GSR
2011
Discussion
Paper

Strategies for Financing Universal broadband Access

TABLE OF CONTENTS

1 THE MORE THINGS CHANGE, THE MORE THEY STAY THE SAME: STRATEGIES FOR FINANCING UNIVERSAL BROADBAND ACCESS

Author: Mandla Msimang, Managing Director of Pygma Consulting

1.1 Executive Summary

Chatting, tweeting, blogging and browsing are becoming the norm for the 1.6 billion users globally who were able to access Internet in their homes by the end of 2010.[1] However, over five billion people have never experienced the Internet, let alone participated in the impending "broadband revolution" or have only experienced it through public or shared access. The mobile voice story however is very different. Mobile voice and SMS, now considered "basic" in many countries are available to over 90 percent of the global population, and 80 percent of people living in rural areas.[2] The challenge in this area relates to affordability.

While countries strive to close the ever narrowing mobile voice gap, and start to grapple with access to Internet, they are also forced to tackle a new development in the ICT sector – the emergence of high speed broadband networks.[3] It is anticipated that a 'broadband revolution' will facilitate access to information carried over high speed networks, yet today broadband only reaches a small segment of the global population. The disparity in broadband[4] access is wide. Penetration sits at 34 percent and 36 percent in North America and the European Union ("EU") respectively. This can be compared to 3.4 percent in Latin America and the Caribbean, 1.7 percent in Sub Saharan Africa and 0.1 percent in South Asia[5] – mind the gap!

In light of the divides that still exist across technologies (e.g. mobile, fixed, Internet, broadband), across regions and within countries, universal service and access, an old concept, which seeks to narrow the divide between the haves and the have-nots, has unfortunately, not lost its relevance. It is however time to reassess it. With two decades of experience with shared access, infrastructure funding, end-user subsidies, and most importantly market reform, the time is ripe to critically consider what strategies have worked and those which have not, particularly with respect to universal access funding, which remains a key challenge. This will enable the development of effective strategies to tackle the challenges posed by low levels of affordability and insufficient rollout of networks in "high risk," rural and remote areas on the one hand; and take advantage of the opportunities presented by advances in technology, and developments in society on the other.

This paper deals briefly with universal service and access concepts and principles, but is concerned primarily with the financing of universal access. As a starting point, that a public financing mechanism is introduced in a liberalized market indicates the existence of a market access gap – a gap between what the private sector can deliver and what is needed by the public – arrived at through a thorough analysis of the relevant market based on national definitions of universal service and access and agreed targets in a country. The premise of universal access projects is that they are deployed in high risk areas or to low income users and communities where without a financial incentive to invest, operators or other suppliers will not provide the services. As such, creative public or public private partnership ("PPP") financing models are required to encourage the rollout of networks and services in such areas and in so doing meet the socio-economic objectives of the country.

Table 1: Mind the Gap, Access across the World, 2010				
Region	**Internet Subscriptions**	**Mobile Broadband (Active) Subscriptions**	**Fixed Broadband Subscriptions**	**Mobile Cellular Subscriptions**
Africa	10.8	2.5	0.2	45.2
Arab States	24.1	10.2	1.9	87.9
Asia & Pacific	22.5	7.5	5.5	69.2
CIS	34	11.2	8.3	134.8
Europe	67	41.3	23.8	117.7
The Americas	50.7	24.1	14.2	94.5

Source: ITU Key Global Telecom Indicators for the World Telecommunication Service Sector **www.itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom2010.html**

This paper begins with a discussion of the scope and objectives of universal service and universal access, particularly in an age of broadband and Next Generation Networks in Section 2 and notes that despite shifts in society and technology, in many ways, the more things change, the more they stay the same. Section 3 considers the policy and regulatory building blocks that should be in place in order to facilitate the execution of sustainable universal access strategies, and the establishment of viable and credible options for funding universal access through a combination of public and private funds.

Section 4 of the report starts to look specifically at the funding models that exist; while Section 5 considers the question of how such funding can be structured – through equity investments, PPPs, and various types of financial incentives and subsidies. It also considers what scenarios are appropriate for the different models of funding in Section 6, i.e. funding to stimulate supply or demand. In section 7, the report discusses Universal Service and Access Funds, one of the most popular funding models that has been employed, however with mixed results. The strengths and weaknesses of USAF models and approaches are discussed with the intention of providing lessons for other types of funding based on subsidies and incentives. Finally, in Section 8, the approach to measuring the success of a funding strategy by assessing its "return on investment" is canvassed.

1.2 Contextualizing universal service and access

"Universal access" and "universal service" (jointly "UAS") are age old concepts that predate the information and communications technologies ("ICT") sector. According to the International Telecommunications Union ("ITU"), Universal Service means that every household or individual in a country has the opportunity for telephone service.[6] Universal Access means that everyone in a community can gain access to a publicly available telephone, although not necessarily in their homes. While the basic notions have stood the test of time, the concepts are evolving in light of changes with respect to technology (i.e. ICT has move beyond the 'telephone'), applications (i.e. offerings other than simple voice) and society (the development of highly mobile populations, increased urbanization, globalization, and increased levels of education in most countries).

This part of the paper looks at some of the changes in UAS principles and approaches over the past 20 years and notes that UAS is firmly rooted in the market liberalization context and that despite the changes in the environment, its rationale is fairly consistent.

1.2.1 The More Things Change...

1.2.1.1 Expanding the Scope of Universal Service and Access

Over the past two decades, the scope of universal service and universal access, which describe the level of ICT inclusion has widened. Historically inclusion related to basic voice (including access to emergency services and access for people with disabilities); today however it is increasingly being re-conceptualized to include Internet – and even broadband – and to address issues around digital inclusion.

Box 1: Broadband as part of the UAS Strategy

Today, over 40 countries include broadband in their universal service or universal access definitions. These include:

- In February 2000, the Estonian *Riigikogu* (Parliament) enacted the new Telecommunications Act, **adding Internet access to its universal service list. It has also been indicated that internet access is a legal right.**

- India was one of the first countries to include broadband in the mandate of its universal service fund in 2006.

- The United States which has had a complete re-think of universal service financing; now the universal service fund has helped increase broadband penetration by providing funding for new lines in rural areas.

- In 2001, Greece amended its Constitution to provide that all persons have the right to participate in the Information Society. The State is obliged to facilitate **access to electronically transmitted information, as well as to the production, exchange and diffusion of information.**

- In Switzerland broadband has been included in the scope of the Universal Service Obligations since 2008 – the universal service provider charged with USO must provide a broadband connection to the whole population, via DSL or satellite or other technologies (at least 600 Kbit/s downloads and 100 Kbit/s uploads, and monthly subscription < CHF 69).

- In Finland broadband access is a legal right and recent national legislation extended USO to cover broadband with the objective of a basic 1Mbit/s broadband connection available to all by 2011.

- Similarly, the Constitutional Court of Costa Rica declared internet access a fundamental legal right in September 2010. The government has thus been urged to adopt the necessary measures to promote its universal service in the country.[7]

Source: Author, based on Press Releases and Articles

The scope of universal service and access varies across countries that are at various stages of development with different, social, political, technological and institutional contexts (see Figure 1). The basis for including a particular service in the scope of national definitions of "universal service" and "universal access" is generally related to the uptake of the service in society in general and its importance in order for people to participate meaningfully in society. To remove the subjectivity from this decision, the 2002 EU Universal Service Directive provided that in order to be included in the scope of a UAS policy, a service has to satisfy two tests:

(1) In the light of social, economic and technological developments, the service has the ability to become essential for social inclusion; and

(2) Are normal commercial forces unable to make the service available for all to use?

Meeting just one of the two criteria is not sufficient. As early as 2006, mobile telephony was considered but not included in the scope since although it met the first test, i.e. it had become essential, it failed the second – normal commercial forces were able to make the service available in the EU. At the time, broadband was also not eligible for inclusion in light of the fact that in 2006 absence of access could not be said to imply social exclusion given the low level of broadband penetration in Europe. There have however been shifts in this approach in Europe; recently in France proposals have been made for the government to develop a social tariff for broadband internet access for low income households. French draft legislation entitled Reinforcing the Rights, Protection and Information of Consumers, proposes the implementation of a social tariff through a labelling regime to make consumers aware of ISP products and services that form part of the tariff scheme.[8]

In a developing country context, mobile voice services would pass the first test, and only in certain rural and underserved areas would it not pass the second test. Therefore although UAS strategies include mobile voice, they should be limited to areas where the gap exists. The reality is that using innovative means, 2G and more recently 3G mobile networks, service and applications have done wonders for access to ICTs. In fact, in developing countries they are being used to achieve many of the same functionalities that broadband enables including banking, mobile money and now e-commerce in Kenya, Bangladesh and

Afghanistan. Whilst consumers would get a better experience from broadband, it is far from being a requirement for social inclusion and commercial forces have yet to be given time to deliver in light of pending mobile broadband spectrum licensing processes.

