YOUTH, ICTS AND DEVELOPMENT

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The first few years of the new millennium saw extremely rapid increases in internet, mobile phone, and computer use in developing countries. Between 2000 and 2003, the developing world gained more than one-quarter of a billion internet users and almost half a billion mobile phones. These new technologies are growing much faster than older information and communication technologies (ICTs) such as television, radio, mainline telephones, and newspapers (definition 1 and table 1). Mobile phones have overtaken mainline phones in coverage in many parts of the world, and there are more internet users per 1,000 people than there are daily newspapers purchased in every region except South Asia. Even so, internet use remains low in poorer developing countries, and radios and televisions are much more prevalent.

TABLE 1: *Catching up fast: The rise of new technologies*

ICT rate per 1000 people for:	EAP	ECA	LAC	MENA	SAS	SSA	Low Income	Middle Income	High Income
"Old" ICT									
Daily newspapers	60	n.a.	61	n.a.	59	12	44	55	n.a.
Radios	287	447	410	273	112	198	137	344	425
Telephone mainlines	161	228	170	133	39	11	32	177	393
Television sets	314	408	290	205	81	63	78	319	362
"New" ICT									
Internet users	68	161	106	46	10	20	16	117	279
Mobile phones	195	301	246	85	23	51	23	224	785
Personal computers	26	73	67	31	7	12	7	42	284
Annual per capita growth since 2000 (%)									
Internet users	41	59	38	39	20	32	63	46	13
Mobile phones	51	48	27	52	87	42	83	43	17
Personal computers	28	18	17	9	27	11	24	20	12
Telephone mainlines	21	1	5	15	12	3	14	12	0
Television sets	10	n.a.	n.a.	10	5	5	4	5	0

Source: World Bank (2006b).
Note: Data are generally for 2002–3, except for newspapers (2000) and radio (1997). High-income countries are non-OECD high income. n.a.= Not available. EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MENA = the Middle East and North Africa; SA = South Asia; SSA = Sub-Saharan Africa.

Rapid Growth in ICT Use Among Young People

Although young and old alike watch television and listen to the radio, young people are the main users of the new ICTs, especially the internet and more advanced features of mobile phones such as text messaging, also known as short messaging service (SMS). In a typical age pattern, youth were the first adopters of the internet in the Kyrgyz Republic and account for most of the growth in users between 2001 and 2005 (figure 8.6). Data from surveys in 2005 show that youth accounted for 43 percent of all internet users ages 15 and older in China, 50 percent in Armenia, 53 percent in Bolivia, 60 percent in Egypt, 61 percent in the Kyrgyz Republic, and

70 percent in Indonesia. These proportions, similar to those for 2002 and 2003, suggest that approximately 130–160 million of the 269 million new internet users between 2000 and 2003 were 15 to 24.

Although youth are more likely than older age groups to use the new ICTs, the use among youth varies dramatically. Across countries surveyed in 2005, the share of 15- to 24-year-olds who have ever used the internet varies from less than 1 percent in Ethiopia to 12 percent in Indonesia, 13 percent in Ghana, 15 percent in Egypt, 29 percent in Armenia, and 53 percent in China. The digital divide also occurs within countries (table 2). Computer and mobile phone ownership and internet and SMS usage are highest among youth in urban areas and with more education and higher household incomes. In Indonesia, 59 percent of university students had used the internet and 95 percent SMS, compared with 5 percent or less among youth with only primary education.

The use of these new ICTs is a more communal experience in developing countries than in developed. Many youth do not have computers in their own homes, and instead access the internet at school or at internet cafes (figure 2). Access at school varies considerably across countries. Some
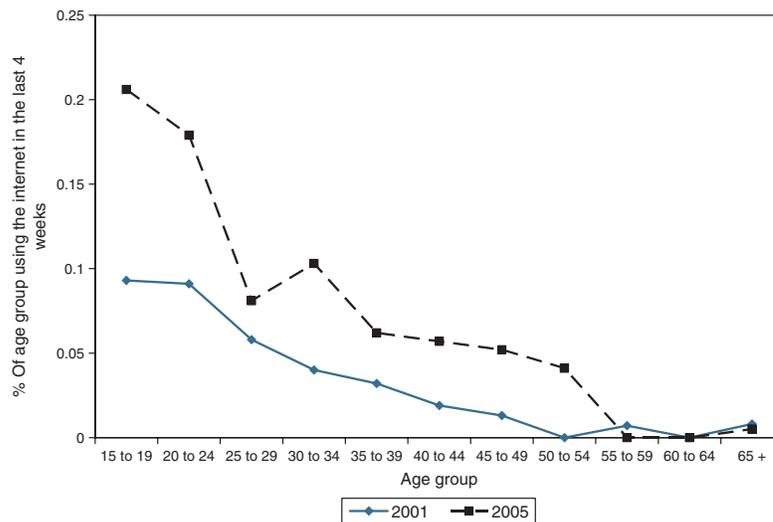
Source: **WDR 2007 Intermedia survey.**

