

WORLD TELECOMMUNICATION DEVELOPMENT REPORT 1998

Universal Access

Executive summary



March 1998

INTERNATIONAL TELECOMMUNICATION UNION

Introduction

Communications are an increasingly critical component of economic growth, the engine of the evolving global Information Society. Access to communication is also recognized as a basic human right (Box 1). For those that have access, communication has become essential to everyday activity. If you become injured, emergency services can be called; if you run out of money, you can go to an electronic cash machine; if you need to communicate with a colleague, you can send an email; if your car breaks down, you can use your mobilephone to summon help; or if you need a business document, you can have it faxed. Many of us take these services for granted. We expect them to be widely available and readily accessible. Now imagine how dramatically the lives of individuals—or communities—would be transformed by introducing communications access where previously there was none.

In rural southern Ghana, petrol stations are able to place orders with suppliers by telephone when previously they could only be made by travelling to Accra; in Zimbabwe, one company generated US\$ 15 million of business by advertising on the Internet; in South Africa, lives have been saved since citizens have been able to call the police from strategically located community payphones; in the mountains of Laos and Burma, yak caravans employ mobilephones to call ahead and find the best route to take during the rainy season to bring their goods to market; and in China, a little girl's life was saved when her doctor posted her symptoms to an Internet discussion group and received an immediate answer.

Unfortunately there remain vast pockets of humankind without access to basic telecommunications services. It is difficult to believe that this is due to a shortage of funds: the telecommunication industry had its most profitable year ever in 1996. A shortage of supply is also increasingly less of a reason for a lack of access. A growing number of countries have restructured their telecommunication sector, through measures such as privatization and competition in order to enhance supply. The greatest danger to improving access today appears to be complacency. There is a tendency to believe that a profitable industry with expanding sources of supply will solve the access problem by itself.

This document provides a summary of the fourth edition of the ITU's *World Telecommunication Development Report*. The Report has been specially prepared by the ITU's Telecommunication Development Bureau (BDT) to coincide with the World Telecommunication Development Conference in Malta in March 1998. It examines progress towards universal access to communications, reasons for disparities, and policies and technological solutions designed to improve the situation.

Box 1: The right to communicate

An inter-agency UN project on universal access to basic communication and information services—“the Right to Communicate”—was created in 1996 at the initiative of Dr. Pekka Tarjanne, Secretary-General of the International Telecommunication Union. As Dr. Tarjanne noted: “The Universal Declaration of Human Rights sets out the rights and freedoms that people everywhere should be able to enjoy. It is the best definition the world community has so far been able to develop of the common elements of humanity shared by all people.” For all to enjoy these rights, they must have access to basic communication and information services. He warned “Without action on the part of the world community, there is a very real danger that the global information society will be global in name only; that the world will be divided into the ‘information rich’ and the ‘information poor’; and that the gap between developed and developing countries will widen into an unbridgeable chasm.”

Following the completion of the project, the UN’s Administrative Committee on Coordination (ACC) issued a statement on Universal Access to Basic Communication and Information Services in April 1997 in which it comments:

“We are profoundly concerned at the deepening mal-distribution of access, resources and opportunities in the information and communication field. The information and technology gap and related inequities between industrialized and developing nations are widening: a new type of poverty—information poverty—looms. Most developing countries, especially the Least Developed Countries (LDCs), are not sharing in the communication revolution, since they lack:

- affordable access to core information resources, cutting-edge technology and to sophisticated telecommunication systems and infrastructure;
- the capacity to build, operate, manage, and service the technologies involved;
- policies that promote equitable public participation in the information society as both producers and consumers of information and knowledge; and
- a work force trained to develop, maintain and provide the value added products and services required by the information economy.

We therefore commit the organizations of the United Nations system to assist developing countries in redressing the present alarming trends.”

The Statement concluded that the introduction and use of information and communication technology must become a priority effort of the United Nations in order to secure sustainable human development and embraced the objective of establishing universal access to basic communication and information services for all.

The Secretary-General of the United Nations, Kofi Annan, transmitted the Statement to the General Assembly in December 1997 where it was endorsed thus committing the UN system to the objective of universal access to basic communications for all.

Adapted from “The Right to Communication: A New Declaration is Born”. ITU News. No. 6/97. For the full text of the ACC Statement on Universal Access to Basic Communication and Information Services see: <http://www.itu.int/acc/rtc/acc-rep.htm>.

