Asia–Pacific Telecommunications USOs: Current Practice and Future Options[1]

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ABSTRACT *Access to information is essential for efficient business operation and social empowerment. Many Asia–Pacific businesses are exposed to international markets while their corresponding information requirements are not well met. Restricted information technology and telecommunications access also diminishes the ability of remote regions to generate reliable income streams. In the Asia–Pacific, several national governments have recently reviewed the notion of telecommunications universal service obligations (USOs). This review considers the adequacy of the 'plain old telephone service' definition for an information society characterised by market liberalisation, new technology, changing community needs, and an uncertain international environment. Several interim and proposed mechanisms for delivering USOs in the Asia–Pacific region are also discussed.*

Keywords: affordability, Asia–Pacific telecommunications, information, liberalisation, universal service obligations

Introduction

The Asia–Pacific region is characterised by rapid technological change in the provision of telecommunications service content, the entry of new facilities-based carriers and service providers, and increased privatisation of regional carriers.[2] Such changes require a reconsideration of the form telecommunications universal service obligations (USOs) take and their funding sources. Clearly, to prevent the marginalisation of remotely located and low-income populations, the concept of USOs should be extended beyond basic telephony to encompass information and communications, broadcast television, telecommunications, mobile voice, Internet, and broadband delivered services.[3] At the Asia–Pacific Economic Cooperation (APEC) Forum's Ninth Ministerial Meeting, ministers recognised that information technology and telecommunications (ITT) is transforming societies and economies, and that the Asia–Pacific Information Infrastructure is an essential foundation to ensure the competitiveness of the region. Ministers called on APEC economies and the APEC Telecommunications Working Group (APEC TEL) to implement actions necessary to make the Asia–Pacific information society a reality.

The APEC TEL recognised that improving infrastructure in rural communities, including roads, telecommunications, power generation, and capacity building, is critical to the region's economic development. Telecommunications coverage is an important concern for the efficient operation of business enterprise. Business in the Asia–Pacific today cannot be expected to operate with inadequate information and communications services. McKinsey and Company note that 'Telecommunications infrastructure is a

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significant or critical factor in respect to business location decisions' and 'the lack of quality telecommunications infrastructure and services in regional areas is a disincentive to investment growth'.[4] Links to global markets and major urban centres are crucial for continued economic growth within the Asia–Pacific region.

Asia–Pacific telecommunications network coverage and traffic flows have experienced rapid growth. The average annual growth rate in main telephone lines from 1990 to 1995 was 10.7%, compared to 4.1% for Europe. Developing Asia–Pacific countries, such as Indonesia, the Philippines, the People's Republic of China (PRC) and Thailand have made substantial investments in telecommunications infrastructure, sustaining growth rates in main lines in excess of 20% for this period, albeit from a low base. The region has also benefited from extensive investment in digital capacity, with approximately 82.4% of main telephone lines served by digital switches in 1995. The growth of Asia–Pacific international telephone service capacity and traffic suggests that the telecommunications sector is important for regional business expansion and trade links.[5] For example, between 1990 and 1995 Asia–Pacific international outgoing telephone traffic increased by 17.5% per annum.[6]

Asia–Pacific economies are currently undergoing a process of adjustment to the Asian economic crisis, environmental pressures, and a more uncertain international marketplace. A stricter competitive business discipline is required in this dynamic environment to ensure that costs reflect world best practice.[7] Asia–Pacific telecommunications services have until recently been provided by publicly owned monopolies. This mandated supply is often justified by natural monopoly arguments and tied to a USO that recognises the socioeconomic importance of telecommunications.[8] The obligation is commonly interpreted as the requirement to supply basic telephony to customers even when it is not commercially viable to do so. By providing telecommunications access to users who otherwise could not afford it USOs may increase the value of the network to existing subscribers through the network externality effect.[9]