TABLE 2: *The digital divide among Indonesian youth*

	Percentage of Youth with			
	Internet Use	Computer in home	Mobile phone	SMS use
All 15–24 year olds	12	5	26	24
15–19 year olds	13	4	20	20
20–24 year olds	12	5	31	28
Among 15–24 year olds				
Males	16	5	22	22
Females	8	5	31	27
Urban youth	16	7	28	27
Rural youth	6	2	21	18
Primary education or less	3	1	9	5
Secondary education	7	4	19	19
Senior education	20	8	37	35
College/University education	59	28	96	95
Monthly household income:				
above Rp.1250,000	29	19	57	55
Rp 600,000 to 1250,000	10	3	33	22
less than Rp 600,000	5	0	7	7

Source: **Intermedia survey (July 2005).**
Note: **Rp = Indonesian rupiah.**

FIGURE 2: *Public Internet access points are important for young people*
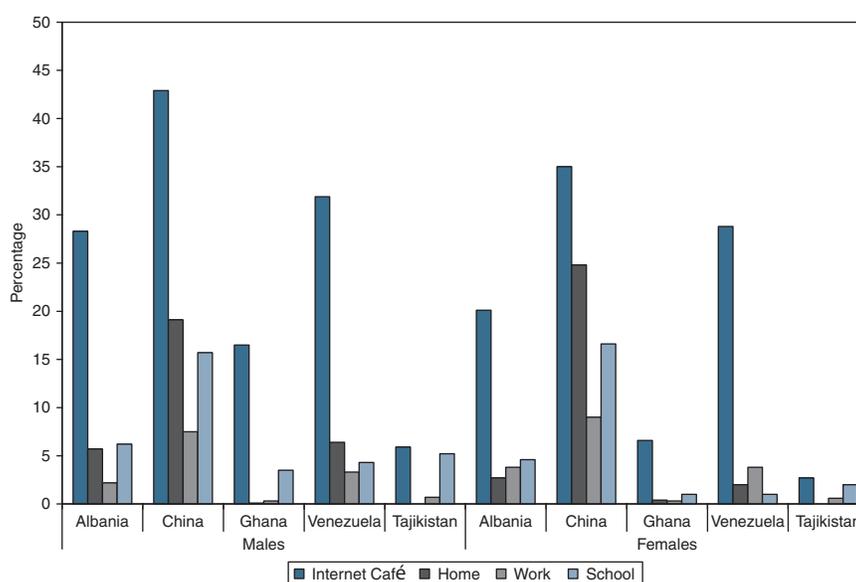
Source: **Intermedia survey (2005).**

richer developing countries have connected many schools, with Chile having 75 percent of schools online. In contrast, data from six Sub-Saharan African countries reveal that fewer than 1 percent of schools are covered.[1] Mobile phone use can also be communal, especially in rural areas. Widespread access to phone resellers in many countries has reduced the barrier to access for young people.

In some countries, young women access the internet less through these public access points than do young men (figure 2). In Ghana, 16.5 percent of male youth use internet cafes, more than twice the 6.6 percent for female youth. Women may not feel comfortable or may be restricted from attending these public points alone or after certain hours. Even at school, girls may find it harder to gain access. In Sub-Saharan Africa, enrollment rates of boys greatly exceed those of girls, so girls compete with a large number of boys for scarce computer resources.[2] In contrast, young women do not appear to have less access to mobile phones than young men, and may actually use them more in some countries.