Global access

As the twentieth century winds to a close, there remain vast differences in access to telecommunications throughout the world. The most common measure of telecommunication access is *teledensity* or the number of main telephone lines per 100 inhabitants. In 1996, teledensity ranged from 0.07 in Cambodia to 99 in Monaco; one indicator of the wide range of telecommunication development around the world.

Despite the giant strides that a number of countries have taken in enhancing telecommunication access, there remain immense variations between regions and countries. Furthermore, the period of time required to attain a high level of teledensity is still relatively long. One quarter of ITU Member States still have a teledensity of below one (Figure 1).

Box 2: Maitland revisited

The theme of this report—universal access—has been studied many times in the past, most notably by the Independent Commission for Worldwide Telecommunications Development which completed its report, *The Missing Link*, in December 1984. The Commission was headed by Sir Donald Maitland and has become universally known as the “Maitland report”.

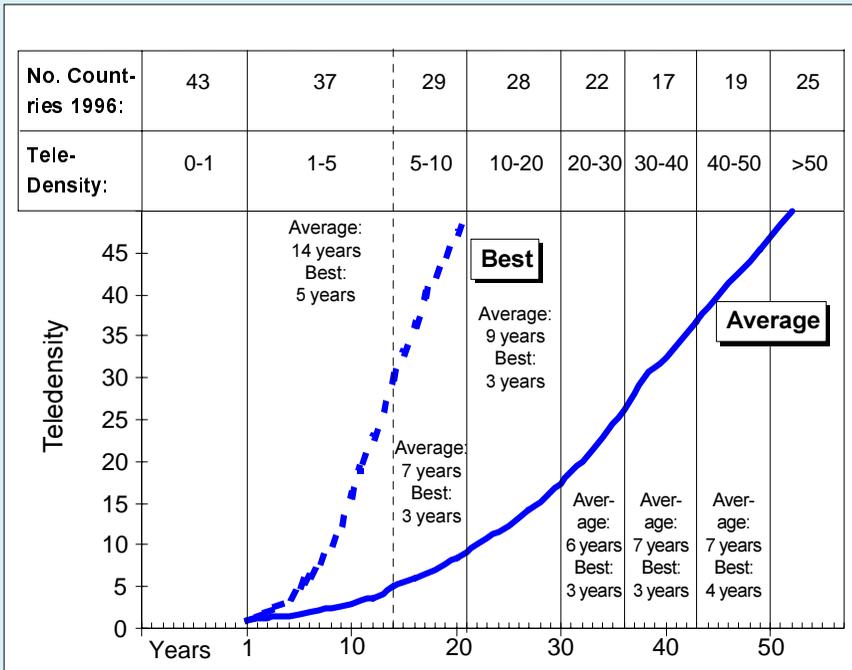
The Commission established the objective that “*by the early part of the next century virtually the whole of mankind should be brought within easy reach of a telephone*”. While it was careful not to state any explicit targets, asserting instead that developing countries should set their own, it was widely interpreted that this phrase meant a teledensity of at least one by the year 2000. At the time the report was published almost three billion people, more than half the world’s population, were living in countries with a teledensity of below one. This situation has improved, so that by the end of 1996 less than 800 million people were in the 43 remaining economies with a teledensity of below one. The world’s two most populous nations, China and India, graduated in 1993 and 1994 respectively, and several other economies should join them before the year 2000.

Furthermore, by that date, the first generation of Global Mobile Personal Communications by Satellite systems should be operational. They will provide virtually global coverage of satellite telephone services to small hand-held telephones. This will mean that, in a technical sense if not in an economic or political sense, the whole of mankind should indeed be within “*reach*” of telephone service.

But the Maitland report was about more than just accessibility; it was also about equality. The report pointed to the gap between the level of service provided in the richest and poorest countries. Here, too, progress has been made, though a gap remains. The absurdity of the gap is evident if one looks at teledensity levels, or indeed at non-basic services. There are, for instance, more cellular telephones in Thailand than in Africa and more Internet host computers in Estonia than in Sub-Saharan Africa (excluding South Africa). The conclusion, therefore, is that the observations of the Maitland report still remain valid.

Until a country has passed this threshold, it is virtually impossible to predict how long it will take to reach higher levels. After attaining a teledensity of one, it then takes on average 50 years to reach 50, a level reflecting high telecommunication development. One heartening observation is that some countries have experienced rapid teledensity gains, demonstrating that the time span can be significantly shortened. Another encouraging sign is that as a country's teledensity rises, the number of years to reach the next level is shortened. For example, while on average it takes 21 years to get from a teledensity of one to 10, it takes about nine years to move from 10 to 20. The downside of this, unfortunately, is that while virtually all countries have increased access, those at high levels have increased their level of teledensity more than those at low levels. The result has been to accentuate the gap between high and low teledensity countries (Box 2).