USOs and their delivery mechanisms remain just as important in a deregulated telecommunications environment. Einhorn notes that 'regulators are still required to decide what services should be protected, who should receive subsidies, how subsidy dollars should be paid or generated, how much money is required, and how the program should be administered'.[10] General affordability can be maintained through telephone rate ceilings, geographically averaged rates, and targeted subsidies for qualified customers and exchanges.[11] With suitable regulatory arrangements, a competitive market can facilitate access to basic telecommunications services for all community members.[12] Whilst reduced charges are one of the most anticipated benefits from competition, even at competitive prices some community members' incomes are still low enough to prevent them from subscribing to telephone services. Thus, competition alone cannot ensure the delivery of important telecommunications policy goals. A successful transition from monopoly to competitive provision requires new mechanisms to achieve universal service. Such mechanisms should not impede competition but provide incentive for telecommunications companies to deliver services to geographical areas and individuals where they would not otherwise not do so.[13]

This study examines telecommunications USOs and the means by which they are funded in the Asia–Pacific. Data for Asia–Pacific economic development and ITT coverage and affordability are provided. A description of Asia–Pacific proposals and interim USO measures are presented. USO funding mechanisms in a deregulated environment are discussed and conclusions and policy implications are presented in a final section.

Table 1. Economic development

Country	Population		GDP		Main telephone lines	
	Total (million) 1995	Density (km^2) 1995	Total (billion US$) 1994	Per capita (US$) 1994	Teledensity[a] 1995	Digital[b] 1995
PRC	1214	127	508	424	3.35	99.0
Indonesia	195	101	175	920	1.69	93.0
Philippines	68.0	225	64.1	968	2.09	70.0
PNG	4.00	9.00	5.40	1277	1.01	55.0
Malaysia	20.0	60.0	70.6	3622	16.6	95.0
Chile	14.0	19.0	52.2	3716	13.2	100
Mexico	92.0	47.0	376	4089	9.60	88.0
South Korea	45.0	456	377	8449	41.5	63.0
Chinese Taipei	21.0	592	243	11503	43.1	92.0
New Zealand	3.60	13.0	49.9	14102	47.9	99.0
Brunei	0.30	49.0	4.00	14654	24.0	53.0
Australia	18.0	2.00	323	18089	51.0	62.0
Canada	29.6	3.00	549	18777	59.0	92.0
Chinese Hong Kong	6.20	5829	134	22970	53.0	100
Singapore	2.99	4848	69.5	23724	47.9	100
US	263	28.0	6936	26622	62.6	73.0
Japan	125	331	4687	37563	48.8	84.0

Notes: [a] Main telephone lines per 100 persons.

[b] Percentage of main telephone lines connected to digital switches.

Source: ITU, 1997, International Telecommunications Union, World Telecommunications Development Report, ITU, Geneva 1997.

Asia–Pacific Economic Development and Telecommunications

Below we examine briefly the current state of economic development, ITT coverage, prices and affordability in the region. Basic indicators of economic development for a sample of 17 (APEC member) countries are presented in Table 1. The countries are ranked according to gross domestic product (GDP) per capita. As expected, national teledensity is substantially larger for high-income countries. The level of digitisation has no apparent trend.

Data on ITT penetration is presented in Table 2. These data provide a broad indication of the accessibility of ITT infrastructure and associated services. Teledensity data suggest that main-line penetration is more intensive in the largest city for lower-income countries. The number of payphones, cellular telephone subscribers, Internet hosts and personal computers (PCs) per 100 persons are also less in low-income countries.

Prices of selected telecommunications services and their affordability are presented in Table 3. There is no clear pattern in call costs across services. However, in terms of affordability (call costs divided by GDP per capita) there is an observed negative relationship between the level of economic development and relative call cost.

