4.2 Regulatory Reform & Universal Access and Service

Universal access and service (UAS) is achieved through a combination of sector reform, dedicated financing instruments and additional measures that stimulate market expansion into rural and remote areas. This chapter explores the role of sector reform in achieving UAS. Regulatory reform is integral to UAS policy. It is important to emphasize that regulatory reform is part of UAS policy and not separate. There is a misconception that privatization and liberalization does not promote UAS and benefits only investors, industry players and urban and business customers, thereby creating a need for a UAS policy that will ensure that all are served. It is more accurate to consider regulatory reform as the first step in achieving UAS, and that a UAS policy is an additional measure to complete and supervise what a well-regulated and efficient market begins.

Section 2.1 emphasizes the advisability of implementing regulatory reform before implementing any specific measures such as Universal Access and Services Funds (UASF). The section also describes the main regulatory reform topics such as authorizations/licensing, interconnection, competition and price regulation, that need to be addressed, and their impact on UA. The most important step of sector reform is introducing competition, which coupled with fair and independent regulation, creates a level-playing field between operators. This is especially important if the incumbent operator is not yet privatized. The positive impact of effective competition has been demonstrated in most countries' mobile services.

Section 2.2 discusses how competition affects and improves UAS. Also, operators can and do view UAS provision as a business opportunity. How they address the UAS market is described in **Section 2.3**.

Section 2.4 outlines specific regulatory measures that can be used in addition to general reform and best practice regulation to improve UAS.

Section 2.5. is dedicated to discussing measures and options to create an enabling broadband environment. If put into practice, then the regulatory reform measures discussed, create more sustainable and widespread communications access as well as service growth.

Reference Documents

- **Universal Access & Service (UAS) and Broadband Development**

4.2.1 REFORM FIRST

A thorough liberalization process, whereby the communications sector is effectively regulated and open to fair competition from private investors, is vital to the success of a universal access and service (UAS) programme for the following reasons:

- Without an effective regulator operating within a modern communication law, there are significant challenges for the implementation of a UAS programme;
- Where a government continues to be a market player, usually by owning all or a part of the incumbent operator, it is likely that the government cannot be impartial when making sector policy and UAS policy, as it will have a vested interest in one of the market participants. Also, there is a risk that governments will continue to direct the incumbent operator to serve certain areas for political reasons, regardless of viability; and;
- Only a reformed or renewed institutional framework is conducive to network and service expansion on an equitable basis. Therefore, competition, interconnection, licensing/authorization policies, tax burdens and any economic disincentives must be properly addressed.

Liberalization, through private sector participation and open competition, encourages UAS by setting targets or providing opportunities that motivate operators, such as the following:

- Setting license or contractual obligations for the roll-out of services that are explicit and realistic;
- Exceeding roll-out obligations for reasons of longer-term profit;
- Ensuring the ability to run efficient and politically un-encumbered communications businesses;

- Creating fiscal benefits for introducing investment capital and expertise; and
- Facing less political interference (decisions based on non-commercial issues) than incumbents have traditionally faced.
- Being demand-driven increases the chances of both responding to consumers' needs and closing the market efficiency gap.

Thus, governments should implement regulatory reform measures before creating Universal Access and Service Funds (UASFs) or other specialized subsidy tools. Such regulatory reform efforts should include:

- The development of a modern regulatory framework, including addressing the impact of convergence, and the establishment of an independent and effective regulator. The national regulatory authority (NRA) should have the qualities of an accountable entity with decision-making powers that are isolated from vested interests. Consideration needs to be given to the scope of the regulatory authority's role and responsibility, introduction of a statutory framework that enables effective operation within government hierarchy and ability to set and enforce measures that are publicly acceptable. For a discussion of this, see **Module 1: Regulating the Telecommunications Sector: Overview**, and **Module 6: Legal and Institutional Framework**;
- The effective regulation of competition and the establishment of interconnection and tariff rules is examined in **Module 2: Competition and Price Regulation**;
- The pursuit of technologically neutral licensing, unified licensing or general authorizations is discussed in **Module 3: Authorization of Telecommunications Services**; and
- The management of radio spectrum, maximizing the use of this scarce resource, and allowing for innovative and emerging technologies, including Broadband Wireless Access (BWA) is explored in **Module 5: Radio Spectrum Management**.

Sections 2.1.1 to **2.1.3** tackle some of the main regulatory reform issues. These issues include:

- New licensing approaches that allow operators to have the freedom to choose technologies to be used and services they wish to provide; and
- Competition regulation, especially regarding open access and the importance of interconnection and tariffs.

These sections discuss specific cases that illustrate potential problems with UAS programmes if certain reforms or regulatory requirements are not addressed. **Section 2.1.4** review radio spectrum management and regulation, while **Section 2.1.5** addresses other economic incentives that can be used to improve UAS before any special UASF or other intervention is used: taxes, import duties and other (regulatory) fees. **Section 2.1.6** discusses the importance of the removal of pre-liberalization Universal Service Obligations (USOs), often borne by the fixed incumbent operator. The discussion about regulatory reform concludes with **Section 2.1.7** providing some considerations about the timing of a UAS programme in relation to regulatory reform.

4.2.1.1 TECHNOLOGY NEUTRAL, UNIFIED LICENSING OR GENERAL AUTHORIZATIONS

In regards to universal access and service (UAS), having operators in the marketplace that are restricted to fixed service provision only (usually, the incumbent operator) can be a considerable obstacle for the implementation of a UAS programme. Fixed incumbents are disadvantaged and, often resistant to the introduction of a modern UAS programme. Wireless technologies are more cost-efficient in reaching rural areas than fixed services, including broadband wireless access (BWA). Even if a UAS tender for a subsidy (see **Section 7**) is designed technology neutral, wireless operators have a significant technological advantage. At the beginning of sector reform, with the introduction of new entrants and competition for the incumbent, creating a level playing field meant limiting the power of the incumbent, especially in regard to interconnection and access to the incumbent's long-distance transmission network. However, with the success of wireless and mobile technology, the position of many fixed network operators in developing countries is actually weaker, especially in reaching rural areas. Thus, in regard to a UAS programme, creating a level playing field now often means ensuring that incumbents can compete by introducing technology neutral or unified licences, or general authorizations, especially when they have been incorporated as commercial companies or privatized, and no longer receive favouritism and financing from the government. In a competitive UAS mechanism to allocate funding requires all operators to have a fair chance of participating. For example, in Uganda there were three players (MTN, UTL and Celtel) during the universal access (UA) competitive subsidy tenders and they were all able to participate. MTN had a technology neutral licence, UTL was the former fixed incumbent and was not only privatized, but also had a mobile licence, and Celtel was a mobile operator. They all had the same opportunity to use the most cost-efficient technology that contributed to the industry's acceptance of Uganda's rural communications development policy and UA programme and its success to date. Also, there were three regions for which a subsidy was on offer; operators were allowed to bid for all three regions or pick

and choose any of the three. The winning bidder was the operator who offered the lowest request for subsidy in each of the three UA areas. In Botswana, further liberalization is being implemented in time for the new Universal Access and Service Policy. In response to a government study on further liberalization of the sector [1], key further liberalization steps were taken in 2006. These included major moves to achieve service neutral licensing of the three major operators and to allow further competition in the market. Service-neutral means that the licence does not restrict the services that can be provided under this licence, also smoothing the pace for broadband development. The steps include:

- The two mobile operators are permitted to provide their own long distance transmission systems without the current condition of having to request services first from the fixed incumbent operator BTC;
- Current fixed line and mobile operators are able to apply for service-neutral licenses; this, in effect, means that BTC is allowed to operate a mobile network and to utilize mobile technology as it deems appropriate;
- International voice gateway services is liberalized, ending BTC's monopoly; and
- In December 2009, potential new entrants will be invited to apply for a public telecommunications license, under the service-neutral licensing regime.

These steps ensure that the main operators who are asked to contribute to a UASF will compete on a level playing field for future UAS subsidies and projects, and share the burden and opportunity of UAS more equally. Where UAS policies are being implemented without fixed incumbent operators or other major operators having a chance to participate, opposition and un-co-operative behaviour is to be expected. For example, incumbents have been asked to contribute to a UASF, without being able to bid. Fairness and a level playing field require that a technology neutral or unified licensing regime is implemented before or in parallel with the implementation of a UAS programme.