Figure 1: Teledensity transition
Time to attain different teledensities, in years



Note: “Average” refers to the mean number of years taken by countries which have made the transition from one teledensity category to another. “Best” refers to best practice, in terms of the shortest length of time taken. It is not possible to provide an accurate average transition length for the 0 to 1 category due to a lack of historical data for some countries and because a significant number of countries have not yet left this group.

Source: ITU.

Pricing access

The history of telecommunications for most of its first 120 or so years has been about the battle to increase the availability of service in an environment in which demand greatly exceeds supply. *Registered* demand for telephone service continues to exceed supply, but the number of people waiting for a telephone line is falling: 42 million in 1996, down from a peak of 47 million in 1992 (Figure 2, top chart).

But what is the *real* global level of demand for telephone service? The waiting list is an inaccurate proxy for the true level of unmet demand. It measures demand under the existing price structure but does not take into account latent or *unexpressed* demand: those who desire to have service but have not yet explicitly expressed this aspiration, due to a variety of reasons. If the imbalance between supply and registered demand can be corrected, then another factor enters the equation: the affordability of service.

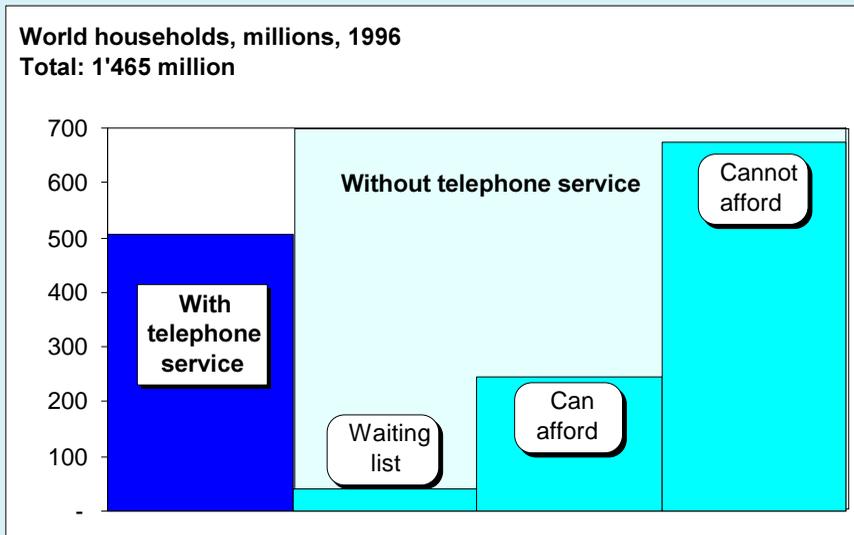
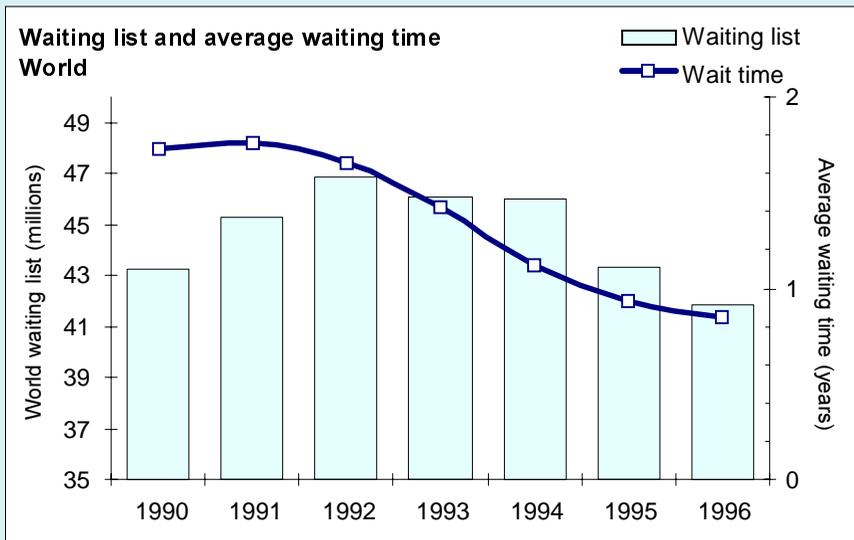
Developing countries, particularly those that have achieved a reasonable level of telecommunication development, face a dilemma. In order to increase telecommunications access to a wider segment of the population, tariffs need to be affordable. One way of reducing prices is to license new market entrants. But competition puts pressure on the traditional cross-subsidy mechanisms. So where does this leave affordability? One approach towards affordability is to determine the average operating costs for a telephone network and then derive an average tariff for telephone service based on those costs. This measure could help policy-makers determine how many households in their country can afford individual telephone service. For those families for whom an average tariff is beyond their ability to pay, other policies can be implemented, such as financial assistance or widespread deployment of public telephones.