In many developing countries, where initial universal service and access targets have yet to be met, the challenge of universal broadband access is being tackled alongside the challenge of ensuring access to more basic services including affordable voice and Internet using narrowband networks. The debate around whether or not to include broadband in the scope of UAS is an important one. The inclusion of broadband in both developed and developing countries is not based on the fact that it is already 'essential' but rather on the *potential* that it will become essential in light of the potential socio-economic benefits. Governments are increasingly recognizing the critical role of broadband and the Internet – the belief is that the benefits for society as a whole appear to be much greater than the private incentives to invest in high speed networks. [9] In addition, the benefits of broadband are reaped when there is a critical mass of users.[10]

The economic and social impact of broadband is well researched and documented. An increase in broadband penetration is said to have a greater impact on economic development than a concomitant increase in access to other telecommunications services that preceded it, including 2G mobile. Recent research on the impact of broadband argues that in low and middle-income countries every 10-percentage point increase in broadband penetration accelerates economic growth by as much as 1.38 percentage points. [11] In addition to the economic impact, the network externalities resulting from broadband penetration include the promotion of access to information – thus promoting transparency and good governance; innovation, the growth of service industries, job creation and employment, the mass customisation of products and new forms of commerce and financial intermediation.[12]

1.2.1.2   Facilitating Demand as well as Supply

That said, in developing countries it has to be understood that broadband for all is a long term strategy and the main beneficiaries, in the short term, of the broadband revolution will be businesses. Because broadband networks need to generate traffic to lower their costs and increase their profitability, and

in light of the fact that broadband is an ecosystem in which users play a central role, stimulating demand is a priority. Funding that was previously focused on supply side interventions – networks and facilities – is now increasingly being channelled to interventions that will stimulate demand. Demand side interventions include funding access to content, applications, services and even training. This is important to promote digital inclusion. As with the evolution of 2G and 3G, it is recognized that broadband for the mass market, accompanied by low cost services and importantly devices, will be introduced over time and only as operators, vendors and equipment manufacturers broaden their consumer markets.

1.2.1.3   Reconsidering Approaches to Funding

Universal Service funding trends have changed along with the ICT environment in which they are practiced. Most of the changes are related to the impact of the introduction of competition and market reform on the sustainability of funding models that prevailed in a monopoly or duopoly environment. The initial practice of promoting universal service through the cross subsidization by monopoly operators of line rentals and local call charges using revenues derived from more pricey international and long distance calls in an era that pre-dated rate rebalancing, gave way in the mid-1990's to the establishment of a first generation of Universal Service Funds mainly for supporting access to basic voice and public telephony in developing countries like Peru and Chile. As competition increases, reliance by incumbents on access deficit charges to fund 'uneconomical' areas has since been found to be unsustainable, as have asymmetric interconnection charges to promote rural operators, in many cases.

The first generation Universal Service Funds have paved the way for more modern Universal Service and Access Funds ("USAF" or "Fund") which recognize the important role of competition and no longer assume that the fixed line incumbent is the sole (or even necessarily any) universal service provider. India, Chile, Brazil and the United States have reviewed their Funds to broaden their scope to enable them to take a converged approach.[13] The newly conceptualized Funds rely increasingly on an Output Based Aid approach to funding to ensure transparency, fairness and the efficient and effective delivery of UAS objectives.

1.2.2 The More Things Stay the Same?

Notwithstanding the changes in the ICT market, particularly the broadening of the scope in many countries and the increased focus on demand side considerations in designing universal service and access projects, the fundamentals of universal service and access have not changed. In particular, some of the constants include:

- Availability, affordability and accessibility -are still the pillars of UAS;

- Market reform and good regulation remain the foundations for UAS policy and strategy;

- UAS interventions have to be competitively and technologically neutral; and

- The UAS funding question persists.

1.2.2.1 The three pillars underpinning universal service and access – availability, affordability and accessibility – remain critical

Infrastructure still needs to be available in inhabited parts of the country through public, community, shared or personal devices – i.e. where people live, work and play. Additionally it needs to be accessible to all people, regardless of location, race, gender or disability. All consumers should be able to afford communications services. In addition, "awareness" and "ability" are fast becoming central tenets of universality as the Internet and broadband services are included in the scope of universal service and access *enabling the use* of ICTs is a factor.

1.2.2.2 Market reform and liberalization should be the first step to meeting US/UA targets.

The principle that good regulation and market reform are the first approaches that should be taken to achieving universal access remains unchanged. The "mobile miracle" has clearly demonstrated the potential of the private sector to deliver services where demand warrants it. Regulatory strategies supporting UAS such as the promotion of infrastructure sharing, the reduction in interconnection rates, the lowering of taxes on services and device, and the issuing of spectrum at reasonable fees, should complement private action to address gaps. The traditional market

gap analysis described in the Figure 1 is therefore still relevant, although the size of the gap may vary across technologies, especially in low income countries (Figure 2).

Universal service and access financing still assumes that as a first step, policy and regulatory strategies have been put in place to create an environment which promotes access in the "market efficiency gap" where network reach is commercially viable. Strategies and funding should focus on areas like the "smart subsidy zone" where there is or is likely to be insufficient competition with respect to the rolling out of networks and services unless a one-time subsidy is provided, and the "true access gap" where on-going financial support is required in order for the area and beneficiaries to be served.

1.2.2.3 Universal service and access interventions should be competitively and technologically neutral and should not distort the market.

Using a market gap analysis assists to ensure that USOs and USF financing are not employed in competitive market segments. In the case of Next Generation Networks and broadband projects (whose deployment is still at an early stage, yet it is critical that the public has access to the services on an urgent basis for them to participate effectively in society), assessment of market access, efficiency and true gaps alone will not lead to the identification of areas needing attention. The EC recognizes that these high investment networks tend to profitably cover only part of the population since they are demand driven and more likely to be rolled out in high demand areas including urban areas, densely populated regions and areas with high income users.

To guide broadband investment, which tends to be investment *ahead* of the market, the EU has published State Aid Guidelines which follow a colour-coded map of areas that should be awarded funds. The State Aid rules cover any form of public funding, including subsidies, tax rebates and, in some cases, the public ownership of firms. State ownership constitutes state aid when equity participation or capital injection by a public investor does not have sufficient prospects of profitability.[14]

Figure 1: Then and Now – Market Gap Analysis

Figure 2a: Then – Classic Market Gap Analysis
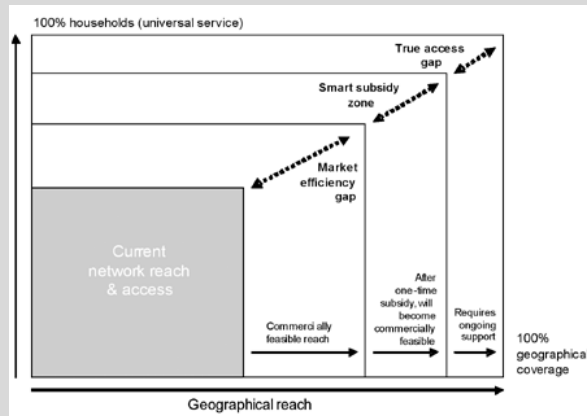
Figure 3b: Now – Low Income Country Market Gap Analysis
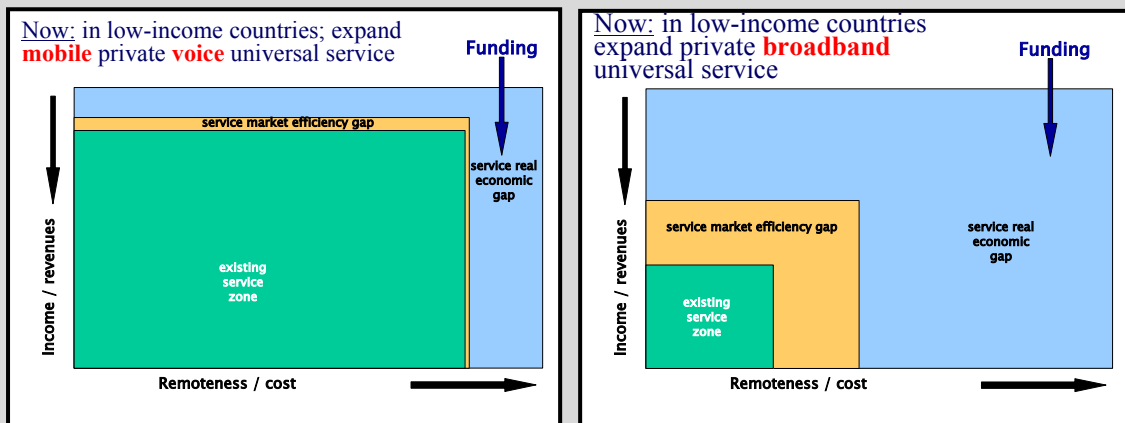
Source: Then: www.ictregulationtoolkit.org/en/Section.3144.html,
based on initial concept by J Navas Sabater, A Dymond, N Juntunen, 2002; Now: ITU Report on Universal Service Funds in the Sub-Saharan Africa Region (Sepulveda, 2009)

Areas with no broadband infrastructure are considered "white," those with one network are classified as "grey" areas, and "black" areas have at least two or more broadband network providers. Funding in "black" areas is unlikely to be justifiable in light of existing competition (Figure 3). As in the case of the market gap analysis, when making public investment decisions, countries have to take into account not only existing NGN infrastructure but also concrete investment plans by telecom operators to deploy such networks in the near future. The rules prohibit any form of public funding that distorts or threatens to distort competition in an attempt to ensure that public participation does not crowd out private investment. In fact, it must also not crowd out the government's own market reform process and initiatives.

