..	59	5.98
Slovenia	199	407	356	150.8	10.5	251.4	99.12	250	..	..	98	4.31
South Africa	32	333	129	..	3.6	54.7	43.12	1,820	17	8	470	7.17
Spain	100	333	547	13.3	..	119.4	136.51	4,652	23	16	857	4.03
Sri Lanka	29	209	102	0.0	..	5.6	0.91	65	..	..	5	..
Sudan	27	271	173	0.0	0.9	2.9	0.00	5	..	..	..	..
Sweden	445	932	531	221.5	..	451.4	703.91	3,666	22	17	934	9.28
Switzerland	337	1,000	518	357.1	..	461.9	582.23	1,427	18	14	..	7.48
Syrian Arab Republic	20	277	66	..	1.4	14.3	0.00	20	..	..	1	..
Tajikistan	20	142	328	..	0.3	..	0.36	2	..	..	..	..
Tanzania	4	279	21	..	..	2.4	0.16	25	..	..	..	..
Thailand	63	233	289	2.4	2.5	22.7	8.84	800	25	33	103	2.13
Togo	4	227	22	..	4.1	17.7	0.34	15	..	..	..	..
Trinidad and Tobago	123	535	337	..	3.9	54.2	41.88	30	..	..	8	..
Tunisia	31	158	190	..	3.4	15.3	0.10	30	..	..	4	..
Turkey	111	180	332	11.0	1.7	33.8	16.60	1,500	25	9	171	2.47
Turkmenistan	..	277	201	..	..	..	1.03	2	..	..	..	..
Uganda	2	127	28	..	..	2.5	0.07	25	..	..	1	..
Ukraine	54	884	413	15.7	0.0	15.8	6.57	200	..	..	37	..
United Arab Emirates	156	345	252	..	21.0	102.1	92.13	400	..	..	24	..
United Kingdom	329	1,435	652	52.6	..	302.5	348.34	12,500	20	29	5,374	9.35
United States	215	2,146	844	246.3	78.4	510.5	2,419.86	74,100	20	0	73,386	8.87
Uruguay	293	606	531	104.6	..	99.6	107.27	300	..	..	32	..
Uzbekistan	3	458	276	..	0.1	..	0.09	8	..	..	1	..
Venezuela, RB	206	470	185	25.9	3.0	42.2	6.48	525	28	39	86	3.44
Vietnam	4	107	184	..	0.4	8.9	0.01	100	..	..	4	7.40
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	15	64	286	..	..	1.7	0.06	10	..	..	..	..
Yugoslavia, FR (Serb./Mont.)	107	297	273	..	1.9	20.7	13.38	80	..	..	8	..
Zambia	12	160	145	..	0.1	7.2	0.86	15	..	..	..	..
Zimbabwe	19	390	180	..	..	13.0	2.61	20	..	..	..	..
World	.. w	420w	268 w	58.5 w	12.3 w	68.4 w	152.47 w	241,864 s			110,498 s	
Low income	..	157	85	..	0.4	4.4	0.48	4,766			224	
Middle income	..	360	279	44.5	2.0	27.1	13.20	45,241			4,622	
Lower middle income	..	322	273	41.4	1.5	17.7	3.55	17,942			1,141	
Upper middle income	89	498	304	50.2	3.8	60.9	48.45	27,299			3,481	
Low & middle income	..	264	193	32.8	1.3	16.6	7.15	50,006			4,846	
East Asia & Pacific	..	302	252	46.8	1.5	17.0	3.98	23,593			844	
Europe & Central Asia	102	446	370	49.9	1.5	39.3	24.10	10,184			1,392	
Latin America & Carib.	71	419	272	29.6	3.1	37.7	29.62	9,687			1,946	
Middle East & N. Africa	33	272	175	..	..	25.4	0.67	1,153			72	
South Asia	..	113	71	36.3	0.3	3.2	0.31	3,034			97	
Sub-Saharan Africa	12	201	43	..	..	8.4	3.10	2,357			495	
High income	286	1,289	693	160.4	73.0	345.9	981.74	191,857			105,652	
Europe EMU	208	821	582	101.6	47.9	234.9	263.37	41,280			10,131	

a. Data are from the International Telecommunication Union's (ITU) *World Telecommunication Development Report 2000* and *Challenges to the Network: Internet for Development* (1999). Please cite the ITU for third-party use of these data. b. Data are from the Internet Software Consortium (www.isc.org).



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About the data

The table includes indicators of the penetration of the information economy—newspapers, radios, television sets, fax machines, personal computers, and Internet hosts and users—as well as some of the economics of the information age—Internet access charges, the number of secure servers, and spending on information and communications technology. Other important indicators of information and communications technology—such as the use of teleconferencing or the use of the Internet in organizing conferences, distance education, and commercial transactions—are not collected systematically and so are not reported here. Important as all these indicators are, they fail to capture characteristics of the information disseminated, such as its quality.

