Telecommunications Regulation Handbook

Module 6

Universal Service

edited by
Hank Intven
McCarthy Tétrault

infoDev

Telecommunications Regulation Handbook

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Principal authors:

Hank Intven
Jeremy Oliver
Edgardo Sepúlveda

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MODULE 6

UNIVERSAL SERVICE

6.1 Universal Service and Universal Access

6.1.1 Introduction

This Module deals with the concepts of universal service (US) and universal access (UA) in the telecommunications sector. These concepts can be described as follows:

> **Universal Service** policies generally focus on promoting or maintaining "universal" availability of connections by individual households to public telecommunications networks. The objective of connecting all, or most, households to public telecommunications networks is generally referred to as the "Universal Service Obligation" (USO). US is a practical policy objective in many industrialized countries. However it is not economically feasible in most developing countries, where universal access is a more practical objective.
>
> **Universal Access** generally refers to a situation where every person has a reasonable means of access to a publicly available telephone. UA may be provided through pay telephones, community telephone centres, teleboutiques, community Internet access terminals and similar means.

While US and UA policies can be quite different, the concepts are closely related. In some cases, the terms US, USO and UA are used interchangeably. In this Module, we use the term **universality** to refer to both US and UA.

The overriding objectives of universality policies are to expand and maintain availability of affordable telecommunications services to the public. In particular, US and UA policies are aimed at providing or maintaining service to those who would not normally be served. This population includes those in high cost service areas, such as rural and remote regions, as well as lower income groups.

This Module reviews the key issues in the development and implementation of universality policies and programs.

Section 6.1 provides background information on telecommunications universality. It lists the main objectives for introducing universality programs, and describes the economics of universality.

Section 6.2 deals with the definition of US, UA and the USO. The definitions vary among countries. The underlying economics of universality suggest that richer industrialized countries will focus on providing a range of increasingly sophisticated services to

every household, while developing countries will focus on providing public access.

Innovative programs in countries such as South Africa, Chile and Peru demonstrate that it is possible to make advanced telecommunications services, including Internet access, available to the public at a reasonably low cost. Good universality policies can go a long way to bridging the "digital divide" between "online" and unserved populations in developing as well as industrialized countries.

Section 6.3 addresses the question: How to fund universality programs? That section reviews the main approaches used in different countries. These approaches include:

- **Market-Based Reforms:** especially privatization, competition and cost-based pricing;
- **Mandatory Service Obligations:** imposed by licence conditions or other regulatory measures;
- **Cross-subsidies:** between or within services provided by incumbent operators;
- **Access Deficit Charges** (ADCs): paid by telecommunications operators to subsidize the access deficit of incumbents; and
- **Universality Funds:** independently administered funds that collect revenue from various sources and provide targeted subsidies to implement universality programs.

These approaches are not mutually exclusive. Most countries use more than one approach.

Industrialized countries have gradually introduced market-based reforms, such as privatization, competition and cost-based pricing over the last two decades. Despite concerns to the contrary, the evidence suggests that teledensity levels increased, and did not decrease, after these reforms were implemented. Many other countries around the world, with historically lower telecommunications penetration levels, have also introduced similar reforms in recent years. In these countries, well-designed sector reforms have led to large gains in telecommunications service penetration levels.

Traditionally, most countries have relied to some extent on the second and third approaches listed above: that is, mandatory service obligations and cross subsidies. These mechanisms were intended to subsidize unserved or high cost subscribers from revenues earned from other subscribers or services. Such transfers are often implicit rather than explicit. International and long distance services, for example, have traditionally been priced well above cost. Surplus revenues from these high-priced services were intended to be used to subsidize higher cost or lower margin services, particularly residential local access lines.

Today, cross-subsidies between services are increasingly viewed as impractical and anti-competitive. With the onset of competition in international and long distance services, rates have fallen. This has left smaller subsidies available to support the universality objective.

Economists and other telecommunications experts have long criticized inter-service cross-subsidies. Cross subsidies can promote inefficiency and depress demand for services (e.g. Internet services) that must pay artificially high international rates. They also constitute a form of hidden taxation, which may be regressive. For example, a cross-subsidy regime may require poor migrant workers, who will never be able to afford a personal telephone, to pay high long distance rates to subsidize individual line services to their wealthier fellow citizens.

Finally, large cross-subsidies have fallen out of favour with telecommunications experts today because they simply have not been effective as a tool to promote universality. Some of the countries with the highest international, business and long distance service rates in the world have retained some of the lowest telephone penetration or teledensity rates. Other countries with similar or lower levels of GDP have often increased their teledensity levels significantly after implementing alternative approaches to promoting universality.

Access Deficit Charges are used to promote universality in some countries. An ADC regime is like a traditional cross-subsidy regime, but modified to fit a competitive market. In an ADC regime, other operators pay subsidies to finance the total local access deficit incurred by the incumbent in providing

local services that are priced below cost. Like cross-subsidies that are internal to the incumbent, ADCs have been criticized for their reliance on inefficient and potentially anti-competitive subsidies. A number of regulators, including those in Australia and Canada, have reformed their ADC regimes by targeting subsidies to finance only the access deficit incurred in providing service to high-cost areas and/or low-income subscribers. Others, such as the UK's Oftel, have abolished ADCs altogether.

The final approach discussed in this Module is the universality fund. This approach is seen as the best option in an increasing number of industrialized and developing countries. The approach has many variations. These are sometimes called USO funds, US funds or UA funds.

Universality funds collect revenues from a variety of sources. These include government revenues, charges on interconnecting services and levies on all telecommunications service operators. The revenues collected in these funds are then used in a variety of ways to promote universality objectives. In contrast to ADCs, universality funds are generally used to finance specific and targeted high cost areas and/or low income subscribers. In practice, the most efficient funds provide relatively small subsidies to incent private sector telecommunications operators to expand their networks to serve specifically targeted service areas. These are typically areas where service would otherwise be uneconomic (i.e. where costs cannot be recovered from available subscriber revenues).

Section 6.4 addresses the main issues involved in designing an effective universality fund.

The last half of this Module is devoted to case studies of universality policies and programs in a range of different countries. The case studies are referred to throughout the Module to illustrate various approaches and issues.

6.1.2 Objectives of Universality Policies

Governments and regulators pursue universality policies for different reasons. In many countries there is strong political support for extending US or at least UA to unserved members of the public.

The following are some of the major objectives for implementing universality policies:

- *To permit full participation in 21st Century society.* Access to telecommunications is increasingly being viewed by policy makers as a basic right of all citizens, essential to full membership in the community. The objective of ensuring access is gaining momentum due to the increased reliance on the Internet and related new media by all sectors of society. It is widely recognized today that telecommunications services are necessary for far more than personal and business communications. Today, telecommunications delivers all types of information, goods and services to the public; including essential government, social, educational and medical services, and a wide range of e-commerce services. Those without access to telecommunications services risk becoming increasingly marginalized members of 21st Century society.

- *To promote national political, economic and cultural cohesion.* These nation-building considerations call for the widespread availability of telecommunications throughout a country's territory. Creating a single market, and even a single nation-state, requires effective telecommunications.

- *To promote economic development.* While the relationship between economic and telecommunications development is a complex one, an increasing amount of research suggests that telecommunications leads to economic growth. With the increasing ubiquity of the Internet and e-commerce, countries or regions without adequate telecommunications infrastructure will not be able to reap the benefits of the "new economy".

- *To encourage more balanced distribution of the population.* Telecommunications can encourage development outside congested metropolitan areas. This objective is often cited in industrialized countries, where "telecommuting" can ease traffic and pollution in urban areas.

- *To eliminate disparity between rural and urban areas.* This objective is particularly apt in lower

income countries. Figure 6-1 illustrates the disparity between urban and rural access to telecommunications in various regions. Only in high-income countries is the ratio of urban to rural teledensity close to being balanced. The ratios of urban to rural teledensities in developing regions is considerably higher, ranging from a high of about 7:1 in South Asia, to a low of the about 2.5:1 in Eastern Europe, Central Asia, Latin America and the Caribbean.

6.1.3 The Economics of Universality

Universality and Economic Development

➢ The most important determinant of telecommunications universality is economic development. There is a strong relationship between the national telephone penetration rate, and a nation's per capita Gross Domestic Product (GDP). Figure 6-2 illustrates the relationship between teledensity and per capita GDP.

➢ The strong relationship between teledensity and GDP per capita provides explanations for major differences in teledensity in different countries. It is not surprising that countries such as the USA, Canada, Japan, France and Germany rank high in teledensity levels, compared to most countries in Africa, for example. A sample of teledensity levels reported by the ITU is included in Table 6-1.

Figure 6-1: Ratios of Urban to Rural Telephone Density by Region

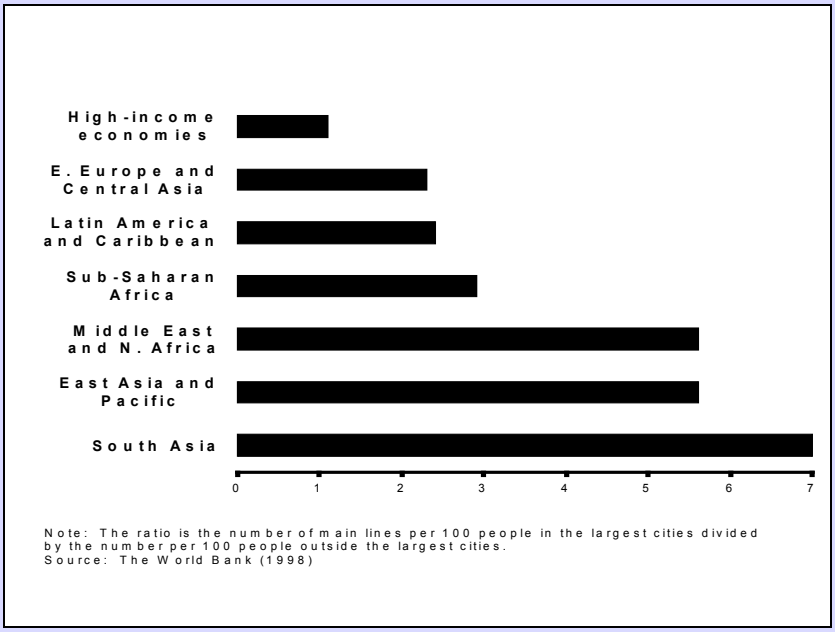
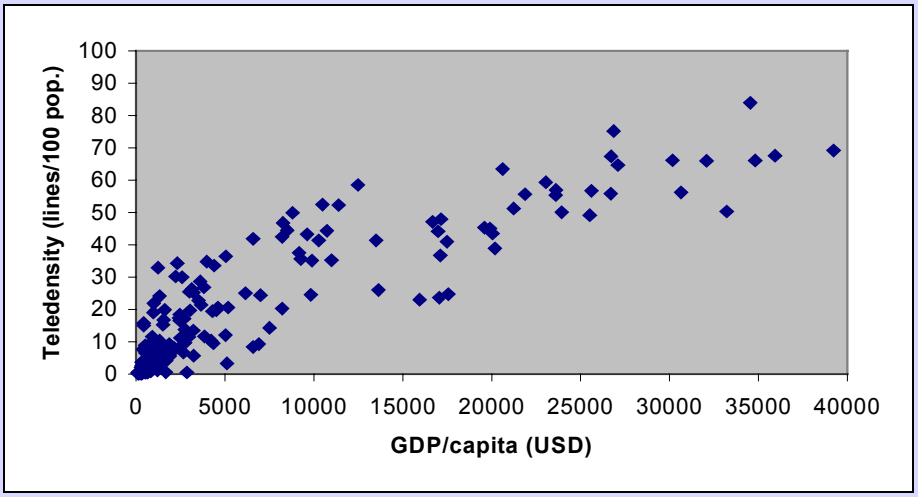


Figure 6-2: Teledensity and GDP per capita



Source: ITU (1999)

In general the maximum amount of revenue available to fund telecommunications networks and services depends on per capita income levels within a country. It is clear, from Table 6-1, however, that per capita income levels do not absolutely determine teledensity levels. Table 6-1 illustrates that there are many variations in the relationship between GDP per capita and teledensity. For instance, the distribution of income within a country will determine the number of households that can actually afford to have access to telecommunications services. The table also makes it clear that penetration of public telephone lines and cell phones varies considerably across the range of countries illustrated.

In some of the least developed countries, aid from foreign governments and multilateral institutions, such as The World Bank, has provided supplementary resources to expand teledensity levels. Cross-subsidies from international telephone accounting rates, and other external sources have also increased teledensity levels in some countries. However, such sources of external revenues are declining. This decline is due, in part, to the widespread perception that scarce public development funds should be devoted to other purposes since private capital is generally available to fund telecommunications network development.

Expenditures on Telecommunications

Although national per capita income levels impose a constraint on universality, there are significant differences in the percentage of income that is spent on telecommunications in different countries. For example, in some countries with a relatively low GDP per capita, less than 1% of GDP is spent on telecommunications. In other countries with similar GDP per capita, as much as 4% or 5% of GDP is spent on telecommunications. These differences and the general trend in telecommunications spending are illustrated in Figure 6-3.

Table 6-1: Teledensity in Selected Countries

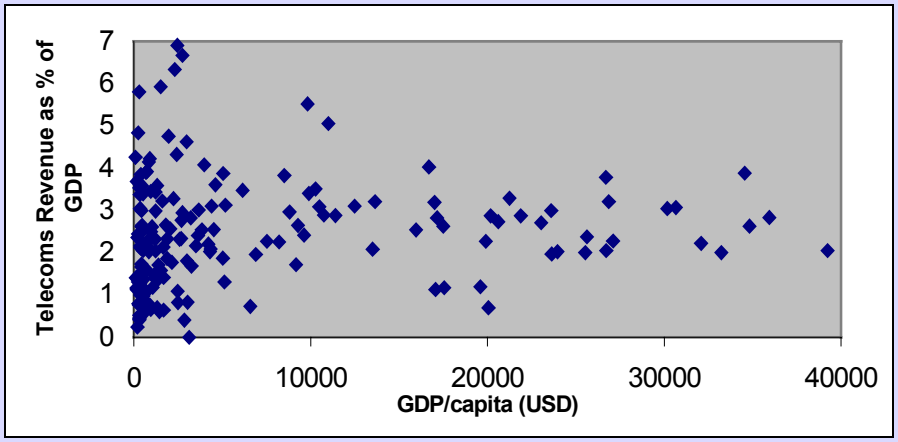
Country	GDP per capita (in 1997 USD)	Teledensity (Telephone lines per 100 people 1998)	Public teledensity (Public telephone lines per 1000 people 1998)	Mobile cellular phones (per 100 people 1998)
Angola	1,684	1.0	0.0	0.1
Argentina	8,214	20.0	2.7	7.9
Bangladesh	262	0.3	0.0	0.1
Cameroon	617	0.5	0.0	0.0
Canada	20,608	63.4	6.1	17.6
Colombia	2,424	17.3	1.4	5.0
Czech Republic	5,052	36.4	3.6	9.4
Egypt	1,195	6.0	0.1	0.1
Germany	25,625	56.7	1.9	17.0
Haiti	447	1.0	-	-
India	451	2.0	0.4	0.1
Indonesia	1,068	3.0	1.1	0.5
Japan	33,231	50.3	6.2	37.4
Mexico	4,216	10.4	3.3	3.5
Morocco	1,218	5.4	1.1	0.4
Nepal	220	0.9	0.0	-
Peru	2,676	6.7	2.0	3.0
Russia	3,030	20.0	1.3	1.0
South Africa	2,979	11.5	3.5	5.6
Thailand	2,478	8.4	2.0	3.3
Ukraine	974	19.1	1.1	0.3
USA	30,173	66.1	6.5	25.6

"-"means zero or a quantity less than half the unit shown.