Young people are more likely to adopt these new technologies for economic, physiological, and social reasons. As with migration, longer working lives mean that young people have more time to gather the benefits from investing in new technology. The cost of investing in the skills required to learn how to use the new ICTs is also likely to be less for youth, who are better educated than older generations and may receive training through school. Moreover, youth find it easier to acquire complex information-processing tasks. The tendency of youth to use these technologies is amplified by the desire to use these technologies for entertainment, and reinforced through peer learning and network effects: the value of a mobile phone or internet connection increases when more of one's peers are using it.

As a result of this rapid expansion in ICTs, young people around the world are more able to access information and connect to ideas and people outside their countries. In 2005 it was estimated that there were close to 1 billion internet users worldwide.[3] A social experiment involving users in 166 countries, meas- uring the number of steps required to connect to designated targets, found that the popular notion of "six degrees of separation" between any two people in the internet world is not too far wrong: the median number of steps required to connect users in different countries was seven.[4] Surveys for this report show youth to be more likely than 25- to 50-year-olds to communicate with people in other countries (figure 3). A remarkable 44 percent of Romanian youth and 74 percent of Albanian youth reported having communicated with someone abroad in the last month. Telephone is the most common means of communication, but SMS and e-mail are also very popular.

Global Connectivity and the Youth Transitions

Although the main reason for many youth to use computers, the internet, and mobile phones is entertainment—playing games, downloading music, and talking with friends (table 3)—the new ICT technologies are having wide-ranging effects on youth transitions. New opportunities for work and study are opening up, and the interactive and decentralized nature of these new technologies is providing youth with many more opportunities to obtain information outside the traditional channels, enhancing their agency. While the majority of youth in many developing countries still do not use the internet or mobile phones, the experience of those who do shows the possibilities and potential benefits of increased access. Because the spread of these technologies is very new in many developing countries, much of the impact has yet to be carefully evaluated. Thus, in many cases this report can describe only how the new ICTs are being used to enhance youth transitions, without providing systematic evidence on the magnitude of the effects. Even so, the rapid and continuing growth of ICTs in developing countries suggests that their importance for youth will increase over the next few years.

Broadening opportunities and providing second chances for work. Business process outsourcing employed approximately 695,000 people in India in 2004–5.[5] One estimate suggests that 11 percent of all service jobs worldwide, amounting to 160 million jobs, could be carried out remotely.[6]

1   Enlaces Centro de Educación y Tecnología (2005), Halewood and Kenny (2006).
2   Mar Gadio (2001).
3   Internet World Statistics, http://www.internetworldstats.com/stats.htm, November 21, 2005, update [accessed December 5, 2005].
4   Dodds, Muhamad, and Watts (2003).
5   Halewood and Kenny (2006).
6   McKinsey Global Institute (2005).

**Percent communicating with someone in another country
in the last month and mode of communication**
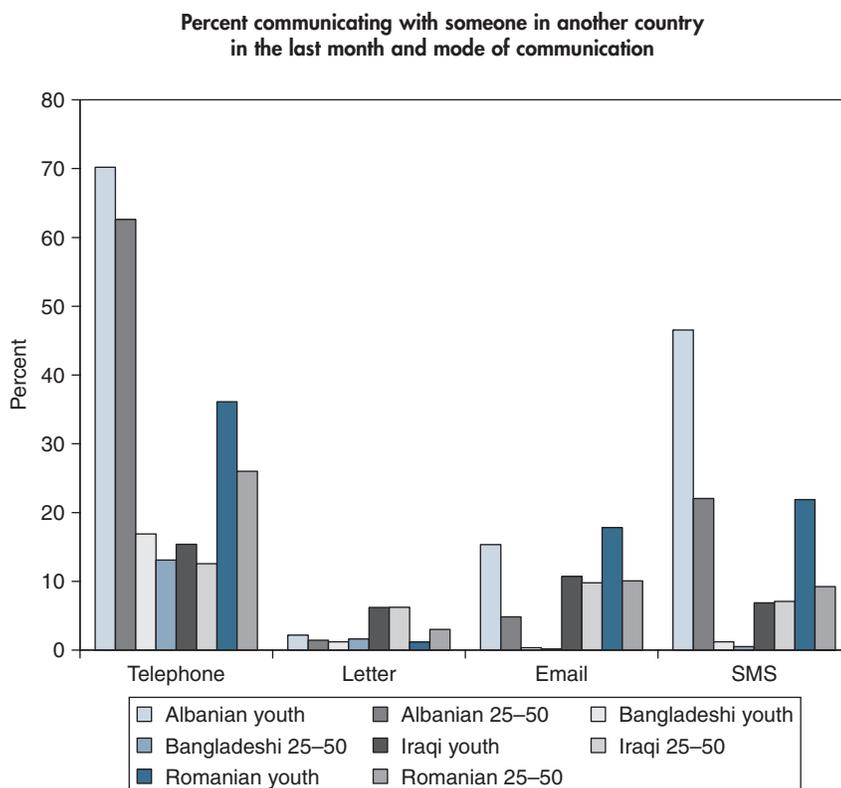
Source: WDR 2007 Intermedia survey.
Note: The figure reflects communication with people abroad in the past month.