The data on the number of daily newspapers in circulation and radio receivers in use are from statistical surveys carried out by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). In some countries definitions, classifications, and methods of enumeration do not entirely conform to UNESCO standards. For example, newspaper circulation data should refer to the number of copies distributed, but in some cases the figures reported are the number of copies printed. In addition, many countries impose radio and television license fees to help pay for public broadcasting, discouraging radio and television owners from declaring ownership. Because of these and other data collection problems, estimates of the number of newspapers and radios vary widely in reliability and should be interpreted with caution.

The data for other electronic communications and information technology are from the International Telecommunication Union (ITU), the Internet Software Consortium, Netcraft, and the World Information Technology and Services Alliance. The ITU collects data on television sets and cable television subscribers through annual questionnaires sent to national broadcasting authorities and industry associations. Some countries require that television sets be registered. To the extent that households do not register their televisions or do not register all of their televisions, the data on licensed sets may understate the true number.

Because of different regulatory requirements for the provision of data, complete measurement of the telecommunications sector is not possible. Telecommunications data are compiled through annual questionnaires sent to telecommunications authorities and operating companies. The data are supplemented by annual reports and statistical yearbooks of telecommunications ministries, regulators, operators, and industry associations. In some cases estimates are derived from ITU documents or other references.

The data on fax machines exclude fax modems attached to computers. Some operators report only the equipment they sell, lease, or register, so the actual number is almost certainly much higher.

The estimates of personal computers are derived from an annual questionnaire, supplemented by other sources. In many countries mainframe computers are used extensively, and thousands of users can be connected to a single mainframe computer; thus the number of personal computers understates the total use of computers.

Internet hosts are computers connected directly to the worldwide network, each allowing many computer users to access the Internet. Hosts are assigned to countries on the basis of the host's country code, though this does not necessarily indicate that the host is physically located in that country. All hosts lacking a country code identification are assigned to the United States. The Internet Software Consortium changed the methods used in its Internet domain survey beginning in July 1998. The new survey is believed to be more reliable and to avoid the undercounting that occurs when organizations restrict download access to their domain data. Nevertheless, some measurement problems remain, so the number of Internet hosts shown for each country should be considered an approximation. In particular, most hosts are now under generic top-level domains (for example, .com, .net, and .org), which, unlike country code top-level domains (.de, .uk), have never had a geographic designation (see Zook 2000). For detailed analysis of Internet trends by country, it is best to use the original source data.

Data on Internet users are based on reported estimates, derived from reported counts of Internet service provider (ISP) subscribers, or calculated by multiplying the number of hosts by an estimated multiplier. The price of Internet access in many countries is a major constraint on universal access. The table shows both the ISP charge and the telephone call charge. ISP charges are similar across countries, but telephone call charges vary much more and are extremely high in some countries because of the monopolistic power of the telecommunications operator. As a result, the price of Internet access is much higher in developing than in high-income countries, especially relative to per capita income.

The number of secure servers, from the Netcraft Secure Server Survey, gives an indication of how many companies are conducting encrypted transactions over the Internet. The data on information and communications technology expenditures cover the world's 55 largest buyers of such technology among countries and regions, accounting for 98 percent of global spending.

Definitions

- **Daily newspapers** refer to those published at least four times a week.
- **Radios** refer to radio receivers in use for broadcasts to the general public.
- **Television sets** refer to those in use.
- **Cable television subscribers** are households that subscribe to a multichannel television service delivered by a fixed line connection. Some countries also report subscribers to pay television using wireless technology or those cabled to community antenna systems.
- **Fax machines** are facsimile machines connected to the public switched telephone network.
- **Personal computers** are self-contained computers designed to be used by a single individual.
- **Internet hosts** are computers with active Internet Protocol (IP) addresses connected to the Internet. All hosts without a country code identification are assumed to be located in the United States.
- **Internet users** are people with access to the worldwide network.
- **Internet service provider charge** is the monthly dial-up access charge for 20 hours of use. It includes local telephone call charges and taxes but excludes the initial ISP connection charge.
- **Internet telephone call charge** is the off-peak telephone call charge for 20 hours of Internet access. If a special Internet tariff exists, it is used instead.
- **Secure servers** are servers using encryption technology in Internet transactions.
- **Information and communications technology expenditures** include external spending on information technology ("tangible" spending on information technology products purchased by businesses, households, governments, and education institutions from vendors or organizations outside the purchasing entity), internal spending on information technology ("intangible" spending on internally customized software, capital depreciation, and the like), and spending on telecommunications and other office equipment.

Data sources

The data on newspapers and radios are compiled by UNESCO. The data on television sets, cable television subscribers, fax machines, personal computers, Internet users, and Internet access charges are from the ITU. They are reported in the ITU's *World Telecommunication Development Report 2000, Challenges to the Network: Internet for Development* (1999), and the *World Telecommunications Indicators Database* (2000b). The data on Internet hosts are from the Internet Software Consortium (www.isc.org), and the data on secure servers from Netcraft (www.netcraft.com/). The data on information and communications technology expenditures are from *Digital Planet 2000: The Global Information Economy* by the World Information Technology and Services Alliance (WITSA), which uses data from the International Data Corporation.