Source: ITU (1999)

The international experience provides a good rule of thumb for testing the effectiveness of universality policies. There are differences in national telecommunications expenditures. However, on average, around the world, people spend about 2% to 3% of their incomes on telecommunications. This relation generally holds true for whole countries, regions, cities, and on average to households.

Figure 6-3: Telecommunications Revenues as % of GDP



Source: ITU (1999)

This rule of thumb that an average of about 2.5% of per capita income is spent on telecommunications worldwide is useful in a number of ways. For example:

- Where the costs of providing telecommunications access is greater than 2.5% of local incomes, external subsidies may be required to promote UA. Funding mechanisms, such as a universal access fund, can be designed with this rule of thumb in mind. Local residents will generally be willing and able to pay about 2.5% of their incomes on telecommunications services, and the fund may be required to subsidize the rest of the costs.

- Where it would cost less than about 2.5% of local income to provide telecommunications services, but no service is available an area, there is often a sector policy problem. In many cases, one or more of the following problems exists:

  - Poor telecommunications sector governance

  - No priority given to telecommunications development

  - No reliance on private sector funding to expand networks

  - No competition in relevant telecommunications markets

  - No effective universality policies

In many countries, lack of supply and not lack of demand is the principal reason for low teledensity. Problems, such as those listed above, have resulted in long waiting lists for telephone service in many developing countries. As illustrated in Figure 6-3, consumers around the world are willing spend a reasonable percentage of their income on telecommunications, if service is provided to them.

A review of international experience makes it clear that the actions of governments and regulators determine the level of universality that is achieved in a specific country. While national incomes place constraints on the upper level of universality, it is clear that some countries have been far more successful than others in providing their citizens with access to telecommunications.

Specific examples of experience with universality policies are found in the case studies in the Appendix to this Module. The case studies of countries such as Peru and Chile demonstrate that good universal access policies can significantly expand service without large government expenditures, even in remote areas with low income levels.

It is clear that low teledensity levels in many developing countries have two distinct causes: (1) undersupply of telecommunications services due to inadequate sector policies, and (2) low demand due to low incomes. The first cause should be addressed first. The most effective and lowest-cost means to increase teledensity in countries that have not already done so, is to implement telecommunications sector reforms such as competition, privatization and pricing reform (e.g. price rebalancing). Evidence around the world demonstrates that reforms of this type will remove many supply constraints on the sector.

However, such sector reforms will generally not be sufficient to address the second cause of universality problems – insufficient local incomes to support the rollout of telecommunications networks. Most of this Module is devoted to regulatory approaches that address that second cause of universality problems. The main approaches are mandatory service obligations, cross-subsidies, ADCs and universality funds.

Before reviewing these approaches, however, we will consider the definitions of US, UA and the USO.

6.2 Defining Universality: What to Fund?

6.2.1 Different Countries: Different Approaches

Reasons to Define US and UA

Countries have defined universal service ("US") and/or universal access ("UA") for a number of reasons. In some cases, universality definitions have been established as a part of national telecommunications development plans. Such definitions sometimes include specific target dates and service levels.

In some countries, state planners or policymakers prescribed certain levels of universality. Such prescribed levels were often included in telecommunications policies or national plans. This was particularly true in some centrally planned economies with state-owned operators, or economies with former state-owned operators that are in transition to market economies. Such definitions of universality were sometimes unrealistic, and many universality targets have been missed in developing or transitional economies. "Planned" levels of universality will only be effective where they are linked to realistic implementation measures, including funding mechanisms.

More care should be taken in defining US or UA when specific universality implementation measures are introduced. Such definitions are generally developed to define the mandatory service obligations of an operator that is designated as a "Universal Service Provider". A definition may be included in the licence conditions of the US provider at the time of its privatization. Definitions are also required as part of specific USO funding mechanisms, such as ADCs and universality funds.

Matching Universality Definitions to Local Conditions

The definitions of telecommunications universality are very different, for example, in Switzerland than in Pakistan. Realistic universality definitions reflect local economic and sector conditions. The level and distribution of national income are important factors. Another key factor is the distribution of a country's population. The resources required to provide telecommunications services to the same number of people will vary depending on whether the majority of the population is concentrated in metropolitan areas, or is widely dispersed in rural areas. National geography, topology and security matters may also be important factors.

Two distinct aspects can be noted in the definition of universality in all countries:

> **Types of access** – At the most general level, the difference between US and UA is that the former generally refers to individual or private (exclusive) access, while the latter refers to community or public (shared) access. Universality definitions sometimes include requirements for a certain level of both private and public access.

Types of services - Basic access is typically defined to include voice-grade fixed access to the PSTN. However, many universality definitions amplify this requirement. Some countries include enhanced or value-added services, including Internet access, within the scope of their universality regimes.

As a general rule, developing and transitional countries place greater emphasis on basic public access. Industrialized countries can afford to define universal service more broadly to include advanced features. Details of different types of universality definitions are included in the following sections.

6.2.2 Universal Service in Industrialized Economies

Table 6-2 provides a summary of the types of service contained in the definitions of universal service in selected OECD member countries. The table provides a good sense of the scope of universality as currently defined in those countries. It should be kept in mind that the definitions are not static. They are evolving with market conditions and public demand.

A review of the definitions in Table 6-2 makes it clear that most of the listed OECD countries have defined universal service to include much more than basic public access to voice telephony. In most cases, the prescribed level of universal service must be provided to individual subscribers on demand at regulated rates. In some cases, these regulated rates are fixed below cost and subsidized through cross-subsidies, ADCs or universality funds. Details of funding approaches are provided in Section 6.3 and in the case studies in the Appendix.

6.2.3 Universal Access in Developing and Transitional Economies

Many different universality definitions and objectives are used in developing and transitional economies. Table 6-3 provides a selected list of universal access policies and operator obligations established by various developing and transitional economies.

In all but the richest of the developing and transitional economies, it is unrealistic to set a universal service objective of providing fixed telecommunications service to each household, at least in the near term. In such economies, the regulatory focus tends to be expansion of access services. Effective universality policies in these countries generally concentrate on:

- ➢ Expansion of new access services, rather than support of existing services
- ➢ Expansion of services to remote or high cost areas and low income subscriber groups, where it is currently uneconomic to provide service
- ➢ Priority on public access services, rather than private household access

Table 6-3 provides examples of some “disconnects” between the definition of universal access and the mechanism to implement such access. For example, in a number of countries where the UA definition calls for a phone in every village, no obligations are imposed on the incumbent operator to supply such phones. More significantly, in many countries, no funding mechanism is defined to implement the universality objectives.

Modelling the Viability of Universality Programs

A number of analytical tools are available to regulators and policy makers to develop realistic universality definitions and implementation policies. Financial models have been developed to determine the cost and feasibility of expanding service to unserved areas. In general, these models calculate the difference between the cost of providing service in specific regions and the projected telecommunications revenues available in those regions.

Table 6-2: Universality in Selected Industrialized Countries

Summary of Definitions of Universal Service in Selected OECD Countries	
Australia	Standard telephone services, including voice telephony and, if voice telephony is not practicable due to a disability, another form of communication equivalent to voice telephony (e.g. a teletypewriter); payphones; prescribed carriage services.
Canada	Individual line local service with touch-tone dialing, provided by a digital switch with capability to connect via low speed data transmission to the Internet at local rates; enhanced calling features, including access to emergency services, Voice Message Relay service, and privacy protection features; access to operator and directory assistance services; access to the long distance network; a copy of a current local telephone directory.
USA	Voice-grade access to the PSTN, with the ability to place and receive calls; Dual Tone Multi-frequency (touch-tone) signaling or its functional equivalent; single party service; access to emergency services; access to operator services; access to directory services; access to long distance services.
Austria	Access to the PSTN via a fixed network connection, through which a fax machine also can be operated, including the transfer of data at rates compatible with transmission paths for voice communication; free access to emergency services; access to directories of subscribers, as well as directory enquiry services; public pay telephones.
Denmark	A telephony network and an associated telephony service; an ISDN network and the associated ISDN services; leased lines (excluding broadband lines); special services and tariffs for disabled subscribers; public radio-based maritime distress and safety services; directory enquiry services.
Italy	Voice telephony (also capable of providing fax G3 and data transmission); provision of directory for local area users; provision of customer information service; payphones; special services for the disabled; connection to emergency services.
Norway	Public voice telephony; operator assistance; emergency and directory inquiry services; public payphones.
Spain	Basic telephone service including local, national and international access; free directory services; public phones; special services for disabled people.
Switzerland	Real time voice transmission or voice band and digital data transmission, keypad tone dialing and main entry in telephone directory; additional services such as call forwarding, privacy protection, itemized billing and outgoing call barring; emergency services; directory services; public telephones; text service; operator assistance.
United Kingdom	Connection to the fixed network able to support voice telephony and with speed data and fax transmission (and the option of a more restricted service package at a lower cost); public telephones; free access to emergency services; itemized billing; selective call barring; access to operator assistance and directory assistance.

Source: Adapted from OECD (1999)

Table 6-3: Universality in Selected Developing and Transitional Economies

Summary of Universality Access Definitions and Obligations		
Country	**Universal Access policy**	**Operator Obligations**
Bhutan	A phone booth in every village.	No obligations.
Comoros	A phone in every locality.	No obligations.
Costa Rica	Within 1 km of both public and private access.	No 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.	Obligations under preparation.
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.
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 km of any community.	Voluntary objective to be achieved by 2002.
Madagascar	A public phone in every village.	No obligations.
Maldives	At least one telephone booth per 500 inhabitants; a phone on every island.	Operator's licence condition is to provide access to basic telecommunications services to the whole country by the year 2000.
Mozambique	A public telephone within distance of less than 5 km. 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.
Togo	A telephone within a 5 km 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	Telephone booths in public places (schools, clinics, etc) countrywide.	No obligations.

Source: Adapted from ITU (1998a)

Cost projections may be based on specific network construction studies, or on local or international benchmark costs for building new lines. Revenue projections can be developed in different ways. One approach is to start with per capita income estimates for residents of the target region, and then to multiply those estimates by the number of inhabitants in an area. The results can then be used to determine whether the provision of new telecommunications services is financially viable.

For example, we know that, on average, people are willing and able to spend about 2.5% of their income on telecommunications services (see Figure 6-3). A very rough estimate of the viability of providing a specified level of service (e.g. one payphone per village) can be made by determining whether it will cost more to provide that level of service than about 2.5% of the village's estimated income (per-capita income multiplied by the number of inhabitants). The same type of study can be conducted for clusters of villages or regions.

If it is determined that a specified level of universal access is not financially viable, the same type of model can be used to estimate the shortfall between the projected costs and revenues of providing new access lines. This type of approach is used in the successful Chilean and Peruvian universality funds (See Appendix.) It can then be determined whether a source of revenues will be available to subsidize the shortfall between costs and revenues. The financial model can project the amount of subsidies required to make the service financially viable.

Similar types of models have been used to project the number of rural pay phones that can be financially viable in different countries. An example of the results of such a model is presented in Table 6-4. If a country's universal service policy requires a greater number of payphones than the market can support, a subsidy mechanism must generally be developed to implement the policy successfully.

6.3 Implementing Universality: How to Fund It?

6.3.1 Criteria for Selecting Universality Mechanisms

This section considers the five main mechanisms in use around the world today to implement universality policies. These mechanisms are:

- **Market-Based Reforms:** especially privatization, competition and cost-based pricing.
- **Mandatory Service Obligations:** imposed by licence conditions or other regulatory measures.
- **Cross Subsidies:** between or within services provided by incumbent operators.
- **Access Deficit Charges (ADCs):** paid by telecommunications operators to subsidize the access deficit of incumbents; and
- **Universality Funds:** independently administered funds that collect revenue from various sources and provide targeted subsidies to implement universality programs.

This list is not exhaustive and the mechanisms are not mutually exclusive. One (or more) of these mechanisms constitutes the main regulatory tool to promote US and UA in most countries. There are many variations on the five mechanisms. Specific examples of the application of these mechanisms are included in the case studies in the Appendix to this Module.

The following sections of this Module describe the five mechanisms. The strengths and weaknesses of each are reviewed. In considering the different approaches, a number of criteria should be kept in mind. The following are particularly relevant:

Table 6-4: Modelling of Financial Viability of Rural Payphones

Rural Population Required to Support One Rural Public Phone in Different Countries			
Country	**Rural GDP/Capita (USD)**	**Investment/Line (USD)**	**Rural Population to Support One Public Phone**
Argentina	2,327	3,000	28
Bangladesh	171	1,000	187
Bolivia	299	9,000	535
Botswana	1,315	7,000	97
Brazil	843	9,000	190
Colombia	321	8,000	449
Ecuador	446	6,000	251
India	220	2,000	219
Indonesia	444	5,000	216
Kenya	140	5,000	687
Malaysia	1,152	2,000	42
Mexico	1,108	10,000	159
Nepal	139	7,000	574
Pakistan	275	2,000	175
Paraguay	812	7,000	158
Peru	295	10,000	597
Philippines	386	3,000	166
Thailand	1,212	4,000	66
Uganda	134	8,000	1,077
Zimbabwe	236	6,000	474

Source: Dymond and Kayami (1997)

Note: GDP/capita and cost numbers are based on data from mid-1990's

➢ **Compliance with International Trade Rules:** The *WTO Regulation Reference Paper* which forms part of the *WTO Agreement on Basic Telecommunications* deals with universality and subsidy issues. The Reference Paper is reproduced in the Appendix A of the Handbook and contains the following provision regarding US:

> *Universal Service* - Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obliga-

> tions will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member.

In addition to this specific section on US, the Reference Paper has a number of other provisions that could impact upon the choice of universality mechanism, and particularly a mechanism that uses cross-subsidies. For example, the Paper provides that:

> Appropriate measures shall be maintained for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices [including…] engaging in anti-competitive cross-subsidization.

If a country that has committed to the regulatory rules in the *WTO Agreement on Basic Telecommunications* maintains a universal service mechanism that infringes the Agreement, it will be open to a trade complaint to the WTO from other signatory countries.

- **Economic Efficiency:** Some universal service mechanisms are more efficient than others. The degree of economic efficiency will depend, among other things, on which services receive and provide the subsidies, and on the size of the subsidy. Among the least efficient mechanisms are implicit cross subsidies between services of an incumbent that are neither quantified nor targeted. Such cross-subsidies are maintained in many countries, particularly those that retain state-owned incumbents. It is generally assumed in such countries that high international and long distance rates are being used to subsidize low local access rates and to promote universality objectives.

  In reality, such implicit cross subsidies are often misdirected and wasteful of resources. For example, under such an approach, low-income international callers subsidize low access rates for high income local service subscribers. Many of the local access subscribers who benefit from such cross-subsidies would continue to pay for local access even if their rates were rebalanced to cover underlying costs.

  Such cross-subsidies also depress demand for higher cost services that provide the subsidies (e.g. international, long distance, Internet and value-added services). This effect not only reduces operator revenues but can reduce overall economic activity. Similar inefficiencies are associated with other universality mechanisms that distort prices. This applies, for example, to ADCs which inflate long distance rates to provide subsidy to the access services of the incumbent.

  In contrast, the most efficient mechanisms are those that provide small targeted subsidies to promote specific universal service initiatives. On the revenue side, the more efficient mechanisms will collect revenues from government sources or from a widely-based range of telecommunications services, rather than only from specific "high margin" services, like international or long distance services. Broadly based collection mechanisms with uniform charges will also reduce the inefficiencies associated with operators "gaming" the system by by-passing highly-taxed services of attempting to have their services classified as low-taxed or untaxed.

- **Political Considerations:** These are undoubtedly important to any regulator that is appointed by, or accountable to, government or a legislature. Public relations and political considerations are often cited as reasons not to introduce market-based reforms, such as rebalancing rates, elimination of cross-subsidies, and, in some countries, privatization. Political considerations can also be used to argue against increased taxes or levies on telecommunications revenues to finance a universality fund.