Box 2: When to provide public funding for broadband, EU example

To ensure that funding does not distort the market, the EC Criteria for Determining an Areas Eligibility for State Aid for Broadband is:

- **White areas:** *no broadband infrastructure exists* and none is likely to be developed in the near future. Support measures for broadband deployment in these areas are most likely to be considered compatible with state aid rules;

- **Grey areas:** *only one broadband operator exists*. Measures may be compatible if no affordable or adequate services are offered or are likely to be offered to satisfy the needs of citizens or business users and if no less distortive measure is available. The Commission accepts that state aid may be the only alternative where the area is underserved and the inherent profitability of investment is low;

- **Black areas:** *at least two or more broadband network providers are present and broadband services are provided under competitive conditions.* Any state intervention in these areas will be viewed negatively as there is in principle no need for intervention, unless the member state is able to establish a clear market failure.

*Source: Author and Communication from the Commission – Community Guidelines for the application of State aid rules in relation to rapid deployment of broadband networks (*http://eur-lex.europa.eu*)*

1.2.2.4   The question of how to fund universal service and access persists

The age old question of how to finance the deployment of networks and the provision of services, whether narrowband or broadband, in underserviced areas and to underserviced communities remains. The general consensus has not changed – private capital should first be used to address the gaps identified. However, increasingly, in light of the greater financing requirements of Next Generation Networks, and also bearing in mind the drying up of liquidity following the 2009 global financial crisis, there is a return to public funding. Three particular models continue to stand out – equity investment, private public partnerships ("PPP") and financial incentives (See Section 5.1, Public Funding). The mix of approaches and where they are best applied has however changed mainly in light of experience over the years with more infrastructure PPPs and USAFs as a means of providing financial incentives, amongst others. Notwithstanding this, the rules for and principles underpinning such funding, as will be explored in this paper, remain the same.

1.3   Flavours of Public Funding

There are many 'flavours' of public universal access financing. Public funding can be done solely by governments or in collaboration with NGOs, donor organizations, and the private sector which have jointly and separately been financing ICT sector investment for decades. It is important to note that there are a number of different funding partners and vehicles available to fund universal access projects and the appropriate structure and partners depend on the type of project and its objectives in many cases. *No single funding model is appropriate for all universal access projects, or for all countries.*

The shift away from the role of governments in providing infrastructure to private sector participation as the main way of structuring and funding the ICT sector in the 1980's was premised on the fact that the public sector had competing priorities for funding coupled with the belief that the private sector could:

- Better handle risks associated with high value and long term investments which are characteristic of ICT infrastructure projects;

- Secure debt and/or equity sourced from a variety of investors whose main interest would be to increase take up and usage to drive revenue from services which will contribute to their return on investment.

- manage the complex structuring, funding and contracting arrangements related to infrastructure rollout

- ensure efficient delivery of services, particularly in a competitive market

Left to commercial forces the market has delivered well in some areas, and has failed to reach others. An important nuance in UAS funding is that the failure of the private sector to deliver on its own does not necessitate the public sector "taking over" the commercial function of service delivery. Rather, it necessitates the public sector developing 'in cash' or 'in kind' strategies to incentivize its telecommunications operators to deploy networks and provide services (i.e. "play"/in kind) or to provide funding for willing operators to address those markets (i.e. "pay"/ in cash).

Table 2: ICT Funding Options	CASH	IN KIND (INDIRECT)
PRIVATE	Infrastructure rollout Device subsidies	Mandatory USAF obligations
PUBLIC	Equity investment PPP Disbursement of USAF subsidies Commitment of Stimulus plan funds	Tax incentives Spectrum licensing Rights of way Risk guarantees
Source: Author		

There is, however, a specific universal service and access framework checklist that will facilitate the selection of an appropriate funding model. The minimum policy and regulatory decisions required in this regard are:

(1) Any legal requirements relating to public financing mechanisms should be considered. Examples include EU State Aid Rules, South Africa's PPP Manual[15], the legal scope and mandate of a USAF if one is in place, and national or municipal supply chain regulations that would apply to ICT sector procurement;

(2) Country specific definition of "universal service" and "universal access;"

(3) Determination of national targets with respect to UA and US; and

(4) Determination of access gaps[16] and a related decision on what constitutes "underserviced areas" and who are eligible beneficiaries.

The above four decisions provide parameters for the public funding of universal access projects and a "roadmap" for project financiers to assess the relevance of projects in the context of the legal and policy context, and defined socio-economic objectives. The first criterion relates to the legal mandate of the financing mechanism, and any rules surrounding the public funding of ICT. It is probably the most inflexible of the identified criteria. Quite simply, projects that fall outside of the legal mandate or scope of the Fund or other forms of public funding cannot be eligible for financing.

The other three criteria exist in visions, strategies and policies and can evolve over time. An understanding of UAS definitions, targets, and identified gaps assist funders with the prioritization of

projects. For example, if universal access (as opposed to universal service) is defined as a priority in a country, and it is furthermore defined as access to voice and data services through Multi-Purpose Community Centres; then projects geared at meeting this objective can be considered eligible for financing, and would be prioritized ahead of projects that enable personal access through, for example the provision of subsidies to categories of individual users.

1.3.1 Public Funding: In Kind and Indirect Contributions

Governments have a range of instruments at their disposal to narrow market gaps or accelerate roll-out of broadband. In a way, governments too are faced with a decision on whether to pay in cash or in kind. Instead of playing in the market, and thus risking distorting it, it is government's primary role to make an "in kind" contribution in the UAS policy space. The government need to put in place institutions, policies, rules and regulations to promote competition which will enable operators to play their role in providing services and thus indirectly fund universal service and access. Regulatory and policy approaches that assist in lowering capital and operational costs include regulations relating to–

- **Tax breaks and discounts** – Governments indirectly fund the provision of universal service and access by making interventions that directly affect operators' cash flow, such as allowing for lower or deferred license fees, and providing tax incentives. In 2003, Kenya's Department of Finance, in line with measures taken in Tanzania and Uganda zero-rated tax on all computers and other ICT equipment imported into the country. In the 2009/10 financial year Kenya's government furthermore took bold moves in the 2009/10 financial year and committed to allowing ISPs to

offset against their taxable income the costs incurred in acquiring the right to use undersea cables over a 20 year period, provided tax deductions of 5 percent on software; and exempted all handsets from VAT. [17] These incentives should stimulate the supply of computers, reduce costs and increase PC penetration to stimulate broadband use.

- **Infrastructure sharing** – Australia, Saudi Arabia, Tunisia and Nigeria facilitate infrastructure sharing as a way of ensuring effective use of existing networks, and encouraging the entry of new players. It is mandated in countries like Greece, Italy, South Africa and Spain. In India, it has been specifically linked to the universal service and access tendering process, with TRAI recommending in a 2007 study that operators installing base stations in rural or remote areas should be offered a one-time subsidy from the USOF provided the installed infrastructure is shared with at least one other operator.[18]

- **Facilitating access to rights of way** – As much as 70 percent of the upfront costs of constructing fibre optic cable networks are related to civil works. [19] Governments can lower the costs of accessing public infrastructure such as roads, pipeline or electricity transmission lines through reducing fees, providing clear and rapid application processes for rights of way, and also by entering into Private Public Partnership arrangements with operators where state owned entities in the electricity and railway sectors, for example, own rights of way ad infrastructure.

- **Assigning spectrum** – timely assignment of spectrum is key to enabling the delivery of universal service and access, particularly in light of the fact that the solution to ICT access to date has been primarily mobile. In many developing countries and especially in rural areas, it is likely that wireless broadband will continue to outstrip fixed. Assigning spectrum through flexible allocations which are technology and service neutral is important for enabling last mile access. This should be done through open and transparent licensing processes, in some cases coupled with an obligation to provide access in rural areas and to underserviced communities, will facilitate universal service and access. Broadband Wireless Access (BWA) spectrum has been linked to the provision of services in rural areas in Peru where the regulator, OSIPTEL, allows high powered use of the 2.4 GHz band for wide area Wi-Fi in rural areas.

Government's response to universal service is not black and white. "In kind" or policy interventions as discussed above are a first option and can enable operators to conduct business in a cost effective and stable environment, but governments can also 'pay.' The German model (Box 4) demonstrates that in some countries governments can 'play' through regulatory incentives as well as 'pay' through financing broadband.

Box 3: Electricity Company & Infrastructure Sharing, Kenyan case

Kenya Power and Lighting Company (KPLC) was granted a Network Facility Provider licence (Tier 2, with regional spectrum) by the regulator enabling it to construct, install and operate an electronic communications system which may in turn be leased to licensed operators. KPLC has indicated that it has 18 pairs of fibre for leasing and has so far leased three through infrastructure sharing agreements signed with licensed operators Safaricom (20 years), Wananchi Group (5 years) and Jamii Telecoms (5 years) signed in 2010. The agreements allow them access to KPLC's fibre optic network that runs on the national electricity grid. KPLC's model enables ISPs to connect to them to reduce their time to market, and the need to duplicate costly broadband infrastructure.[20] Their infrastructure sharing model provides a supplementary revenue stream for KPLC. The three infrastructure sharing contracts signed to date are worth KES 828 million (USD 7.2 million) and may potentially provide access to 1.3 million customers on the national grid.