Measuring affordability of telephone service, based on a tariff reflecting best practice among operators, provides a categorization of global demand for telephone service (Figure 2, bottom chart). At present only around 500 million households have telephone service (34 per cent of all households in the world), but this could be increased to almost 800 million (55 per cent) if service was uniformly available and sensibly priced.

The conclusion is that there are more families that could afford telephone service than actually have it and that the vast majority of them are not on an official waiting list. One explanation is that tariffs are too high, discouraging demand. Another explanation is that there is an insufficient supply of telephone lines because of inefficiency, financial constraints, or market restrictions. In both of these cases, new sources of supply could help, by lowering prices and increasing the availability of telephone lines.

Figure 2: The phoned and the unphoned

Waiting list for telephone service and average waiting time, worldwide, 1990-96, and an estimate of household telephone demand based on affordability



Note: Average waiting time is estimated by dividing the total waiting list at the end of a year by the number of new lines added during the year.

Source: ITU.

Supplying access

Supply-side strategies are of two broad types: policies aimed at increasing the number and effectiveness of players licensed to provide service; and strategies to exploit advances in telecommunication technology which promise to make it easier and cheaper to provide service. Regulatory policies aimed at market liberalization and technological strategies are closely related. The area in which new players have been introduced most widely has been mobile communications. Successive generations of mobile technology have resulted in several stages of licensing of new operators.

Even so, mobile cellular has had mixed success in enhancing universal access in the developing world. Here, the relevant indicator is the substitution rate—the ratio of mobile cellular subscribers to total telephone subscribers—which indicates the degree to which mobile cellular is being used as an alternative rather than a supplement to fixed-line networks. Substitution typically occurs where relatively low levels of fixed-line density are combined with competitive mobile cellular markets (Figure 3). Another circumstance where cellular enhances access is when the fixed-line network has been extensively damaged due to civil unrest or natural disasters. Cellular solutions are also being used to increase *accessibility* in remote, rural or otherwise disadvantaged areas.

Cost is the main constraint which prevents cellular from being a viable alternative for first-time telephone users in developing countries. One alternative is to strip away some of the functionality of a mobile cellular system to reduce its price. This has given rise to a radio-based access technology—generically referred to as “wireless local loop” (WLL)—that provides an alternative to the traditional way of connecting subscribers to the local telephone exchange using copper wire. Data suggest that the cost of WLL has declined over time, making it price competitive with copper wire. As a critical mass of users is reached, the cost of WLL systems should fall even faster. WLL’s low implementation and operating cost promises to significantly alter the expense equation of building telephone networks, resulting in lower tariffs and enhanced affordability for potential subscribers.

Global Mobile Personal Communications by Satellite (GMPCS) systems promise to enable users to make and receive calls via mobile handsets from virtually anywhere in the world. Most attention has focused on a handful of Low-Earth Orbit (LEO) systems that plan to provide global voice service coverage. Although GMPCS operators acknowledge the potential for enhancing global communication access, for example by proposing public telephones linked to their systems or providing a limited number of low-cost monthly minutes of use, they also predict that the largest group of users will be business people. It is likely that more modest GMPCS operations (so-called “little LEOs”) will do more to enhance access in the short run.

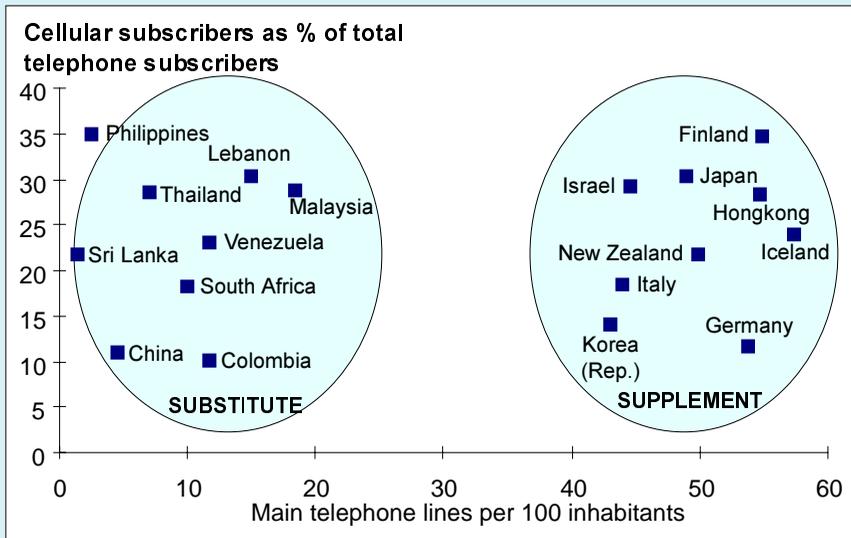
A major constraint to extending access is that the revenue stream generated by the subscriber must be sufficient to pay for the costs of installing and maintaining the line. Where installation