However, actual offshore employment is predicted to only reach 4.1 million by 2008, suggesting considerable scope for future growth. Such employment acts as an alternative to migration, allowing workers to sell their labor overseas without having to leave their country.

The average age of a call center employee in India is 23, with employees more likely to be male and urban and to have upper secondary or tertiary qualifications. While wages are much lower than in developed countries, they are high by developing country standards, creating a new generation of young professionals who are often the first in their families to have a debit card, benefits, and to live alone or with roommates. Other jobs created for

youth by ICTs include employment as programmers, internet café workers, local language Web site developers, and village phone operators.[7]

In addition to directly creating jobs, ICTs provide information about non-ICT job openings to youth. Online jobs databases, such as one run by the Philippines Department of Labor and Employment, offer information to those with internet access. In poorer developing countries, mobile phones are particularly important for job information. In South Africa and Tanzania, many respondents identified mobile phones as essential for contacting employers and getting contacted about job openings, particularly in remote areas and areas of high crime.[8] The newer uses of mobile technology are also

7   Curtain (2001).
8   Samuel, Shah, and Hadingham (2005).

TABLE 3: *What do youth do online?*

Percentage of Chinese internet users ages 16–25 reporting that they sometimes, often, or always use the internet to

Play games	72
Download music	70
Do general browsing	69
Read news	61
Search entertainment information	61
E-mail	53
Online chat	50
Online study	35
Work	31
Check product information	30
Search for medical information	20
Blog	15
Online professional training	11

Source: The Chinese Academy of Social Sciences Internet Survey taken in five cities, January 2005.[9]

proving useful for job information. OKN Mobile in Kenya provides a job information service called Kazi560, which sends SMS (text message) job advertisements to job-seekers, who pay a small fee per listing received. The service, with more than 30,000 subscribers, is targeted at poorer workers for whom the cost of job information has been prohibitive—the SMS information is marketed at one-tenth the cost of a newspaper or bus fare into town.[10]

New ICTs also offer the potential for a second chance at work for youth with disabilities, but this promise has yet to be achieved for many disabled youth. Speech synthesizers and text magnifier programs can allow visually impaired youth to use ICTs for work, while e-mail and SMS offer greater flexibility in work-related communication needs for the hearing impaired. Many ICT jobs do not require mobility, and coupled with possibilities for

telecommuting, this opens options for youth with disabilities.[11] However, young people with disabilities often have among the least access, due to higher likelihoods of low income and education, and to physical barriers such as internet cafes that are not wheelchair accessible or equipped with the necessary technologies. One example of a self-sustainable business model providing opportunities for disabled youth is Digital Divide Data (DDD), a data outsourcing center in Cambodia that employs only youth who are orphans, land mine victims, physically disabled, or trafficked, with each of the more than 100 employees receiving vocational training and scholarships to continue their education.[12]

ICTs diversify the range of learning opportunities, but lack of education can be a barrier to their use. Distance education has incorporated television and radio for more than 60 years, and these traditional ICTs are still the most cost-effective ICT educational interventions for secondary schooling in many developing countries, helping to meet the challenge of extending schooling beyond primary. For example, Mexico's Telesecundaria program gives those finishing primary school in rural areas a way to continue their schooling without having to travel long distances.[13] More than 1.2 million students in 16,500 locations receive televised lessons, followed by in-class work guided by a teacher. One teacher is used to cover all subjects, rather than the subject matter specialists used in general secondary schools—cutting per student costs in half. But concerns remain about quality, with Telesecundaria students scoring poorly on the international Programme for International Student Assessment tests. The challenge is thus to raise quality while maintaining the low cost.

