4. UNIVERSAL ACCESS

Universal service is a concept that has increasingly become focused upon connection of individual households to the public telephone network. The objective of universal service has come to be equated with a telephone in every household. In most developed countries, this objective has come close to being achieved and those families who do not have a telephone are few in number: typically those in remote areas or inner cities, the very poor or those who, by choice or by misfortune are without a private telephone service.

In contrast, few developing countries have been successful in achieving universal service. This is not surprising, given that the proportion of those close to, or below the poverty line is far greater.[1] Consequently, policies for access to communications in developing countries have a vastly different, if no less urgent, target audience. The objective of universal service in developing countries therefore requires a different interpretation.

In recent years, developing countries have begun to implement policies more in tune with local economic, demographic, social and geographic circumstances. Underlying the various policy approaches is a common notion of *universal access*. The concept of universal access is that everyone, at home or at work, should be within a reasonable distance of a telephone. Defining 'a reasonable distance', of course, is another matter: it 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 payphones to public call offices to community telecentres.

This chapter traces the shift in focus from individual service to servicing a wider base of the population; from a telephone in every household to community access. Section 4.1 examines the ongoing redefinition of universal service. Section 4.2 looks at the status of universal service in developing countries. Finally, Section 4.3 examines the case for transitional objectives and provides an account of recent universal access strategies.

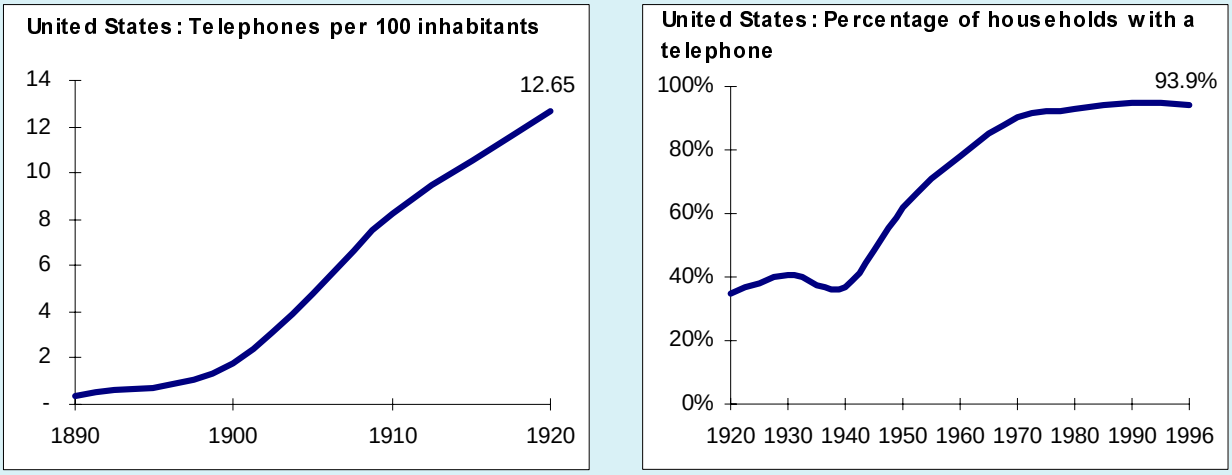
4.1 Universal service: a concept in transition

The concept of universal service has gone through several different incarnations over the past 90 years. As applied to telecommunications, the phrase was first brought into use in 1907 by Theodore Vail, President of AT&T. Vail's 'One System, One Policy, Universal Service' slogan had little to do with contemporary notions of universal service but resulted from competition between the Bell System and a range of independent service providers. Vail advocated that Bell should become the sole US telephone service provider to achieve widespread geographic access. This, he argued, was preferable to the "*world of competing island networks*" which had emerged across the United States in the first decade of the century.[2]

While Vail came close to achieving his objective as the Bell System consolidated its ownership of telephone service, historians point out that the period of competition between 1895 and 1920 was significant in boosting network growth across much of the United States (Figure 4.1, left chart).[3] Moreover, regulations sought by the Bell system which were introduced after 1920 and formalized in the 1934 Communications Act, were focused upon the development of a single

Figure 4.1: Universal service in the United States

Telephones per 100 inhabitants, 1890-1920 and percentage of households with a telephone, 1920-1996, United States



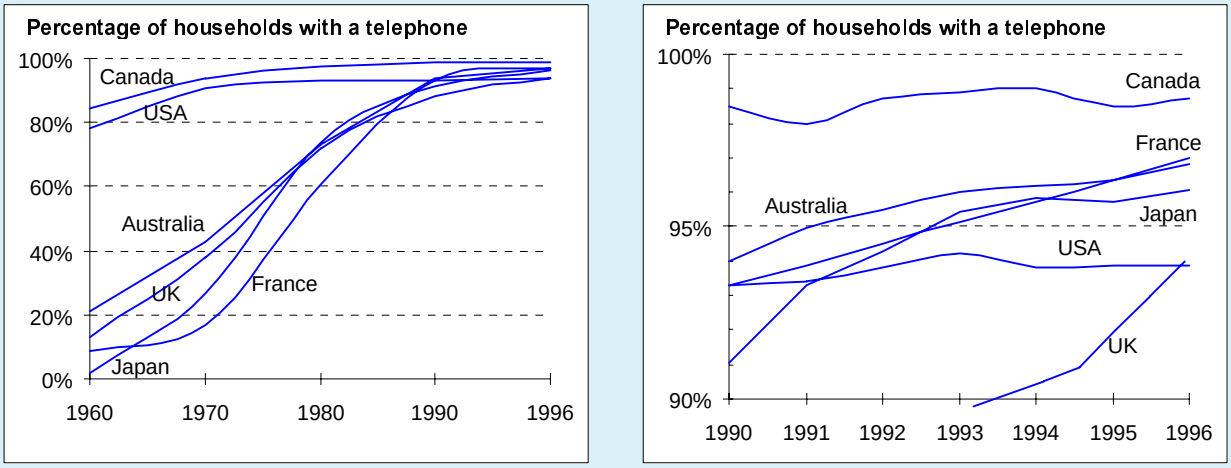
Source: United States Federal Communications Commission (FCC).

integrated national network and were not directly linked to a policy of promoting household telephone penetration. The concept of universal service as a telephone in every home, underpinned by policies to make service affordable for residential and rural subscribers did not emerge until the mid-1960s—by which time widespread household penetration had already been attained (Figure 4.1, right chart).

This concept of universal service was also only adopted relatively recently in the telecommunication sectors of Western Europe, Japan, Australia and New Zealand. There was rarely explicit mention of universal service in policy statements. Instead, government operators strived to expand network access as part of their public service mission. It was only after high levels of household penetration had been achieved that these countries began to liberalize their telecommunication service market (Figure 4.2). It has been liberalization—and the attendant fear that the marginalized in society might be excluded—that has focused attention upon the concept of universal service.[4]

Figure 4.2: Universal service in the developed world

Percentage of households with a telephone, selected developed countries



Source: ITU World Telecommunication Indicators Database.

Table 4.1: General agreement: available, accessible and affordable
Universal service definitions, selected countries

Country	*Definition*	*Source*
Australia	"The USO is a legislative requirement designed to ensure that *every* Australian citizen has access, on an *equitable* basis, to a standard telephone service, pay-phone and carriage services."	A New Regulator for the Industry—The Australian Communications Authority 1997
Canada	"…to render reliable and *affordable* telecommunications services of high quality *accessible* to Canadians in *both urban and rural areas in all regions* of Canada…"	Telecommunications Act 1993
France	"Universal service for telecommunications is the supply to all of a quality telephone service on *all the territory* at an *affordable* price."	Law of 26 July 1996 on telecommunications regulations
United States	"to make available, so far as possible, *to all the people* of the United States *without discrimination* on the basis of race, color, religion, national origin, or sex a rapid, efficient, nation-wide, and world-wide wire and radio communication service with adequate facilities at *reasonable charges*..."	The Purpose of United States Communications Law as amended by the Telecommunications Act of 1996

Source: ITU, adapted from Sources shown above. Italics added.

Today, there is a general consensus among developed countries about what constitutes universal service (see Table 4.1):[5]

- **Availability.** There should be nationwide coverage of telephone service, wherever and whenever required;
- **Accessibility.** Users should be treated alike; there should be non-discrimination in terms of price, service and quality, irrespective of geographical location or race, sex, religion;
- **Affordability.** Telephone service should be priced so that most users can afford it.

From the perspective of developing countries establishing and pursuing universal service policies more recently, there are three points to consider:

(i) for developed countries, the articulation of detailed universal service policies did not come about until household telephone penetration was already well on the way to universal levels;

(ii) in developed countries, policies have been aimed at the few without telephone service rather than the majority of the population which already have it; and

(iii) the achievement of universal service (household penetration in excess of 90 per cent) in most developed countries has only occurred relatively recently—after more than 90 years of network development (Table 4.2).