Asia–Pacific USO Proposals and Interim Measures

ITT improves living standards in remote and rural areas by providing important commercial, social and educational benefits.[14] The potential for substantial economic and social gains from the information revolution led to a reappraisal of information access by administrations and regulatory authorities in the Asia–Pacific. The importance of

Table 2. ITT accessibility

Country	Teledensity		Payphones	Cellular	Information technology	
	Largest city[a] 1995	Rest of country[b] 1995	Payphones per 100 persons 1995	Subscribers per 100 persons 1995	Internet hosts per 1000 persons 1995	PCs per 100 persons 1995
PRC	14.0	3.23	0.07	0.30	0.01	0.21
Indonesia	na	na	0.06	0.11	0.10	0.37
Philippines	9.58	0.95	0.01	0.73	0.30	1.14
PNG	20.0	0.09	0.01	na	na	na
Malaysia	14.3	14.7	0.49	4.34	1.99	3.97
Chile	19.2	9.47	0.13	1.38	7.01	3.78
Mexico	11.6	6.74	0.27	0.70	1.53	2.61
South Korea	52.9	33.0	0.69	3.66	6.47	12.1
Chinese Taipei	65.7	39.9	0.57	3.62	11.7	8.32
New Zealand	45.6	44.7	0.13	10.8	50.1	22.3
Brunei	77.7	8.37	0.10	12.6	2.94	2.87
Australia	48.5	49.9	0.47	12.8	55.4	27.6
Canada	na	na	0.60	8.75	41.2	19.3
Chinese Hong Kong	53.0	na	0.08	12.9	48.5	11.6
Singapore	47.9	na	1.04	9.77	30.1	17.2
US	na	na	0.57	12.8	38.0	32.8
Japan	na	na	0.64	8.15	7.19	15.3

Notes: [a] Refers to the number of main lines in the most populated city.

[b] Calculated by subtracting main lines in the largest city from country main lines

na denotes not available.

Source: ITU, 1997, International Telecommunications Union, World Telecommunications Development Report, ITU, Geneva 1997.

universality of service coverage in industrialised countries is reflected in the establishment of several agencies. The Clinton administration in the United States established an inter-agency Information Infrastructure Task Force and National Information Infrastructure Advisory Council (NIIAC).[15] Other national organisations, such as the National Science Foundation (NSF), the National Science and Technology Council, and the National Telecommunications and Information Administration, also examined the issue.[16] The Canadian Government established the Information Highway Advisory Council Secretariat (IHACS), which in turn has commissioned a Working Group on Access and Social Impacts.[17]

Other initiatives include the Japanese Ministry of Posts and Telecommunications (MPT) report *For Achieving Globalisation of an Intellectually Creative Society*.[18] The MPT has set a target of linking every home and business in Japan with optical fibre by 2010. Singapore's IT2000 initiative, undertaken by the National Computer Board, has a similar target and time frame. The Telecommunications Authority of Singapore (TAS) has played an active role in formulating and supporting the National Information Technology plan and the IT2000 plan, which aim to make Singapore an intelligent island through extensive computer-based information links.[19] This has largely taken the form of early support for investment in ITT-related infrastructure, such as an all-digital network, optical fibre links and broadband technology. In addition, TAS has encouraged Singapore Telecom to introduce value-added services such as interactive videotext and video-on-demand.

Increased competition, industry restructuring and technological advance threaten to alter the feasibility of the traditional 'plain old telephone service' (POTS) interpretation

Table 3. Telecommunications prices and affordability

Country	Local call cost: 3 minute call (USD) 1995	Local call cost: Subscription as a % of GDP per capita 1995	Analog cellular call cost: 3 minute call (USD) 1995	Analog cellular call cost: % of GDP per capita 1995[a]	International call cost: 3 minute call (USD) 1995[b]	International call cost: % of GDP per capita 1995[c]
PRC	na	na	na	na	na	na
Indonesia	0.05	12.4	na	na	6.07	6.598
Philippines	na	11.7	0.91	0.940	6.22	6.426
PNG	0.13	na	na	na	na	na
Malaysia	0.05	2.50	0.34	0.094	5.99	1.654
Chile	0.09	5.60	na	na	2.79	0.751
Mexico	0.08	3.50	0.82	0.201	3.01	0.736
South Korea	0.04	0.50	na	na	4.88	0.578
Chinese Taipei	0.04	0.50	0.74	0.064	3.74	0.325
New Zealand	na	1.70	1.42	0.101	4.78	0.339
Brunei	na	0.90	na	na	5.29	0.361
Australia	0.19	0.60	1.48	0.081	3.00	0.166
Canada	na	0.50	0.66	0.035	1.16	0.062
Chinese Hong Kong	na	0.40	1.95	0.085	2.65	0.115
Singapore	0.01	0.30	0.42	0.018	4.02	0.169
US	0.09	0.50	1.95	0.073	na	na
Japan	0.10	0.50	2.76	0.074	5.10	0.136