costs are high, telephone service revenue alone might not be sufficient to justify the expense of connection. A possible solution is to bundle voice with some other service. Bundling services in this way provides an opportunity for new market entrants to differentiate their services from those of the existing service provider. Thus it is a way of introducing additional supply into the market.

One example is cable telephony, which uses a unified network architecture to provide both cable television and voice telephony. Existing cable television operators in developed markets are upgrading their networks in response to market liberalization, permitting them to provide telephone service. A mix of start-up and incumbent telephone companies in developing markets are deploying cable telephony in order to deliver multimedia services. Another approach to offering “voice plus” is to provide a voice telephony service bundled with Internet access. The technology, which goes under the generic name of Internet telephony, is experiencing explosive growth as it changes from being an application used mainly by hobbyists into a mass market. Although Internet telephony is unlikely to increase the *availability* of service due to high start-up costs, it may help to make it more *affordable*. As call-back services have already done, the low rates available with Internet telephony will put pressure on public telecommunication operators to reduce their own tariffs.

Figure 3: Substitute or supplement?

Mobile cellular subscribers as a per cent of total telephone subscribers, selected countries, 1996



Source: ITU adapted from Smith, P. (“What the Transformation of Telecommunications Markets Means for Regulation”).

Universal access

Concerns about *universal service*, usually defined as a telephone in every home underpinned by policies to make service affordable, have emerged relatively recently in many developed countries. In these countries, market liberalization, introduced once high levels of household telephone penetration have already been achieved—after more than 90 years of network development—has focused attention upon universal service. Policies have generally been aimed at the few without a telephone rather than the majority of the population which already have one.

For developing countries, basing telecommunications development around policies of universal service is problematic. This is because universal service is not a single concept but, rather, a composite, comprising *nationwide availability*, *non-discriminatory access* and *widespread affordability*—which have tended to be achieved in stages (Table 1). Pursuing all three simultaneously involves making hard choices: the deployment of a nationwide telecommunication network is a costly undertaking, but regulating for affordable prices may reduce revenues.

As a result, developing countries have begun to articulate transitional goals more in tune with local economic, demographic, social and geographic circumstances. Underlying the various policy approaches is a common notion of *universal access* (Figure 4). The concept is that a telephone should be within a reasonable distance for everyone. The distance depends upon the coverage of the telephone network, the geography of the country, the density of the population and the spread of habitations in the urban or rural environment. This diversity has been reflected in a range of innovative policies and platforms: from the use of public telephones to entrepreneurial teleshops to community telecentres.

A universal access approach can take a variety of forms. Communication access points can be established for remote dwellers, such as a policy to provide a telephone to every village or, for marginalized urban residents, a telecommunication outlet in places where they are likely to come together, such as community centres. Access is then based upon a reasonable distance from each user's location. The result has been a variety of definitions, from a telephone "*within less than five kilometres*" in Brazil, to "*a thirty minute travelling distance to a phone*" in South Africa, to China's "*one family, one telephone in urban areas and telephone service to every administrative village in rural areas.*" Technology also allows for a re-evaluation of access options. In Brazil, voice-mail boxes are made available so that individuals without a telephone are able to receive as well as to make calls from public telephones. In South Africa, there is an initiative to provide email addresses to all families accessible from post offices equipped with public Internet facilities.