Table 4.2: The universally served

Economies with greater than 90 per cent of households with telephones, 1996

		Persons per household	*Percent of households with telephone*	*Year when 90% household telephone penetration reached*	*Main telephone lines per 100 inhabitants*
	DEVELOPED ECONOMIES				
	North America				
1	Canada	2.7	98.7	1971	60.3
2	United States	2.6	93.9	1970	64.0
	Asia-Pacific				
3	Australia	2.7	96.8	1986	50.1
4	Japan	2.8	96.1 †	1989	48.9
5	New Zealand	2.9	96.0	1976	49.9
	Europe				
	EU				
6	Austria	2.6	*90.0*	1995	46.6
7	Belgium	2.5	*92.0* †	1994	46.5
8	Denmark	2.3	‡	1982	61.8
9	Finland	2.2	90.0	1987	54.9
10	France	2.5	97.0	1985	56.4
11	Germany	2.2	94.7 †	1995	53.8
12	Greece	2.8	98.1 †	1993	50.9
13	Italy	2.7	97.5	1992	44.0
14	Luxembourg	2.7	‡	1989	59.3
15	Netherlands	2.4	*96.5*	1990	54.3
16	Spain	3.2	94.7 †	1994	39.2
17	Sweden	2.2	‡	1975	68.2
18	UK	2.5	*91.1*	1994	52.8
	Other Europe				
19	Iceland	2.8	‡	1985	57.3
20	Norway	2.4	97.6 †	1986	55.7
21	Switzerland	2.1	‡	1990	64.3
	DEVELOPING ECONOMIES				
1	Bahrain	6.6	‡	1992	24.1
2	Brunei	5.7	‡	1993	26.3
3	Cyprus	3.6	‡	1990	48.5
4	Hongkong	3.3	‡	1986	54.7
5	Israel	3.5	*95.0*	1989	44.6
6	Korea (Rep.)	3.4	*95.2*	1990	43.0
7	Kuwait	7.6	‡	1993	23.2
8	Macau	3.8	‡	1992	36.7
9	Malta	3.2	‡	1987	48.4
10	Qatar	7.0	‡	1983	23.9
11	Singapore	3.9	‡	1983	51.3
12	Taiwan-China	3.7	‡	1990	46.6
13	UAE	5.7	93.5 †	1995	30.2

Note: Economies with populations of more than 200'000 inhabitants. Economies with less than 200'000 inhabitants that have reached more than 90 per cent household telephone penetration are: Andorra, Bermuda, Channel Islands, Cook Islands, Faeroe Islands, Falkland/Malvinas Islands, Gibraltar, Liechtenstein, Monaco and San Marino.
† = Residential main telephone lines per 100 households. Derived by dividing the number of residential main telephone lines by the number of households. Therefore may include second lines and vacation homes. ‡ = Residential main telephone lines per 100 households is statistically greater than 100 per cent due to second residential lines.
Figures in italics are estimates or refer to another year.

Source: ITU World Telecommunication Indicators Database.

Box 4.1: Phoneless in the USA

Despite having a relatively high household telephone penetration rate, more has probably been written about universal service in the United States than any other country. Although the United States was one of the first countries to reach the 90 per cent threshold of households with telephone service, penetration has since stagnated at levels below other developed countries (see Figure 4.2, right chart). In March 1997, some 6.1 million US households did not have telephone service.

Some have attributed this to a natural level of 'non-penetration'.[6] It is argued that there will always be some households without telephones for various reasons such as families relocating or religious beliefs. Thus, it is argued that 100 per cent household penetration is not achievable. Others claim that these factors explain only part of the reason why households do not have telephone service. Another reason is simply lack of service; according to a 1991 study, an estimated 2.5 million US households were in areas with no telephone service.[7] Probably the most compelling reason US households do not have telephone service is income and, more specifically, its distribution.[8] In the United States, the poorest 20 per cent of households receive a smaller share of income than in almost any other developed country.[9]

The contrast between those with telephones in the United States and those without is striking when compared with its northern neighbour, Canada:

- In May 1997, 98.6 per cent of Canadian households had a telephone compared to 93.9 per cent of US households in March 1997. It is noteworthy that Canada has a higher rate despite a significantly lower per capita income (US$ 19'380) than the United States (US$ 26'980).
- Some 96 per cent of the poorest quartile per cent of Canadian households had a telephone compared to less than 90 per cent in the United States.
- Interestingly, the elderly, often cited as a disadvantaged group for telephone service, have among the highest level of telephone penetration in both countries. While young households had the lowest telephone penetration rate, the figure is much more striking in the United States (85 per cent) than in Canada (97 per cent).
- The unemployed were more poorly served in the United States (88.8 per cent with service) than in Canada (95.7 per cent with service).
- Rural comparisons are harder to make because of different survey methodology. In Canada, there is no significant statistical difference between urban and rural household penetration. In the United States, the central city poor have a lower penetration rate than suburban or rural areas.

4.2 Revisiting universal service in developing countries

Basing telecommunications development around policies of universal service could be problematic. This is because contemporary universal service is not a single concept but, rather, a composite, comprising nationwide coverage, non-discriminatory access and widespread affordability—which have typically been achieved in stages. Pursuing all three simultaneously requires conflicting policy choices: the deployment of a nationwide telecommunications network is a costly undertaking, but regulating for affordable prices may generate lower revenues. Reconciling the three contending criteria of contemporary universal service—availability, accessibility and affordability—has proven a difficult task for most governments. It is perhaps more helpful to consider these criteria as representing different stages of telecommunications network development (Table 4.3):

- As the network is established, the emphasis typically has been on finding technological solutions to provide long-distance service linking all major urban centres;
- As the network grows, emphasis shifts to ensuring service is available in all geographic areas on the same basis;
- At the next stage, universal service goals become driven by the expected benefits to the economy from mass participation encouraged by low installation and rental charges;
- As the network reaches completion, with a high level of household telephone penetration, universal service becomes focused upon social goals, ensuring telephone service is available to all and meets special needs;
- The final stage is reached when all needs for basic communications are satisfied and access to advanced information services are available to the public.

While most developed countries and a small group of developing countries (Table 4.2) have successfully managed to reach stage four, the majority of developing countries are widely dispersed across the first three stages of development. A handful of emerging economies at stage three are on the way to

Table 4.3: Five stages of universal service policy development

	Stage 1: Network establishment	*Stage 2: Wide geographic reach*	*Stage 3: Mass market take-up*	*Stage 4: Network completion*	*Stage 5: Service to individuals*
Business take-up	0 - 30%	20 - 80%	70 - 100%	100%	100%
Household take-up	0 - 10%	5 - 30%	20 - 85%	75% - 100%	100%
Typical telephone company culture	Entrepreneurial.	Administrative (gov't department).	Operational (large workforce).	Commercial (maybe privatized).	Competitive.
Typical management preoccupations	Large scale capital investment in new technology.	Technical network improvements, public service.	Growth of the network.	Growth of call revenues (marketing).	Profitability.
Main constraints to network expansion	Investment funds, appropriate technology and skills.	Limited demand due to high prices and use of alternative communications.	Manpower for plant installation to meet mass demand (waiting lists).	Affordability of service to poorer households; cultural acceptability of telephony.	Market appeal.
Typical public policy measures (telecom)	Investment incentives.	Gov't control (for national security & economy); geographically uniform charges.	Installation and rental charges kept low to stimulate line demand.	Network competition, cost-oriented tariffs.	Free, fair competition.
Universal service goal type	Technological (acquire new technology).	Geographic (maintain regional parity).	Economic (stimulate economy).	Social (achieve political 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 of disabled people).	Everyone can meet basic communication needs; public access to advanced services (esp education, health).
Typical public policy measures (universal service)	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: Claire Milne. [10]

achieving higher levels of household telephone penetration. They are followed by a range of middle-income economies that have reached stage two; that is, they have established the network, but have not yet achieved mass take-up. At the earliest stage are lower income countries still struggling to provide access to basic infrastructure. For each of these groups the focus of network development—and the emphasis given to universal service—differs:

- **Medium level of household telephone penetration.** Countries at this level of development are just starting to achieve mass market take-up—i.e., they have reached 30-60 per cent household telephone penetration. The majority of the countries at this stage are Latin American and Central European. What most of them have in common is that they privatized their telecommunication operators in the 1990s. This generally resulted in a significant increase in household telephone penetration. However, some of these countries are beginning to face problems in maintaining or increasing network access. Growth is levelling off, thus resulting in a plateau—or in some cases, even a decline—in household telephone penetration. One reason for this has been a failure to deal effectively with issues of affordability as the network has progressed from one stage of network development to the next. Tariff rebalancing, which was implemented in several Latin American countries to fund early network development, can have an adverse effect in discouraging demand at lower levels of income. A widely dispersed income distribution exacerbates the problem. The use of cross-subsidies to maintain

Box 4.2: The Republic of Korea's path to universal service

By 1996, there were 13 developing economies that had graduated to the ranks of the 'universally served': 90 per cent or greater of households with a telephone (Table 4.2). How did they succeed in achieving universal service? First, the composition of the group tends to reinforce the importance of wealth. All are high-income economies with GNP per capita in the range US$ 11'450 - US$ 23'790. Hongkong, for example, has a higher GNP per capita than the United Kingdom. Several are oil-rich states (Brunei, Kuwait, Qatar, United Arab Emirates) and most are relatively small (Bahrain, Cyprus, Hongkong, Macau, Malta, Singapore).