Practice Notes

- **Botswana: Multi-service Authorization Regime**
- **Saudi Arabia -- General Authorization Framework**
- **The Regulatory Framework for General Authorizations**
- **Uganda's Multi-Service Authorization Regime**

Reference Documents

- **Botswana -- Service Neutral Licensing Framework in the Era of Convergence**

4.2.1.2 OPEN ACCESS AND REGULATING DOMINANT MARKETS

Access to competitively priced national and international long-distance transmission is crucial for the success of a universal access and service (UAS) programme, both for the telephony part as well as the Internet or broadband part. In a more general way, any dominance over transmission or international gateways usually keeps bandwidth and leased line prices higher than in a competitive environment and affects affordability for the end-user. It also limits the investment capacity of the other operators and service providers, which pay high prices for transmission or bandwidth rather then investing in network expansion. More specifically, being able to participate in a particular UAS competitive bid depends, at least partially, on the existing backbone footprint of each operator - especially in very large and geographically challenging countries. If the backbone networks of the main operators are vastly unequal, so too will be their participation in a UAS subsidy bid assuming no regulation is in place allowing open access at fair prices. This is even more so the case with Internet Service Providers (ISPs) and Mobile Virtual Network Operators (MVNOs), which are often not facilities-based and depend on receiving fair access to and pricing of transmission networks. Mozambique launched a universal access (UA) pilot project in 2007, in the northern provinces of Zambezia and Nampula, which was initially unsuccessful. An investigation of the bid unveiled a combination of inhibitive factors; prominent among those was the challenge of the backbone. The fixed incumbent operator has the largest fibre-optic network in the country, however, its backbone prices are considered by most of the industry to be too high, prompting other players to build their own networks or to use satellite transmission. As a consequence, the high long-distance transmission cost to provide UA service in the far-north deterred most potential bidders, especially ISPs that were interested in the separate Internet component. Uncovering such challenges is precisely why a pilot project is recommended. Mozambique has now put itself in a position to move forward on a UAS programme with greater knowledge of inhibitive factors.As discussed in more detail in **section 3**, there are several reasons why open access is important and there are several ways of achieving it. As can be seen from the example above, open access must be addressed before UAS projects are implemented.

related materials

4.2.1.3 INTERCONNECTION AND TARIFFS

Interconnection agreements are a crucial regulatory factor for the commercial viability of rural telecommunications, because rural operations typically have more incoming calls. Interconnection agreements are particularly necessary vis-à-vis the payment for terminating access. For interconnection and tariffs see also the ICT RegulationToolkit **Module 2 - Competition and Price Regulation**, and **Section 2.4.6** in this Module for asymmetric interconnection. A study in 2003 [**1**] that analyzed the success of Peru's Fund for Investment in Telecommunications (FITEL), the country's programme to address rural telecommunications development and universal access (UA), found that almost 60 per cent of the traffic on the FITEL phones was incoming. This is typical for rural networks, where the more affluent urban relatives or friends make calls into rural areas. However, the interconnection rates and procedures for the licensed rural operators were the same ones applicable to the remaining non-rural operators and did not reflect their considerably higher network, operation and maintenance costs, especially since they used VSAT technology. The effective interconnection charge (a combination of a termination charge plus local and long-distance transport) received by rural operators was USD 8.5 cents. As a comparison, in Chile, where the interconnection charge had been established through cost-based studies, the interconnection rate for a rural operator was USD 18.7 cents. This strongly affected the viability of the two Peruvian rural operators. While outgoing traffic accounted for less than half of all traffic, it provided over 80 per cent of revenue. Incoming traffic accounted for more than half of all traffic, but for only 15-20 per cent of revenue. The problem was compounded through very low regulated retail tariffs, equivalent at the time to USD 5 cents for a local call. A local call was defined as a call within a department, an administrative unit of Peru. There are 24 departments within Peru, all of which are geographically quite large, so a local call might in fact be between two destinations over 200 km apart. Financial analysis at the time of rural company, GTH, with three years of operating history, reflected a loss-making enterprise even with subsidies included. Once aware of the issue, the regulator OSIPTEL took action and changed tariff and interconnection regulation for the rural operators.

4.2.1.4 RADIO SPECTRUM REGULATION

Module 5 of the ICT Regulation Toolkit, **Radio Spectrum Management**, describes the fundamental objectives, principles, and processes of spectrum policy and management. There are three basic approaches to the allocation of frequencies, namely administrative, market and commons. The balance between them is now open to change due to the pressures of wireless innovation, as well as the need and also the opportunity for meeting the needs of rural areas and other targets of universal access and service (UAS).

- **Administrative approach** — assignment of frequencies by licensing to specific users for specific purposes, in a prescriptive fashion dictating the details of spectrum use, permissible equipment types, emission powers, etc;
- **Market approach** — recognizing that the conditions dictating the licensed ownership and use of the spectrum can change, even in the course of a licensee's operation. The approach creates markets for spectrum including trading of spectrum and even change of use with market demands; and
- **Commons approach** — covering the unlicensed use of frequencies, usually for short range, within certain technical limits. This includes applications such as Bluetooth, wireless identification and telemetry, and frequencies such as 2.4 GHz and 5.8 GHz used by Wi-Fi and sometimes WiMAX equipment to provide wireless LANs (WLAN) and MANs (Metropolitan Area Networks).

Broadband innovation and the need to enable service providers to meet UAS targets economically are both strong drivers for regulators to consider creative change [**1**]. In the current environment, effective spectrum management for the broadband era should follow the 2005 ITU Global Symposium for Regulators Guidelines, which are the following:

- Facilitate deployment of innovative broadband technologies - including the principle of minimum regulation and allocation of frequencies in such a way that facilitates new entry into the market;
- Promote transparency - including consultation and publishing of market forecasts, plans and registers of industry interest;
- Embrace technology neutrality;
- Adopt flexible use measures - including minimizing barriers to entry and adopting lighter regulatory approaches in rural and less densely populated area;
- Ensure affordability - reasonable spectrum fees that encourage innovation;
- Optimize spectrum availability on a timely basis;

- Manage spectrum efficiently;
- Ensure a level playing field - especially to prevent spectrum hoarding by incumbent operators;
- Harmonize international and regional practices and standards; and
- Adopt a broad approach to promote broadband access - including special measures for UAS.

Several international gatherings have focused on trying to promote Broadband Wireless Access (BWA) globally – and with some success. For instance, the WRC-07 event held by the ITU saw progress on the allocation of certain common frequency bands. Key issues remaining include choosing the bands, dealing with regional variations, and sharing the bands in an era of convergence. In the context of UAS, it is possible that strategies should vary geographically within the country to allow for vastly different conditions from region to region or from urban to rural areas. Choices can be based on such things as spectrum scarcity in various parts of the country and in various portions of the spectrum and population density across the country. Consideration should be given to the various possibilities for both basic mobile telephony and BWA that may exist for:

- Reclaiming or splitting national spectrum allocations for rural areas only, to enable more operators to share spectrum than might be possible in urban areas.Especially in hilly, mountainous or low population regions, some GSM or CDMA mobile allocations are not fully utilized, even though they might be needed in urban zones. Operators often resist change, but regulators can look creatively at the need and resources available for enabling new market entry into the technologies that are proving to be economic, and efficiency of spectrum use. This has been successfully done in Brazil, where the regulator Anatel obligated major cellular players to split their spectrum and a new entrant, Ruralfone, entered the rural market;
- Reducing or eliminating spectrum licensing fees for competitive operators in rural areas or those providing UASF tendered services;This would encourage the entry of small operators and would also mean that UASF competitions become efficient one-stop shops for license, subsidy contracts and the required spectrum under certain conditions. One of the reasons for the success of the initial Chilean UASF competitions, which resulted in very low required subsidies, was that spectrum was offered in the tender package [2];
- Reducing the technical constraints in the commons approach, such as allowing the power radiation limits to rise in rural areas where interference is not a major problem.The Peruvian regulator, OSIPTEL, allows high powered use of the 2.4 GHz band for wide area Wi-Fi in rural areas [3/];
- Allowing frequencies normally limited to access networks (e.g., in the 2.4 and 5.8 GHz bands) to be used also for backhaul;
- Allowing spectrum trading where underused frequency allocations are freed for use by other operators; and
- Encouraging national roaming that helps drive up the overall use of communications and the ease of use between regions.

The Practice Note Ireland's regulation of broadband wireless access provides an example of the principle of barrier reduction and a creative approach to options 3) and 4) to encourage both BWA development and encouragement of small operators meeting potentially high cost challenges in rural areas.Further discussion of spectrum issues specifically related to rural and UAS applications is provided in **Section 2.4.4**.