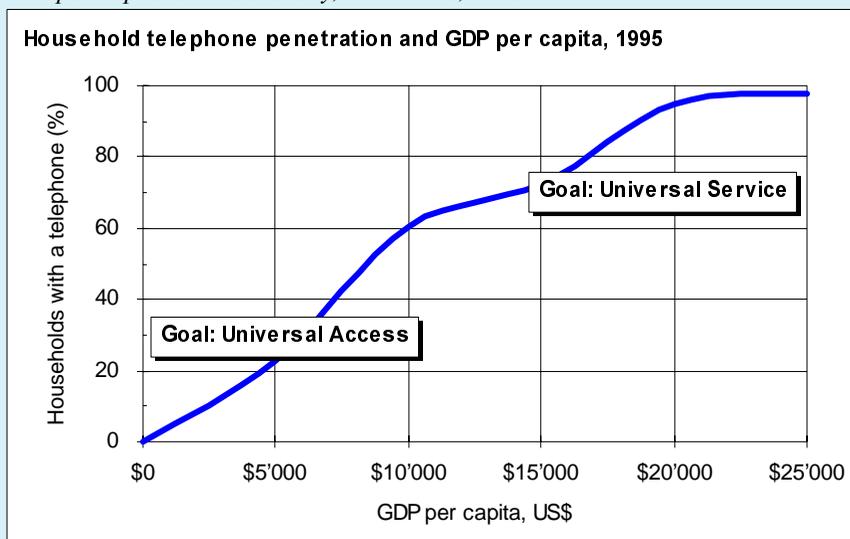
Table 1: Five stages of universal service

	<i>Stage 1: Network establishment</i>	<i>Stage 2: Wide geographic reach</i>	<i>Stage 3: Mass market take-up</i>	<i>Stage 4: Network completion</i>	<i>Stage 5: Service to individuals</i>
Universal service goal type	Technological (acquire new technology).	Geographic (maintain regional parity).	Economic (stimulate economy).	Social (achieve national cohesion).	Libertarian (individual right to communicate).
Examples of universal service goals	Long distance service linking all major centres; public telephones where demand warrants.	Telephone service available in all population centres; widespread adoption of telephony in business.	Widespread residential take-up of telephony; meet all reasonable demands for telecoms.	Telephone affordable to all; telephone service adaptable to special needs (eg. disabled).	Everyone can meet basic communication needs; public access to advanced services.
Typical universal service policy measures	Licence conditions on network roll-out.	Profitable licences subject to unprofitable obligations.	Control speed of price rebalancing.	Targeted subsidies.	Identify and meet non-market demand.

Source: Milne, C. ("Universal Service for Users: Recent Research Results—An International Perspective").

Figure 4: Universal access to universal service transition

GDP per capita and teledensity, worldwide, 1995



Source: ITU adapted from Kayani, R. and Dymond, A. (*Options for Rural Telecommunications Development*).

Achieving access

Strategies to achieve universal access fall into two categories: regulatory changes to increase overall network development (Figure 5, A, B and C); and specific programmes for those without individual telephones (Figure 5, D and E). *Privatization* has had a positive impact upon telephone access. One reason is that network expansion targets have frequently been made a requirement of the privatization. Another approach to expand network penetration has been to *contract out* specific projects to private companies under Build/Transfer schemes. A few countries have introduced *competition* for providing fixed-line local services while other countries have issued licences to new companies to provide service in unserved areas.

Countries are also adopting new methods to enhance access for those without individual telephones. Public payphones have been the traditional method of encouraging widespread access to telecommunications facilities. New approaches to increase the supply of payphones revolve around mandated targets for incumbent operators and *liberalization* of payphone provision. A number of developing countries are adopting policies calling for the installation of telephones in unserved localities, through establishing targets for incumbent operators or by establishing special *funds*.

Box 3: Redefining access

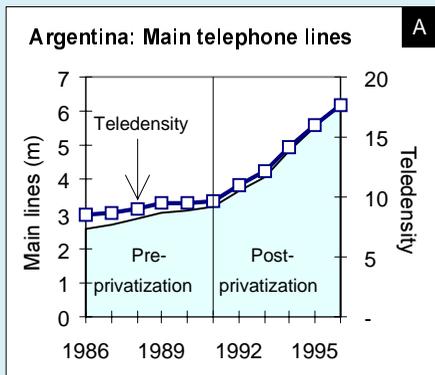
As the role and complexity of information increases in daily life, more sophisticated computer-based systems are needed to transmit and process text and graphical information. One manifestation is the growth of the Internet; according to one estimate, there were over 100 million users of the Internet in January 1998. Does this mean that providing basic telephony is not enough? Or is universal access to information services a luxury that should not yet be regarded as a priority?

There is no compelling reason, at present, to expand the definition of universal service to include *individual* access to information services, particularly when a conventional telephone line equipped with a modem and computer can be used to access the Internet. A major factor which affects information service accessibility is pricing. Local telephone usage charges which are very low or charged at a flat-rate appear to boost Internet usage. Allowing competition in the Internet Service Provider market also tends to reduce prices and increase take-up.