For tertiary education, the internet's capacity for two-way interaction offers the greatest promise for improving access and affordability and for providing flexibility to combine work with further study. Several developing countries already cater to substantial numbers of online students, while developing country students also take online classes from developed country universities without having to migrate. For example, close to 1 million students are studying online in China, while the U.S.-based University of Phoenix had students from about

9 Special tabulations for youth provided by Guo Liang. See Liang (2005) for full details of the survey.
10 Mungai (2005).
11 International Labour Office (ILO) (2001).
12 www.digitaldividedata.com. [accessed December 3, 2005].
13 Instituto Nacional para la Evaluación de la Educación de Mexico (2006).

BOX 1: *Moving in fits and starts with technology—The African Virtual University*

Tertiary education in many Sub-Saharan African countries is hampered by limited resources, empty libraries, and excess demand for classes. The African Virtual University (AVU) uses new technologies to help remedy this problem, increasing access to quality tertiary education in the region by tapping into global knowledge and educational institutions. But its experience illustrates the travails of working with evolving technologies and the challenges currently facing online education in developing countries.

The AVU grew out of a World Bank pilot project initiated in 1997. Its rocky start raised concerns about its viability. Because the ICT infrastructure in Africa was in its infancy, the initial delivery approach used digital video broadcasting over satellite networks, very expensive and offering only limited interactivity with teachers. Rapid advances in internet protocol standards during 1998–2001 made online learning feasible—and African Virtual University's 100 percent satellite-based approach outdated and inefficient.

AVU reassessed its technology options in 2001 to reduce costs and improve the connectivity and efficiency of networks. The delivery approach now consists of a mixed mode methodology, incorporating online and satellite video broadcast courses, prepackaged learning materials on CD-ROMs and DVDs, chat sessions with the lecturer, and face-to-face in-class sessions with teaching assistants. Supplementary use of the internet lowered costs significantly, but satellite technology is still needed because of poor telecommunications infrastructure in the region.

The AVU has provided courses to over 24,000 participants. Degree, diploma, certificate, and short-course programs are offered in a range of subjects, including computer science, public health, languages, journalism, accounting, and business administration. Current joint university programs include business studies offered through Curtin University in Australia, and computer science offered through RMIT University in Australia and Laval University in Canada. AVU also provides a digital library, offering access to international journals and e-books, substituting for empty libraries.

The AVU, a work in progress, will need to continue to evolve with technology. African universities still are likely to pay 100 times more for internet service than institutions in North America. The remaining challenge is finance. The AVU pilot relied too heavily on donor financing and private sector subsidies. The learning centers are now financed through course fees and educational grants from local universities and governments.

Source: www.avu.org, Prakesh (2003), International Telecommunication Union (2005) and Halewood and Kenny (2006).

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90 countries in 2003.[14] Such programs can expand access and save on costs. Mexico's Tec Milenio uses professors from its parent university to deliver online courses to modestly equipped satellite campuses for one-third the original cost, opening access to young working adults. In other countries, however, poor infrastructure, low incomes, and government regulation limit the access of youth to online education. One approach in these circumstances is to create learning centers that combine online classes with local moderators and technology (box 1).

Considerable debate surrounds the cost-effectiveness and justification for public provision of specialized classes in computer skills in poor developing countries. Some initiatives, such as the World Links program in Uganda, lessen digital divides in access and have spillover benefits, with 80 percent of secondary school students in the program indicating that they had taught friends or family members some computer skills.[15] Until costs fall, however, computer provision is unlikely to be financially possible in many poorer developing country educational systems, with the cost of a computer lab amounting to between 2 and 21 times the total discretionary budget per primary student, according to one calculation.[16] Even when computers are provided, a lack of infrastructure and trained personnel can inhibit use: in the Dominican Republic computers sat in their boxes for more than four years at some schools because of inadequate or absent electrical capacity.[17] Using computers already in school for computer-assisted learning can help—a program run by the nongovernmental organization Pratham in India resulted in sizable improvements in mathematics skills.[18]

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14 Perkinson (2005).
15 World Links Impact Evaluation Series (2002).
16 Halewood and Kenny (2006). The discretionary budget covers all costs apart from teacher salaries, including supplies, teaching equipment, utility bills, building maintenance, and other classroom needs.
17 Neto and others (2005).
18 Banerjee and others (2005).