Source: Author based on Jamii Telecoms Press Release, March 2010 (http://jamii.co.ke/home/?p=235)

Box 4: Broadband Financing in terms of the German Broadband Strategy

In Germany, broadband expansion is to be done through:

- Capitalizing on synergies in infrastructure construction across the country

- Guaranteeing supportive frequency policies

- Committing to growth and innovation-geared regulation

- Providing appropriate financial support

As with all financing, broadband financing in Germany exists in the policy and regulatory context. Funding it to meet national targets and as such is for two purposes – (1) connecting households without broadband access; and (2) connecting households with broadband access below 1Mbit/second. The maximum subsidy is 200,000 Euros per project; up to 90 percent of the profit gap can be funded. In addition, funding can be made for technical and consulting services obtained from third parties – a maximum of an additional 100,000 Euros is available for this per project.

In the general fiscus, there is a scheme enabling people to claim tax deductions for laying cables to homes – the plan is to expand this to any installations connecting broadband to buildings and distributed within houses and apartments.

Source: The Federal Government's Broadband Strategy (Germany)[21]

1.3.2   Public Funding: Cash Contributions

Figure 4: Government Funded High Speed Networks, Global (2011)
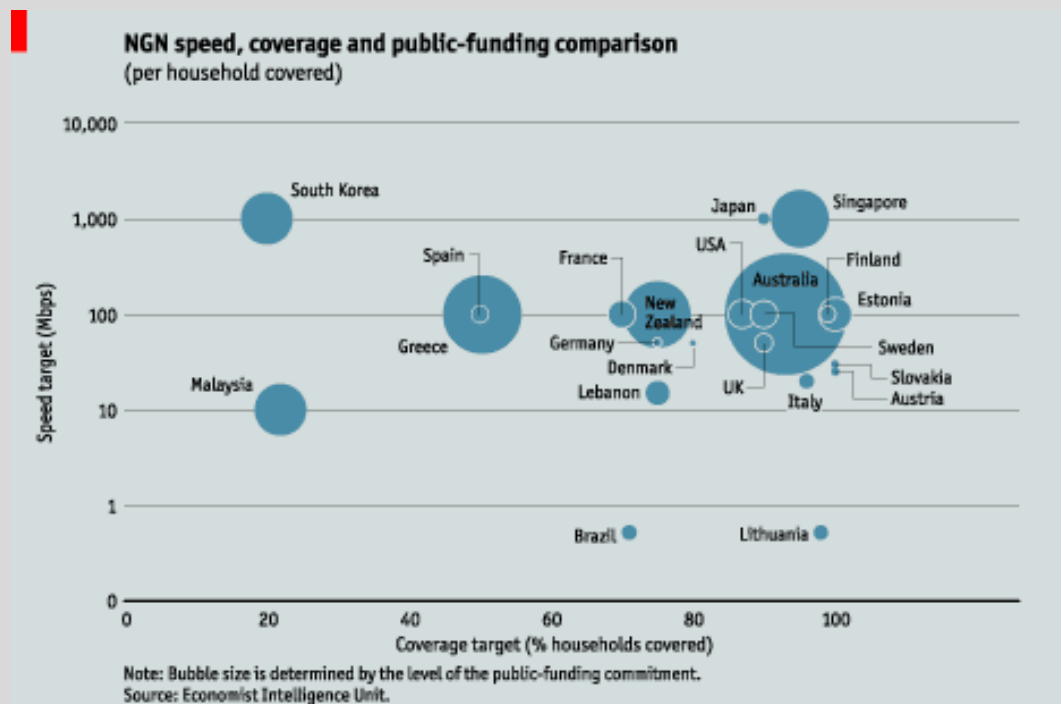
Source: Economist Intelligence Unit, www.eiu.com/public/topical_report.aspx?campaignid=broadbandMay2011

The fact that public money is being used to find ICT deployment means normal funding mechanisms have failed. It means that internally generated funds, equity contributions (in exchange for shares), debt funding through commercial banks, vendor funding, and partnerships with donor agencies[22] have not delivered and need to be combined with government support to be present. Importantly it does not mean that they have to be *replaced* by public money. In some cases public support through loans, partial equity and government guarantees to enable traditional funding mechanisms to work. The failure of the private sector through these mechanisms necessitates that for 'high risk' or 'unprofitable' areas or to address certain categories of users, public money must be used.

1.3.2.1 Allaying fears, keeping public funding neutral

It is important to recognize that where underserviced areas that are considered uneconomic to serve or where there is little or no existing infrastructure are properly designated, government participation as an investor is less of a concern. Hence the importance of defining these areas upfront (through public consultation) and designing Universal Access Programmes that set out clear objectives and targets so that it is clear that public funding is not conflicted. Uganda's Rural Communications Development Fund Programme[23], and Canada's Broadband for Rural and Northern Development Pilot Program[24] are examples of programmes that are designed upfront and agreed to, clearly identify their socio-economic objectives and as a result do not generally attract much criticism from the perspective of their policy objectives.

Government loans and grants – and, for that matter, any type of public financing -become more problematic when the effect of the financing may be to distort competition. Where public funding is used to develop networks and services in areas with existing networks, there is generally more resistance to such approaches. This is not to say that such funding is always anti-competitive; however where this is the case, primarily in the case of the funding of broadband networks, clear guidelines are needed as set out in the European Union where countries have agreed to provide public funding for broadband in terms of Europe's Recovery Plan. Public funding has to be provided in accordance with Guidelines on the application of EU state aid rules to public funding of broadband networks[25].

1.4 Public Funding Models

Government financing of universal access networks includes at the most 'intrusive' level of support equity participation, as well as other mechanisms such as subsidies, grants, loans, and guaranteed purchase of services. Three main models of public or government funding for universal access are:

- Ownership or Equity Participation in broadband projects, as seen in Australia, Brazil, New Zealand, Malaysia, Sweden and South Africa;

- Public Private Partnerships, such as the broadband infrastructure deployment projects undertaken in France, Thailand, Kenya and Tanzania; and

- Provision of financial incentives and subsidies as seen in many Latin American countries through the use of first-generation Universal Service Funds, and also as seen in China, Japan, the USA and EU through broadband stimulus packages.

1.4.1 Ownership or Equity Participation

The government 'ownership or equity participation model,' in terms of which government plays a direct role in the rollout of infrastructure, is an approach that in many ways seems the antithesis of the privatization efforts that have accompanied market reform and liberalization in many countries. Investing equity involves cash contributions up front that may be recovered in the long run (e.g., as dividends) to the extent that the ventures are commercially successful. In this model a public company, for example a national or municipal utility, undertakes the construction and the operation of the broadband network.

In Australia the government has deployed and operates a national broadband network, and has committed A$46billion in funds for this project, the highest public funding commitment globally (See Figure 3).[26] The national fibre to the home (FTTH) network will provide wholesale services on an open access basis. In Sweden, a state owned fibre backbone is combined with municipal networks. Brazil's model sees the government owning the fibre backbone and being a retailer of last resort as well. In the South African case, the national signal distributer has had its mandate increased to include being a national broadband network, in addition, under the Department of Public Enterprise, and national infrastructure company has been established and its ability to provide retail services has been debated and currently not included in its mandate.

The government ownership model sees government taking the investment 'risk' usually reserved for the private sector. The risk however is related to the return. If government's desired return is related to social and economic objectives, rather than a financial return on investment, then the risk relates to the non-achievement of those objectives such as universal access, job creation and increase productivity. However, in light of the liberalization of the sector and the fact that the return is normally defined in terms of financial return which in turn impacts sustainability, then one of the core principles of public investment is that such risk should not be managed using tax payers money.

1.4.2 Private Public Partnerships

The role of Public Private Partnerships in the development and implementation of universal access projects is recognized as an effective means of achieving universal access objectives. PPPs recognize the broad range of skills, expertise and resources needed to successfully execute universal access projects whether they are telecentre projects or higher investment fibre networks. As narrowband and broadband internet access begin to fall within the scope of universal access definitions and targets these partnerships have begun to include more than just network operators and government; PPPs now include equipment suppliers, vendors, manufacturers, academics, civil society and communities. This is in recognition of the fact that increasingly, in underserved areas, bottom up approaches to project development and implementation are key.

1.4.3 Financial Incentives and Subsidies

Financial incentives and subsidies remain a key approach to financing universal service and access, although the form and framework has changes over the last five years in particular in light of the lessons learned from USAFs, the growing importance of broadband, and the impact of the global financial crisis on the liquidity of telecoms companies. Subsidizing investment requires cash outlays up front that will never be recovered. If there is an expectation for the recovery of the monies, a loan or long term debt financing would be granted. Whereas producer subsidies, i.e. subsidizing operators to rollout infrastructure, are likely to be one off, subsidizing users (i.e. schools, elderly, people with disabilities) involves long-term and repeated payments. Two main approaches to providing financial incentives and subsidies are:

- Universal Service and Access Funds
- Stimulus Packages

1.4.3.1 USAF

The most popular response to the funding challenge posed by universal service and access in developing countries has been the establishment of Universal Service and Access Funds. Over the past 15 to 20 years, the model of a mainly industry-financed Universal Access and Service Fund has been implemented in many countries – primarily those in the developing world and emerging markets with only 9 Funds operational in Europe and the Americas. 27 Presently, Funds or plans to establish Funds exist in over 66 countries. Operators are required to contribute from 0.1 % of revenues in France to over 10% in the United States. Most countries have contributions of between 2 % (Nepal) and 5 % (Colombia, India).