Of these developing countries, the Republic of Korea stands out. It has the largest land area of any country in the group and has developed its economy without the benefit of natural resources such as oil. Until the 1960s, telephone services were mainly used for political and military purposes. The country's rapid economic growth and consequent rise in living standards led to a surge in demand for telephone service in the 1970s. Waiting lists grew and the backlog emerged as a social problem.

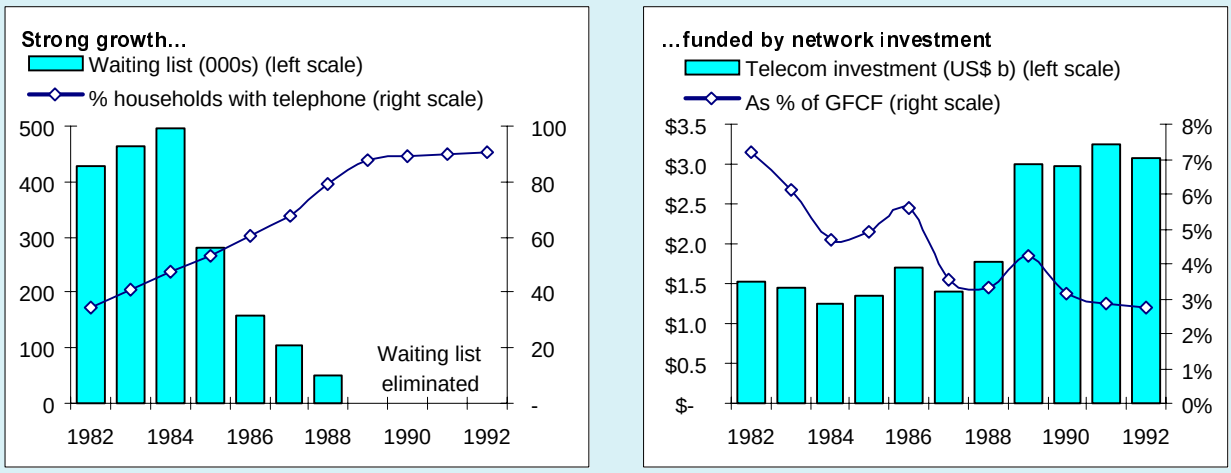
As a result, upgrading the telecommunication network became a priority. Korea Telecom was separated from the Ministry of Communications (MOC) in 1981 to give it more flexibility to eradicate the waiting list. The country achieved rapid telecommunication growth through the 1980s. Household telephone penetration increased from 15 per cent in 1978 to over 90 per cent by 1992. Investment was also directed to rural areas to minimize disparities between rural and urban regions. Rural areas were also targetted for the latest digital technology because of the investment already made in analogue exchanges in urban areas.

Tariffs were modified to enhance accessibility. The number of local-call areas was reduced from about 1'600 to about 150 and a national flat-rate usage tariff became a policy goal. Installation charges were standardized by raising urban installation charges and lowering rural ones.

Funds were raised from several sources. Various laws were established to raise funds from bonds and other national sources. Tariffs were structured to maximize investment funding. Telecommunications was given priority in the Fifth Five-Year Socio-Economic Development Program (1982–86), rising from less than 3 per cent of total national investment in the 1970s up to 7 per cent in the 1980s. Domestic and international pressure to open the telecommunication market began to grow in the 1990s. As in many developed countries, a high level of universal service has allowed the Republic of Korea to progressively liberalize its telecommunication market.

Box Figure 4.2: The way to universal service in the Republic of Korea

Waiting list, percentage of households with telephone and telecom investment, US$ billion, Republic of Korea



Note: In the right chart, GFCF refers to Gross Fixed Capital Formation.
Source: ITU World Telecommunication Indicators Database.

low tariffs in Central European countries has meant that telecommunication revenues are limited, discouraging operators from investing in high cost and rural regions. This acts as a natural barrier to household penetration growth.

- **Low level of household telephone penetration.** Countries at this stage have generally provided service in major cities. They have household telephone penetration rates ranging between 10-30 per cent. This group of countries, predominately Arab States and Latin American nations, are those that have not yet, or have only recently, introduced significant changes in their telecommunication sector. Most also tend to have relatively low fixed charges (installation and subscription) but higher

long-distance and international call charges. These countries are faced with the dilemma of trying to encourage mass take-up by keeping tariffs affordable while at the same time generating sufficient revenue for investment.

- **Very low levels of household telephone penetration.** Countries that remain in the early stages of network development are those without widespread geographic availability, generally achieving less than 5 per cent household telephone penetration. These countries have failed to focus effectively upon telecommunications development for reasons such as civil conflict, extreme poverty or poor governance. As a group, these are mainly the Least Developed Countries, primarily in Sub-Saharan Africa. Ironically, many of the countries in this group have among the highest levels of telecommunication revenue per subscriber in the world. The revenues are generated from a low base of primarily business, government and wealthy subscribers; in many cases, over half the revenues are generated from international telephone calls. Investment has tended to flow to improving urban and international communications at the expense of rural and low income users. In other cases, profits from the telecommunication industry has been channelled to other sectors of the economy.

In its contemporary incarnation—that of availability, accessibility and affordability—universal service demands rapid network development and widespread, equitable access. These are neither mutually exclusive nor simultaneously achievable objectives, but rather different stages of telecommunications development. As different thresholds of network and service development are passed, policy emphasis and development priority need also to change. For developed countries, the focus is on ensuring basic telephone service to all citizens. A telephone should be considered a basic requirement in all households, just as electricity and water services are expected. For middle- to high-income developing countries, the provision of universal service remains a worthwhile goal and, having achieved widespread geographic availability, issues of access and affordability need equally to be focused upon. In lower income developing economies, the objectives of universal service are increasingly being seen as a long-term goal rather than central to policy. Here the concern should be on providing access to the network to promote both network expansion and economic development. In the next section we examine the rise of alternative strategies more suited to the provision of universal accessibility.

4.3 The rise of universal access

Despite years of struggling to expand connectivity by promoting a telephone connection for every household, most developing nations are still far from turning this political will into reality. By the end of 1996, while most high income countries had achieved, or were approaching, at least one telephone line for each household, in the rest of the world, only 18 per cent of households had a telephone. In low income countries, fewer than 3 per cent of households have a telephone. Given the magnitude of the gap, developing countries have begun to articulate more practical transitional goals. The underlying thread that ties the policies together is the notion of *universal access*: a shift from individual service to a broader base of the population; from a telephone in every household to community access.

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 a user's location depending on the context (Table 4.4) and involving factors such as the mode of transport (walking, bicycling, motoring) as well as the coverage of the telephone network, the population density, and the spread of locations. The result has been a variety of differing definitions, from a telephone *"within one kilometre of both public and private access"* in Costa Rica, to *"a telephone within five kilometres (or two hours walk)"* in rural South Africa, to *"a telephone booth within 20 kilometres"* in Burkina Faso (Table 4.5). Moreover, this relationship will change over time as the network develops. India, for example, adopted a principle of *"easier and quicker and increasing access to a public telephone for people who can not take a private subscription."*[11] Through successive Five-Year Plans, India has reduced, first, the population size of a village required to qualify for a public telephone and, then second, the distance within which one public telephone should be available. By 1997, a population agglomeration

Table 4.4: Defining universal access
Universal access definitions

Criteria	*Definition*	*Example*
Population	A telephone for every permanent settlement of 'x' population	In Ghana, defined as a telephone in every locality of more than 500 people.
Distance	A telephone within 'x' kilometres	In Burkina Faso, defined as a telephone within every 20 kilometres.
Time	A telephone within 'x' minutes	In South Africa, proposed as a telephone within a 30 minute travelling distance.

Source: ITU.

of 2'500 or a distance of five kilometres set the standard of qualification for a public telephone.

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.[12] This 'virtual telephone' works by assigning users a telephone number; an answering machine records all messages to the number that can be retrieved when the user has access to a telephone. In South Africa, there is an initiative to assign email addresses to every Post Office box address in the country, thereby providing electronic mail indirectly to around eight million South African households.[13] Public Internet Terminals—similar to a bank's automated teller machines—will be located in every Post Office. Through an encoded card with a personal identification number, users will be able to send, retrieve and print email messages.