  In many cases, hindsight proves that the political risks of introducing telecommunications sector reforms are exaggerated. For example, when cost-based rate rebalancing was first proposed in countries in North America a decade or more ago, there were dire predictions of decreased teledensity levels or network "drop off". Looking

back, it is clear that teledensity levels actually increased in most countries as local access rates went up. (See Table 6-5.) The same is true in many countries where privatization was introduced. Initially, political and labour reaction was often strong. In retrospect, most telecommunications privatizations in the last decade are now seen as successful initiatives to expand network infrastructure while maintaining reasonable rate levels.

Many proactive regulators realize that they can play an important role in shaping political and public opinion about telecommunications sector reforms. Some political opposition to sectoral reform is based on ignorance or blatant self-interest by established players. Regulators can often play an essential role in analyzing and publishing the real costs and benefits of different universality options for politicians and the public.

6.3.2 *Promoting Universality: Comparing the Options*

Table 6-5 lists the main options for promoting universality dealt with in this Module. Major advantages and disadvantages are noted for each option. These advantages and disadvantages are dealt with in more detail in the following sections. Note that in our detailed discussion of universality funds in section 6.4 we provide a set of criteria for the selection of the most appropriate revenue collection mechanism for that specific universality approach. Some of those criteria may also be applicable to the revenue collection aspects of some of the other universality approaches discussed below.

6.3.3 *Sector Reform and Universality*

In many countries, particularly those with developing and transitional economies, outdated sector policies are a principal cause of universality problems.

Many of these countries have low income levels, and undoubtedly have many poor people who could benefit from domestic or international programs to promote universal access. However, in many cases, these countries also have large unserved populations that are willing and able to pay for personal or community telecommunications access. These include businesses that could increase economic activity if they had the telecommunications services to do so.

Experience in a growing number of countries around the world indicates that the introduction of market-based reforms can significantly increase the supply of telecommunications services. This experience is supported by an increasing body of statistical evidence, including multiple regression studies. In many countries, a few key telecommunications sector reforms would eliminate most supply constraints. Three key reforms will be considered here:

- Privatization
- Competition
- Cost-based pricing

Privatization

There is a growing amount of data available to demonstrate that privatization increases the supply of telecommunications services. Privatization has significantly increased teledensity and public telephone penetration in a variety of different types of countries.

Privatization promotes universality for a number of reasons. First, network expansion targets are often included in contracts or licences that form part of the privatization process. However, that is only one reason. Privatized operators have surpassed many mandatory network expansion targets. Investors in the privatized operators have demonstrated their willingness to meet or exceed rollout targets, not simply to comply with legal obligations, but as a profit-maximizing strategy. There are other reasons why privatization promotes universality. These include:

- Availability of private capital to fund network expansion;
- Commercial incentives to supply service to meet demand;
- Improved management; and
- Reduced political and bureaucratic constraints on extending service.

Table 6-5: Options for Promoting Universality

Main Options for Increasing Universality – Advantages and Disadvantages		
Option	**Advantages**	**Disadvantages**
1. **Market-Based Reforms:** (Privatization, Competition & Cost-Based Pricing)	➢ Proven effectiveness in expanding service in economies with state-run telephone monopolies ➢ Privatization tied to specific network roll-out obligations (sometimes including non-economic areas) ➢ Combination of 3 reforms should provide incentives for continuous service to all areas that are economic to serve ➢ Reforms are consistent with sector development in all areas (i.e. not just uneconomic areas)	➢ Privatization, competition and cost-based pricing will not expand service to uneconomic areas (however these reforms can be supplemented by targeted subsidies to achieve universality objectives in uneconomic areas) ➢ Some conflict between these 3 reforms. Direct competition and rebalancing may be limited immediately after privatization to maximize network rollout obligations. Exclusivity periods are often granted in order to maximize privatization proceeds to the government
2. **Mandatory Service Obligations:** (imposed by licence conditions or other regulatory measures)	➢ Can be effective, if realistic and not anti-competitive ➢ Most effective for newly licensed or newly privatized operators	➢ Places burden of financing universality on specific operators; with potentially anti-competitive effects (if USO burden outweighs benefits) ➢ Sometimes used as a rationale to limit other sector reforms: rebalancing & competition
3. **Cross Subsidies:** (between or within services provided by incumbent operators)	➢ Traditional approach in place in many countries; often combined with mandatory service obligations	➢ Promotes inefficiency; demand is depressed for higher cost services that provide subsidies, and entry is foreclosed in subsidized markets ➢ In most cases, only existing users receive the subsidy. ➢ Anti-competitive effects are difficult to detect and prevent
4. **ADCs:** (Access Deficit Charges paid by telecommunications operators to subsidize he access deficit of incumbent operator)	➢ Spreads burden of financing uneconomic access services across all operators (including competitors)	➢ Difficult to calculate access costs; difficult to implement and administer in a transparent and efficient manner ➢ Inefficient (as with cross-subsidies)

Table 6-5 Options for Promoting Universality (cont'd)

		➢ Difficult to calculate benefits of USO provider; can lead to excessive access charges to competitors
5. **Universality Funds:** (e.g. USO, US or UA funds that collect revenue from various sources and provide targeted subsidies to promote universality programs)	➢ Most effective means of providing targeted subsidies to expand or support uneconomic service ➢ Potentially most efficient ➢ Most transparent ➢ Work best in expansion of service to new areas if combined with competitive bids for private operators	➢ Some administrative complexity and transaction expenses in establishing fund; some potential for bad governance; difficult to forecast associated costs and revenues

Competition

Competition generally has positive universality effects. These include increased teledensity and public payphone penetration and reduced waiting lists. Competition has also resulted in significantly increased penetration of wireless service, which is becoming a substitute for wireline services in many countries. The relationship between competition and teledensity has been demonstrated in studies of both developing and industrialized country markets.

Cost Based Pricing

As discussed in other Modules, "rate rebalancing" refers to initiatives to align prices for individual telecommunications services more closely with costs. In most countries, this means increasing local subscription and usage rates and decreasing international, long distance and Internet access rates. When rate rebalancing was first proposed in most countries, some predicted that higher local access rates would lead to lower teledensity levels.

Ten years later, the evidence indicates that such concerns were exaggerated. Penetration levels actually increased after rate rebalancing, at least in OECD countries, where most research has been done.

This result is not surprising since, in most OECD countries, the evidence indicates that rate rebalancing resulted in lower overall prices of telecommunications service for most consumers. Other reforms, such as privatization and introduction of competition, also stimulated price decreases in these countries.

In addition, the evidence indicates that the price elasticity of access services is very low. In other words, relatively few people will give up telephone access due to an increase in access rates. The research is consistent with the conclusion that local access services and telephone calling services are complementary. Therefore a decrease in the price of usage will result in an increase in demand for access services. In other words, demand for access service is influenced at least as much by the level of usage rates as by the access charge.

Figure 6-4 and Figure 6-5 demonstrate that there has been significant price rebalancing over the last decade in business and residential telecommunications markets in OECD countries. While fixed charges, such as those for local access, have increased significantly, prices have declined overall. During this period, teledensity increased every year despite the increase in fixed charges. As Figure 6-4 demonstrates, this trend continued even in 1991 and 1996, when fixed business charges increased around 10% each year.

Figure 6-4: Index of OECD Business Charges and Teledensity

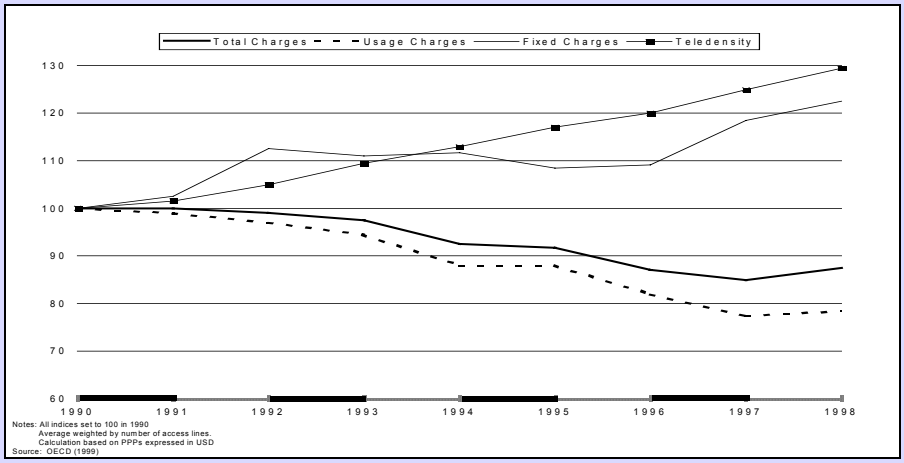
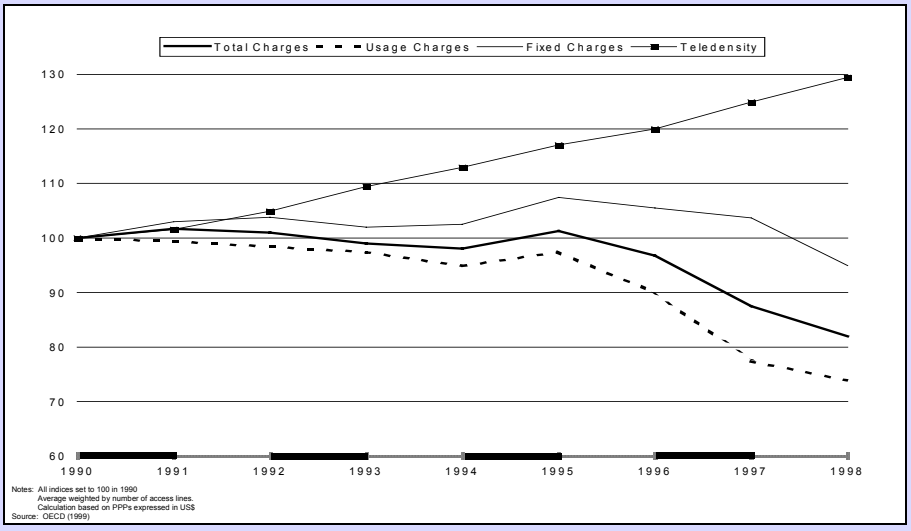


Figure 6-5: Index of OECD Residential Charges and Teledensity



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The positive relationship between rebalancing and teledensity also seems to apply to developing countries. For instance, as Ros and Banerjee (2000) have shown, higher subscription prices result in higher telephone penetration rates and in reduced waiting lists. While this relationship seems counter-intuitive, there are good explanations. The main reason is that residential subscription rates tend to be set below economic costs. As operators are permitted to raise these rates, they are able to reduce their access deficits. It becomes profitable, rather than unprofitable, to construct more network access lines. Thus, higher prices lead to increased supply.

The experience with rate rebalancing in OECD countries is discussed further in Appendix 4-1 of Module 4.

6.3.4 Mandatory Service Obligations

Perhaps the most commonly used mechanism for promoting universality is the mandatory service obligation. In some countries, this obligation is described as a "duty to serve" all customers willing to pay the prescribed rates.

Geographic limits are sometimes prescribed for areas where service is mandatory. For example, such areas include urban areas but not remote rural areas where no telecommunications infrastructure is installed. In most cases, new services must be installed within a prescribed time after an application for service is received. Compliance is monitored through quality of service indicators.

The operator with a general obligation to serve all customers is usually referred to as the universal service provider. In most cases, it is the incumbent operator.

In some countries, governments and regulators have imposed mandatory service obligations on newly licensed or newly privatized operators. These may include obligations to provide service throughout certain areas (especially for wireless operators) or to install a specific number of lines within a certain period (coverage and rollout obligations).

Such mandatory service obligations are currently the most common mechanisms used to expand telecommunications networks in developing economies. They are used in the case of most privatizations and new licence grants. A major benefit of implementing such mandatory service obligations is that the funding is generally provided by the private sector.

There are disadvantages to imposing excessively high roll-out obligations. A privatized operator normally has a commercial incentive to roll out service to previously unserved customers that are able to pay for its service. If privatized operators are subjected to uneconomic service obligations they will have to finance such obligations through monopoly profits, cross-subsidies or future considerations. In other cases, an operator may simply fail to meet its roll-out obligations.

Table 6-6 presents a sample of recent licence obligations in developing and transitional economies.

6.3.5 Cross-Subsidies

For decades, in most countries, internal cross-subsidization by the incumbent operator has been the main mechanism used to promote universality in the telecommunications sector. Such cross-subsidization involves the use of surplus revenues earned from profitable services to cover losses from providing non-profitable services. In the context of universality, we are primarily concerned with the use of such cross-subsidies to maintain low access rates, particularly in high cost areas.

Theodore Vail, the driving force behind the early success of AT&T in the USA at the turn of the last century, promoted universal service through cross-subsidization. This was a means of expanding the reach of the telephone, and thus the value of AT&T's service to the public. While the public interest was undoubtedly a concern, this policy was also very valuable to the company, which soon became one of the largest business corporations in the world.

Incumbents have often been encouraged by regulators to maintain a policy of internal cross-subsidization in order to extend telephone access services, and to maintain low access rates. Similar policies were adopted by both state-owned and privately-owned operators during the monopoly era of telephony which lasted for most of the 20th Century.

Several types of internal cross-subsidies were commonly used by incumbents:

- **Inter-service cross-subsidization.** Connection and access services are usually priced below cost and long distance and international calling are priced above cost. In this instance, the subsidy flows from long-distance and international calling to access and local calling. Other services may also provide or receive subsidies.

- **Intra-service cross-subsidization.** A common example is geographic tariff averaging, where access prices in rural or other higher-cost areas are set at the same level as in urban and other lower-cost areas. Another example involves the pricing of business access services, which were often set much higher than residential access services.

A number of countries maintain more complex targeted cross-subsidy regimes. One example is Colombia, where residential households in low-income "strata" pay lower access rates than households in high income "strata".

While internal cross-subsidization has been the most commonly used mechanism to promote universality; it is being phased out in many countries. The cross-subsidy approach has a number of weaknesses that make it undesirable and probably unsustainable in the long run. These weaknesses include:

Competitive unsustainability: Cross subsidies are increasingly unsustainable in a competitive environment. New entrants typically target profitable market segments or classes of service (i.e. the services or areas that provide subsidies, rather than those that receive it.) This reduces or eliminates subsidies.

International accounting rate reform: International accounting rates are being significantly reduced in the near to mid-term, hence reducing or eliminating a major source of funding for cross-subsidization in many countries.

Table 6-6: Selected Licence Network Expansion Obligations

Country	Company	Obligation
Ghana	Ghana Telecom	225,000 new telephone lines within 5 years, starting in 1996.
Mexico	Telmex	Starting in 1990, average annual line growth of 12% p.a. to 1994. Public payphone density of 2 per 1,000 inhabitants by 1994 and 5 per 1,000 inhabitants by 1998.
Panama	Cable and Wireless	From 1997, increase teledensity to 25% by 2002. Install 600 rural payphones within 2 years.
Peru	CPT and Entel	Starting in 1994, add 978,000 telephone lines by 1998. Install 19,000 public telephones by 1998.
Venezuela	CANTV	Increase telephone lines by 355,000 p.a. from 1992 to 2000.
South Africa	Telkom	Starting in 1997, install 2.69 million new lines by 2002. Install 120,000 new public pay phones by 2002.
Philippines	9 International Licensees	Each install 300,000 new access lines within 3 years of obtaining licences.
	5 Cellular Licensees	Each install 400,000 access lines within 5 years of obtaining licences.

Sources: Various, including ITU (1998a)

- **Inefficiency of untargeted subsidies:** All existing access users generally receive the subsidy, whether they can afford to pay the full economic price or not.