Note: [a] Figures have been multiplied by 10^3.
[b] Denotes the cost of a 3 minute call to the US.
[c] Figures have been multiplied by 10^3.
na denotes not available.
Source: ITU, 1997, International Telecommunications Union, World Telecommunications Development Report, ITU, Geneva 1997.

of USOs.[20] The US 1996 Telecommunications Act identifies criteria for service inclusion within USOs. Services are supported nationally when they: are essential to education, public health or public safety; have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers; are being deployed in public telecommunications carriers; and are consistent with public interest, convenience and necessity. NIIAC propose a national goal should be set to enable all individuals to have access to the National Information Infrastructure (NII) by 2005. This goal includes the definition of basic levels of access and service capability, the deployment of an interactive, multimedia infrastructure, and the availability over the NII of readily accessible information from government.

The Canadian IHACS final report defines universal service in more general terms. The report suggests that universal, affordable and equitable access requires that 'basic access facilities for the delivery of information highway services should be locally available, at reasonable cost, regardless of location'. While the report does not supply a definition of USOs it suggests that demand should determine essential services as candidates for universal service. The report recommends periodic public reviews to determine the inclusion of additional services for universal provision and the best means to accomplish delivery.

The Canadian approach outlines market penetration conditions by which conforming services can be designated as USOs. For instance, the IHACS interpretation suggests that high-income countries should consider services for inclusion in the USO when they

achieve penetration rates of 50–60%.[21] By contrast, Singapore defines basic universality according to the type of service offered. The services include electronic commerce enabling transactions through the network, electronic mail, and a directory service providing a central source of information on other users and services. The immediate provision of advanced networked services to all households and businesses may be feasible in countries like Singapore, given its comparatively small land mass, dense population and relatively high levels of income. Tan *et al.* identify ITT infrastructure, in particular facilities for accessing the Internet, as one of the most significant factors in the early stage of Internet diffusion in Singapore.[22] They argue that one of the most important tasks for policy makers is to ensure access facilities are affordable and available to the general public and companies.

The substantial capital investment required for network roll-out per kilometre suggests that the universality of advanced services is not as viable for more sparsely populated countries. For instance, in the Sixth Malaysian Plan 1991–95 government telecommunications sector planning aims to digitise both domestic and international networks, to increase telephone subscription, to utilise all modern technologies, and to initiate a satellite programme. In the Vision 2020 initiative, teledensity is forecast to reach 50 main telephone lines per 100 residents. Whilst Malaysian exchange lines rose by 9.1% to 3.4 million main lines in June 1993, the capital expenditure required to achieve the 2020 objectives is approximately 16.4 billion ringitts per annum.[23] The task of raising such funds is a difficult challenge given restricted access to foreign capital brought about by the Asian economic crisis. However, even if the crisis were to pass quickly, the capital base required to fund the 2020 objectives is enormous when placed in context by International Telecommunications Union data which show that the partial privatisation of Telecom Malaysia in 1991 and 1993 raised 3.35 billion ringitts.[24] Nevertheless, Vision 2020 and accompanying legislation describe a broadly based programme for an information society. A comprehensive set of issues are addressed including: poverty alleviation and social restructuring; productivity-driven growth; enhanced competitiveness; deregulation; private sector collaboration; an effective education system; accelerated deployment of information infrastructure; and early adoption of multimedia technology.