Policies to enhance universal access generally fall into two categories: (1) sector changes such as introducing privatization or competition as a means to increase overall network development; and (2) shared-access programmes for those without individual telephones.

4.3.1 Network development strategies

Sector change is increasingly seen as a way to inject rapid growth into the national telecommunications market, thereby improving access. For a number of developing economies—mainly Latin American and Central and East European countries, but also more recently some African states—privatization has been the most significant transformation in the telecommunication sector. Privatization of the national operator provides capital and management know-how for building up the network. An alternative method of introducing private capital is to contract out network building. These Build/Transfer (B/T) arrangements grant the investor the right to build or rehabilitate the network, operate it for a period of time and then turn it over to the state-owned operator. A third way of attracting investment is through licensing additional operators. Although most countries have not introduced direct competition for fixed-link local telephone service, many have licensed new mobile cellular operators, thus increasing overall telephone accessibility. A more recent trend has been the licensing of new fixed-link companies to provide operation in specific, unserved regions.

Table 4.5: What is universal access?

Universal access definitions, selected economies, 1997

Country	*Universal access policy*	*Operator obligations*
Bhutan	A phone booth in every village.	No obligations. Telecommunication Legislation Act under formation.
Chile	By 1997 no community of more than 50 inhabitants should remain without a payphone.	No obligations on operators. Government pursuing through Telecommunication Development Fund.
Columbia	Telephone per household in urban areas; communal phone in estates of urban areas; communal phone in rural areas.	No obligations.
Comoros	A phone in every locality.	No obligations.
Costa Rica	Within 1 kilometre of both public and private access.	No regulated obligations.
Cuba	Access to all villages and to communities of more than 500 inhabitants.	Licence conditions stipulate by the end of the first 8-year programme all villages of more than 500 inhabitants must have access.
Ethiopia	A phone booth in every town.	Definition and obligations under preparation; to coordinate with 3-year plan.
Guinea	A telephone box for every locality; a telephone exchange for every administration.	Service and interconnection expected; no specified obligations.
Iran	Telephone facilities to all villages of more than 100 people.	Expansion, service quality, interconnection and service to the elderly as part of licence conditions.
Kenya	A phone within walking distance.	A performance contract entails obligations on service quality and expansion (including rural development).
Kyrgyzstan	A phone booth in every town; a phone in every home.	Expansion, service quality and interconnection contracted with the government.
Lesotho	A public telephone within 10 kilometres of any community.	Voluntary objective to be achieved by 2002.
Madagascar	A public phone in each village.	No defined obligations.
Maldives	At least one telephone booth per 500 inhabitants; a phone booth on every island.	Operator's licence condition is to provide access to basic telecommunications services to the whole country by the year 2000.
Morocco	To provide a 'point of access' to every community.	No obligations.
Mozambique	A public telephone within distance of less than 5 kilometres. At least one public telephone in each of the 144 district centres.	Expansion, service quality and interconnection contracted with the government.
Pakistan	A phone in every village.	No obligations.
Peru	On a needs-assessed basis to provide at least one public phone to each of the 70'000 inhabited rural counties without service.	Licence requirements include having to install at least one payphone in 1'500 of the 2'900 population centres of 500-3'000 persons (and all towns of greater than 3'000 persons) by 1999.
Romania	A payphone in every village and telephone in every home.	Order of the Minister of Communications.
South Africa	A telephone per school/clinic within 5 kilometres or 2 hours walk in rural areas; community telephones in urban settlements.	Cellular operators required to provide approx. 32'000 community telephones in urban settlements.
Togo	A telephone within a 5 kilometre radius by 2010; a telephone in every administrative and economic centre of importance.	Contract with the state to determine the objectives for development and plurality of service.
Zambia	Telephones booths in public places (schools, clinics, etc) country wide.	No defined obligations.

Source: ITU/BDT Regulatory survey.

Table 4.6: Targeting access
Network expansion requirements for privatized telephone companies

Country	*Company*	*Date*	*Requirement*
Ghana	Ghana Telecom	1996	• Provide a minimum of 225'000 new telephone lines within 5 years.
Mexico	Telmex	1990	• Average annual main line growth of 12% per year between 1990-94. • Payphones to be installed in each town of population greater than 500 by 1994. • Public payphone density to be 2 per 1'000 inhabitants by 1994 and 5 per 1'000 inhabitants by 1998.
Panama	Cable and Wireless (Panama) (formerly called INTEL)	1997	• Increase teledensity to 25% by 2002. • Install 600 rural payphones within 2 years.
Peru	CPT and Entel	1994	• Add 978'000 main lines between 1994-98 (distributed between metropolitan and provincial areas). • Install 19'000 public telephones by 1998. • Provide public service to all towns larger than 500 persons by end-1998.
Venezuela	CANTV	1991	• Increase main lines by 355'000 per year, 1992-2000.
South Africa	Telkom	1997	• Increase main lines to 6 million by 2002. • Install 120'000 public pay phones by 2002.

Source: ITU.

4.3.1.1 Privatization

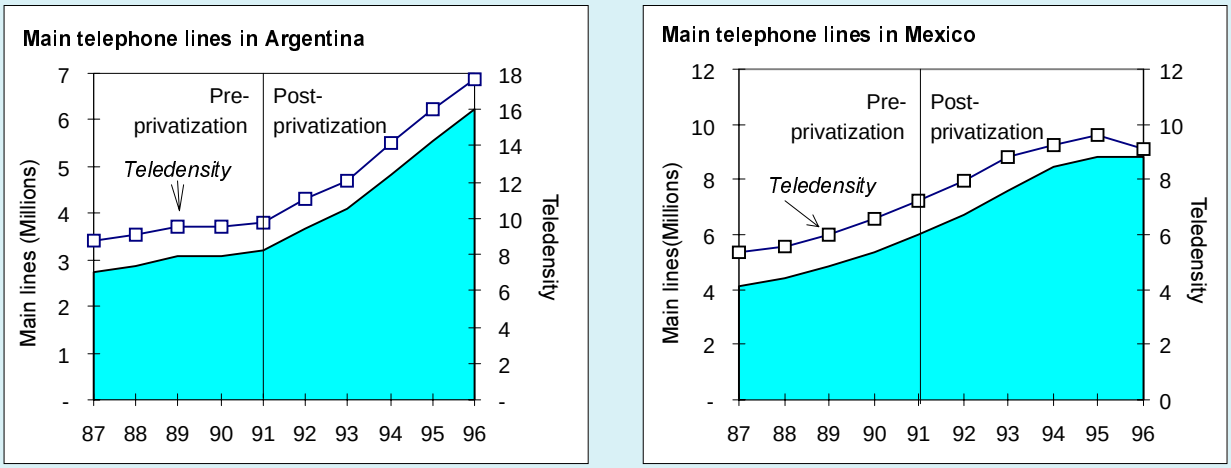
Privatization has had an initial positive impact upon network growth and access. One reason is that network expansion targets have increasingly been made a requirement of privatization concessions (Table 4.6). For example, significant increases in teledensity were achieved in Latin American countries that underwent privatization in the early 1990s (Figure 4.3). In Mexico and Argentina, targets included in the licences for the privatized companies required a combination of annual network growth and coverage achievements. In Mexico, Telmex—in which a strategic stake was sold to foreign investors in 1990—was required and achieved an average annual growth in main telephone lines of 12 per cent through 1994. In Argentina, the two new operators created from the privatization of the government-owned Entel in 1990, were required to install sufficient lines to achieve an average network growth of six per cent in the first five years. Growth achieved during the period was in fact closer to 14 per cent.

The impact of privatization is more recent in Central and Eastern Europe. The two Baltic countries, Estonia and Latvia, partially privatized their telecommunication operators in 1992 and 1994 respectively, while the Czech Republic and Hungary began privatization processes in 1993. Since privatization, the latter two countries have ranked among the top in the region in terms of increases in teledensity, household penetration and payphones.