Practice Notes

- **Ireland's regulation of broadband wireless access**

Reference Documents

- **Broadband Spectrum Management of Trends in Telecommunications Reform 2006: Regulation in the broadband world, ITU, 2006.**
- **CTU Workshop: Administrative and Market Methods for Assignment, 2006**
- **Global Symposium for Regulators**

4.2.1.5 TAXES, IMPORT DUTIES AND OTHER FEES

Countries need to carefully review their ICT-related tax and fees regime before considering a Universal Access and Service Fund (UASF) or any other special government intervention. A UASF collects money, often from the industry itself through a small percentage of gross revenue, and then re-distributes it to operators willing and qualified to provide universal access

and service (UAS) in certain areas for the least amount of subsidy (for more details on UASFs see **Section 3.2**).High taxes, including corporate tax, import tax, and tax on services and handsets, result in fewer people gaining access to telephony services and slower network roll-out. Some countries with higher taxations of mobile services and handsets have low subscriber penetration [1]. In general, lower taxes, especially import duties, do lower the cost of network equipment, resulting in more network build-out. Lower taxes on end-users equipment, including computers, make them more affordable to customers; thus lower service taxes impact demand elasticity and can increase usage.Countries can review and benchmark their tax regimes, especially with those countries that can be categorized as comparable (e.g., in regards to their economy), but have higher network coverage and subscriber penetration. It is also worthwhile to analyze whether a tax reduction could be revenue neutral as the tax base increases (e.g., when more people buy handsets or use services). It might also be possible that lower import duties result in more revenue, or the same amount of revenue, for the government, as there are fewer import duty losses due to black market activities. An illustration of this possibility is that a 30-50 per cent import duty on handsets makes them attractive for the black market to supply because of the opportunity for a good profit margin. A 5-15 per cent import duty reduces that attractiveness. It is a well-known general concept that a black market is likely to occur where there is excessive taxation.A country with high taxes on ICT equipment and services could initially do more for network and access expansion by reducing taxes than by implementing a UASF or any other special UAS measures. Reducing taxes is easier than establishing a UASF and implementing a UAS programme, though it might be politically more controversial. Also, tax reductions can be used selectively to support the UAS objective. In Malawi, the 2007 draft Universal Access Policy foresees, as one of its key measures, to exempt low-cost end user terminals (e.g., mobile handsets and CDMA fixed phone sets) from the import duty, as well as reducing VAT on small denomination pre-paid cards by 50 per cent. In Mozambique, operators can apply to the Investment Promotion Center (CPI) for some fiscal and tax benefits, and operators have received tax exemptions for investments in (rural) network roll-out.Another form of incentive that lowers the barrier to providing services and offsets the initial start-up costs is tax forbearance for a limited time period or tax rebates offered on a sliding scale. There are numerous opportunities through tax benefits to help encourage investment.

Reference Documents

- **GSM Association: tax and the digital divide**
- **Review of sector taxation policies and determining the elasticity of penetration and price of the various telecommunication services in Uganda**
- **Tax Incentives to Attract FDI**

4.2.1.6 THE REMOVAL OF PRE-LIBERALIZATION OBLIGATIONS

A central tenet of the privatization process is that a level playing field must be created for all operators, including recently privatized incumbent operators. The potential burdens and opportunities of a market should be equal amongst all participants.As such, pre-existing universal access and service (UAS) obligations must be dismantled in order for there to be fairness in the market. The incumbent, ex-monopoly operator has often been shouldered with the burden of serving rural areas (even if inadequately) at the behest of political interests. The incumbent should be given the option to retreat from those areas where it does not wish to provide a communications service, including areas where it believes existing service provision is economically unviable.Should an incumbent operator decide to withdraw its UAS service offering from an area, it should make adequate provision for a delayed departure and a handover to any potential buyer. If no buyer is interested in acquiring the network or service area targeted for withdrawal, this may trigger the implementation of a UAS (subsidy) plan. Of note is the importance of technology neutrality when either identifying or licensing a new operator to provide network and service. New technology – whether mobile, an IP network or broadband wireless – tends to reduce costs, can offer more services and therefore has the ability to turn economic loss into gain.An example of how to deal with pre-existing obligations is the approach Botswana was considering in 2007. BTC, the fixed incumbent operator, stated during stakeholder consultations on UAS policy that it had to continue to operate rural networks that previously received initial capital subsidies but are chronically loss-making. Fundamental issues with regard to this situation may include the following:

- Many of BTC's fixed rural networks may not represent the ideal or least cost solutions for rural service provision; and,
- In the newly liberalized UAS regime, BTC should not necessarily be required to continue offering end-user services in areas where they are uneconomic and have been replaced by mobile options.

In order to address this situation, the following approach could be taken: BTC is required to declare in detail which of the rural communities they consider unviable and for which they would like to cease operation. Once these details are known, one of the following three options is recommended:

- BTC be permitted to cease providing services in areas where the services are redundant because of existing mobile service provision;
- BTC sell all or part of its non-economic facilities to another interested operator; or
- Areas now unable to be operated economically by BTC as fixed networks should be bid as new UAS subsidy competitions under the competitive least-subsidy rules.

Related Materials

Module 3, "Authorization of Telecommunication/ICT Services", section 8.3, **"Unified and Multi-Service Licensing"**

4.2.1.7 TIMING OF A UNIVERSAL ACCESS AND SERVICE PROGRAMME

There are several reasons why the timing of a universal access and service (UAS) programme must be carefully considered, as well as linked to the liberalization process. They are:

- If a best practice UAS programme is implemented before major reform measures have been taken, it has a high risk of failure or of being ineffectual. It will be more costly, as the market does not operate efficiently; subsidies will be used for areas that could be commercially served in a better regulated market, leaving less subsidy for areas that truly need it;
- If a UAS programme is implemented too early, before the market has had an opportunity to work efficiently, or while it is still in a period of major expansion, the UAS programme can quickly become outdated; and
- If a UAS programme is implemented before existing pre-liberalization obligations are addressed, it can face major disruptions and pushback from the incumbent.

When is the right time to implement a UAS programme? Regulatory reform can go on for many years and with ongoing developments in the sector like convergence or broadband development, improving and adapting regulatory efficiency is a never-ending endeavour.The following recommendations are made in regards to pre-requisites for implementing effective best practice UAS programmes that rely largely on competitive allocation methods for funding and on working with the industry to achieve UAS. These recommendations should be regarded as minimum regulatory reform requirements:

- The majority of the main operators should be privatized [1]. That does not mean that operators cannot still be government-owned; a possible scenarios is that the government owns less than 50 per cent, i.e. has no controlling interest;
- The regulator, if recently established, needs to have had sufficient time to establish a minimum amount of capacity, trust and credibility within the industry, and a demonstrated ability to make regulations free of vested interests, which are evidence-based and have been developed in consultation with stakeholders;
- The sector and its sub-sectors, such as public telephony, long-distance transmission, mobile, Internet, etc., should have a minimum amount of competition, e.g., at least three competing major service providers and prospects of further opening of the market (plans to issue more licences or authorization or set full liberalization dates); and
- Policymakers and regulators should have a clear view of which areas or population groups are clearly underserved with certain services despite some considerable regulatory reform. Through consultation with the industry, it should be clearly established that these areas and groups would indeed not be served in an acceptable amount of time. This is when special measures are taken and a UAS programme is implemented.

However, even if some of these pre-requisites are not yet achieved, it is still possible to develop a UAS policy. It is even advisable, as the development of a UAS policy can take up to a year, since it requires inter-governmental co-ordination and agreement, public and industry consultations, and an assessment of the sector status quo. Also, subsequent changes to laws and regulation and the development of additional regulatory instruments, take significant amounts of time.

4.2.2 IMPACT AND IMPORTANCE OF COMPETITION ON UNIVERSAL ACCESS

Competition, intrinsically linked to universal access and service (UAS), promotes UAS in the following ways:

- Competition drives expansion (i.e., coverage and availability), as discussed in **Section 2.2.1**;
- Competition lowers prices (i.e., affordability), introduces new pricing models and promotes better quality of services, as presented in **Section 2.2.2**;
- Competition encourages market segmentation and stimulates the introduction of innovative new services (i.e., more choices and new services); and promotes the servicing of the less affluent, through removal of non-price barriers

(see **Section 1.2.2**) and subscriber growth, as outlined in **Section 2.2.3**; and;

- Competition makes universal access and service fund (UASF) tenders for subsidies to provide UAS successful; it often needs more than two major operators in the market for a UASF tender to work;

An openly competitive marketplace is essential for the delivery of communications services to those who had no such service before. For example, fixed telephone penetration in India reached only 2 per cent of the population in the 50 years following independence, 1947-1997. However, industry reforms, including competition and other regulatory measures, launched in 1998 had, by 2008, propelled penetration (including mobile) to almost 20 per cent. The Indian mobile phone market in 2007 had 220 million subscribers and this figure is growing by more than 6 million users per month. [**1**].Research shows that privatization can significantly lead to improved performance regarding increased sales, profits, investment and employment. Across the board, this research also finds that competition drives the greatest improvements in the sector [**2**]. For example, markets operating with a duopoly are less able to realize the benefits of free competition, as there is not enough incentive to capture market share by expanding service, or by lowering prices. Collusion between the two operators on keeping retail prices high is also a potential concern.For more information please also see the ICT Regulation Toolkit, **Module 2: Competition and Price Regulation**.