The Indonesian telecommunications sector has also experienced an unprecedented transformation.[25] Until 1993 the incumbent carriers provided basic telecommunications services, PT Telekom (local and long distance) and PT Indosat (international). A duopoly in international services was established in 1994 following the entry of Satelindo. During this initial phase of telecommunications liberalisation, the government has maintained its goal of increasing the accessibility, affordability, and quality of telecommunications services. Ministerial Decree 108/1994 imposed a USO on all providers of telecommunications services for the construction, development and operation of telecommunications facilities. The long-term objective of the USO is to ensure that every household wanting telephone service could be connected to the public network at affordable prices. Achieving this objective in the short term with traditional technology is difficult given the dispersion of Indonesia's population over many islands, and the current low level of network penetration. The introduction of mobile and satellite technology has the potential to provide instant and universally available service.

Another theme of recent debate focuses on interim measures to promote public access to new information services at strategically located sites. Both US and Canadian policy documents recognise that establishing public access points is an interim means of ensuring service access. NIIAC indicates that the short-term national goal should be to deploy NII access and service capability to all community-based institutions that serve

the public, such as schools and libraries, by 2000. This effort would involve technologies available today and access to publicly available networks. The strategy recognises both the prohibitive cost of network infrastructure and user interface equipment. The NSF notes that presently there is no compelling argument for a government programme to accomplish universal network access to all individuals. Costs are prohibitive, and the absence of a universal culture of use means that benefits are swamped by costs. Rather, what is required is an assurance that those individuals who desire access can obtain it in a cost-effective and straightforward manner. Anderson and Schement similarly argue 'that due to the variety of services available (at present, and in the future), the current definition of universal service, the availability of access to a telephone for all community members, has outlived its usefulness'.[26] As it is impossible to formulate a definition that is acceptable to everybody, it is in the public interest to prompt individuals to make communications choices that best suit their needs. This means educating the public on the available technology and promoting its use.

The debate concerning an appropriate definition of USO continues in Australian public policy. Traditionally, regional access to ITT in Australia is promoted through USOs and provision of POTS. The Australian Telecommunications Act 1991, S288(1)(a) indicates that the objective of USOs is to ensure that standard telephone service is reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry out business. A lack of clarity concerning the definition of POTS led the Australian Telecommunications Authority (AUSTEL) to interpret the legislative definition in terms of service aspects of voice-grade telephone calls.[27] The POTS interpretation concerns the geographic availability of service, rather than its affordability or associated equipment needs.

Both the Broadband Services Expert Group and the Commonwealth Department of Communications and the Arts express concern as to the relevance of POTS in an information-orientated society.[28] They argue USOs should include data transmitted communication services such as electronic mail, Internet and video conferencing. More recently, the then Minister for the Commonwealth Department of Transport and Regional Development, the Honorable John Sharp, MP, announced a government review of telecommunications USOs.[29] The review includes redefining standard telephone service to reflect new technology and changing community needs, whilst identifying options to ensure rural and remote area have access to telecommunications services that enable high-speed data transmission.

Public access sites such as telecentres lessen the information disadvantage of regional communities. Telecentres are community owned and operated facilities that house modern ITT. The facilities provide regional communities with access to on-line forums, education services, weather forecast information, market research, market intelligence (such as price and foreign exchange rate information) and niche marketing opportunities. Telecentres generate business enterprise and employment, provide access to information, and facilitate the transfer of knowledge. A profile of Western Australian telecentre use and evaluation of their effectiveness in delivering a range of USOs to regional communities is provided by Madden *et al.*[30]

IHACS's final report also proposes that Canadians who do not have a computer at home must rely on public access points in order to access a variety of services. Dedicated access points to the information highway should be as common as public telephones, postal outlets and automated banking machines. In Singapore, universal service is ensured through a combination of government and market-orientated policies. For example, government funding has supported the creation of Technet (the first Internet gateway) and Internet access sites in public libraries and community centres, whilst

competition between Internet service providers has lowered prices and increased affordability.[31]

Geographically smaller industrialised countries, such as Japan, also recognise the need to develop an interim access strategy. In Japan, the MPT requested the Telecommunications Council to develop an interim plan, in addition to the 2010 objective, that outlines targets for promoting advances in communications and information services by 2000, and specific means to attain these targets. Whilst most ITT plans are initiated by national governments (and agencies), state, local and community group policies also attempt to enhance the service provided to rural and remote communities. The Rural Datafication Project focuses on improving the ability of state networks to deliver services to rural communities.[32] Similarly, the National Public Telecomputing Network's Rural Information Program provides access to local community information and access to the Internet.