Funds are firmly situated within the ICT sector and seek to ensure the affordability, availability and accessibility of networks and services to all communities. The first generation of USAFs was implemented in Latin America (e.g. Peru, Chile) and in Africa by the Ugandan Rural Communications Development Fund ("RCDF") who followed a similar model. While these models were successful, in the last decade there has been a move towards using the principles of Output Based Aid ("OBA") to finance investments targeted under UAS policy, particularly in developing countries. OBA is an innovative approach to increasing access in a manner that seeks to ensure that money is well spent and that the benefits go to the identified beneficiaries by linking the payment of aid to the delivery of specific services, outcomes or "outputs."

Funds are relatively easy to establish, through passing legislation and making USAF regulations which amongst others set out a minimum contribution by operators to the Fund, but history has shown us that they are much harder to implement and maintain. This is the case whether USAFs are administered by a regulatory authority as is the case in countries like Uganda, Sri Lanka and Malaysia, a separate Fund administrator as in Tanzania, Nigeria, Peru and the United States or in a few cases the responsible Ministry as is the case in Colombia and Korea. This is discussed in Section 7 which focuses on Fund experiences and lessons learned which are applicable both to Funds and other types of public funding.

Figure 5: Increased Use of Funds as a UAS Financing Approach

Does your country have an operational Universal Service Fund? (i.e. one that has begun collecting or disbursing funds)?

Please indicate how the operator(s) finance their universal access/service or universal obligations

Source: ITU World Telecommunications Regulatory Database, available on the ITU ICT Eye at: www.itu.int.icteye

Funds are considered an independent and transparent mechanism to implement and maintain universal service and access initiatives while continuing and promoting market reforms. The objective of USAFs, which typically offer once-off, start-up subsidies for designated areas, is to finance the expansion and/or maintenance of designated networks/services on a geographic, population or other basis that would not otherwise be commercially sustainable. Commercial sustainability is determined through economic analysis prior to project development, and in specific the assessment of market gaps. USAFs provide financing primarily through subsidies in order to compensate designated universal service providers who have in most cases elected to provide the identified networks and services in return for a subsidy or special regulatory, policy or licensing concessions.

Technology evolution and the deployment of NGNs will lower the costs of communication for users and, ironically, will also in all likelihood erode the revenue base (mainly operator levies) used to fund universal service and access programmes. This is in light of lower cost voice services and affordable access techno-logies.[28] As such, if it is found the Funds are still relevant despite the challenges that they have faced

(see section 8: Reflecting on Lessons from Fund Management), for them to remain sufficiently financed it is important to broaden their sources of funding to include other sources ranging from general taxation revenues and end-user taxes to spectrum and license fees. Broadening the scope of contributors to the Fund is one approach that can be taken, this could result in new players, Internet Service Providers and licensed applications providers having to make contributions. However, it is equally important for governments to recognize that Funds are but one approach to financing universal service in situations where the market cannot deliver.

1.4.3.2   Stimulus Plans

Like USAFs, Stimulus Plans seek to provide initial funding to encourage private sector investment. The stimulus plans, however have as objectives the creation of jobs and the stimulation of economic output. The impact of universal access to broadband is not limited to the impact of the ICT sector, as may be the case with respect to Funds; rather stimulus plans and packages including broadband access are aimed at achieving broader economic objectives. The United States grant of $7.2 billion to deploy broadband in underserved

areas, the Portuguese 800 million Euro credit line fir the rollout of NGAN as part of its 2.18 billion Euro stimulus plan to boost the economy, and the Finish funding of one third of the NGN rollout costs can be seen as stimulus plans. In addition cases in New Zealand, Malaysia and Ireland are evidence of stimulus plans that promote ICT investment to improve the economy – jobs, productivity, efficiency and competitiveness.

Important to note is that where USAFs are explicitly focused on rural and remote infrastructure development to improve access, stimulus package funding may be better directed at investment in advanced and industrialized regions in order to yield a stronger impact in the short term.[29] This may be contrary to universal service and access objectives of the sector, but aligned with broader socio economic targets such as those linked to job creation.

1.4.3.3   Criteria for assessing a funding mechanism

As indicated in the Organisation for Economic Development ("OECD") report *Rethinking Universal Service for a Next Generation Network Environment,* the funding approaches that are available should be considered on a case by case basis and should be thoroughly assessed against a number of criteria, such as economic efficiency, equity and competitive entry as well as against current practice where the infrastructure and service providers directly fund universal service.[30]

1.5   How big is the gap?

There is no uniform response to the question of 'how much' is needed to fund universal service and access. However, an indication of "how much" must precede a decision on "how." That is, it will assist in determining what type of funding mechanism is appropriate. Projects can typically be broadly divided into two types with different funding approaches and requirements:

- Supply side projects addressing **infrastructure gaps** in high costs areas which typically include rural and remote areas. The required funding for infrastructure should match the gap between the level of investment a private company would be willing to make in wired broadband, wireless broadband, mobile or multi-purpose community centres, for example, and the investment required to provide the service.

- Those aimed at addressing **user needs** and demand side considerations which include the needs of institutions (e.g. schools and clinics) as well as targeted population groups such as people with disabilities, low income users and the elderly. Included in these needs are training, and relevant content and applications. For users, funding should cover the gap between the retail price and the 'affordable' rate as determined through a means test, or other objective evaluation criteria. For other user related interventions, funding should stimulate demand.

- Networks are not monolithic; nor are users so how do governments decide what to fund when it comes to both categories of beneficiaries? The approach is to determine where the most impact can be made, and what the most sustainable approach is to using public funds to finance ICT supply and demand. Strategies that address infrastructure and user needs – which need not be mutually exclusive and can in fact be complementary – are discussed in turn.

Box 5: Criteria for Assessing a Funding Mechanism

The strengths of a funding mechanism can be assessed relative to:

- economic efficiency – financing US/UA should not distort competition
- equity – costs should be similar for people with similar abilities to pay, contributions should be fair and reasonable
- competitive neutrality – financing should not discriminate in favor of any company
- technology neutrality – financing should not discriminate in favor of any technology
- certainty – specific, predictable and sustainable arrangements
- transparency – information relating to the process of selecting projects and financing arrangements should be publically available
- cost effectiveness -- introduction and on-going management of the funding scheme should be cost effective

Source: DSTI/ICCP/TISP(2005)5/FINAL, Pg. 50 (OECD)

1.5.1 Supply: Financing Infrastructure Gaps

The funding set aside by various governments to meet the shortfall has varied and ranges from the USD 27 billion set aside by the Australian government for its state owned open access national fibre to the home (FTTH) network to the $2.8 billion committed by the French government to using PPPs to assist with the rollout of shared and open-access networks. The extent of the funding needed to meet universal service and access targets relating to addressing infrastructure gaps, whether or not they include broadband rollout, depends on the particularities of each market. This includes issues relating to technology choice, existing infrastructure, competitiveness and the policy and regulatory environment. Assuming the same technology choice, macro-economic and geographic factors such as population distribution and topography as well as consumer demand will also affect the funding available in a given market. For example:

- **Population and housing patterns** – deployments of

fibre-to-the-home or building will be faster in countries like Korea and Hong Kong where high rise buildings are commonplace. In the UK it has been argued that deployments have been slow relative to other European countries as 85 per cent of people live in single-family homes.[31]

- **Infrastructure** – civil engineering costs for laying fibre can be reduced substantially if infrastructure sharing is in place and at a municipal level operators are allowed to, or even mandated to, share existing routes or ducts. It has been argued that the early deployment of fibre in Paris, France can be partially attributed to the relative simplicity of laying cable through the city's sewer system. The same approach is being rolled out in the Southern African Development Community ("SADC") with plans for continental expansion by i3 Africa which will start in South Africa and will spend between ZAR 5 billion (USD 725.4 million) and ZAR 6 billion on the network — approximately one-third of the cost usually associated with a FTTH rollout by

Table 3: How much is Universal Broadband Access Worth?							
	Universal Broadband Access Policy Framework				Public Funding Model, State Sees Itself As:		
	Broadband Programme	Targets and Service Details	Estimate of Investment Expenditure	Tackling Unserved Areas	Financer of Infrastructure	Owner/ Operator of Infrastructure	Demand Stimulator
Australia	New NBN	≤ 100 Mbits/s for 90% by 2018; ≤ 12 Mbit/s for the remainder	Yes (Est. A$46 billion)	Yes	Yes	Yes	-
Germany	Federal Gov. Broadband Strategy	1 Mbit/s nationwide by 2010; ≥50 Mbit/s for 75% by 2014	Yes (Est. €36 billion)	Yes	Partly	-	-
Finland	National Broadband Strategy	1 Mbit/s for 100% by 2010; 100 Mbit/s for 99% by 2015	Yes $131m (est.) total NGN project cost	Yes	Partly	-	Yes
United Kingdom	Digital Britain	2 Mbit/s as a universal service by 2012	Yes	Yes	Partly	-	-
Japan	Next Generation Broadband Strategy 2010	"Ultra High Speed" for 90% by 2010	Yes	Yes	-	-	Yes
Sweden	Breidbandsstrategi for Sverige	100 Mbit/s for 40% by 2015; for 90% by 2020	No (Est. € 864 million)	Yes	-	-	Yes
Korea (Rep.)	Ultra Broadband Coverage Network	100 Mbit/s for 14 million users by 2012; then Gbit/s upgrade	No	No	Partly	-	-

utilising metropolitan sewerage and water networks, negating the need for expensive civil works. The i3 FTTH network will connect up to 2.5 million homes within the next four to five years at minimum connection speeds of 100 Mbps.[32]

- **Population distribution** – high population density in Sweden contributed to their Next Generation Access (NGA) leadership in Europe and the Swedish government will support rural rollout. Countries like Mexico and Portugal which have relatively high broadband access are densely populated.