4.2.2.1 COMPETITION AND COVERAGE

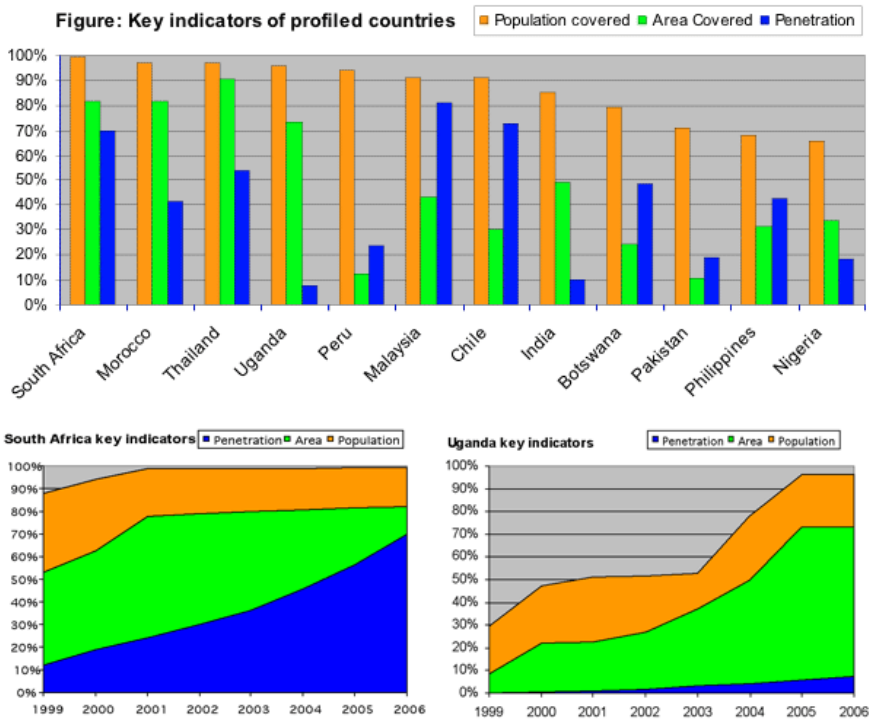
Competition encourages expansion of networks and services as a result of a general increase in the available investment capital necessary for providing services; this expansion is due to an increased number of operators involved. Another benefit of the competitive environment is that currently marginal or uneconomic areas may be offered services based on expectations of demand growth and competitive pressure for operators to position themselves as first in and establish their brand.The expansion of networks is particularly true of mobile or wireless communications as the infrastructure needed is far less expensive to roll-out and has a greater ability to reach more territory (and therefore more consumers).Countries that introduced (mobile) competition early and/or licensed more than two operators achieved high signal coverage and considerable penetration. This has to be seen in conjunction with other important indicators. For example Pakistan and India, both having GDP per capita of around USD 600, and with roughly two-thirds of their population being rural, have done quite well in terms of coverage and penetration is increasing. Same applies to Nigeria. The table below shows countries that were analyzed in more detail, including the number of wireless operators, and key socio-demographic data.

Country	Population	% Urban	Per cap GDP	Per cap PPP	Gini Index	Geog. Area	Population density	No. of GSM operators	% of Pop covered by GSM	% of Area covered by GSM	Q2/2006 GSM teledensity
Botswana	1,720,000	54.0%	$5,014	$10,500	63.0	600,370	2.9	2	79.5%	24.4%	48.7%
Chile	15,956,000	87.0%	$5,898	$11,300	57.1	756,630	21.1	3	94.0%	30.3%	51.2%
India	1,079,721,000	29.0%	$641	$3,300	32.5	3,287,260	328.5	8	60.9%	39.0%	7.5%
Malaysia	24,894,000	64.0%	$4,672	$12,100	49.2	329,740	75.5	3	91.7%	43.5%	81.1%
Morocco	29,824,000	58.0%	$1,637	$4,200	39.5	446,550	66.8	2	97.3%	82.0%	41.4%
Nigeria	128,709,000	47.0%	$516	$1,400	43.7	923,770	139.3	4	71.8%	33.9%	18.4%
Pakistan	152,061,000	34.0%	$632	$2,400	30.6	796,100	191.0	5	36.0%	7.4%	18.8%
Peru	27,562,000	74.0%	$2,483	$5,900	54.6	1,285,220	21.4	2	56.6%	6.3%	11.2%
Philippines	81,617,000	62.0%	$1,041	$5,100	46.1	300,000	272.1	3	68.3%	31.2%	42.5%
South Africa	45,509,000	57.0%	$4,668	$12,000	57.8	1,219,090	37.3	3	100.0%	81.9%	69.6%
Thailand	62,387,000	31.0%	$2,621	$8,300	42.0	514,000	121.4	4	97.1%	90.5%	53.7%
Uganda	27,821,000	12.0%	$264	$1,800	43.0	241,040	115.4	3	96.3%	73.3%	7.5%

◂ **Table: Country comparison of pop. coverage, geographical coverage and penetration (GSM only) [1]**

Source: Universal Access – How mobile can bring communications to all, GSMA 2006 (Data from 2005 and 2006)

The graph below shows the percentage of population covered by wireless signal, the percentage of geographic area covered, as well as the actual wireless subscriber penetration. Almost all of the countries that have achieved high service coverage have three or more mobile operators. Also, in almost every case where transition from slow to rapid growth in population coverage is observable, an increase in the number of operators, to more than two, is at least partly responsible for this growth. Good examples of this are Pakistan and India, both of which experienced rapid growth between 2003-2006 and which currently have five and eight mobile operators respectively.



Source: Universal Access – How mobile can bring communications to all, GSMA 2006

Even the threat of impending liberalization can result in existing operators creating a growth spurt. This was seen in Morocco when large scale coverage growth occurred just prior to and during the roll-out period of the second mobile operator. There is less evidence, though, that a very high number of operators is conducive to reaching out into remote rural areas, as market fragmentation could reduce the incentive for expansion.Uganda and South Africa as examples of competition and coverageAlthough they have widely differing economies, both Uganda and South Africa show the impact of liberalization, competition and policy leadership in the mobile sector, and both have achieved high population and geographic coverage.South Africa's mobile market has had competition since the mid 1990's. Encouraged by an aggressive government policy that required mobile operators to meet roll-out targets and to provide public access telephones at concessionary prices, the operators were reaching over 80 per cent of the population and 50 per cent of land area before 1999.

Figure Sources: Universal Access – How mobile can bring communications to all, GSMA 2006

Uganda's story illustrates the immediate impact of competition. The second national operator received its licence in 1998. Prior to this, the country had an ineffective incumbent fixed line operator and one mobile operator with only limited coverage. Rapid roll-out of the new entrant led to 50 per cent population coverage within less than two years. The granting of a third mobile licence to the privatized incumbent led to a second stage of rapid expansion from 2003 to 2005. Under this second growth stage, the operators together covered 96 per cent of the population in 2006. Subscriber penetration though is still low, largely due to the cost of handsets and high taxes on telecom services.

4.2.2.2 ACHIEVING AFFORDABILITY AND IMPROVED SERVICE

An increased level of competition generally has the effect of lowering prices which can expand the market through price elasticity of demand. Competition also lowers the access barrier for new subscribers through new and innovative pricing options, as well as shared or public access. Therefore, the consumer stands to gain from the price effects of competition. Operators are generally driven to increase their efficiency and reduce costs by a need to be more competitive in the market and increase the subscriber base. A lowering of prices, which is operationally feasible for the operator helps to close the market gap. An integral part of the service quality package is to offer reliable communications services with greater customer support and to a wider service area. This availability and reliability increases the attractiveness of the service offering which leads to greater use and increased economic viability.Competition generally improves the quality of services, though periods of rapid growth may temporarily lead to lower quality of service provisions. However, similar to the rationale behind a lowering of prices, improvements to service quality is driven by each operator's desire to differentiate itself from competitors, and thus to further its brand. Competition also allows customers to switch their service provider if they are unsatisfied with the quality of service. For example, operators in Nigeria, Mozambique and Malawi experienced a considerable amount of churn from customers when their networks were either too congested or had technical problems due to an upgrade, especially when the problem persisted for some time. In numerous countries, because SIM cards are cheap (often approximately USD 2.00), customers can easily switch to another provider if their

existing service is poor quality. Regulation that mandates number portability, a customer's ability to retain their phone number when switching service provider, facilitates both affordability and improved service as it is even easier for customers to switch if another service provider offers better rates or quality of service.