Although specialized education in ICTs may not be required, a lack of education hampers the use of the new ICTs. A study of mobile phone use in several African countries found that rural uptake of SMS messaging was low because of illiteracy and indigenous language, even though text messages were cheaper than making a call.[19] The information gains from internet searches are naturally less for youth who are unable to read, process, and choose among different sources of information, or even spell the words they are looking for. The difficulties are compounded for many developing country youth by the lack of access to content in their native languages. In 2002, 72 percent of the world's internet pages were in English; 7 percent in German; 6 percent in Japanese; 3 percent in Spanish; 3 percent in French; 2 percent in Italian, Dutch, and Chinese; and 1 percent or less in any other language.[20] Education in global languages, especially English, is thus key to expanding access to global content, together with development of local language Web sites.

Facilitating more informed reproductive health decisions. The private and anonymous nature of the internet offers youth the possibility to discretely access information about reproductive health and sexuality that they may be otherwise too embarrassed to ask or unable to talk about for cultural reasons. One-quarter of young internet users in Kathmandu, Dakar, and Sao Paulo reported using the internet to find information about sex education and health topics (box 2).[21] This is particularly important for young women in traditional societies, who tend to have few other opportunities for obtaining this information. All young women who had access to the internet through the World Links program in Mauritania reported obtaining information on sexuality, puberty, and HIV/AIDS prevention.[22] Although developing country evidence is not available, a randomized experiment among young women at family planning clinics in the United States offers evidence that computer-based aids to contraceptive decision can improve health knowledge, increase take-up rates, and reduce adolescent pregnancies.[23]

Helping migrants stay connected as citizens. New ICTs are lowering the barriers between migrants and their home communities, enabling them to connect with one another while abroad. High prices for international calls are becoming less of a

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19 Gough and Grezo (2005).
20 Online Computer Library Center (OCLC) (2005).
21 Geary and others (2005).
22 Mar Gadio (2001).
23 Chewning and others (1996).

problem as prepaid phone cards and voice over internet protocol (VoIP) calls lower the costs of connecting home. Calls to migrant family members are also one of the most common uses for village mobile phones. Online discussion boards and migrant Web sites provide a way for migrants to connect with and meet others from their community and to foster expatriate civic associations. The Haiti Global Village Web site receives 500,000 hits a month, with 80 percent from outside of the country, acting as a central forum for those in the diaspora to discuss community affairs and ways to help their country.[24]

What Policies Enhance the Development Impact of Youth Use of ICTs?

Youth use of ICTs matters indirectly for development outcomes through the impacts on youth transitions—and directly through the large youth contribution to overall ICT use. A few transition and newly industrial countries, such as the Czech Republic, the Slovak Republic, Hong Kong (China), Singapore, and the Republic of Korea, have seen economic growth directly driven by the production of ICTs. But for most developing countries, ICT use rather than ICT production is likely to have a much bigger impact on growth. Substantial evidence from developed countries now shows a strong effect for information technology use on productivity and growth, but this occurred only with a substantial lag after the introduction of these technologies.[25]

The more recent introduction and relatively low use rates in many developing countries suggest that the contribution of ICTs to growth is currently lower than in developed countries,[26] but that the rapid current expansion should contribute to future growth. Positive effects are already beginning to be seen. Recent cross-country work has found that access to the internet spurs the export performance of developing country firms.[27] At an even more micro level, several studies have documented improvements in prices received by farmers and fishermen thanks to better access to mobile

telephony— fishermen in India, for example, using mobile phones to get information about prices at different ports before deciding where to land their catch.[28]

The most important government policies to foster ICT use are the core elements of any infrastructure policy: sound economic conditions, regulatory policy promoting competition, and complementary infrastructure. Yet uncertain market demand and network externalities may lead the private sector to underprovide access, providing a rationale for further government intervention to serve rural areas. The case is clearest for cellular telephony, due to mounting evidence linking greater access to telephones to several development outcomes.