Indonesia's N-21 National Information Policy (NIP), takes into account the transition to the information age. The N-21 NIP emphasises the existence of hard and soft information infrastructure. The former is a network of narrowband and broadband networks; the latter includes a suitable legal and regulatory framework, a trade regime, privacy protection and content service provision. Important USO objectives of the NIP are the extension of access to the NII to all 4,000 districts throughout Indonesia, and the provision of public access sites at all high schools and universities in municipalities, regencies and districts.

A final theme is the need for education and training programmes to promote information access and use.[33] Canada's IHACS report refers to 'the need for all Canadians to be able to acquire a basic understanding and command of information technology to enable them to use and benefit from the Information Highway'. The central role of public education and training in the optimal provision of new information technology is recognised by Noll. He suggests that the social value of new information technology is maximised if the greatest number of people can use it, and the act of maximising the number of informed users also serves to minimise the extent to which redistribution of wealth will motivate the adoption of the technology. Thus, better education in how to use information is an essential component of rational public policy toward the information sector. In their study of Internet use in Singapore, Tan *et al.* argue that the provision of access facilities is not sufficient. Efforts should also be directed towards emphasising how the technology can fulfil user needs. Specifically, education and awareness campaigns should aim at creating awareness about the presence of a large variety of on-line information and services to pull individuals and organisation into adopting the Internet.

USO Funding Mechanisms

Recent liberalisation in Asia–Pacific telecommunications markets has refocused attention on the methods used to manage and fund USOs in a competitive environment. Table 4 provides a description of USO funding mechanisms currently adopted by APEC member countries, along with mechanisms that may be appropriate for future delivery.

Cross-subsidies managed and funded by the incumbent carrier are the traditional method of funding and managing USOs under monopoly service provision. In a competitive environment, several Asia-Pacific nations continue with this system—Australia, Japan, Malaysia, New Zealand and Singapore. The system relies on the cross-subsidisation of local exchange services with revenue from long-distance and international services. However, increasing competitive pressures in long-distance

Table 4. Asia–Pacific USO funding mechanisms

Funding mechanism	Country	Description
Cross-subsidies by incumbent carrier	Australia, Indonesia, New Zealand, Japan, Malaysia, Singapore	The incumbent carrier is assigned as the universal service provider (USP). Losses incurred in providing below-cost local-exchange access and usage service are subsidised with revenue from long-distance and international services.
Universal service fund	Australia, Canada, Chinese Taipei, US	All telephone operators contribute to a central fund which is then disbursed to the USP to cover their net costs of universal service.
Competitive tendering	Philippines	Regional tendering mechanisms linked to network roll-out targets.
National government funding	Chile, Mexico	National governments establish a fund from consolidated revenue. Service is provided to individuals and service areas on the basis of cost–benefit analysis.
Interconnect payments	Indonesia, Korea	The USP adds a small fee to their interconnect charges to cover the respective net costs of universal service.
Voucher system	Not currently in operation	Qualifying individuals would be given a credit with a fixed dollar value which could be used to purchase telecommunications services. Carriers would then compete for voucher holders just as they would compete for other customers.[a]
General taxation	Not currently in operation	National and/or state governments use consolidated revenue to pay each USP the net cost of providing universal service.
International settlement revenue	Chinese Hong Kong	International settlement revenue is used to fund domestic universal service.