- **Subsidies promote inefficient consumption:** Demand is depressed for higher cost services that provide subsidies, and entry is foreclosed in subsidized markets (competitors cannot match low prices).

- **Anti-competitive use of subsidies:** Subsidies from profitable services are intended to support universality. However, in many cases the cross-subsidy regimes are not quantified or carefully monitored by regulators. As a result, the incumbent may engage in anti-competitive subsidization as well. For example, surplus revenues from monopoly international or long distance services may be used to provide below-cost Internet access services, thereby driving competitive ISPs out of the market.

- **In most cases, only existing users receive the subsidy.** While access rates may be low in many urban areas, those without telephone service, in rural areas or on waiting lists, do not benefit from the subsidy.

These problems have initiated an international trend away from reliance on internal cross-subsidies. While such cross-subsidies remain important in many countries, including most industrialized nations, they are increasingly being phased out or supplemented by more efficient targeted mechanisms to promote universality.

An exception to the trend away from cross subsidies involves services to physically handicapped and other disadvantaged subscribers. A number of countries maintain subsidized services to the hearing impaired and the blind, among others.

6.3.6 Access Deficit Charges

Access Deficit Charges (ADCs) are a variation on traditional cross-subsidy mechanisms. Traditional cross-subsidies are internal to the incumbent. That is, the incumbent uses subsidies from some of its own services to subsidize below-cost prices, usually for local access services.

With the onset of competition, regulators in some markets, including the USA, Canada, and Australia, initially established ADC systems to replace or supplement internal cross-subsidies. The difference is that in an ADC regime, all providers of subsidizing services (e.g. long distance services) must contribute payments to subsidize access services. In other words, in the example above, the subsidy "tax" is expanded beyond the incumbent and spread across all competitors in the long distance market.

Like cross-subsidies that are internal to the incumbent, ADCs have been criticized as being inefficient and anti-competitive. Some regulators, notably including those in the UK, Australia and Canada, have recently rejected or reformed ADC regimes. Other regulators, including those in the USA are reviewing their ADC regimes. ADCs are referred to as "supplementary charges" in some countries. A detailed description of the approach to ADCs is included in the USA case study in the Appendix.

ADCs are imposed on designated operators as a means of financing the local access deficit that results from local services of the incumbent being generally priced below cost. More specifically, ADCs may be used to subsidize either broad service categories (for instance, all access services) or narrower categories (such as only residential access services).

ADCs are often collected in a similar manner to interconnection charges. In most cases, this means they are collected on a per-minute basis. In other cases they are collected on a per trunk basis, or on some other basis. They may also be collected by means of a levy on telecommunications service revenues earned by contributing operators. In the latter case, they resemble a tax.

Whatever means is used to collect ADCs, they should not be bundled or confused with standard interconnection charges. International trade law and best practice require ADCs and other payments that promote universality to be collected in a transparent, non-discriminatory and competitively neutral manner. Interconnection charges should be separate from ADCs, and should be cost-based and unbundled. (See discussion of *WTO Agreement on Basic Telecommunications* in Section 6.3.1 above, and in Module 4, Price Regulation).

ADCs were traditionally collected and administered by the universal service provider in many countries. However, regulatory reform, and the impetus of the *WTO Agreement on Basic Telecommunications*, has caused most regulators to establish an independent administrator to collect and disburse ADCs.

If an ADC regime is to be maintained, ADCs should be calculated based on detailed estimates of the access deficits (i.e. access revenues minus costs of the universal service provider). Such calculations form the basis of the ADC regimes in several countries, including the USA. In other countries, such calculations have led to the conclusion that ADCs should be abolished (as in Australia and the UK), or that there is no need for an ADC regime (as in some European countries). The European Commission has established criteria to be applied by its member states in determining whether an ADC regime or similar USO charges should be established. These and other examples are described in the case studies in the Appendix.

The move by several industrialized countries to eliminate or replace ADCs is based on a growing perception that ADCs are a problematic and inefficient mechanism for promoting universality. Perceived problems with ADCs include:

- ADCs inflate the prices of the subsidizing services and, therefore, reduce the demand for them. (e.g. long distance or international services). ADCs are an economically inefficient means to collect the required subsidy. The demand for long distance calling, for example, is relatively price elastic compared to other telecommunications services, such as access service. Therefore, ADCs can reduce demand for these services in a disproportionate manner, hence contributing to economic inefficiency.

- ADCs encourage bypass of the PSTN. In countries where ADCs are charged for interconnected services (e.g. the USA), competitors have a strong incentive to terminate services to customers by means other than the PSTN. Such bypass may be uneconomic, in the sense that the competitors could terminate calls more cheaply on the PSTN if they did not have to pay the ADCs for PSTN termination. Therefore, ADCs can promote inefficient duplication of network facilities and deprive the incumbents of interconnection revenues they would earn, except for the bypass.

- Technological and market developments are starting to reduce the distinction between local minutes of traffic and minutes of traffic that pay ADCs (e.g. international or long distance). IP Telephony and "refiling" of long distance traffic by CLECs are two developments that undermine the viability of ADC regimes. These developments make it difficult to detect and measure minutes of traffic that should contribute to ADCs. As a result, the collection of ADCs will become increasingly problematic.

- Finally, many of the problems with ADCs are the same as those of traditional cross-subsidies that are internal to the incumbent. These problems are listed in the previous Section 6.3.5.

6.3.7 Universality Funds

Universality funds, sometimes called US funds, USO funds or UA funds, are generally seen as the best option for promoting universality objectives. This view is shared in an increasing number of countries, including those with industrialized, transitional or developing economies.

Universality funds collect revenues from various sources and disburse them in a fairly targeted manner to achieve specific universality objectives. Depending on the country, the source of revenues may include government budgets, charges on interconnecting services, levies on subscribers (e.g. on access lines) or levies on all telecommunications service operators.

In contrast to ADCs, universality funds are generally used to finance specific and targeted high cost areas and/or low income subscribers. The most efficient funds provide relatively small subsidies to incent private sector telecommunications operators to serve targeted service areas. These are typically areas where service would otherwise be uneconomic (i.e. where costs cannot be covered by available subscriber revenues). Good examples of the universality funds are included in the case studies of Chile and Peru, set out in the Appendix.

The design and operation of universality funds is considered in detail in the next Section of this Module.

6.4 Universality Funds

6.4.1 Introduction

International experience is demonstrating the benefits of universality funds. These funds are designed to meet universality goals by subsidizing specific initiatives to extend or maintain service or access. Such funds have most of the benefits and few of the disadvantages of the other universality funding mechanisms discussed in this Module.

Universality funds (USO, US or UA funds) are special-purpose mechanisms designed to achieve universality objectives. These funds are generally administered independently from the incumbent operator. Subsidies from universality funds are typically used to provide financial support to fund specific programs. Examples include network expansion projects and installation of public payphones or calling centres. While they come in different forms, good funds have a number of features in common. Some of these features are summarized in Box 6-1.

As noted above, two of the most successful universality funds in the world today have been established in Chile and Peru. There are many possible variations on such funds. Some of the main considerations in designing funds are discussed in the remaining sections of this Module.

Universality funds can be used to subsidize existing levels of universal service, or to provide new universal access or service through new network rollouts. Both purposes are discussed below. However, it is clear that universality funds are an ideal mechanism for subsidizing new network rollouts to expand universal access to uneconomic areas. Much of the discussion below relates to funds used for that purpose.

6.4.2 Sources of Fund Revenues

Unlike cross-subsidies and mandatory service obligations, universality funds involve the collection and disbursement of funds by an independent organization. There are various possible sources of such funds. These "collection mechanisms" include:

- Direct funding from general government revenues (e.g. Chile);
- Contributions from telecommunications operators (e.g. in proportion to their revenues from specified services);
- Proceeds from telecommunications privatizations, spectrum auctions and/or licence/ concession payments;
- A subscriber levy (e.g. on a per access line basis) collected by telecommunications operators; and
- Funding from international development agencies.

Box 6-1: Features of a Good Universality Fund

- Independent administration – not related to telecommunications operators
- Transparent financing
- Market-neutral – does not favour incumbent operators or new entrants
- Funding targeted to specific beneficiaries (e.g. high cost regions, unserved rural areas, low income populations, educational & health sectors)
- Subsidies should be relatively small; should only subsidize the uneconomic portion of service; private sector operators should finance the rest
- Competitive bidding process for implementation of universality projects: i.e. lowest bidder should be awarded subsidy and right to build and operate networks to expand service

If funds are collected from telecommunications operators, or through them from subscribers, the rules of the *WTO Agreement on Basic Telecommunications* should be kept in mind (see Section 6.3.1 above). Specifically, the collection and administration of such funds should be transparent, non-discriminatory, competitively neutral and not more burdensome than necessary for the kind of universal service defined by the country's laws or policies. Below we discuss some of the principal criteria used by regulators for selecting amongst these collection mechanisms. Most regulators have selected contributions from telecommunications operators (i.e. a proportion of operational revenues for universality funding.)

Criteria for Collection Mechanisms

Regulators have established different criteria to determine the best way to collect revenues for universality funds. These criteria include:

- **Economic Efficiency:** All collection mechanisms result in some degree of economic inefficiency. The goal, therefore, should be to collect universality fund revenues in a manner that minimizes economic efficiency losses. For instance, as discussed in Appendix B of the Handbook, Ramsey pricing principles suggest that services with relatively inelastic demand should pay higher universality charges than those with more elastic demand. In practice, for administrative and equity considerations, most regulators have opted for widely-based uniform universality charges rather than Ramsey-based charges. As discussed in section 6.3.1, a uniform widely-based charge will reduce the inefficiencies associated with operators trying to avoid or by-pass highly-taxed services in favour of low-tax or untaxed services. Other analysts have suggested that collecting universality fund revenues from the government budget is the most efficient option. This conclusion is based on the observation that only the government has an overall economic vision and mandate to tax all sectors of the economy, and can, therefore, choose the optimal level and mix of taxation. However, many governments are in the process of implementing fiscal reforms and hence direct government funding is often not a feasible or reliable option.

- **Administrative Efficiency:** Universality revenues should be collected in an efficient and transparent manner. It may be that the existing government revenue collection process is the most administratively efficient because the infrastructure to collect taxes and other revenues already exists. On the other hand, experience suggests that the administrative costs of setting up a universality fund to collect revenues are reasonably low. The collection mechanism should be designed so that the calculation of the amount that each operator is required to pay is relatively simple and not subject to interpretation and controversy. This consideration supports relatively simple and broad collection mechanisms, such as on applied to all telecommunications revenues (basic and non-basic services).

- **Sustainability:** Collection mechanisms must be designed so as to access a relatively stable revenue base. Collection mechanisms based on a specific service or based on minutes may not be sustainable in the long term. Universality funding based on one-off events such as spectrum auctions, may also not be sustainable. The advent of distance-insensitive long-distance calling and the significant growth of mobile wireless telephony is blurring the distinction between local and long-distance calling. Developments in digital and IP technology are also leading to doubts about whether minutes will continue to be the basic unit of measurement for telecommunications. Rather, it may be the bit or the IP packet. Therefore, it may be prudent to select a constant measure, such as revenues, rather than a technology or service specific measure, such as minutes of long distance traffic.

- **Equity:** The collection mechanism should be fair. Many regulators have rejected the economically-efficient option of collecting universality revenues through a levy on access charges due to equity considerations. Such levies would increase local access rates for all, including low-income subscribers. Many observers have argued that telecommunications universality objectives are an aspect of government social policy and that they should, therefore, be funded from the government

budget rather than exclusively from the telecommunications sector. However, as a practical matter, few governments have made funding available for universality funds.

6.4.3 Determining the Amount of Subsidy

Funds can be used to finance various types of universality objectives. However, they are ideal vehicles for financing the expansion of service to specific high-cost areas or populations. The funds in Chile and Peru were used for this purpose, and each country's fund has succeeded in extending new telecommunications access to thousands of rural localities.

Where a subsidy is used to fund specific network extension targets, such as in Chile and Peru, some estimate should be made of the amount of financing that will be required to reach that target. The fund should not pay too much for a network extension project.

There are generally two ways to determine the subsidy required for a network expansion project. They are complementary, and both should generally be used. The first is to estimate the cost of the subsidy using a financial model along the lines discussed in the next section. The second approach is to let the market determine the final amount of the required subsidy, through a competitive bidding process.

It is recommended that the competitive bidding approach should always be used. However, the financial study can be useful for a number of purposes. It can assist in fund budgeting, and assist the fund administrator in determining the maximum subsidies that will be available for the projects. It can also act as a safeguard against possible bid rigging or other attempts to undermine the competitive bidding process.

Cost Models for New Universal Access

A financial model can be used to determine the subsidy required to expand new service to rural and other high cost areas. In general, these financial models calculate the difference between the capital and operating costs of providing service in specific regions and the projected telecommunications revenues available in those regions. Cost projections may be based on network construction estimates or on national or international benchmark costs for new access lines. Revenue projections can be developed in different ways.

The fund should only pay for the uneconomic part of the project. For example, it may cost USD 10 million to provide one or two public telephones per village to 500 very remote villages. However, the financial model may indicate that telecommunications service revenues from those villages can be expected to finance USD 6 million of the cost of the network expansion, plus cover ongoing operating revenues. In this case, the required subsidy from the fund should be no greater than USD 4 million. It may be less once ancillary benefits to the operator are taken into account.

Cost Models for Maintaining Universal Service

Estimating subsidies required to maintain existing levels of universal service is somewhat more difficult and controversial than estimating subsidies required for new network extension projects. This difficulty is due, among other things, to the larger and more diverse scope of the services to be costed and due to the embedded nature of the costs of existing services.

Universality funds in industrialized countries have generally focussed on providing subsidies to existing services or to maintaining below-cost rates for subscribers already on the network. Under these circumstances, a detailed cost model incorporating installation and ongoing costs appears to be the only practical option for estimating the required subsidy. International best practice suggests that the calculation of the net costs of providing the required level of universal service should be based on the long run incremental costing (LRIC) method.

At best, an LRIC cost model only provides a general estimate of the subsidy costs, not a precise calculation. Models incorporate a series of choices about how to assign costs in the network. These choices are made using expert judgement; the choices are not black and white. Disagreements may arise about what geographic areas should be used as net cost areas, how to assess which technologies could have been used to deliver the designated services most

efficiently, whether and how to account for depreciation, how to calculate the cost of capital, how to account for the benefits to the operator of being the universal service provider (see discussion below) and how to judge which network and access costs are truly avoidable, as opposed to costs that would have been incurred in any event.

As a result, there have been significant controversies about regulatory decisions on the level of funding to maintain existing levels of universal services in industrialized countries. In the end, the level of funding is based, in large part, on regulatory judgement. The same controversies will generally exist whether universality initiatives are funded through ADCs administered by an incumbent or through an independent universality fund.

A number of regulators have found innovative solutions to address universal service costing. For instance, the FCC in the USA has made publicly available its Hybrid Proxy Cost Model. As part of a regulatory proceeding, the FCC developed this model based on three other cost models that different parties had submitted. The FCC selected its preferred modules from each of the models and created its own hybrid version.

The FCC model is referred to as a "proxy" because it does not model the network of any specific operator. Rather it may be used with the particular costs of different operators to estimate or "proxy" its TELRIC. The FCC has made the model publicly available (free on the FCC's website and at a nominal cost on CD-ROM) for interested parties. Parties are able to input their own data to run the model and to carry out sensitivity analyses.

Competitive Bidding to Implement Universality Projects

Even the best regulators or universality fund administrators will generally have less information than telecommunications operators about the real costs and benefits of implementing universality initiatives. Therefore, a competitive bidding process is a better approach than cost modelling to determine the final subsidy amount, if any, required to implement a universality initiative.