As online applications grow in sophistication, they increasingly require high speed access for effective use. Few countries have gone as far as Singapore, where there is a project to provide broadband access to every home, business and school on the island. Instead, the high cost of providing an individual broadband connection has encouraged countries to adopt community-based approaches that support Internet provision to schools, libraries and other public places. This also provides a venue for teaching computer and other skills necessary for using the Internet. Governments can encourage these efforts by adopting pro-Internet policies. These include opening up the Internet service provision market, decreasing import tariffs for telecommunication and computer equipment, mandating the provision of community centres with Internet access in the licences of telecommunication operators, and providing financial assistance for connecting schools, hospitals and libraries.

Figure 5: Five ways of enhancing access

Privatizing...



A. Argentina privatized its telecommunication operator in 1990 by separating it into 2 companies. The new owners were obligated to install a minimum number of telephone lines.

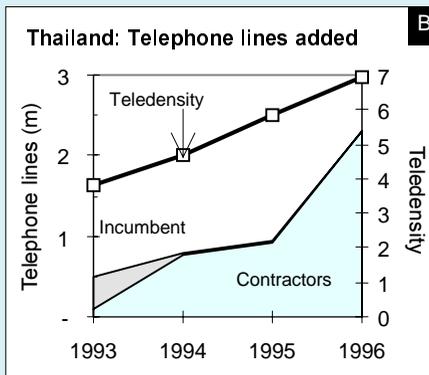
B. In 1991, two Build/Transfer "contracts" were awarded for the installation of 4.1 million telephone lines in Bangkok and rural areas.

C. In the Philippines, the incumbent Philippine Long Distance Telephone Company (PLDT), has doubled the size of its network since the introduction of "competition" in the local exchange market.

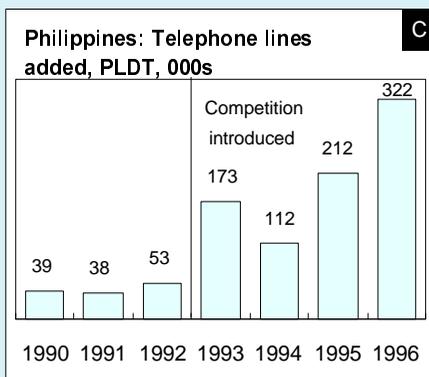
D. Senegal "liberalized" its payphone market in 1992 by allowing privately operated telecentres.

E. In 1994 Chile established a government budgeted "fund" for providing telephone service in unserved areas.

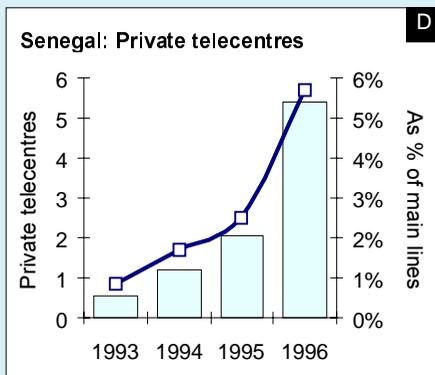
...contracting out...



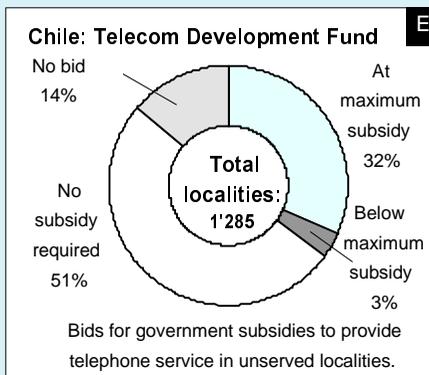
...competing...



...liberalizing...



...funding.



Source: ITU.

Enhancing access

Few countries, if any, have achieved universal service. Most developed countries provide a high level of household telephone penetration although, even within high-income countries, pockets of disadvantaged citizens without access can be found. In developing countries, a majority of households do not have telephone service and many individuals and communities do not have reasonable access to communication facilities. At the same time, the liberalization of the telecommunication industry is bringing universal service into sharper focus. The introduction of competition raises questions about traditional cross-subsidy methods for extending affordability of telephone service. The obligations of incumbent and new operators must be defined if progress towards universal service is to be maintained and advanced. This is now mandatory for countries that made commitments under the World Trade Organization's Regulatory Reference Paper, which calls for universal service to be administered in a *“transparent, non-discriminatory and competitively neutral manner”*.