The internet is a newer technology, and less evidence is available, making it still too early to recommend direct government provision of internet infrastructure. However, because the costs of delaying the introduction of ICTs are also difficult to measure, and the development of ICT skills is seen by many to be necessary for workers to take part in the global economy, governments may want to speed the diffusion of this technology. Governments have a mixed record in this area, and those that do choose to directly provide access to underserved areas can learn from countries like Chile, where the Enlaces program combined infrastructure provision with teacher training and decentralized support, leading to widespread use in schools. In the Dominican Republic, however, the provision of computers was not accompanied by complementary infrastructure and personnel, resulting in unused computers in some locations and lack of use for educational purposes in others.[29]

Regardless of their position on direct provision of internet access, governments can increase the benefits of ICTs for youth. A youth perspective on ICTs reveals that government regulation affecting communal modes of access determine youth access. Regulation can have dramatic effects on the incentives for private entrepreneurs (often youths) to set

24 Parham (2004).
25 See Jorgenson (Forthcoming) for a recent review.
26 See World Bank (2006a) for an assessment of the growth impact.
27 Clarke and Wallsten (2004).
28 Jensen (2006).
29 Neto and others (2005).

up internet cafes. A reform of the licensing process in Algeria made it extremely affordable ($13) to obtain authorization to provide internet service. The number of internet cafes grew from 100 in 1998 to 4,000 in 2000, dramatically expanding youth access and generating many internet-related jobs.[30] Similarly, regulations allowing easy entry for prepaid phone card operators and long distance phone calls over the internet can have large payoffs for youth.

Regardless of whether the government is involved in internet provision, governments can help stimulate demand for new services by providing public service content online. Governments can reach youth through the media they use. They can also kick-start local language content, preventing a vicious cycle in which non–global language seekers do not use the internet because of a dearth of content, while the lack of users acts as a disincentive to local-language Web site creation. The government of Tamil Nadu offers one such example, providing seed support to online initiatives and working with the private sector to decide on a standardized Tamil keyboard and Tamil character encoding scheme. As a result, use of Tamil on the internet was reported to be far greater than any other Indian language.[31]

The current generation of youth is the first experiencing the internet in many countries, with all the pros and cons. Parents unfamiliar with the new technology and not present when it is being used thus have little ability to protect young people from some of the dangers. This raises issues of how to teach young people to be safe and responsible users of this new technology, protecting them from some of the risks of unfettered access, such as child pornography, hate groups, stalkers, pedophiles, and cyber bullies. In early December 2005, three of the top five search terms on the internet, and 68 of the top 200, were sexual.[32] This presents a problem for

youth who wish to use the internet to seek reproductive health information: web-filtering programs can block useful content, while unfiltered searches for teen sex are likely to result in pornographic content. Moreover, parents and society may consider some content appropriate for an 18-year-old but not for a 12-year-old.

Given the vast amount of information available, many youth may be unprepared to sort through and judge what is reliable and what is not. There is thus a need to help youth become safer and more effective users of the internet. The natural place for this is in schools, but in many countries access to the internet is available only out of school. So experimentation is needed with alternative mechanisms for teaching youth how to use these new ICTs safely, perhaps government partnerships with telecenters. Little is known about what works in this area.

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Young people are extremely active participants in the global flows of information. What then should be the priorities for governments to take full advantage of this involvement? The main ICT priority for governments is to ensure a good investment climate that allows private companies to serve the growing demand for ICT services, by enacting regulations that provide for easy entry and competition. For youth it is particularly important to also provide good regulatory conditions for modes of communal access, such as village phones and internet cafes. Governments also need to experiment with ways to provide youth with the skills needed to best take advantage of new technologies, through teaching global languages, providing support for local language content development, and developing ways to teach youth responsible and safe use. Rigorous evaluations of such policies are needed to find out what works and to share lessons across countries.

30 Guermazi and Satola (2005).
31 Rao (1999).
32 www.wordtracker.com unfiltered list of top 500 search terms for December 6, 2005.

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