Note: [a] J. Panzar and S. Wildman, 'Network competition and the provision of universal service', *Industrial and Corporate Change*, 4, 1995, pp. 711–20.

and international markets suggest the system is not sustainable. While this system appears to work well in New Zealand, the advanced level of network penetration suggests that the obligation is less onerous than it is in less developed economies with larger populations. Malaysia is currently investigating alternative USO funding mechanisms.

A central USO fund requires arrangements to determine carrier contributions. The fund allocates carrier responsibility for universal provision to specific areas. Currently in Australia, Telstra is the only national USP although legislation provides for separate service areas and separate USPs. Telstra must submit a plan indicating how it intends to fulfil USOs for particular service areas. Other carriers would be expected to contribute to a universal service fund in proportion to eligible revenue (ER). ER includes revenue

from connections, line rentals, call transmission, leased lines and interconnect services. The fund contribution is calculated from the cost avoided in not serving particular areas, less the revenue foregone in not serving these areas.[34] Central funds meet the requirements of transparency, fairness and proportionality and allow flexibility in meeting future developments.[35] A concern is the USP may tend to inflate costs and deflate revenues to gain a larger subsidy. However, regulators can reduce costs when they appear in excess of acceptable benchmarks.

A competitive tendering system has been implemented in the Philippines to promote universal access. The National Telecommunications Commission (NTC) instituted the Service Area Scheme, which divided the Philippine archipelago into 11 equally viable local-exchange carrier areas, each with a mix of urban and rural areas. These areas are assigned to international gateway and cellular service providers by way of tender. Successful tenders must meet roll-out targets in both urban and rural areas. For example, rule EO109 required international and cellular licensees to install between 300,000 and 400,000 telephone mainlines within five years.[36] The NTC has also adopted a system to monitor the actual compliance rate of licensees by computing the number of lines installed as a percentage of each company's obligations under EO109. Concerns that carriers concentrate their installations in profitable urban centres, at the expense of rural communities, prompted the NTC to warn non-complying carriers that their service areas will be allocated to rivals who roll out main lines faster. In the first quarter of 1997, the NTC reported that only ICC/BayanTel has fully complied with its EO109 commitment to install in excess of 300,000 lines. To create additional roll-out incentive the NTC is attaching the right to bid for licences for the upcoming personal mobile telephone system (PMTS) conditional upon exceeding the SAS roll-out requirements by 100,000 telephone lines.[37]

In terms of network coverage, the Philippines' competitive tendering process has been successful. The Philippines Department of Transportation and Communications 1996 report indicates that the NTC's telephone programme resulted in the installation of approximately 1.5 million lines, with 80% fully functional.[38] Between 1993 and 1996 Philippines teledensity increased from 1.21 to 4.66 and is forecast to rise to 9.30 in 1998. By this time, four million lines were required to be installed by carriers under the NTC service area scheme.[39]

USO funding can be provided by governments directly from consolidated revenue. In 1994 the Chilean Government established the Telecommunications Development Fund, financed by the national budget and managed by a council chaired by the Minister of Telecommunications. The fund's objective is to increase access to public telephones in rural and low income urban areas. Localities without service are grouped and cost–benefit analyses undertaken by the telecommunication regulator (Subtel) to estimate the net benefit from potential regional commercial opportunity. When commercial benefit is evident, local operators are given targets for network expansion with no subsidy provided. Where commercial viability is dependent upon the provision of a subsidy, the areas are opened for bidding on a competitive basis. Ten-year non-exclusive operating licences are awarded to the bidder seeking the least subsidy. A ceiling set at the subsidy level is determined by cost–benefit analysis. The choice of technology, interconnection arrangements and location of public telephones is left to licensees. Licensees also have discretion over tariff setting to a maximum equivalent to two cents per minute above the call rate in urban locations. In practice, the approach has a number of drawbacks, such as a reluctance of governments to include new spending in budgetary policy and increased potential for arbitrary political decisions.