The potential of privatization to increase network development in Africa, where stakes in four incumbent operators were sold between 1996 and 1997, is immense. Ghana Telecom, thirty per cent of which was sold to a strategic investor in December 1996, must install 225'000 lines in 5 years. If this target is met, it will triple teledensity, raising it from less than 0.5 in 1996 to almost 1.5 by the end of the year 2001. In South Africa, thirty per cent of Telkom was sold in March 1997. Telkom must install 2.8 million new lines also within five years. One outcome would be that at least half of households that can afford telephone service, would

Figure 4.3: Privatization and network growth in Latin America

Number of main telephone lines (millions) and teledensity (lines per 100 inhabitants) before and after privatization in Argentina and Mexico, 1987-96



Note: For **Telecom Argentina**, a private sale was concluded in 1990 of 60 per cent to a consortium including STET (Italy, 30%), France Télécom (30%), JP Morgan (USA, 10%), Compañia Naviera Perez Companc (30%). A further 30 per cent was sold to the public in February 1992 and 10 per cent went to the company's employees.
For **Telefónica Argentina**, a private sale was concluded in 1990 of 60 per cent to the COINTEL consortium, comprising Telefónica de España (30%), Citicorp (USA, 57%), and Techint (Italy, 10%). A further 30 per cent was sold to the public in 1991 and 10 per cent went to the company's employees.
For **Telmex**, prior to June 1990, 54 per cent of its shares were privately held. In 1990, 4.4 per cent of the government-owned shares were sold to the employees and 20.4 per cent was sold to a consortium including Grupo Carso of Mexico, France Télécom and SBC of the US in 1990. In 1991, 15.7 per cent was offered to the public (domestic and international public offerings) and SBC exercised its option to buy 5.1 per cent for some US$ 467 million. 4.7 per cent was sold in 1992, through a domestic and international offering. In 1993 a further 3.3 per cent of the company was sold. The remaining 1.5 per cent was sold in January 1994.
Source: ITU World Telecommunication Indicators Database, ITU "World Telecommunication Development Report, 1996/97".

have their own individual telephone. Côte d'Ivoire-Telecom, 51 per cent privatized in January 1997, will install 300'000 telephone lines over a five year period, quadrupling the number at the time of privatization.

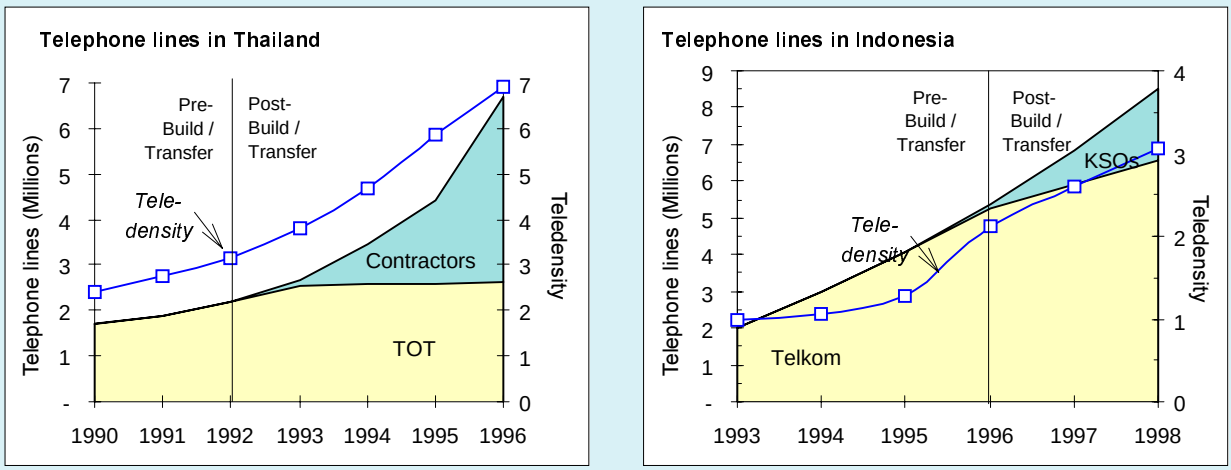
4.3.1.2 Build/Transfer

Another approach to expand network penetration has been to contract out specific network expansion projects to private companies under a Build/Transfer (B/T) or similar scheme (Figure 4.4). This has been mostly used in South-east Asia. Indonesia and Thailand, for example, have successfully used this approach while, more recently, Vietnam has introduced its own variant—the 'Business Cooperation Contract'. Although countries in other regions have also introduced B/Ts, they have been on a smaller scale and typically carried out in conjunction with equipment supply contracts.

In Thailand, B/Ts have been implemented for a variety of services (mobile cellular, data communications, paging, satellite operations) and structured as agreements between the private sector and the two state-owned operators, the Telecommunications Organization of Thailand (TOT) and the Communications Authority of Thailand. The main motive for BOTs was to attract private capital while not violating restrictions that called for government provision of telecommunication services. In 1991, the government supported TOT's use of the variant 'Build-Transfer-Operate' (BTO) mechanism for increasing the number of telephone lines. The project was originally structured to provide three million new lines in and around Bangkok but, following a 1991 military coup, the concession was restructured to increase the number of lines required to be installed. The project was also divided into two separate contracts, one for Bangkok and a second for provincial areas. Between 1991 and 1996, the scheme enabled Thailand to increase teledensity from 2.7 per cent to 6.0 per cent, including increasing access in the provinces.

Indonesia is now undergoing its second B/T programme. The first—known by its Indonesian acronym, PBH, was initiated in 1990 to help alleviate network undercapacity in Jakarta. Six concessions for

Figure 4.4: Increasing access with private contractors
Installation of main telephone lines by private contractors in Thailand and Indonesia



Note: For Thailand: Two Build/Transfer (BT) contracts were signed between the incumbent fixed-line operator, Telephone Organization of Thailand (TOT), and Telecom Asia (in 1992) and the Thai, Telephone and Telecommunication Company (in 1993) to install 2.6 and 1.5 million telephone lines respectively by the end of 1996.
For Indonesisa: In October 1995, the incumbent fixed-line operator, PT Telkom, entered into "Kerja Sama Operosis" (KSO or "Joint Operating Schemes") with 5 companies. The KSO companies must install at least 2 million lines by 31 March 1998.
Source: World Telecommunication Indicators Database, PTO Annual Reports.

120'000 lines each were awarded to local telecommunications equipment distributors. PBH awardees were responsible for providing capital, labour, and other network construction resources, in exchange for 70 per cent of the operating profits. The second Indonesian B/T programme (Kerja Sama Operasis, 'KSO'), was developed in 1993 (and awarded in 1995) as part of the government's six-year planning cycle, ending in 2000. This aims to increase the number of telephone lines by five million: two million lines are to be provided by private investors through the KSO programme, while the incumbent operator PT Telkom is to be responsible for adding the other three million. Private investors were invited to bid on contracts for five regions where telephone density is extremely low. The five winning consortia, comprising major international telephone operators as well as local companies, have invested a total of US$ 2 billion for the licences. The five private Regional Division Companies—if successful—will increase the size of the network by at least 61 per cent within three years.

4.3.1.3 New market entrants

There has been a gradual opening of local telecommunication markets in order to attract new operating companies to increase the supply of telephone lines. A limited number of countries have awarded licences to provide competitive fixed-line local services while other countries have introduced indirect competition through the licensing of new mobile cellular operators. In other cases, licences are issued to new telecommunication operators to provide service in a specific region or using a specific technology, such as wireless local loop (WLL).

The impact of new market entrants is particularly evident in the Asia-Pacific region where more than 80 new companies have been formed since 1990.[14] In the Philippines, for instance, five mobile cellular licences were awarded in 1993 with the requirement to also install 400'000 new fixed-link lines over a five year period, while seven international gateway licences were awarded with the obligation to install 300'000 new fixed-link lines over a three year period. This policy calls for four million new lines to be installed across the country by 1999, quadrupling the number of lines. To ensure that lines are not located only in major cities there are targets for the ratio of urban to rural lines. Although the programme has been hampered by interconnection disputes between the new operators and the incumbent Philippine Long Distance Telephone Company (PLDT), one fifth had been installed by the end of 1996 and most operators are committed to install the remaining lines by 1998 (see Table 4.7). Faced with the possibility of real

Table 4.7: Local loop competition in the Philippines

Local telephone lines required to be installed by new cellular and international telephone service operators

Operator	Type of licence		Lines required by EO 109 [3]	Lines installed 12/96 [4]	Planned lines 1998
	IGF [1]	CMTS [2]			
Digitel	•		300'000	120'624	337'932
Globe Telecom	•	•	700'000	109'686	704'150
ICC/Bayantel	•		300'000	338'870	341'410
Islacom	•	•	700'000	6'594	701'330
Philcom	•		300'000	45'502	305'706
Piltel		•	400'000	-	417'858
Capwire	•		300'000	50'000	168'200
Smart	•	•	700'000	161'700	678'150
ETPI	•		300'000	-	200'050
Sub-total	**8**	**4**	**4'000'000**	**832'976**	**3'854'786**
PLDT [5]	•		0	656'510	1'629'522
Total	**9**		**4'000'000**	**1'489'486**	**5'484'308**
Philippines			*1994*	*1996*	*1998*
Lines in service			1'109'652	1'787'000	7'348'000
Teledensity			1.67	2.55	10.05

Note: 1. IGF (International Gateway Facility): 300'000 lines in 5 years.
2. CMTS (Cellular Mobile Telephone System): 400'000 lines in 5 years.
3. Executive Order 109 mandating installation of lines in exchange for IGF or CMTS licence.
4. Installed Lines as opposed to Lines in Service.
5. PLDT, as the incumbent operator, was not required by EO 109 to install lines but instead made a commitment under its Zero Backlog Programme (ZBP). Note that the figures shown only relate to new lines under the ZBP and not to its existing base.