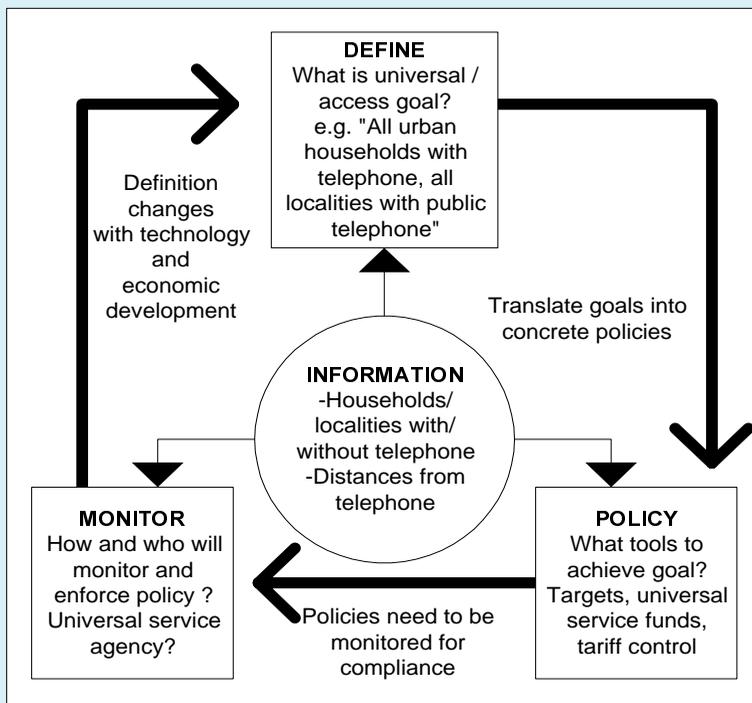
These developments require a pragmatic, concrete and transparent programme to enhance access to telecommunications. This involves a practical definition, based on the socio-economic situation of each country, policy tools for translating the definition into reality and a monitoring mechanism to measure and enforce progress towards universal access (Figure 6). All of these functions depend on a detailed information base with interaction between the telecommunication regulatory agency, operators and the national statistical office.

Technology that theoretically provides telecommunication access from anyplace on the surface of the earth is already available. At the same time, the introduction of cheaper, more efficient sources of supply and new players should help shift the balance from supply-deficit to demand stimulation. As a result, universal access is now not so much an engineering or supply-side problem but rather a regulatory and policy challenge.

Table 2 proposes a series of modest goals the world should strive to attain by the year 2010. For developing countries as a whole, a goal of 10 telephone lines per 100 inhabitants, with more than 50 per cent of households served, seems reasonable as a target for the year 2010. However for low income countries (excluding China) goals of 5 lines and 20 per cent of households are more realistic. For payphones, an achievable goal would be one per 500 inhabitants in developed countries and one per 1'000 in low income countries.

The adoption of relevant universal access policies, with committed monitoring, enforcement and funding mechanisms, are essential to ensuring that all of the world's citizens have reasonable access to telecommunications early in the 21st Century.

Figure 6: A roadmap to universal access

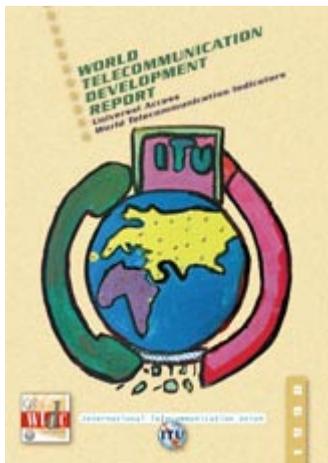


Source: ITU.

Table 2: Year 2010 goals for universal access

	<i>Teledensity</i>		<i>Household telephone penetration</i>		<i>Payphones per 1'000 people</i>	
	1996	2010	1996	2010	1996	2010
WORLD	12.80		34.4		1.55	
Developing	5.07	10	16.3	>50	0.84	2
Low income	2.44	5	8.5	>20	0.57	1
excluding China	1.22		4.1		0.21	
Developed	54.03		94.3		5.19	

Source: ITU.



The fourth edition of the ITU *World Telecommunication Development Report*—published in March 1998 to coincide with the World Telecommunication Development Conference—explores specific themes related to the topic of universal access, including methods of measuring access, pricing, supply, definitions and policies for enhancing access.

The *World Telecommunication Indicators* forms the second part of the report and presents the latest comparable data available on the development of communications services in some 200 economies worldwide. This database is also available on diskette, or via the Internet.

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