Competitive bidding is more practical and is administratively simpler in cases where new universal access is to be provided, for example, in an unserved rural area. As previously discussed, the process is more difficult where an incumbent is already providing the designated universal services. Most of the discussion in this section relates to subsidies for new services and not existing ones. However, in principle, competitive bidding processes could be equally effective in determining the amount of subsidy required to maintain existing services.

For example, an auction could be held to determine the amount of subsidy required to maintain or upgrade service in a region where an incumbent currently operates network facilities at a loss. A universality fund administrator might require the incumbent to submit to a competitive tender process as a condition of receiving a continued subsidy for the region. If another financially and technically qualified operator makes a firm bid to operate the network in that region for a lower subsidy, then the incumbent's subsidy might be limited to the lower amount. If dissatisfied, the incumbent could negotiate with the alternative operator to have it take over network operations. Alternatively the incumbent could sell the network facilities to the other operator, which would then be required to upgrade them to meet the required universality objectives. A variety of management contracts, joint ventures, build-operate-transfer arrangements, and asset purchase contracts could be used to implement the transfer of network operations to the lower cost bidder.

The case studies for Chile and Peru provide good descriptions of competitive bidding processes for licences to serve rural areas. In these countries, licences were granted to the bidders that offered to provide the designated services at the lowest subsidy. As a result of the competitive bidding process in those countries, many licences were granted with a zero-subsidy, meaning that there was no need to subsidize the winning bidder at all.

Use of competitive bidding processes means that the fund administrators need not determine the actual net cost of fulfilling the universal access requirements, but rather only the subsidy that the fund must provide to UA providers. It does not absolutely require the use of economic or financial costing models by regulators, although such models are

useful to determine the maximum subsidy amount that may be required. Bidders will use their own models and projections to determine their proposed subsidy bid. It is clear from the results in Chile and Peru that competitive bidding has the advantage of reducing the total funding required to meet universality objectives.

The Peruvian case study illustrates another advantage of the competitive bidding process. There may often be synergies in providing service to different localities or across various regions. An operator's willingness to serve a market at a given subsidy will depend on whether the operator can also serve other areas. When tendering more than one designated service area, fund administrators can capture scale economies by allowing applicants to bid to serve different combinations of areas at different subsidy amounts. The methods and effectiveness of such a multiple bidding approach are discussed in the Peruvian case study.

Intangible Benefits

Another advantage of a competitive bidding process is that it can transfer the value of the intangible benefits of being a US or UA provider from the operator to the universality fund. In this sense, intangible benefits refer to financial or other benefits accruing to US or UA providers that are not taken into account in traditional costing or revenue models. The United Kingdom case study in the Appendix describes some of the benefits of being a universal service provider.

In theory, a bidder that wants to become a US or UA provider would include intangible benefits in its calculation of the subsidy required to serve a new area. The larger the benefits, the lower the subsidy a bidder would require. Until recently, there were no real-world examples to test this theory. However, the competitive bidding processes in Chile and Peru provide such evidence. As described in the case studies for those countries, the actual winning bid amounts were generally well below the maximum subsidy that was calculated to be required to provide economic service in the tendered regions. In some cases, the proposed subsidy was zero, although the subsidy estimated by the fund was much higher.

In Chile, over the 1995-1999 period, the average winning subsidy was about 50% of the maximum subsidy offered. Similarly, in Peru, in the last two years, the average winning subsidy has been about 25% of the maximum subsidy offered. These market-based results suggest that operators are prepared to become a UA provider for a compensation which is significantly less than the net financial cost of the activity. The evidence suggests that the difference between the net financial cost and the compensation must be equal to the intangible benefit that the UA provider expects to receive.

In the absence of a competitive auction, subsidy valuations should include a value for such intangible benefits. A degree of judgement will be required to estimate such values. However, it should be possible to establish benchmark estimates for certain categories of benefits. Perhaps the best practical example of the valuation of intangible benefits is the UK. As described in the UK case study, in 1997, Oftel determined that such benefits offset any net costs involved in the provision of universal service by British Telecom. As a result of this determination, BT does not receive any funding from other operators or the government to subsidize its USO.

APPENDIX: UNIVERSALITY CASE STUDIES

1 CHILE

The Chilean model of extending public telecommunications service to low income and rural areas was one of the first to utilize market-based mechanisms to implement a successful universal access policy.

1.1 Universal Access Policy

The Chilean telecommunications sector was the first in Latin America to be privatized and opened to competition. The introduction of market-opening policies succeeded in reducing telecommunications prices and increasing teledensity. Despite this success, however, many low income and rural localities continued to be unserved. This lack of access to telecommunications services was identified as a market failure.

The Chilean government developed an effective and economically efficient approach to address this market failure. The approach relies on public funding in the form of targeted financial subsidies to provide public telephone access to low income and rural localities.

The Chilean program focuses on providing community access (i.e. universal access) rather than individual access (i.e. universal service). The program provides one-time subsidies for the installation of public telephones. It does not provide ongoing funding.

1.2 Legislation

In March 1994, the General Telecommunications Law was revised to establish the Telecommunications Development Fund. The fund is referred to as the "FDT" (*Fondo de Desarrollo de las Telecomunicaciones*). The FDT provides government funds to private operators to subsidize the installation of public telephones in unserved, low income and rural areas. The private operators who receive the subsidies are selected by means of a competitive bidding process.

The FDT is administered by a special Ministerial Council presided over by the Minister responsible for Telecommunications. The FDT's Executive Secretary is the head of the telecommunications regulator, SubTel (*Subsecretaría de Telecomunicaciones*).

The FDT is financed from the Chilean national government budget. Each year, a specific allocation is approved for FDT purposes. This type of funding was selected for several reasons. First, it avoided the economic inefficiencies that result from cross-subsidies between telecommunications services. Providing tax-based funding was also consistent with the government's view that universal access is a social policy issue. As such, subsidizing universal access is primarily seen as a government responsibility, and not that of telecommunications operators or telecommunications subscribers.

1.3 FDT Project Selection Process

A Regulation to implement the FDT was approved in December 1994. The Regulation established the rules for the operation and administration of the FDT.

The process for the selection of projects eligible for FDT subsidies is detailed in the Regulation. The main features of the process are:

- **Focus on Public Telephone Services:** In general, only public telephone services are financed by the FDT. These services may be provided by individual public telephones or telecentres.
- **Publicity:** SubTel has undertaken publicity campaigns to raise awareness of the FDT and to promote participation from unserved localities around the country.
- **Application Process:** Any person, community or municipal organization may submit a public telephone application to SubTel by 30 September of each year. After the annual

closing date, SubTel compiles a list of localities requiring public telephony service. (In 1998, 1,963 rural applications were received, and a total of 1,951 localities were accepted.)

- **Development of FDT Projects:** With the assistance of external consultants, SubTel undertakes a technical analysis of the applications. SubTel then develops specific rural public telephony projects. Each project is designed to cover a number of adjacent localities. (In 1998, 80 projects were designed to incorporate all 1,951 eligible applications.)

- **Financial Evaluation:** SubTel evaluates each of the projects based on general government-approved methods of cost-benefit analysis. For each project, two measures of net present value (NPV) are calculated: private and social. Projects that have a positive private NPV are excluded from the list. Projects with a positive private NPV are those capable of being financed solely from project revenues, without a government subsidy. SubTel then ranks the remaining projects (those with a negative private NPV) based on the relationship between social and private NPV, among other factors. This formulation aims to maximize the social returns per dollar of private investment. For these subsidizable projects, the maximum subsidy is calculated as the private NPV (always negative). The NPV's are calculated based on the tariff regime established for rural public telephones. The tariff regime in Chile is based on maximum rates that are adjusted on an annual basis with reference to an aggregate price index and productivity offset. Operators are allowed to set their rates lower than the designated maximum. The maximum rates for local calls from rural public telephones are approximately USD $0.07/minute based on a 5-minute local call. In comparison, local calls from urban public telephones are priced at approximately USD $0.05/minute, also based on a 5-minute call. Higher rates are allowed for shorter calls from rural public telephones. Interconnection access charges for all telecommunications services, including rural public telephones, are set by SubTel.

- **Selection of Projects:** A list of projects that are eligible for subsidies is then developed by SubTel. The projects are ranked based on the financial evaluation. The list is submitted to the FDT Ministerial Council, which selects the projects that will be opened to competitive bidding, based on the available FDT budget. In 1998, 80 projects were eligible for subsidy, and 31 were selected. These 31 projects covered 1,023 localities.

- **Competitive Bidding Process**: Once the Ministerial Council selects projects eligible for subsidy, SubTel prepares tender documents for a competitive bidding process. These are published in the country's Official Digest. Tender documents for each project include the following information:

  - the localities to be served by the project;
  - the minimum quality of service to be provided;
  - the applicable tariff regime (see further discussion above);
  - the time period allowed for the installation of the public phones;
  - the maximum subsidy available for the project;
  - available spectrum frequency bands; and
  - any other conditions.

- **Selection of Successful Bidders:** For each project, the bidder that proposes the lowest subsidy is declared the winner by SubTel. In 1998, firms bid for 27 of the 31 eligible projects. In total, the successful bidders proposed subsidies of USD 5.5 million, well below the maximum subsidy of USD 8.9 million available for the 27 projects. In some cases, no (zero) subsidy was required by the successful bidder.

- **Concessions:** The winning bidders must apply for a public telephone concession. Concessions are issued by the Ministry responsible for Telecommunications, based on the recommendation

of SubTel. The concessions are non-exclusive. The decree granting the concession includes the following information:

- ➢ name and details of the holder of the concession (the "concessionaire");
- ➢ type of service to be offered;
- ➢ duration of the concession;
- ➢ geographic zone covered by the concession;
- ➢ technical specifications of the infrastructure to be installed;
- ➢ deadlines for commencement and termination of installation;
- ➢ technical specifications of radio stations, if any;
- ➢ amount of subsidy awarded, if any; and
- ➢ other conditions.

➢ **Implementation:** Concessionaires must generally install the required public telephones within about 20 months. These public telephones must be capable of sending and receiving calls from other subscribers, including local and long distance calls from both fixed and mobile terminals. Once the infrastructure has been installed and verified by SubTel, the concessionaire receives the subsidy it is eligible for.

1.4 Results of the Bidding Process

Table 6-7 summarizes the results of the FDT bidding process to 1999. At the start of the FTD program, around 6,000 localities were identified as unserved. Between 1995 to 1999, a total of 183 projects were approved under the program. These projects covered 5,916 localities with a served population of over two million people. Therefore, it is evident that the original target of providing telephone service to unserved areas was met over a five-year period.

Table 6-7 demonstrates that competition between bidders significantly reduced the actual subsidies paid, as compared with the maximum subsidies that had been projected to be required to provide service. Over the five-year period, only about 50% of the estimated maximum subsidies were actually paid. In 1996, only 21% of the estimated maximum was paid. In 1999, 80% of the maximum was paid.

In practice, some delays have been experienced in the installation of public telephones under the FDT program. For instance, at the end of 1998 about 1159 or just over 50% of committed telephones had been delivered. As a result of these delays, SubTel has issued warnings and imposed fines in accordance with the terms of the concessions. The fines are calculated separately for different localities.

Table 6-7: Summary of FDT Results

Year	Projects	Localities	Inhabitants in Localities (000)	Maximum Subsidy (USD m)	Subsidy Granted (USD m)
1995	34	726	240	3.1	2.1
1996	18	1632	762	4.2	0.9
1997	70	2146	772	20.4	8.1
1998	27	858	229	8.9	5.5
1999	34	554	154	5.5	4.4
Total	**183**	**5916**	**2157**	**42.1**	**21.0**

Fines increase for longer delays. By the end of 1999, an additional 3,264 public telephones were installed under the programme, for a cumulative total of 4,424 to that date.

1.5 Regional Funding Differences

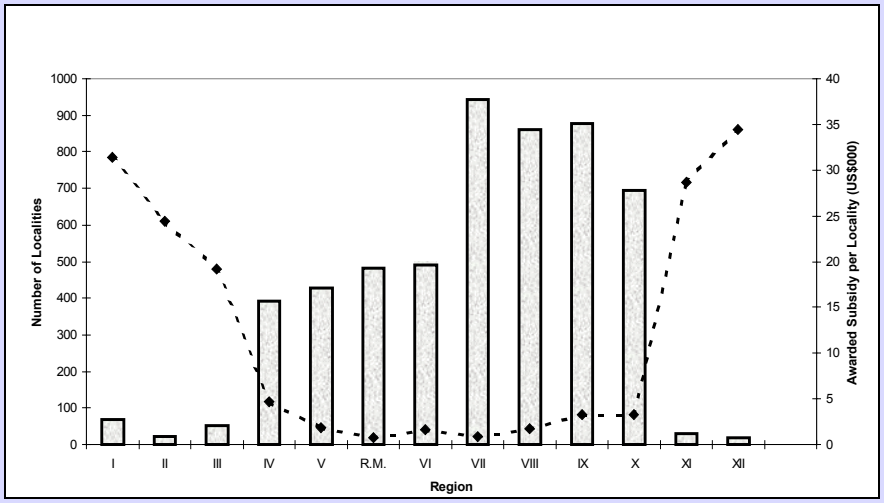
Chile is divided into 12 regions plus a capital region (R.M.). The Regions range from Region I at the northern end of Chile to Region XII at the southern end. The central Regions IV to X are the most densely populated areas. Figure 6-6 provides a regional analysis of the 1995-98 results.

Figure 6-6 indicates that most localities that received subsidies were located in the densely populated central areas of the country. Not surprisingly, the figure also indicates that the average subsidy per locality is significantly higher in outlying regions as compared to the central regions. It clearly cost more to provide service in more remote regions. For instance, the subsidy was 33 times greater per locality in Region I than in Region VII. Therefore, while the more remote Regions I, II, XI and XII, accounted for 25% of the total amount of subsidies for the country as a whole, they represent only about 2% of the newly served population.

1.6 Access to the Internet

The original FDT target of providing public telephone service to approximately six thousand unserved localities was met over the 5 years between 1995-1999. Having met this target, the President of Chile proposed revisions to the FDT in November of 1999. Under these changes, FDT funds may be used to finance community Telecentres with access to the Internet and to other new information and communications technologies.

Figure 6-6: Regional Analysis of FDT Subsidies Awarded (1995-98)



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McCarthy Tétrault

2 PERU

Peru's experience with universality programs bears similarities to that of Chile's. Peru's policy, like Chile's, promotes universal access by means of a rural telecommunications fund. However, the Peruvian program is more recent, and includes some notable differences and innovations.

2.1 Universal Access Policy

In the mid 1990s, Peru's government joined a growing number of others in deciding that the traditional policy of financing universal access by internal cross-subsidies was no longer feasible or desirable. This decision was consistent with its policy to rebalance rates and to eliminate all inter-service cross-subsidies over a five-year period after the privatization of its monopoly operator.

The Peruvian government distinguished between the universal service emphasis of maintaining access in industrialized countries, and the emphasis in developing countries on extending basic access in the first place. Peru clearly fit into the latter situation, particularly in rural areas. Accordingly, the Peruvian government established a universal access fund with targeted subsidies to finance new public access telephones in rural areas.

2.2 Legislation

A new regulatory framework for the Peruvian telecommunications sector was introduced by revisions to Peru's telecommunications laws in 1993 and 1994. The revisions promoted private sector participation in telecommunications, and among other things, authorized the privatization of the main wireline operators.

The legislative changes also created OSIPTEL as the new sector regulator. In addition, they established the universal access telecommunications fund, FITEL, which is administered by OSIPTEL. Under the law, OSIPTEL collects 1% of gross revenues from the telecommunications sector to finance FITEL. Collection started in mid-1994. By mid-1998, when FITEL undertook its first pilot project, over USD 30 million had been collected.