1.5.1.1 Infrastructure: Deciding where the need is

Making a commitment to fund "the rollout of broadband networks" is not a clear commitment. Public funding models including ownership, financing incentives (including USAF), and PPPs (national, local, municipal) can be used to develop networks which consist of four main infrastructure components, i.e.:

- International connectivity, which links the network to other international networks usually using gateways and satellite technology or undersea cables. There has been significant investment in undersea cables by governments in Africa in partnership with the private sector which has seen the deployment of the EASSY Cable and The East African Marine System (TEAMS), amongst others over the last 3 years. Access to this part of the network lends itself to private investment of a PPP model in light of the network and technical expertise required to successfully deploy the network, the costs associated with rollout and the need for rights of way and landing rights which can be provided by governments;

- National or domestic backbone networks, which are also known as "long haul" networks. They carry traffic between major points of interconnection, usually major cities in a country, using satellite, microwave and fibre-optic across the country. The investment in this part of the network is mainly private sector driven, and in many countries there is some level of competition with mobile and fixed line operators deploying their own backbone networks. From a government perspective regulator incentives such as infrastructure sharing are key contributions to lowering costs, in addition USAFs are increasingly used to fund the extension of the backbone, a case in point is Pakistan's USF

that is working with the Pakistan Telecommunications Company Limited to [33] Sri Lanka 's government is working with its incumbent through a PPP model to extend the backbone ;

- Metropolitan connectivity, which can also be referred to a "middle mile" or "backhaul" is the part of the network that connects communities to the backbone. Generally municipal connectivity exists in urban areas, although capacity may require upgrading, and rolling out metropolitan network in rural areas in a priority to ensure accessibility across a country. Municipal PPPs have been used to address this gap successfully in Knysna in South Africa, and in the Pirai municipal network in Brazil.

- The Brazilian case is important in that its success lay in part in the demand driven by the municipality itself which served as an 'anchor tenant' to ensure the sustainability of the rollout project. The project included e-government, education and public access, with a range of application support and development activities.[34] In a recent German case (2009) municipalities were set to invest in and own specific ducts to encourage broadband deployment in underserved areas. Such dedicated multi-fibre ducts were made available to broadband network operators to deploy their networks, thereby encouraging infrastructure based competition.

- Local connectivity or local access networks, which are also called the "last mile," are the part of the network connecting the end user to the network. Delivered either wirelessly or using fixed technology such as fibre or xDSL, it is the most expensive link in the broadband supply chain. There are several regulatory and policy interventions that have been made to support the reduction of costs at this level, local loop unbundling, and spectrum assignment and permission of trading are two such approaches.

Each part of the broadband supply chain faces different challenges in terms of its availability and ease of deployment. As a result, a uniform approach to financing broadband cannot be taken – the part of the network that is being funding is another dependency that affects the response to the question of "how much."

Box 6: Approaches to Funding Infrastructure

Finland –"Last mile" is off limits

The cost of the investment in universal broadband access in Finland is estimated at EUR 200 million, of which the state will pay up to a third, municipalities, regions and the EU another third, and telecommunications companies at least one third. Under the model, the public support would be paid to the builders of the networks. However, in Finland, public money is not on offer for subscriber connections – that is, the two last kilometres. Bringing 100 Mb fibre optic or radio link connections all the way to people's homes would raise the costs by EUR 480-780 million. Connections between homes and the optical fibre network are expected to involve the traditional copper cables or wireless connections. Speeds of both copper and wireless connections are expected to increase considerably in the coming years to dozens of megabits a second.

Pakistan – Funding the National Backbone (Capex and Opex)

Pakistan's Fund noted in 2010 that 30 percent of the 400 Tehsils in the country did not have any fibre connectivity. Extending fibre cables to all Tehsils would assist the telecommunications service providers in extending services to those areas. Contracts have been awarded for Optic Fibre Projects to provide a subsidy of PKR 6.7 billion in total. These projects will ultimately lay 8,313 kms of fibre optic cable and through the projects awarded so far 5,324 km of optic fibre cable is being laid.

Universal service financing tends to focus on the provision of subsidies for infrastructure, with Funds such as that in Pakistan being limited to providing money for Capex initially. Recently, in light of the realization that projects must be sustainable, a total cost of operation or ownership approach is followed. Thus where infrastructure is funded, it may also require elements of Opex such as human resources, energy and transmission costs, to be covered in order to make the project sustainable in rural areas where these costs may be higher than in urban networks.

South Korea – Mandatory Obligation

In South Korea, the leading operator was obliged to provide broadband access as part of a universal service obligation to a minimum standard of 1.5Mbit/sec. The upgrading of existing networks is expected to cost about EUR 25 billion over the next 5 years which is to be partially funded by the South Korean government through direct subsidies totalling EU 1 billion. Private investors are expected to invest in the difference and are being incentivized to do so through tax incentives and cheap loan facilities.

Qatar – National Broadband Network

The Supreme Council of Information and Communication Technology (ictQATAR) announced in March 2011 that Qatar's government has established a new company – Qatar National Broadband Network Company (Q.NBN) – with a mandate to accelerate the rollout of a nationwide, open, and accessible high-speed broadband Fibre to the Home (FTTH) network. Although it is a government led initiative, Q.NBN is an independent company, holding the relevant licenses to permit it to rollout a national broadband network. It will focus solely on the deployment of a passive network infrastructure, efficiently leveraging existing and new infrastructure in Qatar. This initiative is part of the strategy to achieve the goal of having ninety percent of Qatari households and businesses with broadband access and an open-access fibre network by 2015.

Source: Author. Information compiled from Pakistan Fund Website, www.usf.org.pk/project.aspx?pid=6 ; ICT Qatar ictqatar.qa/en/news-events/news/qatar-national-broadband-network-company-established; and Deutsche Bank Research, http://mpra.ub.uni-muenchen.de/22909/1/MPRA_paper_22909.pdf

1.5.1.2   Supply: Getting the most out of Infrastructure Funding

Public investments in infrastructure need to have the maximum potential benefit. As such, in many countries governments put conditions on publically funded networks to derive the maximum 'return on investment'. Key principles to be borne in mind when infrastructure projects are financed publically include that the:

- network should be open (open access) and provide universal coverage in the area concerned.

- amount of the compensation for rolling out the network cannot go beyond what is necessary to cover the additional costs to deploy the network in non-profitable areas.

Putting good money into projects designed in a context of bad policy is a risky exercise. To avoid this, in

Sweden, financing of rural broadband networks is linked to the following conditions:

- a requirement to provide the network on a non-discriminatory, open access basis to third parties for 7 years from project completion;

- a requirement to provide passive and active infrastructure (ducts, dark fibre, and bitstream access included)

- a requirement to provide access to at least three operators at infrastructure level

- a claw back condition in the contracts avoids "overfunding." It requires the recipient of the subsidy to pay back part of the financing if the demand in the area exceeds expectations making the subsidy unreasonably high (claw back is maintained for 5 years after the network is operational). This is particularly a risk in the case of broadband funding where demand is unclear.

1.5.1.3   Demand: Financing End User Needs

For end-user subsidies, a number of factors will impact the required level of funding, which is unlikely to be 'smart' or once-off, as in the case of infrastructure funding, but will rather be recurring and continually provided as long as the user remains in the same group – i.e. connectivity for a person with a disability, an elderly person or low income. Where the beneficiary is a community or institution this remains true as in the case of an e-rate subsidy to schools. In the case of subsidies for end user devices such as laptops and personal computers, a once of subsidy is more likely – this however does not address the total cost of ownership as it discounts the on-going maintenance and repair costs. Different approaches can be taken to identifying beneficiaries for end user subsidies such as:

- **Self-selection targeting** – projects are designed to ensure that the outputs that have been chosen by the beneficiaries receive a higher share of subsidies. Thus a 'sliding scale' of subsidies is possible in terms of this approach. For example, progressively higher subsidies can be provided for more basic services or services that those who can afford would not necessarily want (e.g. basic and low cost devices or services).

- **Means test targeting** – where beneficiaries are determined based on affordability using income, a proxy means test, or sometimes living standard measures (LSM) such as the availability of a dwelling. It has been argued that this approach is most effective in middle income countries,

particularly where an existing social grant or welfare system in place which can be used a point of reference. A key risk with this approach , and many user based approaches is that users can move from one 'level' or 'status' to another – whether the means is determined by income or access to a social grant, making monitoring and implementation of this type of targeting by the funder more complex.