4.2.2.3 MARKET SEGMENTATION AND SERVICING THE POOREST

Competition causes greater segmentation of a communications market. This results in a stronger differentiation of customer groups and a variety of services that are more tailored for each segment. In the developed world, there are services designed specifically for teenagers and students who typically text message extensively, swap photos, frequently talk to specific groups of friends (and receive discounts for calls to those numbers), and call more on weekends. For example, the company Blyk in the UK offers a free number of calls and text messages to 16-24 year olds, which is paid for by advertising. In contrast, developing countries, especially for the third or fourth entrant mobile operator, the service focus often shifts to the rural or lower income segment of a country, leading to products and services suited for minimal spending and aimed at economies of scale.Competition therefore also strikes at the core of the universal access and service (UAS) mandate, which is to reach the population that is currently unconnected and has no electronic communication medium at their disposal. As operators compete for more business, with it higher revenues, they look to consolidate the greatest share of subscribers (or users). While this race to subscribe tends to take place first in urban areas, due to higher income and easier network roll-out, the trend is to continue seeking new consumers where there is still profit to be made and then, where there is a future potential for profit.Consequently, operators that are late entrants into the market may focus efforts on areas or segments of the population who are not yet subscribers to, or regular users of, an existing service provision. New operators, unencumbered by other sunk costs, previous obligations, or outmoded delivery concepts, may have very effective expansion into previously underserved areas, with or without a formal UAS subsidy. For example, Atelit (Life) of Ukraine is three years old and covers 90% of the population, and Mobitel of Sri Lanka who installed 300 base stations within only 18 months of existence.In addition, competition is increasing the variety of services on offer. In order to attract or to hold consumers through service or product differentiation, an operator will tend to offer more products, using various technologies or innovative pricing packages. The desire to provide innovative services and products includes a commitment to using smarter technology that offers greater coverage, brings more applications, provides better quality, uses less power, and requires fewer resources to operate.An example of an innovative technological solution for coverage is the increasing use of WiMAX, a communications technology that provides wireless data over long distances. The OECD notes that "the introduction of competition to markets has a profound effect on penetration rates, even when the competition comes via a different technology. Evolving wireless technologies such as WiMAX may dramatically increase the reach of backbone networks in developing economies, but other wireless technologies have already been implemented and have made a difference in competitive markets around the world" [1]. An example of innovation in services and applications is the trend towards new value-added services such as voice SMS (e.g., Bubbletalk), daily prayers (e.g., The Ilkone), forms of entertainment such as horoscopes and sports scores, and updated commodity prices via SMS, instant messaging over mobile, mobile e-banking (as seen in countries like the Philippines, South Africa and Kenya), VoIP over mobile, m-learning (mobile learning), gaming, and mobile TV.

4.2.3 THE UA MARKET AND HOW OPERATORS ARE ADDRESSING IT

In the past, many countries were concerned that competition and private-sector market participation would leave their urban poor and their rural areas un-served, or at least under-served. The underlying perception was that the urban poor and rural areas could not be profitably served and would therefore be neglected by private operators. Increasingly, policy-makers and industry experts are altering their views of un-served and under-served areas, regarding them less as intractable problems and more as potential markets for investment. Clearly, this has been prompted by the success of mobile operators and their expansion into un-served and under-served markets. Also, there are models demonstrating how to serve the poor profitably; these are discussed in "The Fortune at the Bottom of the Pyramid" by C.K. Prahalad, a professor of corporate strategy and business consultant, who addresses a complex emerging market, the world's poor and the innovative business models that promise to end world poverty.**Section 2.3.1** examines the universal access and service (UAS) market in detail by looking at sources of revenue of operators in rural and poor markets, and demonstrating that potential revenue is not limited to the expendable income of the rural poor. **Section 2.3.2** provides a practical demonstration that low Average Revenue Per User (ARPU) does not imply a lower profitability for operators.

4.2.3.1 SOURCES OF OPERATOR REVENUES IN RURAL AREAS

Decreased per-subscriber revenue with increasing reach is a general assumption (see figure below); to effectively reach low-income areas and increase penetration to poor users, a lowering of certain user prices – specifically the lowest possible tariff to secure and maintain access, as well as the minimum pre-paid card top-up denomination – is often necessary. However, the operating model need not necessarily be so limiting from the operator's perspective. Operators' revenues when serving rural areas are not limited to the apparent outgoing marginal revenue generated by the rural users

themselves.

◂ **Figure: Decreasing per-subscriber revenue with increasing reach**

Source: ITU-infoDev ICT Regulation Toolkit – UA Module

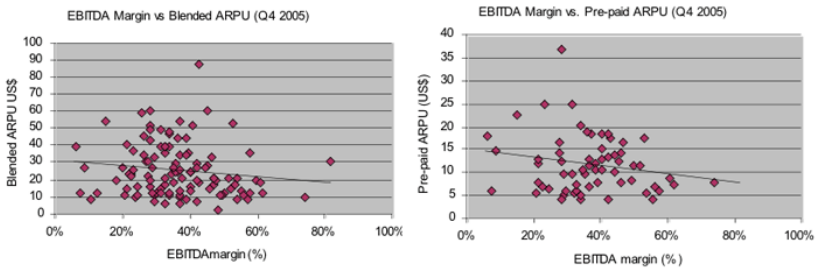
Many demand studies have observed that the vast majority of rural citizens have relatives, friends and business correspondents in urban areas [1]; the urban relatives earn more and are usually willing (or expected) to assume the larger share of the cost of communication. This is often achieved by "beeping" a technique employed by users trying to avoid the costs of calls. To "beep", a user makes a call, lets it ring briefly, and then hangs up before the call is answered, incurring no charges. Beeping practice is reported to be so widespread in Africa that operators have had to develop explicit "call me" services for a minimal fee to avoid the short call and hang-ups that are swamping networks [2].Another consideration is that not all rural people are at the bottom of the income distribution curve; even in un-served areas, there is a diversity of household incomes which include at least some lower-middle income deciles.Thus, there are at least five sources of marginal revenue from rural expansion. These are the following:

- The rural inhabitants who will spend a certain percentage (typically in the range of 3-5 per cent) of their household incomes on telecommunication services;
- Rural institutions – government, schools, clinics and their staff – these are additional to the expenditures of rural inhabitants and are essentially government expenditures; then there are also national or international NGOs;
- Urban inhabitants travelling into rural areas for business or personal reasons;
- Calls originated by urban relatives and correspondents, either in response to "call-me" SMS messages, "beeping" or other means of reverse charging used by low income people; and
- Calls originating in the rural areas after the receipt of electronic air-time top-ups for pre-paid phones transmitted from urban to rural relatives, where operators offer such services.

4.2.3.2 LOW ARPUS ARE NOT AN INSURMOUNTABLE BARRIER FOR OPERATORS

Companies operating in a low Average Revenue Per User (ARPU) environment are often as profitable as companies in high ARPU situations. For example, Philippine operators have some of the lowest ARPUs and highest reported Earnings Before Interest, Tax, Depreciation and Amortizations (EBITDAs) in the world, and Indian operators' EBITDAs have increased significantly over the last two years, while ARPUs have reduced. An analysis of 61 operators confirms this as shown below.

Figure: EBITDA margin compared with ARPU



◂ **Figure: EBITDA margin compared with ARPU**

Source: Universal Access – How mobile can bring communications to all, GSMA 2006

Philippine operators have creatively marketed their services with products such as micro-refills (less than USD 1.00), m-banking and related services that are well-suited to securing market share and customer loyalty with low income and rural customers. The Philippine operators, as well as operators in India and many other countries, also have very low tariffs for low-usage customers, allowing their customers to stay connected for less than USD 2.00 per month. The operators have also reduced their own distribution and other internal costs through measures such as "e-Load" (electronic prepaid top-up). A recent benchmarking study of Indian mobile operators has also shown increasing EBITDA levels due to economies of scale and cost-cutting measures over the last three years, as ARPU levels have decreased [1].

4.2.4 REGULATORY MEASURES TO IMPROVE UAS

Section 2.1.1 discusses which specific liberalization and reform measures are recommended before a universal access and service (UAS) programme is implemented and what challenges occur if these regulatory measures are not taken.

Section 1.3.3 demonstrates that a good, enabling regulatory environment leads to an efficient market, which in turn leads to improved UAS, and Section 2.2 covers in detail how competition promotes UAS. In a broad sense, all key regulatory measures discussed in this ICT Toolkit ultimately improve UAS.Every improvement in the regulatory environment will contribute to reduction in the total cost of ownership of a communications network and to improving service provision or lowering consumer prices. The end result is more viable network expansion. Thus these measures assist the market to expand its frontier and reduce the size of the zone requiring intervention. However, within the broad regulatory topics such as interconnection, licensing, price regulation and spectrum management, there are aspects that demand further attention and options that can accelerate the achievement of UAS.

Section 2.4.1, Section 2.4.2 and Section 2.4.3 present options on promoting UAS when awarding main licences, opportunities for UAS when moving to a new licensing regime, and other licence-related incentives.

Section 2.4.4 discusses options for regulating spectrum use that could help rural areas being better served, especially with broadband, while Section 2.4.5 explains the importance of tariff flexibility for operators, tailoring various tariffs both to customer demand and their corporate requirements to continue network investment.

Section 2.4.6 explores the advantages and disadvantages of geographically asymmetric interconnection rates.