2.3 Sector Policy

The Peruvian *Full Competition Guidelines*, published in August 1998, opened the sector to competition. These Guidelines placed renewed emphasis on rural telecommunications. Although the privatized incumbent operator had met the rollout obligations imposed as part of its privatization, many rural localities in Peru remained without telecommunications service.

In the 1998 guidelines, the government set a target of extending service to five thousand unserved localities by the year 2003. The government defined universal access as access to a set of essential services provided by public operators and available to the majority of users. Specifically, these services included voice telephony, low-speed fax and data, and free emergency calls.

2.4 Regulation

To implement its universal access policy, the government issued the *FITEL Regulation* in September 1998. The regulation establishes administrative and technical terms for FITEL's operations.

The *FITEL Regulation* establishes criteria to select the localities that will receive funding for service expansion. Such localities include:

- rural towns (with a population of more than 400 inhabitants and less than 3,000 inhabitants);
- district capitals; and
- towns in high social interest areas (as defined by the Government).

FITEL will not finance past or future network expansion or coverage obligations imposed by the Government on telecommunications operators. Therefore, the incumbent operator is excluded from accessing FITEL funds to finance its rollout obligations. The Regulation also stipulates that FITEL will not provide direct subsidies to subscribers or provide funding for localities that already have access to telecommunications services.

FITEL refines the list of possible projects by determining which projects have the highest social benefit for FITEL's investment, among other things. According to the regulation, FITEL must establish a list of projects eligible for subsidy, and forward it for approval by the Ministry responsible for Telecommunications. Once the list has been approved by the Ministry, OSIPTEL prepares tender documents for a public bidding process to select operators to implement the projects.

The competition is public and international. Notice of the tender is published in the country's Official Digest, and in at least one newspaper with national circulation. The tender may also be published in international media.

The bidder with the minimum subsidy bid is selected as the winning bidder. The winner is eligible to receive the concession to provide the designated services. The winner is required to enter into a financing contract that stipulates the conditions under which FITEL will provide the subsidy.

The maximum subsidy is set at the "private NPV" of each project. Tariffs for rural public telecommunications services are regulated by OSIPTEL, based on a maximum rate regime. Operators are allowed to set lower rates if they wish. The maximum rate for local calls from rural public telephones is approximately USD $0.057/minute. In comparison, the price for local calls from urban public telephones is about USD $0.048/minute (based on a three-minute call), with each additional minute at about USD $0.029. Domestic long distance charges are set at the same regulated rate as that of the dominant long distance provider.

Interconnection charges are negotiated by the operators. If there is no agreement, the general interconnection regime established by OSIPTEL applies. This regime includes provisions for default cost-based rates.

Box 6-2: Key Information in Fitel Tender Documents

FITEL tender documents include the following information for each project:

- the localities to be served;
- technical description of the service to be offered;
- timetable for the project, including expected installation dates;
- the maximum subsidy offered by FITEL;
- the applicable tariff regime (see below for further discussion);
- a technical, financial and economic profile of the project (i.e. business plan);
- a description of the socio-economic situation of the area to be served;
- information relating to a guarantee bond;
- information relating to a performance bond for the proper operation of the infrastructure;
- timetable and procedures for the tender process;
- the evaluation process for the offers;
- draft financing contract;
- draft concession contract (for 20 years, non-exclusive); and
- other conditions and requirements.

2.5 Project Results

FITEL's program began with the Northern Frontier pilot project, which was awarded in May 1998. This project was a test case used to verify the design of the program. The project included 213 localities in 4 departments, with a total of about 59,000 inhabitants. The project required the installation of one new public telephone per locality.

The maximum FITEL subsidy for the pilot project was calculated at USD 4 million. The public bidding process was won by a subsidy bid of USD 1.66 million to serve the designated communities. This sum was equal to 41% of the maximum available subsidy.

The winning bidder completed installation of all required public telephones in December 1999. We understand that in this instance the winning bidder used VSAT technology to implement the project. The public telephones in the project can send and receive calls to and from other subscribers, including local and long distance calls from fixed and mobile terminals.

After the pilot project, a number of changes were made to the program. These changes applied to projects awarded in December 1999. One change required the winning operator to install and maintain a public Internet telecentre in all district capitals in the areas covered by the three projects. The three projects tendered in December 1999 included a requirement to install 1,937 public telephones and 236 public Internet telecentres.

2.6 Bidding Procedure

Another innovation introduced after the pilot project encouraged bidders to bid simultaneously on more than one project. OSIPTEL's objective was to provide the lowest total subsidy for all three projects. Therefore, OSIPTEL adopted bidding procedures designed to capture possible economies of scale (i.e. to pay a lower subsidy if a single operator could serve two or three projects at a lower total cost than one project).

OSIPTEL designed a bidding process that permitted bidders to bid on any combination of the three projects. Table 6-8 and Box 6-3 use a specific example to illustrate this process. This example assumes there are three projects (1, 2 and 3) and three bidders (A, B and C).

In the example in Table 6-8 and Box 6-3, the combination of bids that minimizes the total subsidy is (iv) with a total of 170. Hence the winners would be Bidder A for Project 3 with a bid of 50 and Bidder B for projects 1 and 2 together (1&2) with a bid of 120.

In fact, for the bidding process undertaken by FITEL in December 1999, the winning firm made a combined bid for all three projects for a total of USD 10.99 million. This bid was well below the maximum available subsidy of USD 50 million. Details are provided Table 6-9. Projects to be tendered in 2000 and afterwards will include the requirement to install community Internet telecentres and will incorporate the multiple project bidding process described above.

Table 6-8: Example of Multiple Project Procedure

	Project 1	Project 2	Project 3	Projects 1 & 2	Projects 1 & 3	Projects 2 & 3	Projects 1, 2 & 3
Bidder A's bids:	100		50		130		
Bidder B's bids:	80	50	60	120	130	100	180
Bidder C's bids:	90	45		130			

In September 2000 OSIPTEL modified the FITEL Regulation to among other things, formally introduce the possibility of funding access to the Internet and other advanced services. The new Regulation also expanded the geographic and operational coverage of the Fund. Indeed, FITEL can now provide funding for areas that, while having limited telecommunications access, are not expected to fully benefit from competition in the near future. In addition, FITEL is now permitted to provide funding for the operation and maintenance of the designated services, rather than just installation as was previously the case.

Box 6-3: Evaluation Process for Bids

Example of Evaluation Process (Multiple Bids):

Step 1: Determine the minimum subsidy amounts requested for each project or combination of projects:

Min(Project 1) = 80;

Min(Project 2) = 45;

Min(Project 3) = 50;

Min(Projects 1&2) = 120;

Min(Projects 1&3) = 130;

Min(Projects 2&3) = 100;

Min(Projects 1&2&3) = 180

Step 2: Compare the minimum amounts requested, this time for all three projects based on the following possible combinations:

(i) Sum (Min(Project 1) + Min(Project 2) + Min(Project 3)) = 175

(ii) Sum (Min(Project 1) + Min(Projects 2&3)) = 180

(iii) Sum (Min(Project 2) + Min(Projects 1&3)) = 175

(iv) Sum (Min(Project 3) + Min(Projects 1&2)) = 170

(v) Sum (Projects 1&2&3) = 180

Table 6-9: Projects Tendered in December 1999

Project	Localities	Inhabitants in Localities (k)	Maximum Subsidy (USD m)	Subsidy Granted (USD m)
South	534	136	14.0	
Centre South	1029	303	27.0	
Jungle North	374	141	9.0	
Total	**1937**	**580**	**50.0**	**10.99**

3 EUROPEAN COMMISSION

In developing new policies for the telecommunications sector, the European Commission issued a Communication in November 1993 on developing universal service in a competitive environment. This Communication initiated a process that established a consensus within the European Union on key issues related to universality. These issues include the scope of universal service, the choice of costing methods to determine the actual costs of universal service (if any), and possible universal service funding mechanisms. Each of these issues is discussed below.

The European Commission has declared that its member states are free to select their approach to universal service from three options. The decision on the appropriate national option must be based on the costing method stipulated by the Commission. The options are:

- Universal service financing is not required (i.e. universal service obligations do not represent an unfair burden to the designated operators providing universal service);
- Universal service obligations do represent an unfair burden on the designated operators; however the State chooses to finance it directly or indirectly; or
- Universal service is considered to be an unfair burden on the designated operators and a specific universal service financing mechanism scheme is required. In this case the national scheme must comply with European Community Law.

3.1 Scope of Universal Service

The European Commission has defined universal service in its *Interconnection Directive*. Universal service is defined as a minimum set of services of specified quality which is available to all users independent of their geographical location and, in light of specific national conditions, at an affordable price.

In the most recent version of the *ONP Voice Directive*, the Commission defined universal service to include:

- voice telephony service via a fixed connection which will also allow a fax and a modem to operate;
- operator assistance;
- emergency and directory inquiry services (including the provision of subscriber directories); and
- the provision of public payphones.

The European Commission has recognized that the concept of universal service may evolve as technology develops, and as the needs and expectations of citizens in its member states change. Accordingly, the scope of universal service may need to be redefined in the future. (See further discussion below.)

3.2 Costing Method

The *Interconnection Directive* states that universal service regimes must be based on the net cost of universal service obligations. The net cost must be audited by the NRA of the member state. The calculation of the net cost and the structure of the mechanism adopted by the NRA must be based on objective, transparent, non-discriminatory and proportionate criteria and objectives.

According to the directive, the costs of universal service should, in principle, be calculated based on a long-run average incremental cost (LRAIC) methodology. Universal service funding mechanisms are only justified when the net cost of the USO is considered to represent an unfair burden on the operator(s) subject to the obligation by the NRA.

The European Commission considers that the assessment of the net costs of universal service must be rigourous. The calculation of net costs should take into account all of the benefits derived by an operator from the provision of universal service.

3.3 USO Funding Mechanisms

The *Interconnection Directive* stipulates that national universal service regimes may take the form of:

- a universal service fund established at a national level,
- a system of supplementary charges collected directly by the operators who have the responsibility of providing the service, or
- a combination of elements of both mechanisms.

Universal Service Fund: Such a fund pools contributions from operators and service providers required to contribute. The funds are then transferred to operators that are entitled to receive universal service payments. The fund must be administered by a body that is independent of the parties who contribute to and benefit from the fund. The NRA is responsible for verifying the net cost of the USO.

Supplementary Charges: A supplementary universal service charge may be added to interconnection charges to recover the net cost of the USO. Such charges must be distinct from interconnection charges. The NRA must ensure that such contributions:

- are made in a transparent, non-discriminatory and proportionate manner, and
- that there is no conflict of interest between an operator's commercial activities, and its role in collecting such supplementary charges from competitors.

The *Interconnection Directive* states that only organizations providing public telecommunications networks and/or public voice telephony services may be required to contribute to a Universal Service Fund or to pay Supplementary Charges. This determination was based on a number of factors. First, contributions should be apportioned amongst market players according to their activity in the relevant market. In addition, the collection mechanism must be designed to prevent double contributions. Note that the European Commission considered the use of Supplementary Charges only as a transitional measure and required them to be phased out.

Only service obligations that flow from the Commission's definition of universal service may be financed by universal service schemes. European Union member states may impose other obligations on telecommunications companies and finance such obligations in accordance with Commission law (including fair competition principles). However, member states may not require other market players to contribute to the resulting costs.

In November 1996, the Commission issued a Communication on the assessment criteria for universal service schemes. This document provides more detailed guidance on various aspects of universal service, including some of the matters discussed in this section.

3.4 Current Status of USO in the European Union

In February 1998, the European Commission completed its *First Monitoring Report on Universal Service in Telecommunications in the European Union*. The report concluded, among other things, that it would be premature to propose an expansion of the scope of universal service obligations at this stage. In the most recent European Commission communication pertaining to universal service, the Commission reports that the provision of universal service does not appear to be creating an undue burden on the designated operators in the member states.

In practice, the vast majority of European Union member states have not established specific USO mechanisms. Some have decided that any burden associated with universal service is so low that it does not constitute an unfair burden for the designated operator. Others have determined that any USO burden does not justify the administrative overheads of a specific mechanism.

4 UNITED KINGDOM

The United Kingdom (UK) provides an interesting specific case study of the European Union's general approach to USO issues. Oftel, the UK telecommunications regulator, has determined that specific universal service financing is not required for the designated universal service provider, British Telecom (BT). This determination was based on the conclusion that its USO does not represent an unfair burden on BT.

4.1 Background

In December 1994, Oftel published a consultative paper which examined the evolution of the telecommunications regulatory framework in the United Kingdom. The paper examined the interconnection regime and the Access Deficit Contributions (ADCs) which provided universal service funding in the UK at that time. ADCs were made by interconnecting operators to pay for the deficit incurred by BT in providing access services. The consultative paper set out a number of options to address concerns about ADCs. The options included elimination of ADCs and their replacement, if necessary, with other universal service funding mechanism(s).

In July 1995, Oftel decided to eliminate ADCs from 1997 onwards. In coming to this decision, Oftel identified what it considered to be critical problems of ADCs in the UK. First, the net costs of universal service in the UK were calculated based on fully-allocated, historical costs and not the preferred LRIC method. In addition, the ADC regime was complex and difficult to administer. Oftel also concluded that ADCs provided a major source of uncertainty for potential market entrants, since the calculation of ADCs was in the hands of the incumbent, BT. Finally, Oftel expressed concerns that maintenance of ADCs would institutionalize a significant distortion of the market.

4.2 Benefits of Providing Universal Service

Once Oftel decided that ADCs were to be eliminated by 1997, it had to determine whether BT's USO constituted an unfair burden. If so, based on EC practice, such a burden could justify the establishment of a specific funding mechanism.

In February 1997, Oftel reached a preliminary conclusion that, taking into account the benefits to BT of providing universal service, there was no proven net cost of the USO. Accordingly, Oftel decided that there was no justification for setting up a USO funding mechanism, at least in the short term. Oftel confirmed this preliminary conclusion in July 1997.

Early in its process of determining the cost of universal service, Oftel identified some of the benefits to operators of being a universal service provider. These benefits are summarized in Box 6-4.

4.3 Calculation of Net Cost of USO

Table 6-10 below presents two estimates developed by Oftel of the net cost and benefits of being the USO provider. The net cost estimates were based on standard costing and revenue calculation methodologies, consistent with European Commission guidelines. Of the various possible types of benefits, Oftel estimated the value of the following: life cycle effects; ubiquity; corporate reputation (brand enhancement); marketing from Public Call Boxes.

The original estimates were released by Oftel in February 1997. In this instance, the total intangible benefits (£102m to £151m) were estimated to exceed the total net cost (£45m – £65m). These estimates are presented in Table 6-10.

In July 1999, Oftel released a consultative paper to review universal service issues. The paper included revised estimates of net cost and benefits of the USO. The revised estimates are also presented in Table 6-10. Oftel noted that the balance between the costs and the benefits is closer than previously estimated. However, Oftel maintained its view that the case has not been made for the establishment of a universal service fund to share the USO costs with other operators. In September 2000 Oftel again stated its belief that the USO is not an unfair burden on BT. Oftel expects to be able to issue a definite statement on the issue in Spring 2001.

Box 6-4: Benefits of Being a Universal Service Provider

- Enhanced corporate reputation;
- Marketing and brand recognition;
- Access to customers' telephone usage and demand data;
- Benefits associated with customer life cycle. The life cycle effect refers to the effect of basing a decision on the net present value (NPV) of the business proposition in question, instead of on the current difference between costs and revenues;
- Ubiquity provides a marketing benefit to an operator within its traditional serving territory. All customers know they can order telephone services from that operator no matter where they are in the serving territory;
- Avoidance of loss of business through poor image and loss of trust due to disconnecting or discouraging subscribers;
- Avoidance of disconnection costs; and
- Reduced planning costs.