1.5.1.4   Demand : Where End Users are Institutions

In some cases end users may be institutions and not individuals. Chile, Colombia and Ecuador offer examples of countries that have publically financed school connectivity, mainly in areas where there is no existing access. In most cases where connectivity at schools is funded, the financing of devices such as computers, laptops and dongles is incorporated into the connectivity plan. In Ecuador this is in line with the national strategy which seeks to provide the majority of schools in the country with Internet connections. The telecommunications regulator (Commission Nacional de Telecomunicaciones, or CONATEL) included school connectivity on the annual plan that identifies UAS targets for funding from the Fund. 62 The Fund, FODETEL, has financed a number of school connectivity programs, including a US$ 469,000 project providing broadband connections and free Internet access to 74 schools in the Cantón Montúfar Municipality.[35] Such activity should also be well measured, focused on areas and communities with potential for sustainability in the medium term, and designed to be responsive to market forces, with several types of financial instrument that respond to entrepreneurial need, while not distorting or misdirecting embryonic and still emerging markets.[36]

Pakistan's USF does not fund schools directly, but has effectively aligned its infrastructure financing programme to the financing of school connectivity. In the Pakistani model, as part of the universal access strategy the successful bidder is given obligations regarding connecting educational institutions and communities. Included in this is the obligation to provide each higher secondary school, college and library in the area covered with the subsidy free connection, free broadband access for the first year, 5 personal computers in a Local Area Network and the training of 2 trainers.37 The same approach can be taken for other public institutions such as clinics and hospitals.

1.5.1.5 Demand: Funding Content and Applications

Most public financing, particularly through USAFs, has prioritized the rollout of infrastructure, and recently this infrastructure consists of wholesale transmission and broadband networks. In order to maximize the use of these networks, relevant content and applications must be available for consumers to use – this however is an area of funding that most USAFs have not delved into. The Kenya ICT Board which facilitates access, but is separate from the Universal Service Fund in Kenya, has several programmes to support local content development through the issuing of subsidies. It furthermore provides subsidies to support the development of applications, and for the subsidization of laptops for university students which will enable them to access the internet. As ICT sector strategies focus more on broadband uptake, it becomes critical that mechanisms are developed to promote the development of relevant, user friendly, culturally and linguistically sensitive information. Financing of content and applications can include funding:

- Local content production

- User friendly and graphics based interfaces

- Local content in local languages

- Shared content (e.g. tourism, education, e-government) that is locally relevant, where possible to a community level

A key aspect of successful demand side strategies, particularly those related to the promotion of relevant local content and applications, is the level of government buy-in and participation. Where government has become an "anchor tenant" for broadband networks in rural, underserved and unserved areas, it plays a key role in that it stimulates demand for broadband services. A rural municipality, for example, can use broadband to connect its main public school, library and post office. In so doing it stimulates demand, but also becomes a large customer, thus contributing to the profitability and sustainability of the broadband network.

1.5.1.6 So the question of "how much" is relative

In summary, there is no single answer to the question of "how much." The scale of funding required has a significant bearing on the type of financial instruments used, and on who is able to provide such funding. As an example, the deployment of a low cost

WiFi based municipal network with a payback period of two years can often be covered out of local government or municipality revenues. In contrast, deploying a multi-million dollar fibre optic cable system with a payback period of 10 or more years requires long-term financial commitments. [38] Depending on national universal access and service definitions, a combination of these types of projects is needed for countries to achieve their national universal access and service targets and meet the Millennium Development Goal (MDG) targets and World Summit on Information Society (WSIS) commitments that are to be achieved by 2015.

Importantly, in making this decision, it should be noted that non-infrastructure projects are also key. In certain projects such as those promoting applications and content, or those stimulating demand such as 'e-rate', telecentres or schools programmes, ideal funding may not include any infrastructure. CAPEX will relate to equipment and furniture. However in these cases funding of OPEX is even more critical.

1.6 Level of Subsidy: Providing the 'right' amount

Over time, and through experiences in other jurisdictions, it has become clear that the determination of the level of subsidy can be a complex exercise. Increasingly, process is being used to assess the level of subsidy rather than cost analysis on its own. Experience with cost based approaches to the determination of subsides have shown that the information asymmetry that exists between the government funder and the operators can affect the final determination of cost and lead to inefficient financing of projects. Cost analysis requires the regulator or government to have information on:

- Market data which is below national level, preferably on the area in which the service is to be provided.

- ICT access – which is more micro than readily available information on national penetration levels, i.e. public phones within the project area, telecentres/multi-purpose community centres, mobile access (network coverage, population coverage), mobile service (subscribers), fixed lines, internet access (home, business, and shared), and broadband access (home, business, and shared).

- Geographical information on the project area – terrain (mountains, hills, valleys, forests, deserts, etc) which will impact network planning and the

costs of constructing a network, as well as the technology choice

- Population centre's and total population – total population of the region, area, major population centres and levels of urbanization

- Network planning and costs which are based on amongst other things, the terrain, the network plan needed to cover the area to serve the estimated demand (i.e. cell size), which in turn determine the number of base stations that need to be built, amongst others.

Proper cost analysis requires a range of skills that the regulator may not have including network planning, and cost analysis. Even in developed countries like Australia and the United States (See Box 7) where regulators are relatively well capacitated, operators have far better knowledge of the costs of their own operations. To address this asymmetry, and the risks associated with relying only on operator data, particularly when it may be in the operators' interests to inflate costs in light of the potential subsidy that may result, least cost subsidy approaches have been taken

to financing universal service and access in many countries.

1.6.1   Least Cost Subsidies

Where a Universal Service Provider is not designated up front, Fund Administrators have to find ways to determine who will be responsible for providing infrastructure or service on a project by project basis.[39] Determining the level of subsidies, and the recipient, is now commonly done through conducting a competitive bidding process or reverse auction for a least cost subsidy. The approach broadly is for the regulator, universal service fund administrator or Ministry, as the case may be, to follow a 5 step approach:

- Define the scope of funding which includes the national objectives, target area or population, and levels of funding available for the public subsidization programme or project, whether it is funded through a Fund or a Stimulus Plan offshoot.

Box 7: Changing Approach, US and Australian examples

Shifting Away from Detailed Cost Modelling

Because of the complexities related to cost modelling, while it is acknowledged that it assists regulators, Fund Administrators and Universal Access Project Financiers to assess costs and arrive at the maximum subsidy, it is no longer a requirement to engage in costly, time consuming and often complex cost analysis to arrive at a cost-based subsidy; rather reverse auctions coupled with benchmarking, or use of cost modelling tools can be used to enable them to award least cost subsidies.

United States

The United States recently reviewed its US funding system for high-cost areas. Over the past decade, total high-cost funding has quadrupled to US $ 7 billion per year. As part of the review, the Federal-State Joint Board is considering introducing auctions, based on the experience of developing countries, but modified to suit the United States' conditions. This will determine the amount of funding that would be available. Many commentators believe that auctions are better than administrative approaches for this purpose

Australia

In Australia, the move away from a cost modelling approach in the last decade required a legislative amendment. In 2000, an important amendment to the legislation was introduced – the formula for calculating the Net Universal Service Cost, which was previously the fundamental element of USO subsidy calculations, was not included in the amended legislation. The amendments do not prescribe any methodology for calculating or otherwise establishing, USO subsidies. Rather, the legislation simply provides for the Minister to determine USO subsidies, having regard to advice of the ACMA[40]. The Minister may determine subsidies for the supply of services under the USO in a universal service area for up to three years in advance using a number of approaches including least cost subsidies/competitive bidding.

Source: HIPSSA/SADC Toolkit on Universal Service Funding and Universal Access Fund Implementation (2011)

- Prepare and publish, through an open tender process, a Request for Proposals or Invitation to Apply for the subsidy. This can be a one-step or a two-step process, depending on whether there is a need for a pre-qualification phase. This type of bid has been issued by the USPF in Nigeria, the Universal Service and Access Agency in South Africa, the USF in Pakistan and the USOF in India over the last few years. It is important that the tender is competitively, technologically and service neutral so that the outcomes are unlikely to distort competition.

- Evaluate bids in response to the request. The bids can compete on service as well as on price – the objective being to provide the most for the least subsidy from the government. A winner is selected through an open and consultative process.

- Contract the winner using an outcome based approach (see box XX).

Monitor and evaluate the investment to ensure the expected 'return' in both social and financial terms as discussed in Section 9.

1.6.1.1   Keeping the funding requirements low

Based on global experiences, primarily in developing countries and emerging markets, some key strategies have been identified to get operators to rollout services for as little subsidy as possible – in some countries the subsidy has been as low as zero. This was the case in the Dominican Republic where frequency spectrum was used as an incentive and a win-win situation was created when the competitive bidding process culminated in a zero subsidy. In Chile, where the competitive tender allowed new entrants and offered new licences, Chile's successful bidder

accepted zero subsidies and used the process as a means to enter the market and access spectrum. In this case, linking the universal service objectives to something that the operators wanted (license rights) to provide to be incentive enough such that the financial incentive (subsidies) was secondary. The Fund thus achieved its objective by working with the regulatory regime and without disbursing funds for that project.

Other strategies to encourage bidders to compete and bid low subsidies thus reducing public support include:

- The proper design of attractive bidding areas, sometimes called bidding "lots"

- Bundling opportunities to encourage economies of scale. This would enable successful bidders to provide adjacent services to the one bid. This may not be applicable in countries such as Tanzania, Malaysia and the United Kingdom where a converged framework is in place or under development, this is a lesser consideration where licenses are technology and service neutral and operators may provide any service using any technology – as such bundling internet services and voice services, or public payphones with internet POPs may be inherent in the licensing regime and thus in the bidding process.