4.2.4.1 DESIGNING LICENCE AWARDS TO PROMOTE UNIVERSAL ACCESS AND SERVICE

Licensing provisions can create a positive investment climate and increase the rate of network development through the application of appropriate, consistently applied regulations and incentives.Operators can, and often do, make major contributions to universal access and service (UAS) under their main licences, either voluntarily, because it makes sense commercially, or through licensing obligations.Although historically, the initial licensing of telecommunications operators has largely been kept separate from the achievement of UAS, there are clear connections between the two exercises of main operator licensing and UAS. The greater the network coverage put in place by main operators, the smaller the need for special UAS initiatives or funding arrangements (discussed in Section 3.2) to complete network coverage at a later date.Licensing new operators to provide telecommunications services on a commercial basis is discussed in depth in Module 3: Authorization of Telecommunications Services of the ICT Regulation Toolkit. Decisions pertaining to the number of licences, the terms of licences, and the awarding of licences are often matters of national policy. They take into account difficult and conflicting factors, such as the following:

- The number of operators the market is thought to sustain in the medium term;
- Constraints imposed by undertakings to existing licensees; previously promised terms of exclusivity must be respected unless they can be negotiated down or away;
- Political pressures, often exerted especially to support vested interests; and
- The amount of money a licence auction could raise for the government.

Licensing decisions, and the level of interest from potential operators in a licence opportunity, usually rest on assessments of, or assumptions about, the commercial viability and profitability of the opportunity to be licensed. So long as network coverage is clearly beneficial, commercially, to main operators, it is likely to be provided without specific licence obligations. Considering the concept of market gaps (introduced in Section 1.3.3), if the regulatory environment is conducive to growth and expansion, main operators close the market efficiency gap without any special incentive or subsidy. However, licensing authorities often specify in invitations to tender, and impose in licence conditions, roll-out timetables for providing coverage in commercially viable areas in order to ensure that it happens as fast as desired.

Reaching beyond the commercially attractive market

To extend main network coverage to the limits of viability or beyond, various approaches may be used, including the following:

- Ambitious roll-out requirements, including some marginally viable areas, may be stated in the initial invitation to tender. So long as the licensing competition allows for extra costs to be reflected in lower bid offers, this approach should still lead to good competition. In practice, commercial roll-out has more often exceeded initial estimates;
- Roll-out requirements may be specified in ways that encourage desired results. For example, instead of saying “200,000 lines or customers must be operational by 2010” (which could be anywhere in the country), the

requirement might read, “By 2010, commercial service must be operational in each of the following 50 named districts”. This focuses on a presence in chosen areas; and

- Instead of specifying the required coverage and asking bidders to compete on the fee they will pay for a licence (a common practice), the licence fee can be fixed at a moderate level and bidders asked to compete on the amount of coverage that they will commit to provide. This was done in Botswana’s initial cellular licensing in 1997 with results that were generally agreed to be successful. More information on the approach adopted is given in the Practice Note Mobile telecommunications licensing in Botswana 1997.

Module 3 of the ICT Regulation Toolkit discusses the merits of different selection methods for licensees, including objective methods (auctions) and subjective methods (beauty contests).Auction design is a complex matter, particularly when the competition has multiple goals, e.g., both raising significant revenues and increasing network coverage. There are no simple prescriptions for designing initial licence competitions that will achieve the best results, however, there is evidence that roll-out targets attached to mobile operator licences, provided they are explicitly stated in the licence competition, are often effective tools of achieving high population coverage. Examples of this can be seen in Morocco, which has coverage that currently reaches 96 per cent of population, and in South Africa, with has 99 per cent population coverage. The Ugandan case demonstrates the efficacy of this strategy, as operators were faced with a serve it or lose exclusivity clause in their licence and chose to serve most of the country [**1**].The Reference Document Workshop on Licensing of Third-Generation Mobile also considers how different goals, including affordability and UAS, may be balanced. The Practice Note Socio-economic benefits of lower authorization fees in **Module 3** of the ICT Regulation Toolkit, says:By setting licence fees at a reasonable level during the first years of market development, regulators can advance several policy objectives, including:

- The promotion of economic or social goals, such as universal access (UA) - often by requiring a certain extent of network coverage - or service affordability (by regulating retail pricing); and
- The spurring of competition by lowering barriers to market entry, exerting downward pressure on prices and stimulating innovation.

Practice Notes

- **Mobile Telecommunications Licensing in Botswana 1997**
- **Socio-Economic Benefits of Lower Authorization Fees**

Reference Documents

- **Nepal- Request for Applications for a Licence to Provide Rural Telecommunications Service (RTS) in the Eastern Development Region**
- **OBA Working Paper Series**
- **WORKSHOP ON LICENSING OF THIRD-GENERATION MOBILE**

4.2.4.2 REVISING THE LICENSING REGIME OR ISSUING NEW LICENCES

With the need to respond to convergence, and moving towards simpler class or general authorizations by issuing technology neutral or even unified licences, regulators have a major opportunity to incorporate universal access and service (UAS) objectives. Any requirements added later are generally accepted in the context of an overall review of the regime or licensing process.It is key that the new licenses balance costs and benefits. In the interests of technology neutrality or simplified authorization regimes, some countries, like Malaysia and Nigeria, have already implemented converged or unified access licences. Tanzania and Kenya are also moving in that direction. Where this happens, a transition mechanism is needed for existing licensees. There is an opportunity here to extend UAS requirements, in return for the greater flexibility offered by the new regime. The new regime can also be a step towards removing old restrictions on UAS licensees.

South Africa has a couple of examples of adding UAS obligations to new licences. ICASA, the industry regulator, granted Neotel, a new entrant operator, licences for providing Public Switched Telecommunications Services (PSTS) and Value Added Network Services (VANS). Neotel is entitled to apply for such radio frequency spectrum as may be required for the provision of its services, and has obtained the spectrum from ICASA necessary for it to provide the various services in its service portfolio, including a 3G licence. As part of its Community Service Obligations (CSO), Neotel has to provide high speed Internet connectivity to 5,000 public schools, Further Education Training Institutions (FETs) and rural medical clinics in South Africa.South Africa’s two mobile operators, Vodacom and MTN respectively, made applications for access to the 3G frequency spectrum bands and these licences have been issued subject to the condition that they each provide

Internet access to 5,000 public schools and 140 institutions for people with disabilities, including 1,400 terminals to those institutions for people with disabilities.

In Brazil, after the telecommunication sector was deregulated in 1997, the regulator Anatel, established licensing provisions that allowed operators to have the opportunity to obtain additional licensing authorizations that included providing mobile and international long distance services once their Universal Service Obligations (USOs) were reached. For example, by 2004, Brazil Telecom had met its USOs and was able to roll out additional mobile and long-distance call services in southern areas where it previously only had licences for providing local services. In addition, Anatel is pursuing now broadband UAS targets, planning to connect all of its 5,600 municipalities with minimum broadband capacity, as well as creating and connecting 8,500 telecentres and 50,000 urban schools. Anatel used their 3G tender to achieve coverage throughout the country, by matching profitable areas with less attractive ones. For example, Anatel paired Sao Paulo with the poor North-East region, and was willing to accept a lower tender amount (i.e., the government made less money from the auction) in exchange for mobile coverage in all regions. While only 1,836 municipalities currently have mobile services, all municipalities will soon have mobile and 3G services as a result of the 3G tenders.A potential approach to combine unified licences and UAS objectives could be to offer the unified licences at different levels of licence fees depending on whether the operator chooses to accept UAS requirements. This would still allow the operator to choose whether to play or pay , however this approach has not been put into practice so far.

4.2.4.3 OTHER LICENCE INCENTIVES TO PROMOTE UNIVERSAL ACCESS AND SERVICE

Licences as first issued, may not provide optimal support for universal access and service (UAS). This may happen when initial conditions or other factors affecting licensing decisions become inappropriate with the passage of time or because technology advances and cost savings result in changed situations. Either way, the question arises of what is the best scenario for main licensees to work towards universal access UA within their existing licences.Incentives & opportunities through trade-offsIncentives for further network expansion can be provided in the form of reduced contributions to the Universal Access and Service Fund (UASF) or through licence revisions that promote expansion. For example, in its Unified Licensing proposals, the Telecommunications Regulatory Authority of India (TRAI), recommends that a licensee which covers 75 per cent of development blocks in any service area (excluding the four Metro service areas), should be eligible for a reduction in the Universal Service Obligation (USO) fee; such a licensee would pay only 3 per cent instead of 5 per cent. In other jurisdictions, financial penalties have simply been imposed for failure to achieve specified roll-out targets, or the targets have been accepted in return for benefits such as extended exclusivity.Some operators or service providers tend to favour UAS commitments based on incentives that either reduce their contribution to a universal service levy or that can be accepted in exchange for commitments by government to reduce taxes and import duties on end-user equipment or network infrastructure, or to reduce valued added taxes on ICT services. Taxation is a significant hindrance to network and service development in many countries, and taxation on ICT services (e.g., air-time) or phones and computers are more likely to impact lower income users, who are on the margins of affordability, hence such arguments from private industry are very relevant to UAS [1].Non-costly activities or those covered by corporate social responsibilitySome activities by operators support UAS at a marginal cost to them and may be undertaken without explicit financial incentives. For example, installing showpiece multimedia rooms in schools, supporting village phone initiatives (see **Section 3.4.1**) in areas that already have network coverage, and making suitable terminals available for hearing impaired users could all be justified in a corporate social responsibility programme, which benefits the reputation rather than the finances of the operator. During Botswana's consultation on UAS policy it was suggested that operators undertake promotional activities (such as options for serving physically challenged customers) in consultation with the regulator as part of their contribution toward achieving universal service in designated urban and high population areas.Regulators can encourage such activities by publicising their own initiatives and their appreciation of operators' initiatives, by requesting an annual corporate social responsibility report from each operator, or by instituting awards schemes.