USO funding from interconnect payments requires USPs to add a small amount on to their interconnect prices to cover their respective costs of universal service. In

Indonesia, mobile communications and international service providers contribute to USO costs.[40] This contribution is built into the charge for interconnecting the networks to other carriers on the PSTN.[41] In Korea, operators that interconnect with the incumbent (Korea Telecom) contribute to USO costs. Here, cost allocation is based on interconnection minutes and the USO fee is included within the interconnection charge. Transparency is ensured by regulations that specify that interconnection charges be based on costs, which include the non-traffic sensitive deficit.[42] A problem of linking USO to interconnect payments is that interconnect charges are distorted and create incentives for new entrants to interconnect with operators who are not USPs, even if the USPs are more efficient.

Ideally, acceptable mechanisms for recovering subsidy dollars should minimally distort the outcomes of a competitive market.[43] Both AUSTEL and Einhorn suggest that present telephone rate structures display several rate imbalances. Access rental charges for single-line customers are below actual cost. Local exchange price-cost mark-ups are less than for long-distance and international services. Usage prices are geographically averaged without regard to distance or traffic density, whilst peak and off-peak rates do not correspond to actual load patterns. Subsidies are most efficient when recovered through a broad-based tax on personal consumption, income, or property which does not distort the price ratio between any pair of goods. However, as noted by Einhorn, 'these general taxes are politically problematic; it is difficult to imagine that taxpayers would willingly pay, or legislators would attempt to enact, higher general taxes in order to subsidise telephone services'.[44]

Finally, the scope of the traditional USO debate is extended here to consider the implicit role international telecommunications play in funding USO delivery. International telephone traffic is experiencing substantial recent and rapid growth. The direct benefits derived from traffic flows include lower transactions costs, increased revenue and enhanced employment opportunities. Indirect benefits flow from the diffusion of information and knowledge across borders. Agreements describing the cost-sharing arrangements between countries that form a bilateral telephone market are arranged through the international accounting rate system.[45] In the immediate post-war period the system encouraged investment in capacity, and facilitated the rapid expansion of the global network and associated traffic flows. In particular, the distribution of revenues financed network growth in nations that might otherwise be restricted from developing telecommunications infrastructures.[46]

Recent technological advance and increased market liberalisation substantially reduced the costs of providing international telephone service. However, accounting rates have remained high relative to costs. Chowdary, Ergas and the International Telecommunications Union estimate substantial mark-ups on the actual incremental cost of terminating international calls.[47] High mark-ups allow rents to accrue to countries receiving more traffic then they originate. The rents assist in the upgrade of domestic networks—and so indirectly improve USO performance.[48] In essence, the accounting rate system has provided a global universal service cross-subsidy. However, the system is inefficient in delivering USOs, as the redistribution follows no explicit principle of equity or need, and no particular incentives are present to direct the funds towards meeting USOs.

Should international settlement arrangements be viewed as a desirable mechanism to assist developing countries to implement USOs then an arrangement that funds collected in this manner should be directed to a universal telecom fund and allocated to telecommunications network infrastructure enhancements. While the proposal is second-best efficient it is clear that the international accounting rate system is becoming less

effective in fairly distributing international telecommunications revenues and, in turn, delivering USOs to the developing countries of the Asia–Pacific.

Conclusions

The Asia–Pacific debate on regional access focuses on: the provision of education and training programmes; the definition of USOs in the context of new information services; and the need for interim mechanisms to promote these information services. While physical and regulatory infrastructure needed to permit the carriage of networked services is recognised, the corresponding development of human capital to enable the efficient use of the network is often ignored, as is broadening of the POTS. While most Asia–Pacific countries have frameworks to consider the scope of USOs, several countries have identified particular technologies, services and time frames for coverage. Many countries have adopted interim mechanisms to promote access to advanced ITT. The following proposed agenda for reform of regional USOs requires: domestic agendas to set benchmarks for POTS; consideration of USO coverage and intermediate measures to ensure Asia–Pacific information access through education programmes; development of funding mechanisms to deliver universal service in the developing nations; and targeting of infrastructure spending in developing countries.

Notes and References

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