Table 6-10: Annual Net Cost and Benefits of Universal Service Provision

	Original Estimates (February 1997) (£m)	Revised Estimates (July 1999) (£m)
Benefits		
Life cycle	1 – 10	0
Ubiquity	40 – 80	0
Corporate Reputation	50	50
Call Boxes	11	11
Total Benefits	**102-151**	**61**
Total Net Cost (conventional)	**45-65**	**53-73**

5 SPAIN

Spain is one of the member states of the European Union that has introduced legal provisions relating to the creation of a universal service funding mechanism. However, as most other member states, Spain has not yet put the mechanism into operation.

5.1 Legislation

Spain's General Telecommunications Law/1998 (the "Law") implemented a comprehensive revision of the legal framework for the telecommunications sector in Spain. The main objective of these revisions was to facilitate full liberalization of the sector. It also transposed several European Commission directives into Spanish law. *Title III* of the Law created the legal framework for the regulation and financing of universal service in Spain.

Title III states that operators that provide telecommunications services to the public and operators of telecommunications networks whose operation requires an individual licence are subject to public service obligations. Three categories of public service obligations are established: Universal Telecommunications Services (UTS); obligatory telecommunications services; and other public service obligations. Obligatory telecommunications services include telex, leased lines, and advanced services. The Law provides for the possibility of external financing only for UTS.

Universal Telecommunications Services ("UTS") are defined as a set of telecommunications services of a determined quality that should be accessible to all users independent of their geographic location at an affordable price. This definition is similar to the European Commission's definition. The Law provides that the services included in the UTS concept may be enlarged or revised to take into account technological developments.

Initially, UTS should include the following elements:

- the right of all citizens to be connected to the public fixed network and have access to fixed public telephone service available to the public;
- the right of telephone subscribers to receive, free of charge, a printed and updated telephone directory;
- supply of sufficient public telephones; and
- rights of subscribers who are handicapped, or have special social needs, to have access to fixed telephone service available to the public under equivalent conditions as other subscribers.

The Law provides that any dominant operator in a determined geographic zone may be designated to provide any of the services included in the definition of UTS. The telecommunications regulator, the CMT, is empowered to determine whether the USO for designated operators results in a competitive disadvantage. If the CMT so determines, a universal service funding mechanism (the National Universal Service Fund) will be established to distribute among telecommunications operators the net cost of universal service provision. The Fund will be administered and managed by the CMT.

The Law establishes a method for the calculation of the net cost of universal service. The Law's approach is in line with the European Commission's guidelines. If implemented, the specific contribution scheme will be determined by the CMT. As previously indicated, only operators providing telecommunications services available to the public and operators of public telecommunications networks would be liable to contribute to the universal service funding mechanism. However, the Law allows the CMT to exempt certain operators from the contribution requirement, to promote the introduction of new technologies or the development of effective competition.

5.2 Regulation

In July 1998 a regulation was approved to implement *Title III* of the Law. The regulation defines in more detail the initial set of services to be included in UTS. It also sets out UTS quality and technical specifications and establishes the framework for determining UTS affordability.

The regulation authorizes the Ministry responsible for telecommunications to undertake a public

consultation process to determine whether there are operators interested in providing some or all of the services included in UTS in determined geographic areas. This process should be carried out at least once a year before the finalization of the term established to provide universal service. Under this provision, the Ministry could open a competitive tender process to determine the US provider for that zone. The universal service licence will be given to the operator that offers service under the most advantageous conditions, including its offer with respect of the net cost of providing universal service.

The regulation establishes a detailed method for calculating the net cost of universal service provision. Procedures are to be established by the CMT to quantify the non-monetary benefits expected to accrue to the designated operator of being of the universal service provider. The regulation also sets out detailed provisions for the financing of universal service including the distribution of any contribution payments and the administration of the Fund.

On 3 June 1999, the CMT issued a resolution designating dominant operators in three national markets (fixed telephony, leased lines, and mobile telephony). In the first two markets, CMT designated Telefonica as dominant (having over 95% market share in both markets). For the third market, the CMT designated Telefonica Movil and Airtel as dominant operators.

Since its designation as dominant in relevant UTS markets, Telefonica may now calculate its net USO costs and petition the CMT to rule that its USO places the company at a competitive disadvantage. This move could lead to the establishment of a detailed universal service regime in accordance with the Law.

6 CEE AND CIS COUNTRIES

This Section provides a high-level overview of universality policies in the countries of CEE (Central and Eastern Europe) and the CIS (Confederation of Independent States).

In summary, in these countries, USO and universal access concepts are not currently defined in a manner that would allow the specific implementation of universality funding mechanisms. There are plans to implement universal service funds in some countries in the region. However, the most common universality funding mechanisms in the regions are:

- inter-service cross-subsidies by the USO operator; and
- (in countries that have recently privatized their incumbent operators) service performance and rollout obligations.

6.1 Introduction

There are significant variations in the level of economic and telecommunications development among countries in this region. Until the last decade, all countries in the region had state-owned monopolies. Since then, some have privatized, using different models, and others have not. Some have relatively open telecommunications markets. Other markets remain closed, particularly in the key wireline markets.

The policies and practices of the European Union are increasingly becoming the model for telecommunications policy development in the region. The process of accession to the European Union requires countries to adopt European Commission directives on policy, regulations and legislation, including directives on universal service. The following sections review universal service policies in various CEE and CIS sub-regions.

6.2 CEE Countries - EU Accession Tier 1 Countries

The five Tier 1 countries, the Czech Republic, Hungary, Estonia, Poland and Slovenia have signed EU Accession Partnership Documents. The European Commission considers these countries as the most similar to itself in terms of economic and policy development. This group of countries will, therefore, be the first in the region to join the EU.

The telecommunications sector is relatively well developed in these countries. National telecommunications and sector policies generally promote competition and private sector participation. These countries have generally relied on internal operator cross-subsidies to promote universality objectives. Countries that have privatized their incumbent operators have imposed rollout obligations to promote universality.

New universal service schemes in these countries, when established, should be consistent with those of the European Commission. In Poland, for example, the government currently plans to replace the existing posts and telecommunications law with separate laws for each industry. The two new laws will come into force by the end of 2000. The new *Telecommunications Law* will establish a new universal service regime. The regime will implement a universal service fund called the *Fundusz Uslug Powszechnych*. The goal of the universal service fund will be to increase access to universal telecommunications services in less developed areas of Poland, especially rural areas.

Similarly, in the Czech Republic, the current legislation does not specifically deal with the concept of universal service. The concept will be defined in a new Telecommunications Act, which is currently in preparation. A new universal service regime is also being prepared in Hungary.

6.3 CEE Countries – EU Accession Tier 2 Countries

The Tier 2 Accession countries are Bulgaria, Latvia, Lithuania, Romania, and the Slovak Republic. These five countries have also signed EU Accession Partnership Documents and are likely to become members of the European Union some time after the Tier 1 countries. The European Commission considers that more preparation is required to align the policies and regulatory framework of the Tier 2 countries with those of the EU.

Like those countries in Tier 1, Tier 2 countries have generally relied on inter-service cross-subsidies by incumbent operators to promote universality. Countries that have privatized have also imposed service rollout obligations. For example, network rollout obligations were imposed on Lattlelecom, the main operator in Latvia when it was privatized.

Some of the Tier 2 countries have started to define more specific universal service regimes. In Bulgaria, for instance, the telecommunications sector policy incorporates universal service principles that are consistent with those of the European Union. Specific universal service policies are currently under preparation, and the interim Bulgarian universal service definition is similar to the EU definition. At present, the USO is imposed on the main telecommunications operator, the Bulgarian Telecommunications Company.

6.4 CEE Countries – Non EU Accession Countries

Other CEE countries, such as Albania, Bosnia, Croatia, Macedonia, and Turkey have not yet signed EU Accession Partnership Documents, but plan to do so. Turkey has made a commitment under the *WTO Agreement on Basic Telecommunications* and is preparing for the privatization of its established national operator. The other countries in this group have been affected by war and civil unrest which has destroyed significant parts of their telecommunications infrastructure. Generally, countries in this group do not have specific definitions of universal service. They generally require their incumbent operators to cross-subsidize from higher margin services, such as international services, to maintain affordable service.

6.5 CIS Countries

The CIS countries are Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. In general, these countries do not yet have detailed policies on universal service or universal access. Universal service is generally not specifically defined, or is not defined in a manner that implements a specific funding mechanism for universal service or universal access. The traditional model of inter-service cross-subsidization by the incumbent operator is typically still used in CIS countries. Where privatization has occurred, some network rollout obligations have been imposed on the privatized operator.

7 CANADA

Canada's main universal service program was introduced in 1992. It was established by the federal telecommunications regulator, the CRTC, as part of its decision to authorize infrastructure-based long-distance competition.

Under Canada's original universal service regime, long distance operators paid "contribution charges" to support the USO of the incumbent operators. The net cost of the USO is the access deficit incurred by the USO operators as a result of charging the prescribed "affordable" rates for local service in higher-cost areas. In other words, regulatory constraints require USO operators to maintain rate levels in high cost areas below associated costs.

Contribution payments are based on the "contribution-eligible" minutes of long distance traffic of each operator. All long distance providers, incumbents as well as entrants, are required to contribute. The flow of contribution funds is administered by an independent Central Funds Administrator (CFA).

The current contribution payments regime is under review by the CRTC. As part of this review, the CRTC is considering whether to replace contribution charges with a revenue-based contribution regime. Another option under consideration is a levy on subscribers, similar to the subscriber line charge in the USA. (See discussion of the SLC in USA case study below.)

7.1 Background

The CRTC established contribution charges in 1992 in order to provide a subsidy to support local access services. Despite rebalancing initiatives in the 1990s, Canadian local access services are still priced below their associated costs in a number of higher-cost areas. The CRTC policy is intended to promote and retain Canada's high teledensity levels.

The rationale for the 1992 CRTC policy was partly based on the assumption that new entrants in long distance markets would reduce long distance revenues of the vertically-integrated incumbents. Thus, it was assumed that the new entrants would reduce the total amount of subsidy available to fund those operators' access services.

In 1998, the CRTC authorized competition in local access markets. At that time, it modified the contribution regime. For instance, it decided to make the contribution regime portable. Therefore, Local Exchange Carriers (LECs), whether incumbents or new entrants, are entitled to use contribution revenues to subsidize residential access services in designated higher-cost areas. Note that to date, given the relatively slow entry of competitors in those areas, incumbents continue to receive the vast majority of contribution payments.

The CRTC also modified the contribution charge regime to establish an independent administrator to collect contribution charges from long distance operators. These funds are disbursed to LECs based on the number of residential customers they serve. Since competitive LECs (CLECs) have made few inroads into residential markets in Canada, the vast majority of contribution funds are still presently paid to incumbent LECs (ILECs).

7.2 Rate Rebalancing

Since 1992, the CRTC has implemented a program of tariff rebalancing to raise access rates to a level closer to costs. This rebalancing program was completed prior to the introduction of a price cap tariff regime in 1998. The rate rebalancing resulted in a reduction of contribution charges from a range of about CD 0.05 to CD 0.08 per minute per end to the current range of about CD 0.006 to CD 0.023 per minute per end for average (includes peak and off-peak) rates. This has resulted in the elimination of the access deficit in lower-cost areas; however, a significant access deficit is still incurred in higher-cost areas by the ILECs.

As in many countries, social and political concerns have prevailed in Canada to prevent the completion of full rate rebalancing in higher-cost areas. New entrants in long distance markets have been vociferous opponents of the contribution regime, arguing, among other things, that the regime does not take into account the significant benefits that accrue to incumbents in providing universal service. Early in 2000, the Canadian government requested a Senate Committee to study a variety of issues

related to the regulatory framework for the telecommunications sector, including the contribution regime.

The CRTC has frozen the current level of contribution charges until the end of 2002. This move has eliminated the requirement for annual regulatory proceedings to set contribution rates. It has also provided more certainty to competitive suppliers regarding the cost of the contribution regime.

7.3 Cost Classification

As in other countries, the territories of the major Canadian ILECs are subdivided into exchanges (the geographic areas served by a switching centre or cluster of switches). In order to better identify higher-cost areas, the CRTC has classified exchanges into several bands, largely based on the cost to provide telephone service in the exchanges. Only certain higher-cost bands are eligible for subsidy. LECs receive a subsidy based on the number of residential lines they serve in those bands. Bands in higher cost areas generally receive higher subsidies per subscriber line.

The CRTC has recently initiated a regulatory proceeding to revise the banding classification. The overall objective of banding is to de-average the costs to provide services across the territory of the designated operator. The costs of providing service will be significantly lower in the urban core of a city than in isolated rural areas. Universal service programmes should incorporate these cost differences, where practical. The aim of the CRTC in the current proceeding is to have the greatest amount of intra-band exchange cost homogeneity while maintaining an administratively practical programme.

In a recent decision, the CRTC decided that in the future, only residential services in high-cost areas would be eligible for subsidies. This means that rates in all but the defined high-cost areas will have to increase in order to eliminate any remaining access deficit. This decision was based on several considerations. A major consideration was the fact that despite concerns to the contrary, telephone penetration had increased through the period during which rate rebalancing was implemented. The CRTC also considered that contribution subsidies should be better targeted to reduce the overall subsidy and the resulting economic efficiency losses.

The CRTC has defined a high-cost area as:

> A clearly defined geographical area where the incumbent local exchange carrier's monthly costs to provide basic service are greater than the associated revenues generated by an approved affordable rate. Costs are estimated using long-run, incremental costs plus an appropriate mark-up.

Box 6-5: CRTC Basic Service Objective

This objective defines the level of service which should be extended to as many Canadians as feasible in all regions of the country. This level of service includes;

- individual local service with touch-tone dialing, provided by a digital switch with capability to connect via low speed data transmission to the Internet at local rates;
- enhanced calling features, including access to emergency services, Voice Message Relay service (for the hearing impaired) and privacy protection features;
- access to operator and directory assistance services;
- access to the long distance network (the capability to make and receive long distance calls); and
- a copy of a current local telephone directory.

The basic service objective is independent of the technology used to provide service, and may change over time as service expectations evolve.

The CRTC-approved mark-up is intended to cover some of the joint and common costs of the ILECs' operations which are not captured under the LRIC approach.

7.4 Basic Service Objective

The CRTC has recently defined a "basic service objective", which is similar in concept to the definitions of universal service adopted in the European Union and elsewhere. The CRTC's basic service objective is described in Box 6-5.

8 UNITED STATES

8.1 Introduction

The administration of universal service policies is relatively complex in the USA. This complexity is partly the result of the two-tier state and federal regulatory system in that country. In summary, the USA *Telecommunications Act* of 1996, confirmed that the authority for implementation of universal service support programs was shared between the federal government (through the federal regulator, the FCC) and the states. The state regulatory agencies have authority to impose universal support programmes consistent with FCC principles. The implementation of the universal service reform provisions of the 1996 Act were delayed and have been the subject of various regulatory and judicial appeals.

At the federal level, the USA has two distinct funding schemes. One is aimed at the financing of access deficits (i.e. the difference between access costs and access revenues). The objective of the second is the promotion of universal service in higher cost areas.

8.2 Access Deficit Charges

A portion of the access deficit of incumbent local exchange carriers (ILECs) has been allocated to the federal (interstate) jurisdiction. This portion has traditionally been about 25%. This amount is collected through a combination of access charges on interstate carriers and direct subscriber charges. This regime was introduced in 1984 at the time of the AT&T divestiture. The access charge regime has been modified extensively since. Historically, the main access charges have been:

- the Subscriber Line Charge (SLC) which is levied monthly by LECs directly on subscribers;
- the Common Carrier Line Charge (CCLC) which is a per minute charge on interstate long distance calls levied by LECs on interstate long-distance providers; and
- the Pre-subscribed Interexchange Carrier Charge (PICC) which is levied by the LEC on the long distance provider which has prescribed to each access line.