4.2.4.4 FREER USE OF SPECTRUM IN RURAL AREAS

Section 2.1.4 provides a general introduction to the issue of spectrum licensing for broadband and universal access and service (UAS). This section continues the discussion related to the use of licence free spectrum allocation in particular for rural areas. For spectrum related topics also see the ICT Regulation Toolkit Module 5: Radio Spectrum Management. The popularity of mobile services and the introduction of new wireless technologies over the past few years have dramatically increased the demand for spectrum. As a result, countries are looking at new ways to manage spectrum use more efficiently. As part of this effort, increased amounts of spectrum are being allocated on a common basis, i.e., to license free use in order to exploit the potential of technologies such as Wi-Fi and WiMAX, to propel the rapid expansion of affordable high-speed access in both rural and urban areas [1].

There are a few cases upon which spectrum costs can be reduced or eliminated for rural network expansion, and in particular for investments sponsored under Universal Access and Service Fund (UASF) competitions, as noted in **Section**

2.1.4. However, not all countries have embraced the idea of allocating spectrum to unlicensed use, for reasons such of revenue loss or potential spectrum congestion. However, these perceived downsides need to be compared with the potential of these technologies to provide more economic and accessible broadband access.

Furthermore, in largely rural areas where congestion is less of a challenge than in urban areas, it is primarily the license fee revenues that are at stake. Potential revenue loss from forgoing licensing fees could be offset by substantial savings (and increased market efficiency) in terms of fewer disbursements of UASF subsidies.Alternatives such as levying small fees attached to the cost of purchasing equipment that are used in unlicensed spectrum, such as Wi-Fi routers, could eliminate the need for a licence to operate in a particular frequency band while still providing revenue to the government [2].In 2004, a study was conducted regarding the regulation and use of 2.4 and 5 GHz bands (frequencies used by Wi-Fi and WiMAX technologies) in Africa, exploring opportunities for a licence exempt wireless policy [3]. The study focussed on the opportunities for Internet development throughout the continent, as well as UAS in rural areas. Interestingly, while Wi-Fi and WiMAX are typically used for urban hotspots and urban broadband, the study found that in over a third of countries polled, technologies using the 2.4 and 5 GHz bands were being used for backhaul network connectivity in rural areas.Key findings of the study were that while some countries did not require licences for those frequency bands, there were increased restrictions on power, range and service use (i.e., data only), and requirements for end-user equipment certification that posed barriers for expansion and innovation.

While there is, of course, a need to guard against interference, and to protect quality of service and consumer rights, the study found that those imposed limits and requirements were usually too restrictive and not up to date with technological improvements and actual problems in the sector, and were rather pre-emptively imposed.The general heterogeneity of regulation of the 2.4 and 5 GHz bands across the African continent is also considered to create confusion and uncertainty among ISPs, investors and technology suppliers and to limit potential for economies of scale. Clearly, regional harmonization and removing unnecessary barriers will increase innovation, expansion and UAS progress.The practice note Ireland's regulation of broadband wireless access in **Section 2.1.4** highlights the approach of ComReg to allow both high emission use of unlicensed bands as well as use of the same for backbone, to reduce the cost of backhaul in rural areas.

4.2.4.5 TARIFF FLEXIBILITY

Many policymakers prefer keeping tariffs low, especially in rural areas, as they know affordability is lower in rural than in urban areas. This follows common practice and policy in many industrialized countries but it is not always transferable to developing countries where operator revenues are smaller and the task to build-out the network to the entire country still lies ahead.To the contrary, this often has the opposite effect of what is desired. If operators are not allowed to charge commercial tariffs in the more costly rural areas, they have little chance of recovering their cost and making a profit. In consequence, they tend to avoid serving rural areas. If they are forced to serve rural areas by obligations, they try to minimize their attention, effort and resources as this is a loss-making operation for them. This results in either very poor services or no service at all.The ultimate objective of universal access and service (UAS) policy is affordable services for all, including rural areas. However, in some countries with very high-cost areas it might be beneficial for an interim period, of three to five years depending on the situation, to allow operators to charge slightly above urban tariffs, as a reflection of their costs. This would motivate providers to build out infrastructure in rural areas. Again, the best evidence that this scenario works, are the many mobile operators in Africa that were free to charge higher tariffs; the combination of tariff freedom (or at least greater tariff flexibility) and competition has allowed mobile operators to grow more rapidly and venture into rural areas.Furthermore, the rural customer often develops innovative cost-minimizing ways of using the network to their advantage once it arrives, e.g., through sharing phones, use of SMS and of call-back or beeping their urban contacts who are willing to pay for the calls.Despite regulators' statuary independences, regulators are sometimes under pressure from politicians and special interest groups to regulate or control prices in competitive markets. Prices for service typically begin higher than many people would like, but this enables operators to achieve their early investment targets and develop the market. Almost without exception, where competition is strong, the need to drive penetration to higher levels (i.e., to ever-lower income users) has led to price reductions with tariff package innovation and low-user options that, as noted previously, are beyond even the expectation of regulators and policy makers. Experience has shown that market efficiency is achieved with a light hand in regulation, with the regulator's main task to ensure a competitive environment where players who are dominant do not abuse their power.Calling Party Pays World experience shows that Calling Party Pays (CPP), combined with tariff innovation at the low end of the affordability curve, enables low-income users to be able to afford service and to use the network creatively and to have access to communications. Many developing countries have changed from Receiving Party Pays (RPP)/ Mobile Party Pays (MPP) to CPP and seen penetration rates rise significantly [1].CPP also has benefits for the operator because, with low-end users' propensity to use SMS and incoming calls as their means of access, they are creating calls in the network that would otherwise not be made at all. CPP also encourages more users to use mobiles for business purposes since they are not burdened with any cost levied on incoming business enquiry calls [2]. This probably explains the relatively slow business user take-up of mobile communications in North America (which does not use CPP) as compared to Europe.

4.2.4.6 GEOGRAPHICALLY ASYMMETRIC INTERCONNECTION

Disputes over interconnection, typically between mobile and incumbent operators or between other players and incumbent operators are perhaps the single most significant regulatory hindrances to rapid enjoyment of the benefits of liberalization. Key principles for interconnection are as follows:

- The terms of interconnection to be based on transparent, public domain procedures;
- Rates and practices to be monitored and enforced by an unbiased and independent regulator;
- Rates to be based on forward looking incremental costs for fixed incumbent operators; and
- There is a special need to account for the costs of network expansion into regional and rural areas during a country's development phase or for very high-cost areas.

Rural users receive more calls than they make, thus the incoming traffic to, for example, a rural wireless base station, may be considerably higher than the outgoing. This becomes a significant part of the business case. However actual per-minute costs for the operator are higher due to lower population density and higher capital and operating expenditures. Some form of geographically de-averaged terminating rate regime may be justified as both a measure to meet the costs of rural network segments, and an economically justified, non-subsidy measure to increase the commercial incentive for operators to invest in rural expansion. Whereas there is broad precedent for asymmetric interconnection rates between fixed and mobile worldwide, and between traditional fixed network urban and rural operators in North America, Chile and Peru, the application of this principle in the mobile industry and on a geographically targeted basis remains limited. As is fully discussed in the Reference Document Telecommunications Challenges in Developing Countries: Asymmetric Interconnection Charges for Rural Areas, the reasons for this are twofold:

- As mobile operators typically still receive higher interconnection rates, there is less need for geographically de-averaged interconnection rates for rural areas; and
- The implementation of a geographically asymmetric interconnection regime adds complexity and entails some challenges.

In order to consider and implement an asymmetric interconnection regime, there should be a strong case outweighing the costs of implementing such a regime. For example, this could be challenging terrain or the requirement of high-cost technology. It might be necessary to create incentives to reach the last and most challenging 3-5 per cent of a country's population, possibly using satellite technology, VSAT or GMPCS. This might be the case in countries with extremely low population densities such as Botswana, Mongolia, parts of the Russian Federation, etc.

Reference Documents

- **Telecommunications Challenges in Developing Countries**

4.2.5 ENABLING REGULATION FOR BROADBAND

Ensuring that broadband services are widely accessible to people, public organizations and businesses wherever they are located is a major challenge for regulators and policy-makers around the world. The relatively high cost of establishing broadband networks has created inequalities between suitably connected urban and developed countries on the one side, rural areas and less developed countries on the other.General good regulatory practice already discussed in this chapter, such as creating favourable frameworks that are incentive based and investment friendly, liberalization, technology neutrality and unified licensing (see **Section 2.1.1**), and providing fair treatment, also apply to broadband regulation, and can help facilitate the deployment of and access to broadband services by a variety of operators and technology innovations.The following issues are of particular relevance to broadband development and regulation:

- Market liberalization and incentives for network deployment, including a discussion on local loop unbundling or access to wholesale products, in **Section 2.5.1**;
- International bandwidth prices, gateway liberalization and national peering and spectrum for innovative wireless broadband provision, in **Section 2.5.2**; and
- Planning for converged services with frameworks for non-traditional business models such as VoIP, including policy measures to stimulate demand, in **Section 2.5.3**;

Promoting national and regional fibre backbone initiatives, open access and infrastructure sharing is also helping broadband development and is discussed in detail in **Section 3.4**.