Source: Philippine National Telecommunications Commission, ITU.

competition, PLDT enacted its own Zero Backlog Program, installing over 800'000 new lines between 1993 and 1996, more than doubling its network size.

In Bangladesh, a locality-specific approach was adopted by awarding a licence to a joint venture between the Bangladesh Rural Telecommunication Authority and the United States company, International Communications Technologies, to install 123'000 lines by 1999. The 25-year operating licence, restricted to the rural north of the country, covers a region of almost 70 million inhabitants with a current network of only 7'000 lines. In Sri Lanka, a technology-specific solution was adopted by awarding licences to two new operators to provide local service using WLL technology. The operators, Telia Lanka and Lanka Bell, are each required to install 100'000 lines.

In Africa, a second national operator ('SNO') licence was awarded by Ghana in 1996 to the African Communications Group (ACG). ACG must install 50'000 new lines within 3 years. In Tanzania, the government has licensed Zanzibar Telecommunications as a basic service provider on the island of Zanzibar. In Uganda, the government has awarded a second network operator—the MTN Uganda consortium—a full service licence including cellular telephony.

In Central Europe, local exchange operating licences have been issued to new companies in Hungary and Poland. The Hungarian government awarded

Box 4.3: Stumbling towards competition

In 1994, the Indian government decided to throw open the doors to private telephone companies, ending the Department of Telecommunications' (DoT) monopoly over domestic services. Private companies were invited to bid for a licence to provide basic, fixed-link, local service in one of 20 regional areas or "circles". Interested companies could include foreign investors (holding up to 49 per cent of the shares). The process began in January 1995 when tender documents were made available. However, from the outset, the tendering process has been mired in controversy and, by 1998, the country had already been through three rounds of bidding.

In the first round of bids, Himachal Futuristics Communications Ltd. (HFCL), emerged as the highest bidder in nine of the twenty zones on the auction block by bidding US$ 25 billion, some US$ 10 billion higher than all other competitors combined. Controversy increased when the government announced that winning firms could operate in no more than three circles, allowing HFCL to choose three and leave the rest open for rebidding. In the second round of bidding, the DoT set an exorbitant floor price, rejecting bids for eight circles it believed were too low. By the third round of bids, only one company bothered to tender for one of the nine circles available.

As a result, the biggest deals have become licence buy-outs as frustrated investors divest their stakes. Those still in the running are reluctant to begin operations until the DoT clarifies its role. Not surprisingly, many businesses are equipping their executive staff with wireless access, which has been opened to competing private mobile cellular operators since 1994. However, even mobile cellular has not attracted the predicted number of customers. Anticipating strong demand for cellular telephones, the DoT set a high licensing fee. The government estimated there would be 130'000 cellular subscribers in the four main metropolitan areas—Bombay, Delhi, Calcutta and Madras—by March 1996. The actual number was about half that. High licence fees have prevented operators from reducing tariffs to stimulate increased usage.

By November 1997, three licences for basic services had been signed while another two were expected to be signed. It is anticipated that some of the new operators will begin rolling out service by the end of 1998. Four years of possible high telecommunication growth have been lost to the privatization process. Regarding the remaining 15 circles for which no licence has been issued, there are indications that the high licence fees will be abandoned in favour of a revenue sharing arrangement with the DoT.[16]

concessions for local service in 23 out of 25 regions in 1994. The incumbent, Matáv, was awarded five regions plus a further two for which no bids were received. The remaining regions are to be provided service by new local telephone operators. By 1996, the new operators were operating around 20 per cent of all telephone lines in the country. Poland has also awarded concessions for local operators in rural areas. In order to encourage new operators, the government allows joint ventures with foreign strategic partners (as in Hungary) and assists with financing for operators that cannot afford start-up costs. New local exchange operators in these countries have also received financial support from the World Bank's private financing arm, the International Finance Corporation, which established a private investment fund for that purpose in May 1994.[15]

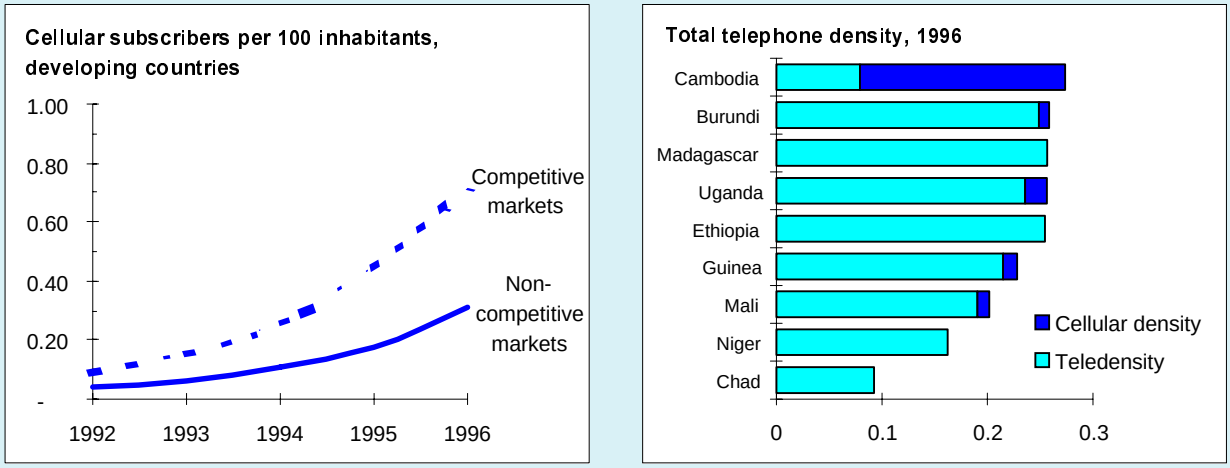
Competition in cellular services has been introduced more widely and for longer than competition in wireline services in developing countries. New mobile cellular operators impact access in two ways. First, competition between mobile cellular operators has generally led to higher mobile cellular access than monopoly environments (see Figure 4.5, left chart). Second, indirect competition from cellular service impacts overall telephone access by increasing the supply of telephone service. As a result, countries which have growing mobile cellular markets have a higher overall telephone access penetration (fixed plus mobile cellular) than simple teledensity alone would measure. So, for example, instead of Cambodia being the lowest ranked country in terms of teledensity, it is ahead of a number of other countries when an overall measure of telephone access is considered (see Figure 4.5, right chart).

4.3.2 Shared access

One feature not captured by household telephone penetration statistics is how many people have access, rather than subscribe to telephone service. For example, households without individual telephone service may have access to a neighbour's telephone. This is particularly prevalent among low income and other disadvantaged users. In the United States, 5.5 per cent of the lowest income households without a telephone use a neighbour's telephone compared to 0.2 per cent of the richest households. In South Africa, only 2.6 per cent of white households share a neighbour's telephone compared to the national average of 7.7 per cent. This concept of sharing access highlights approaches countries are taking to enhance access for those

Figure 4.5: Mobile cellular competition and access

Cellular subscribers per 100 inhabitants in competitive and non-competitive developing markets



Note: Data in left chart are simple averages of the 27 developing countries with a teledensity less than ten that have had a mobile cellular service since 1992.

Source: ITU World Telecommunication Indicators Database.

without individual telephones. Policies revolve around increasing public telephone penetration and expanding the number of localities with telephone service.

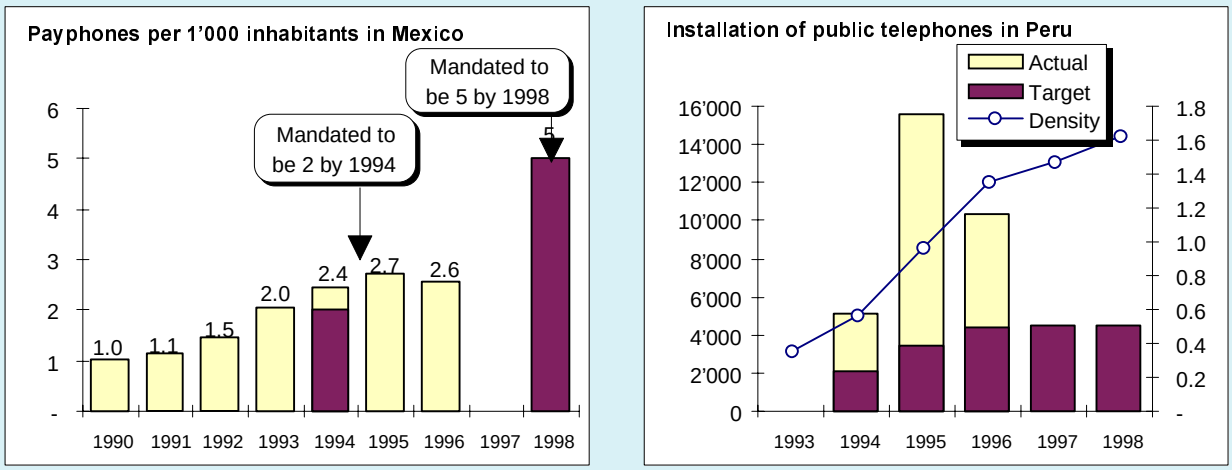
4.3.2.1 Payphones

Public payphones—typically supplied and operated by the incumbent carrier—have been the traditional method of encouraging widespread access to telecommunications facilities. Countries are adopting new approaches to increase the supply of payphones revolving around mandated targets for incumbent operators and liberalization of payphone provision.