As part of the most recent access charge reform package that went into effect in July 2000 the FCC combined the PICC and the SLC into a new SLC. For the first year the new single charge will be lower than the existing two charges combined. By July 2003, however, the cap for the new SLC is expected to increase significantly, to USD $6.50 per month per residential and single-line business lines. Consequently, the CCLC is expected to decrease to below USD $0.005 per minute of interstate long distance traffic (from about USD $0.06 per minute in 1996). Another component of the reform package was to remove about USD $650m in implicit universal service support from access charges, and replace that amount with an equivalent amount to be collected through the existing federal high-cost service fund.

8.3 Universal Service Support - Federal

As in the case of the access deficit, about 25% of the cost of subsidizing high-cost areas is currently collected at the federal level. A central high-cost service fund has been established towards which all carriers contribute in proportion to their share of interstate revenues. The contributions are paid into the Universal Service Administration Company (USAC), an independent fund administrator.

This fund supports three principal Federal programs: High-Cost Support, Local Switching Support and Long Term Support.

- **High-Cost Support** provides funds to rural carriers in high-cost areas to finance their access deficit.
- **Local Switching Support** provides additional support to LECs with fewer than 50,000 lines for traffic sensitive switching costs.
- **Long Term Support** allows high cost providers to have the same CCLC rate level as other carriers.

As part of the July 2000 reform package discussed above, an additional and separate program for high-cost rural support was created. The new program support is provided on a portable, per-line basis. The central high cost service fund also finances FCC low-income support programs for eligible subscribers. Under a different and separate funding mechanism, schools, libraries, and health care providers are eligible for discounted telecommunications services.

All telecommunications carriers that provide interstate telecommunications services must contribute to the cost of universal service. This includes carriers that provide service on a non-common carrier basis, as well as payphone aggregators. However, the FCC has determined that carriers that provide only international telecommunications services are not required to contribute to universal service. This decision was made, in part, so that foreigners would not be required to cross-subsidize the national USA network and its universal service regime.

Contributions for high-cost and low-cost income support mechanisms are assessed against interstate and end-user revenues. Recently, the contribution rate has been approximately 3% of designated revenues.

To date, the FCC has calculated access costs for the purpose of its universal service charges based on historic, embedded costs. As part of the reforms initiated by the 1996 *Telecommunications Act,* the FCC announced that it would introduce a forward-looking cost model to be used from 2001. After this date, federal payments are to be shifted gradually to 25% of the difference between forward-looking costs of high-cost facilities and a benchmark level of designated telecommunications revenues. This new approach is intended to replace the existing programs described above.

8.4 Universal Service Support – States

The remaining 75% of universal service subsidies is collected at the state level. Collection of these subsidies falls under the jurisdiction of state regulators. Each state may allow carriers to use a different mechanism. Historically, most states have relied on inter-service cross-subsidies by the ILECs to promote their universal service plans. Many state regulators are now moving to replace internal cross-subsidies with a central high-cost fund at the state level. These funds will collect contributions from carriers operating in each state in proportion to each carrier's share of revenues.

For example, the State of Arizona has implemented the Arizona Universal Service Fund (AUSF). The AUSF receives its funding equally from long distance customers (based on the total intrastate long distance revenue for a particular carrier) and local customers (based on the number of access lines and interconnecting trunks) of telecommunications carriers operating in the state that are connected to the PSTN.

9 SOUTH AFRICA

South Africa provides an interesting case study because of the high profile that country has given to the development of the telecommunications sector in general and to universality objectives in particular. Telecommunications is high on the Government's economic and social policy agenda.

9.1 Background

In South Africa, universal service is considered a long-term goal, and universal access a short-term goal. A 1995 consultative document (the Green Paper) and the subsequent 1996 White Paper on Telecommunications Policy placed considerable emphasis on these issues. *The Telecommunications Act of 1996* also emphasized universality objectives.

More recently, the newly created Universal Service Agency (see discussion below) undertook a consultation process in 1998 to establish specific universality definitions, mechanisms and targets.

Telkom, South Africa's incumbent operator was partially privatized in 1997 (30% of its equity was sold to a foreign strategic partner). As part of the reform package, Telkom was granted five years of exclusivity for PSTN services, ending in 2002. During this period of exclusivity, Telkom has the primary role in universal service/universal access provision in South Africa. The company is expected to use its monopoly revenues to cross subsidize its network rollout. At the same time, government policy provides that Telkom must rebalance its rates by the end of the exclusivity period.

9.2 Network Rollout Obligations

According to its licence, Telkom must also install 2.69 million new lines by 2002. Of these lines, 1.67 million must be installed in under-served areas. Telkom must also convert 1.25 million existing analogue lines to digital, as well as installing 120,000 payphones in the same time period.

Other telecommunications providers also have obligations related to universal service and universal access. Cellular network operators, for example, have rollout obligations imposed as conditions of their licences. The two cellular operators licensed in 1993, MTN and Vodacom, were required to install 7,500 and 22,000 cellular payphones (community service telephones) in under-served areas over a period of five years.

9.3 Universal Service Fund

Telecommunications licensees must pay an annual contribution to the Universal Service Fund (USF), which was created by the *Telecommunications Act of 1996*. The USF was allocated R3,000,000 as start-up funding when it was established in 1997. The USF may be used for:

- providing direct subsidies to targeted priority (needy) persons to defray the higher cost of telecommunications services due to rate rebalancing; and
- subsidizing the cost of network rollout to under-served areas by operators, including Telkom, whose licences impose such rollout obligations (until such time as Telkom has completed rebalancing its rates).

The USF is administered jointly by SATRA, the national telecommunications regulator, and the Universal Services Agency (USA). SATRA monitors compliance with network rollout and service quality targets and pricing. It also establishes the basis for USF contributions. The USA defines, investigates and recommends ways to achieve universal service and universal access.

The establishment of telecentres has been a priority for USF financing. Generally, the USA is responsible for establishing telecentres in partnership with communities and donor agencies. NGO's, individual entrepreneurs, women and disabled people in rural areas and townships are particularly encouraged to apply to run community telecentres. Telecentres typically contain a number of telephones, fax and photocopy machines, PCs and access to the Internet.

Over the last three years, 150 telecentres have been established or are in the process of being established. In the 1997/98 financial year, six standard telecentres were established. In 1998/99 an additional 12 standard telecentres were set up. In

1999/2000 ten mini-telecentres, 10 standard telecentres and 90 larger multipurpose community telecentres (MCT) will be established. Thirty of the MCT's will be specifically targeted to disabled people.

All telecommunications licensees are required to pay annual contributions to the USF. In the most recent financial year, operators licensed to provide public switched services (including access, local and long distance services) and mobile cellular services were required to contribute 0.16% of their annual revenue from the provision of the corresponding telecommunications services. Value-added network services licensees were required to contribute R1500 annually to the USF, while private network licensees were required to contribute R1000 annually.

9.4 Human Resources Fund

The *Telecommunications Act of 1996* also created a Human Resources Fund (HRF) which is administered by the Ministry of Posts, Telecommunications and Broadcasting, in consultation with SATRA. The HRF is utilized to promote the provision of adequately skilled human resources at all levels of the telecommunications sector. The HRF will finance training and educational programs at the artisan/technician, undergraduate, and post-graduate levels. It includes support for science and technology education at schools.

All licensees are required to pay annual contributions to the HRF. In the most recent financial year, operators licensed to provide public switched services (including access, local and long distance services) and mobile cellular services were required to contribute 0.08% of their annual revenues from the provision of the telecommunications services. Value-added network services licensees were required to contribute R750 annually to the HRF, while private network licensees were required to contribute R500 annually.

10 AUSTRALIA

10.1 Background and Legislation

The universal service regime in Australia is set out in Part 2 of the *Telecommunications Act of 1999*. The Act establishes a USO, which is the obligation placed on the universal service provider(s). Such providers must ensure that standard telephone services and payphone services are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business.

The rates of standard telephone services are regulated. As a result, in high-cost areas, the universal service provider cannot always recover the full cost of its service from the customer. Losses from the provision of such USO services are shared among all telecommunications operators. All operators, including Telstra (the incumbent and USO provider) are required to contribute to the costs of providing the USO in proportion to their overall share of the telecommunications market. Contribution shares are calculated using an eligible revenue formula (discussed below).

10.2 Net Cost of USO

"Net cost areas" are determined by the Australian regulator, the ACA. These are geographic areas for which universal service providers may claim compensation for their losses. They are primarily rural areas. Within 90 days after the end of the financial year, each universal service provider may file a claim to the ACA for a credit, based on its claimed net universal service cost for the financial year.

The net universal service cost is calculated as "avoidable cost" minus "revenue forgone". In essence, avoidable cost is the cost incurred by a universal service provider that it would not have incurred if it had not supplied services to net cost areas. Revenue forgone is the revenue a universal service provider would not have earned if it had not supplied service to net cost areas.

10.3 Eligible Revenue

Within 90 days after the end of a financial year, all participating carriers (including universal service providers) may file returns with the ACA setting out their designated "eligible revenue" for that financial year.

Eligible revenue is calculated as follows. First, the carrier's gross telecommunications revenue is determined, based on all sales revenue earned from telecommunications industry activities. The carrier may then make certain deductions to calculate its net telecommunications revenue. Deductions include revenue earned entirely in overseas markets, sale of customer equipment, USO levy credit receipts, supply of content services and terrestrial radiocommunications broadcasting activities.

Eligible revenue is then calculated as net telecommunications revenue minus "input payments" to other carriers. Input payments are payments to other carriers for services required to provide the first carrier's telecommunications services (e.g. interconnection charges). The carrier's share of the total eligible revenue of all participating carriers is its contribution factor. This factor can be seen as a proxy for its market share in the markets from which a contribution is required.

10.4 Payment Mechanism

The ACA may choose either to accept the net cost claims and the eligible revenue returns as correct, or make further inquiries. After any such inquiries, the ACA publishes a written assessment for the financial year. The ACA assessment sets out a "levy debit" for each participating carrier, which is its contribution factor multiplied by the total net universal service cost.

Each participating carrier must pay its levy debit to the Commonwealth's Universal Service Reserve within one month after receiving the ACA assessment. The total of a participating carrier's levy debit is equal to total net universal service cost. Each participating carrier that is a universal service provider also has a levy credit, which is equal to its net universal service cost. When all carriers who

owe money to the Reserve have paid into the Reserve, universal service providers are paid any net amount to which they are entitled.

10.5 Recent Developments

For the 1996/97 fiscal year, the net universal service cost levied on the industry was agreed between carriers to be USD 153.4 million. For 1997/98, Telstra claimed a net cost of USD 1,115.1 million, a substantial increase over the previous year. ACA's preliminary review of the Telstra claim suggested it would be substantially decreased (to around USD 580M).

The Australian government recognized the potential for Telstra's large universal service claims to generate uncertainty in the industry and serve as a disincentive to investment. Accordingly, the government enacted legislation that capped the 1997/98 net universal service cost at USD154.5 m and at USD154.5 m plus CPI for 1998/99 and 1999/2000. This cap is an interim measure only. These capped amounts represent approximately 1.4% of gross carrier revenue.

The scale of the Telstra claim and the potential uncertainty it generated has called into question the current USO funding arrangements. It has prompted the Australian government to undertake a public consultation process to review the USO funding arrangements, including the desirability and practicality of direct government funding.

11 ASIA

11.1 Introduction

This section provides a very high-level overview of the status of universal service and universal access policies in selected Asian countries. In general, universal service is not currently defined in Asian countries in a manner that would allow for the implementation of a targeted funding mechanism. The most common funding mechanism in the countries we reviewed remains inter-service cross-subsidy by the incumbents.

In a number of countries, network expansion obligations are used to supplement cross subsidies as a method of promoting universality. Such obligations may be imposed on existing state-owned incumbents, on newly privatized operators, on competitive new operators or on joint venture/consortia–type entities, for example, as part of BOT-type arrangements.

There are other variations on the continent. Hong Kong has implemented transparent per-minute charges to promote universal service in competitive conditions. Malaysia is considering the establishment of a Universal Service Fund. In the following sections, we highlight a few notable country examples and provide a summary of developments in other countries.

11.2 Highlights: Selected Countries

In Japan, *the NTT Corporation Law of 1997* reorganized the incumbent, NTT into two regional companies for eastern and western Japan, and one long-distance company. All three operating companies are owned by a single holding company. The 1997 Law specifies that NTT has the responsibility to contribute to securing appropriate, fair and stable provision of nation-wide telephone services. Although universal service is not specifically defined, universality objectives have been implemented by requiring uniform geographically-averaged rates for both access and local calling. In high-cost areas, these charges are cross-subsidized by access charges from more densely-populated, less costly areas, and by long-distance charges.

In New Zealand, the government maintained some restrictions on the incumbent, TCNZ, when it was privatized in 1990. These restrictions are enforced through the so-called Kiwi Share provisions in the TCNZ Articles of Association. For example, the Kiwi Share provisions oblige TCNZ to maintain rural customer access charges at rates no higher than the standard urban residential rate. New Zealand does not have a telecommunications regulator or specific regulations for the telecommunications sector. Recovery by TCNZ of the costs of serving high-cost areas is left to commercial negotiations and general competition policy. Accordingly, TCNZ seeks to recover costs through commercially negotiated interconnection prices. As of late 1999, interconnection negotiations resulted in an impasse which the New Zealand government has tried since to sort out.

Hong Kong has established a cost-based universal service regime funded through charges on external (i.e. international) traffic. The designated universal service provider (CWHKTC) has an obligation to provide PSTN access services in Hong Kong. The universal service provider may receive fair contributions from other licensees towards the net costs of serving customers and providing public telephones. Customers and payphones for which compensation is requested by the USP are referred to as “uneconomic”. The total net cost of CWHKTC (the universal service contribution or USC) was calculated at HKD 510.5 million for the 1997/98 financial year. Of this amount, HKD 398.2 million was incurred in serving uneconomic customers and HKD 112.3 million in serving uneconomic payphones. The USC for the 1997/98 year was equivalent to HKD 0.136 per minute external of traffic. The USC accounted for about one percent of total sector revenues. The USC regime has been maintained after the external market liberalization of January 1999. However, an independent intermediary was appointed to collect and administer the USC.

11.3 Other Asian Countries

Internal cross-subsidization is widely used in other Asian countries to promote universality. This approach is used, for example, in China, Bangladesh, Bhutan, Indonesia, Iran, South Korea, Sri Lanka, Mongolia, Nepal, Philippines and Thailand.

Network expansion obligations are also widely used to promote universality. Some examples follow.

In India, new and existing telecommunications operators are required to install a certain number of lines in rural areas within specified periods. As an example, in category A concessions, in the most desirable areas, the tender conditions for India's basic service operators stipulated that at the end of 12 months, a minimum of 10% of installed lines must be in rural areas. A similar condition applied to the less desirable category B concession areas, but the timetable was extended to 24 months. For category C concession areas, the timetable was 36 months.

In the Philippines, all nine international service providers were required to install 300,000 local lines within 3 years of obtaining their licences. Cellular mobile operators were required to install 400,000 local lines within a period of five years. In some cases, licences were awarded to companies for both cellular and international services, resulting in a requirement to put in 700,000 lines in 5 years.

Thailand and Indonesia have adopted joint-venture/consortia models with Build Operate Transfer (BOT) type arrangements. Under these arrangements, foreign strategic investors entered into agreements with local partners (often including the incumbent operators) to operate telecommunications networks in designated areas. In both Thailand and Indonesia, the licence and contractual arrangements included requirements to install a certain number of lines within specified period. In Indonesia, the new operators were also required to extend service to rural municipal districts in their serving territories within specified periods.