Reference Documents

- **Building Broadband: Strategies and Policies for the Developing World**
- **Universal Access & Service (UAS) and Broadband Development**

4.2.5.1 MARKET LIBERALIZATION AND INCENTIVES FOR NETWORK DEPLOYMENT

Regulation should facilitate the opening of the market to more operators and types of service provision, including liberalizing restrictions on foreign ownership. For example, with Pakistan's 2004 broadband policy, the government has lifted any restrictions on the number of broadband service providers in the market, and at the same time simplified the licensing process, converting data, ISP and electronic information service (EIS) licences into a single class licence.Regulatory approaches in support of broadband development are generally faced with introducing market liberalization in the context of two main scenarios:

- Pre-existing telecommunications networks; or
- Under-developed telecommunications networks.

Strategies for pre-existing telecommunications networks look at issues of market entry of alternative service providers in an existing market traditionally served by one or more incumbent providers. Developed countries with existing services and providers, promote typically both service-based competition as well as infrastructure-based competition.In developing countries with less developed networks, especially in rural and remote areas, the strategy usually focuses on infrastructure network development through market liberalization and promoting alternative wireless broadband provision.Local loop unbundlingIn some developed economies, broadband has been facilitated by regulating local loop wholesale including full local loop unbundling. This can make sense in developed markets with an extensive and well-developed incumbent fixed network, as it allows new entrant operators access to the end-user without having to invest heavily into network deployment. This encourages service-based competition. However, most developing countries are faced with a fundamentally different situation, where network deployment and growth still needs to be encouraged, and operators still need to recover their investment costs. Unbundled service costs would therefore be higher and a less attractive approach to encouraging service competition. Consequently, for few developing countries would local loop unbundling be the best approach. Instead, regulators in developing countries may need to offer incentives for network deployment, and network-based competition combined with backbone network sharing approaches (where required).Incentives for network deploymentPromoting broadband network deployment in a competitive environment where operators' prime focus and revenue sources is still often in telephony requires a system of incentives to ensure evolution to broadband services. These can include the following:

- Consideration of tax incentives for fibre installation over cheaper methods e.g., microwave for network deployment;
- Determination if market conditions are conducive to establishing duplicate backbone networks or single networks in which competing operators utilize shared bandwidth; if the latter, create open access policies for backbone networks [1];
- Establish licensing allowing for infrastructure sharing and open access to broadband networks; and
- Promote site location of infrastructure network projects (fibre backbone) where they can be accessed by a variety of potential operators and promote open access policies.

An example of incentives that could increase broadband deployment include 3G operators, Telstra and Hutchison in Australia, who share wireless access network facilities to increase network coverage and lower costs for both operators. Another example is the case of the SINGAPORE ONE broadband backbone and cable network that is operated by the government of Singapore as a shared use network with open access and level operating conditions [2].Incremental approach for rural areasIn rural areas where connectivity is a major challenge, incremental deployment plans that introduce broadband through multiple, dispersed projects and programmes can reduce the risk of expensive, nation-wide deployment schemes. While rapid nation-wide deployment is the objective, incremental deployment initiatives can serve as pilot that will provide valuable lessons and information about demand, support requirements, operating costs, etc. for both policymakers and regulators as well as industry and consumers. The Practice Note Two examples of incremental approaches: Tanzania and Macedonia explains this approach further.

Reference Documents

- **Broadband infrastructure investment in stimulus packages: Relevance for developing countries**

4.2.5.2 INTERNATIONAL BANDWIDTH, GATEWAY LIBERALIZATION AND NATIONAL PEERING

Competition in international connectivity (i.e., sub-marine cables) and access to services such as international and Internet gateways, is key to lowering the cost of bandwidth and broadband prices for consumers. Effective interconnection and gateway regulatory frameworks that introduce new models of sharing and collocation, and reduce barriers to existing private, government and international networks is important in encouraging existing and new market entrants to expand into broadband and other services.An example of the process to liberalize the international gateway and secure bandwidth capacity at lower prices is described in the Reference Document *International Sharing: International gateway liberalization – Singapore's experience.* Singapore's Infocomm Development Authority (IDA) required the dominant licence holder to provide a reference interconnection offer (RIO), mandated co-location at the submarine cable landing station, mandated connection services and regulated prices, and co-ordinated the submarine cable landing process, offering a one-stop-shop. In the past, sub-marine cable providers had to approach several different government entities.India's regulator, TRAI, has adopted a similar regulation.With Pakistan's 2004 broadband policy, national and regional peering among local Internet Service Providers (ISPs) is prominent. This is to reduce the reliance on the still costly international IP backhaul. The policy goes even further by promoting the creation of a national Intranet to provide domestic IP services. It is expected that this also spurs the creation of locally hosted content and services.

Reference Documents

- **Broadband Policy December 22, 2004**
- **Gateway Liberalisation**
- **TRAI Consultation on Access to Essential Facilities**
- **TRAI regulation on international telecommunication access to essential facilities at cable landing stations, 2007**
- **Trends in Telecommunication Reform 2006**

4.2.5.3 PLANNING FOR CONVERGED SERVICES AND STIMULATING DEMAND

Regulatory approaches in support of broadband network development should take into consideration the eventuality of a convergence of multiple services (e.g., telephony, data and broadband) over IP networks. Approaches for co-existence of pre-existing services such as telephony and new competing services such as VoIP need to be considered and integrated in regulatory strategies as well as the evolution from non-IP networks to converged networks. High demand for new services such as VoIP and cost effectiveness of utilizing multiple network topologies and spectrum bands in service delivery of existing services (e.g., international calls), will be drivers for increasing demand for and deployment of broadband networks. Effective regulatory mechanisms need to be put in place to manage issues such as interconnection, use of spectrum and co-existence of traditional and new services.

Flexible allocation and technical uses of broadband spectrum

Effective spectrum management for BWA allows for a variety of technologies to be used to provide broadband and related services. Measures to consider in facilitation of favourable spectrum allocation include:

- Considering allocating certain spectrum freely on a licence-exempt basis. This will encourage broadband demand and network deployment as has been employed in many countries in WLAN applications using Wi-Fi; and
- Including measures in spectrum licensing that allow for technical flexibility in experimenting and extending spectrum capabilities.

Harmonized policies and approaches for VoIP and industry

The popularity of inexpensive VoIP services is creating demand for broadband network deployment and shared use of these networks. However, inconsistent regulation of VoIP services around the world have created conditions which in some cases undermine and in other cases favour providers of existing services. This has led to outright banning of VoIP services in numerous countries. Regulatory frameworks are needed that address key concerns of stakeholders through enhancing viability and fairness for co-existing industries.The following measures could be considered in regulatory approaches:

- Regulatory frameworks used for telephone services are not well suited for application to VoIP providers and need to be adapted to the specific situation;
- New charge rate structures need to be identified as rates based on call termination and origin points become less relevant in VoIP;
- Complementary frameworks for interconnection agreements between circuit and IP based networks are required;

- Development of strategies that promote incremental change and adaptation;
- Identification and classification of VoIP services; and
- Development of transitioning approaches to full IP-based world.

Increasing public awareness and stimulating demand

Given the high costs of deployment of broadband networks, especially in rural and remote areas, the government needs to assist development by increasing public awareness and stimulating demand. For example, regulatory agencies could work in partnership with other ministries in promoting the development and extension of e-government services, which in turn stimulate demand for broadband services. E-government services can improve citizen's opportunities and communications services for citizens, especially those in poor, marginalized segments of society who lack any other access to critical information, services, and opportunities. Approaches to promote broadband development include:

- Supporting local, relevant, Internet content in local language;
- Lowering the cost of end-user terminals through import duty and other tax reductions and possibly subsidizing broadband equipment in schools;
- Educating citizens about the benefits of broadband while further developing Internet skills;
- Providing a legal framework for e-commerce and other applications; and
- Ensuring that consumers have enough information on providers and pricing options as well as available technology.

The Practice Note Malaysia's broadband plan – stimulating the private sector gives details on how to include the promotion of broadband development in a national strategy, especially in under-served areas.Finally, regulators need to ensure that consumers and the public interest are represented in the policy development process. Consumers need to have input into the process so that broadband strategies are in tune with public demand for broadband services.

Practice Notes

- Malaysia's broadband plan – stimulating the private sector

Reference Documents

- Trends in Telecommunication Reform 2006

Next: 4.3 Overview of approaches to universal access and service ➜