One example of using mandated targets to increase payphones is Mexico (Figure 4.6, left chart). When the incumbent operator Telmex was privatized in

Figure 4.6: Targeting payphones

Public telephones per 1'000 inhabitants in Mexico 1990-1998, and number of new public telephones installed in Peru, 1993-1998



Source: ITU World Telecommunication Indicators Database.

1990, it was required to increase public telephone penetration to two per 1'000 inhabitants by the end of 1994 and to five per 1'000 inhabitants by the end of 1998. Telmex met the 1994 target, increasing the number of public telephones more than two and half times between 1990 and 1994. However, the number of public telephones declined in 1996 with Telmex far short of fulfilling its 1998 requirement. Instead of a payphone density target, Peru's Telefónica is required to install a specific number of public telephones each year between 1994 and 1998 as a part of its concession. The amount is distributed between the two largest cities and the rest of the country to reduce disparities. Teléfonica has thus far largely surpassed its targets (Figure 4.6, right chart).

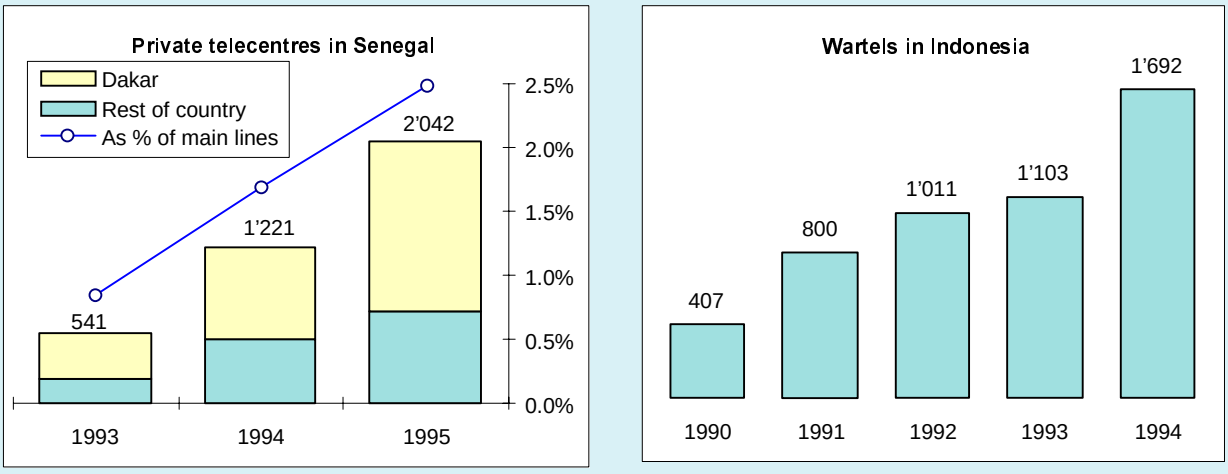
While a number of developed countries allow anyone to provide a payphone service, this is a more recent phenomenon in developing ones. In Chile, for instance, any enterprise that wishes to is able to install and operate payphones. One incentive for companies establishing payphone operations in Chile is that they also obtain a licence to provide a local network in the geographical area concerned. In Tanzania and Uganda, several companies have been licensed to provide card payphones.

One way developing countries have opened private lines to public access has been through franchising Public Call Offices to private entrepreneurs. This legitimizes what was already an existing, if technically illegal, practice in many developing countries with shortages of public telephones.

Indonesia has had a successful experience with its "Warung Telekomunikasi" (Wartels). These franchised call offices began in 1988. They are typically operated by small entrepreneurs who provide not only local, long-distance and international calling but also fax, telegram, telex and, increasingly, Internet service. By 1994, there were over 1'500 Wartels (Figure 4.7, right chart). There is a franchise agreement between the Wartel owner and the national telephone company, PT Telkom. The franchisee pays for the installation and rental of the line and is allowed to keep eight per cent of revenues for domestic calls and over 90 per cent for international ones. Start-up costs have been estimated to be in the range of US$ 1'500 to US$ 3'500 per line. In 1994, the Wartels generated over US$ 60 million or about US$ 9'000 per line, about ten times more than Telkom's average revenue per line.[17]

Francophone Africa is witnessing a blossoming of "Télécentres", "Téléboutiques", or "Télékiosks" with countries such as Burundi, Morocco, Togo and Tunisia franchising the operation of public telephone booths. Senegal initiated a pilot project of four privately-operated call offices in 1992 (Figure 4.7, left chart). These "télécentres privés" ("TCPs") are operated by entrepreneurs who rent telephone lines from the national operator, Sonatel. The number of TCPs has grown rapidly since their inception, with 5'416 installed around the country by the end of 1996, accounting for six per cent of all telephone lines in the country. Around two-thirds of the TCPs are in the

Figure 4.7: Private public telephones
Privately operated public telephone offices in Senegal and Indonesia



Source: ITU World Telecommunication Indicator Database, Zongo, G.

capital Dakar with the remainder spread throughout the country. The TCPs have also created over 1'000 jobs in three years and are heavily utilized; the annual revenue per TCP line is almost four times more than Sonatel's.[18]

The use of cellular technology is also increasing the supply of public telephones. In South Africa, the licensing of two mobile operators included a requirement to deploy almost 30'000 cellular community telephones. In Bangladesh, Grameen Telecom is using cellular technology for its Village Pay Phone (VPP) project. It plans to install VPPs in 68'000 villages over four years, providing service to over 100 million rural inhabitants.[19] The VPPs will be financed through the cooperative Grameen Bank who will lend members money for purchasing the phone and making service available to the rest of the village.[20] Grameen estimates that it costs the government between US$ 1'000-1'500 to establish a fixed-line public call office, compared to about US$ 450 to install a VPP.[21] Unlike conventional payphones, the VPP will provide incoming service with the VPP operator going to find the villager for whom the call is intended. This is an important feature since there are a significant number of villagers working abroad who would like to call their relatives.

4.3.2.2 Serving localities

A number of developing countries are adopting policies which call for the installation of telephones in unserved localities, primarily rural villages and towns. Because of the immense task and cost of wiring all localities, priority is generally given to 'strategic' localities (based for example, on size of population or proximity to border areas). Some countries, such as Malaysia and Turkey, have successfully provided service in all villages while countries such as Thailand have concrete plans for doing so.

One strategy is to mandate incumbent operators to install telephones in localities without service. In Mexico, Telmex's 1990 licence required it to install at least one telephone with long-distance service in all towns with a population greater than 500 prior to the end of 1994. Telefónica del Peru's licence required it to install public telephone cabins in 1'500 towns with a population of greater than 500 within 5 years (1994-1999).

Other countries are pursuing a strategy focusing on specific rural projects. One example is Thailand's Rural Long Distance Public Telephone Project. The incumbent telephone operator, the Telephone Organization of Thailand (TOT), has had four phases of programmes since 1974 to increase telephone access in rural areas. The first phase, completed in 1990, involved the installation of three public telephones in just over 1'800 'tambons' (big villages) in 72 provinces. The second phase, completed in 1995, increased service by providing five public telephones to the remaining 3'500 tambons without service as well as in 1'000 other locations such as tourist attractions and along main roads. Two parallel projects are currently under implementation. One involves increasing the number of public telephones in localities that already have service. The second is to provide telephone service to all 45'000 Thai villages by the end of 1998. Notable aspects about the Thai experience are:

- financing was twice secured from the Asian Development Bank;
- technology has improved so that the projects have ended up costing less than expected, allowing savings to be passed on to subsequent phases;
- the projects have been completed earlier than originally expected.

A further way to increase the number of localities with telephone service has been to license specific rural operators. In Ghana, Capital Telecom was established in 1994 to provide telecommunications to the rural southern part of the country. Despite a number of technical, financial and regulatory difficulties, service began in February 1997. About 10'000 lines will be provided in the first phase.

Special funds can also be used to finance telecommunication development in rural areas. In Poland, where thirty five per cent of the population is rural, the "Telephonization Project for Rural Localities Having No Telephone Lines" was started in 1991 to install at least one telephone line in each locality without service. Over 7'885 localities were connected between 1992 and 1996, with funding of US$ 20 million coming from the state budget.

In Chile, a development fund was established in 1994 to increase access for the roughly 10 per cent of the population living in localities without telephone service. The fund, established to run between 1995 and 1998, is financed from the national budget. The Subsecretaria de Telecomunicaciones (SUBTEL), the industry regulator, determined an initial list of

Table 4.8: Chilean universal service fund
Telecommunications Development Fund, First Round Awards, 1995

	Projects		Localities		Inhabitants	
Level of lowest bid	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
At maximum subsidy	18	39	406	32	127'800	28
Below maximum subsidy	8	17	43	3	9'300	2
No subsidy*	16	35	656	51	275'900	59
No bid	4	9	180	14	49'000	11
Total	46	100	1'285	100	462'000	100

Note: * Firms agreed to provide service without subsidy.
Source: The World Bank. [22]

localities to provide service to, based on consultations with various groups. It then calculated the subsidies *estimated* to be required, distinguishing between those that were commercially viable (not needing any subsidy) and those that were socially beneficial but perhaps not financially profitable. Projects were then put out to competitive tender among interested firms. In the fund's first round, initiated in 1995, the competitive bidding process resulted in a total of 62 bids being lodged for 42 of the 46 projects (Table 4.8). Moreover, while the *maximum* subsidy made available for each project ranged from US$ 300 to US$ 26'000 per locality, the bidding process resulted in 16 projects being awarded to bids of *zero* subsidy. According to observers, bids for a zero subsidy resulted from the bidding process itself documenting the existence of demand and a willingness to pay in many small, scattered localities that had not yet caught the operators' attention. Call charges exceeding those authorized in cities then made the projects viable. The projects awarded covered 1'285 localities throughout the country. The localities typically had fewer than 1'000 inhabitants—the average being 360—and were located within 50 kilometres of existing telecommunications facilities. Once complete, these projects will provide access to basic telecommunications services for about 460'000 people, an estimated third of the Chilean population without access.

In Peru, a universal service fund along with a least-subsidy auction is being used to supply rural telephone services. The fund, established in 1994, is financed by a one per cent tax on the gross annual billings of all telecommunications providers (including cable television providers). Since its inception, the tax has generated an average of US$ 450'000 per month, and the fund has been growing by US$ 12 million annually, allowing the fund administrator to identify and target rural areas considered of preferential social interest. Brazilian authorities, concerned about the lack of access to communications in the rural areas of the north and north-eastern regions, stipulated in the country's General Law that, the privatization of Telebras requires the formation of a rural telecommunications fund similar to the programmes instituted in Chile and Peru.

[1] "*More than a quarter of the developing world's people still live in poverty...*" See United Nations Development Programme. 1997. *Human Development Report 1997*. Oxford University Press: New York (http://www.undp.org/hdro/97.htm

[2] Blackman, C. "Universal service: obligation or opportunity?" *Telecommunications Policy*. April 1995. http://www.elsevier.com:80/inca/publications/store/3/0/4/7/1/.

[3] Mueller, M. 1997. *Universal Service: Competition, interconnection and monopoly in the making of the American Telephone System*. Cambridge: MIT.

[4] This timing is not entirely incidental. Former or existing monopolies have often used arguments centred around universal service as a way of claiming special treatment from regulators or a degree of protection from the full force of competition. See Kelly, T. 1995. "Universal Service: An instrument for regulatory capture?" In *USO in a Competitive Environment.* Cambridge (UK): Analysys.

[5] OECD. 1991. *Universal service and rate restructuring in telecommunications.* Paris: OECD.

[6] Albery, B. "What level of dialtone penetration constitutes 'universal service'?" *Telecommunications Policy*. July 1995.

[7] "*In low penetration states...there are pockets in which telephone services are not being offered. Franchised telephone companies have not extended service into areas in which they believe there is no suitable market for telephone service or where the very low household density would make the cost of extending and maintaining service too high compared with the existing returns.*" See Dordick, H. and Fife, M. "Universal Service in post-divestiture USA." *Telecommunications Policy*. April 1991.

[8] "*First, how can the strong impact of income on telephone penetration be mitigated, so that those without service can be brought onto the net? The fact that those marginalized from telephone service are also the poorest American is not surprising. What demands attention is the persistence of this margin.*" See Schement, J. *Beyond Universal Service: Characteristics of Americans without Telephones 1980-1993*. Communications Policy Working Paper # 1. Published by the Benton Foundation. Available at http: www.benton.org/Library/Universal/Working1/Working1.html.

[9] For example, the poorest 20 per cent of households in the Unites States receive 4.7 per cent of income compared to over 7 per cent in countries such as Spain, Sweden, the Netherlands, Belgium, Germany and Japan. The only developed countries where the poorest 20 per cent of households receive a smaller share of income than the United States are Australia and the United Kingdom. See Table 5 'Distribution of income or consumption' from The World Bank. 1997. *World Development Report*. Washington D.C. http://www.worldbank.org/html/extpb/wdr97pa.htm.

[10] Milne, C. *Universal service for users: recent research results - an international perspective*. Paper for the 25th annual Telecommunications Policy Research Conference, September 1997. http://www.si.umich.edu/~prie/tprc/abstracts97/012.txt.

[11] Chowdary, T.H. "Universal Service Obligations in Developing Countries." Asia and Pacific Telecommunication Finance and Trade Colloquium. New Delhi, India. 3-5 November 1997.

[12] This service had around 40'000 users, primarily small enterprises, by 1996 and is projected to have about 3 million subscribers in 3 or 4 years. See Ó Siochrú, S. 1996. *Telecommunications and Universal Service: International Experience and the South African Effort* IDRC. Available at http://www.idrc.ca/books/focus/809/index.html.

[13] "*In Africa, e-mail is not a luxury but a bare necessity - much more so than in Europe. The main reason is that other modes of telecommunication are too costly for African budgets. It takes ten minutes to read 2,000 words aloud, and a ten-minute voice phone call from the Netherlands to Ghana costs 34 USD. And although the fax machine is faster and cheaper (2,000 words in a compact font will take two minutes to send), the same operation will still cost 7 USD. By contrast, an e-mail message of 2,000 words (around 12 kilobytes or 96 kilobits in digital terms), sent via a modem with a throughput speed of 14 kilobits per second, will take seven seconds to reach Accra from Amsterdam, and cost 0,40 USD. What is more, if the telephone line is good, a 28 k/s modem working at full speed will further halve the transmission charge - making it 175 times cheaper than a voice phone call across the same distance. No wonder e-mail is so important to the developing world - not least for the planet's poorest continent. It is the only mode of international telecommunication that Africa can afford on any reasonable scale.*" See Hegener, M. *Telecommunications in Africa - via Internet in Particular*. 24 March 1996. Available at http://155.135.37.1/faculty/cis/lpress/devnat/general/africa.htm.

[14] For a full treatment of this issue, see ITU. 1997. *Asia-Pacific Telecommunication Indicators: New Market*

Entrants. http://web.itu.int/ti/publications/index.htm#Asia97r.

[15] "*The bulk of the fund is likely to be invested in independent telephone companies in Hungary and Poland, where recent legislative and regulatory developments have created many opportunities for private investment.*" See IFC Press Release 94/90. May 10 1994. "IFC to invest in telecommunications fund for Central and Eastern Europe". Washington DC. http://www.ifc.org/press/1994/CETI.HTM.

[16] Nair, G. and Upadhay, G. "Hello, private operators here." *Business Standard* (India). November 5, 1997.

[17] Pradhan, R. and Smith, P. "Franchising Telecom Service Shops: Meeting demand from nonsubscribers in Indonesia*". Public Policy for the Private Sector*. December 1995.

[18] Zongo, G. *L'impact socio-économique et financier des télécentres privés: le cas du Sénégal*. Available at www.telecom-plus.sn/observatoire/tcp.htm.

[19] According to Grameen, the VPP is "*likely to become the largest wireless pay phone project in the world*". See the Grameen Telecom web page at http://www.citechco.net/grameen/telecom/.

[20] Grammeen Bank has focused on providing micro-credit—the typical loan is US$ 170—to the rural poor. It has more than 2 million borrowers and 1'000 branches serving 37'000 villages. See "A Phone in the Village*". International Herald Tribune*. 11 February 1998.

[21] Singh, S.J. "It makes a village." *Tele.com*. December 1997. http://www.teledotcom.com/1297/features/tdc1297bang.html.

[22] Wellenius, B. "Extending Telecommuncations Service to Rural Areas—The Chilean Experience: Awarding subsidies though competitive bidding." *Public Policy for the Private Sector*. http://www.worldbank.org/html/fpd/notes/105/105summary.html.