- Coupling the award of the subsidy with other licence rights. For example, offering reduced cost use of radio frequencies to the winning bidder. In the SADC region, access to frequencies such as WIMAX in the 2.5/2.6 GHZ and 3.5 GHz bands is coveted. In many countries, these technology opportunities could be used to facilitate universal service;

Box 8: Overview of OBA	
Output Based Aid Principles	**Benefits of Output Based Aid**
• Ensure that the subsidy is linked to specific measurable targets • Contract services out to a third party which receives a subsidy to meet the stated objectives • The Fund pre-finances the project (in tranches) until delivery • Link payments to delivery • Subsidies must be performance based – payment is made only after services are rendered and audited	• Transparency increases efficiency and effectiveness • Performance risk is carried by the provider (recipient of funding) and accountability is increased • The subsidy (and possibly subsidy award mechanism) incentivize the private sector • Results can be tracked and measured through a focus on outputs/ results
Source: World Bank	

- Allowing the winning bidder to provide other services (i.e., a service-neutral approach); and

- Mandating infrastructure sharing, both for transmission and access such as towers for mobile networks, which will reduce the costs for the successful bidder, and increase efficiency.

- Competitive least cost subsidy bidding is used as a project selection method in many Sub-Saharan African countries such as Malawi, Tanzania, Mozambique, Madagascar and Lesotho,[41] and in South America, Colombia, Guatemala, Dominican Republic, Peru and Chile. Nepal and India are amongst the Asian countries that have used this approach.[42]

1.6.1.2   When to use least cost subsidies

While least cost subsidies represent a good approach, it should be noted that this approach is not a 'once size fits all' approach; it should only be used for certain types of projects such as–

- Where large capital investments in networks are required;

- Where large sums of subsidies to be disbursed (e.g., starting from several hundred thousand dollars to several million); and

- Where companies are subsidy recipients.

For projects such as user subsidies or smaller scale projects, lengthy and expensive least cost subsidy processes may not be necessary. Telecentres and Multi-Purpose Community Centres may in certain areas be an example, especially since the costs are easier to derive. In such cases fixed subsidies may be appropriate.

1.6.2   Fixed Subsidies through an open tender

While minimum subsidy allocation has been proven to be an effective OBA-based mechanism to finance projects, other approaches can also be improved that encourage efficiency. For example, the Fund can indicate that a certain amount of funding is available for projects relating to a specific universal service challenged. The Fund Administrator sets a fixed subsidy and awards the funds to the operator that provides the most comprehensive service for that subsidy – this approach is likely to work for smaller projects where the costs can be assessed ahead of time with reasonable accuracy by the Fund Administrator, and for "bottom up" projects where costing information can be provided by the project initiator (usually at community level).

As such, in the case of a smaller project, if X amount is available, the operator that can provide the most internet connections, computer labs, of connect the most clinics, for that amount would be awarded the project. A business plan would have to be provided to allow the Fund Administrator to confirm the viability of the project, and the award would still need to be accompanied by a contract and service agreements (See Figure 5). Fixed subsidies are also appropriate when the Fund is dealing with non-infrastructure projects, i.e. projects for financing users' needs, as is the case increasingly for broadband projects looking at the demand side. These Funds would include fixed subsidies to elderly people, or people with disabilities who would be entitled to a monthly or annual subsidy to cover usage costs. The subsidy is likely to be given to the operator and a discount issued to the consumer for ease of administration.

The concern that has been raised relating to this approach is that it risks being seen as not transparent. This is in light of the fact that finance is likely to be provided on a first come first served basis; or on the basis of subjective "competitive bidding" criteria such as the impact of the project, the track record of the project initiator, the lowest requested subsidy or the perceived economic and social impact of the project. This, in the case of small, bottom up and user needs projects, should be weighed against the lack of efficiency, potential bureaucracy and complex processes associated with reverse auctions and smart subsidies. Regardless of the approach, the principles of OBA should be respected.

Figure 6: Key Bidding Documents

Process Initiation (to Open the process)	In Process Documents (For decision making)	Completion Documents (For Project Implementation)
• **Expression of Interest** or Request to pre-Qualify • **Request for Proposals (RFP),** also known as the Bid Documents, Tender, or Invitation to Apply (ITA) • **Copy of Draft License** (if new license required/being offered) • **Copy of Draft Financing Contrac**t (t governing the payment of the subsidy) • **Service Agreement** (can be combined with Financing Contract) specifying targets and milestones • **Model Performance Guarantee** • **A bid bond /bank guarantee** provided by the bidder, ranging from 1 to 5 per cent of the maximum subsidy, to deter companies that are not serious bidders.	• **Mandatory Application Forms** • **Company registration documents,** founding documents, Articles of Association, and other legal documents • **Detailed Business plan** setting out the project approach, financial plan, marketing plan, risks and mitigation, subsidy details, community involvement , etc • **Detailed Technical Plan** setting out rollout plan, geographic and population targets, technology plan, etc.	• **License (**if applicable, and only if financing is linked to regulatory process) – a licence to rollout the infrastructure, operate the new network or provide the services if the bidder was not already a licensee • **Financing Contract** (governing the payment of the subsidy by the Fund) • **Service Agreement** (can be combined with the Financing Contract) – the contract (or Annex to the Financing Contract) which specifies the targets and milestones, technical performance requirements, services to be provided, quality of service, etc, as well as penalties and remedies for failure to perform. • **Performance Guarantee** to deter successful bidders from not complying with requirments/obligations

Source: Author

1.7 Learning from Experience – Reflecting on Lessons from USAF Management

1.7.1 Why Funds Work?

Public financing of universal service and access through means other than direct investment and ownership has been going on for twenty years when USFs were first introduced in Latin America. Much has been learned since then about what works in terms of public funding and what doesn't. Despite the myriad of options available for financing projects using public money, the case of universal service funds is instructive and lessons have been learned in over 60 countries that have Funds in place. In light of this a specific section of this paper dedicated to Funds is warranted. The range of USF implementations and experiences makes it possible to identify trends and principles that may be applicable for public financing in general across a broad range of countries.

Significant literature exists of fund establishment and management. In summary, the key principles of a successful Fund are accountability, transparency and efficiency. These principles support the key pillars to ensure sustainability of a project sponsored by the Fund, are similar to the pillars identified for OBA in general and can be summarised as follows:

• Alignment with the national regulatory and policy framework

• Good governance

• Technology neutrality in the design and implementation of projects

• An emphasis on market orientation, sustainability and entrepreneurship[43]

• Total Cost of Ownership ("TCO") approach and thus incorporation of support for applications, content and training and capacity building in addition to networks and services.

• Increased transparency through explicitly tying subsidies to targets and defined outputs of a programme, or in the absence of a programme then a policy;

• Increased accountability achieved by shifting performance risk (and thus project risk) to service

providers through amongst others well-crafted Service Agreements and contracts;

- Increased engagement of private sector participants, their capital and their expertise by encouraging them to meet identified gaps, often in partnership with the Fund;

- Encouragement of efficiency and innovative approaches through the design of projects which allow the service provides to design their own solutions through least cost subsidy schemes;

- Increased sustainability through the provision of once-off subsidies that are then linked to sustainable long term service provision;

- Decentralized, bottom up planning and project definition[44]

- Innovation and localization of projects and processes; and

- Effective monitoring through the alignment of payments to agreed deliverables/outputs by the service provider.

The above highlight the need for financiers to 'start with an exit strategy.' Through the above-mentioned elements of the project set-up, from inception to contracting to payment of subsidies upon delivery, the financier ensures that their exit from the project is clear upfront and that the project has increased potential of being sustainable.

The principle of defining an exit strategy is easier to achieve when networks or infrastructure are being subsidized than when subsidies flow to end users groups (e.g. schools, or persons with disabilities). In the case of end user group subsidies the likelihood of an 'on-going' subsidy is higher – the question in this case is generally related to availability and affordability.

1.7.2   Fund Challenges

Experience has shown that Funds are not the only public financing solution, nor, in some cases, are they the best one. A Fund's success is premised largely on its establishment and management. A successful Fund has to be built:

- at the right time, and

- on a solid foundation.

The *right time* is important – a Fund that is built outside of the right policy context without taking into account the liberalization of the ICT sector in a given country, the level of competition and the types of players in the market is unlikely to succeed. If the decision to establish a Fund is made, a Fund should be established as part of the market reform process, and as other forms of funding universal service and access like access deficit charges and cross subsidies are phased out. Countries implementing Funds also have to take into account the existing universal service and access framework, and must consider whether there is a framework for mandatory obligations. If so, important decisions on whether operators will be expected to "pay" or "play" or both should be made – these considerations will affect the structure of the Fund, its collections and its approach to disbursement.

Building a Fund *on a solid foundation* is critical. The institutional framework and governance model is important and regardless of the location of the Fund, i.e. in the Ministry, regulator, or independent, it should have at a minimum its own dedicated*:*

- Full time Fund Administrator/CEO;

- Board of Trustees or Board of Directors;

- Bank account; and

- Reporting procedures

It has been recognized that some of the shortcomings of Funds include the high administration and capacity requirements for the Government to administer this regime effectively. This is true in terms of Fund establishment where the Fund is a separate organization; it is also true with respect to disbursement of USAF monies. In countries where the Fund is part of the regulator, shared resources are used which can reduce the Fund to a department or unit, and thus reduce its priority if the regime is not properly administered.

Box 9: Why Some Funds Do Not Work

Some of the pitfalls of public financing have been evidenced in the implementation of USAFs in various parts of the worlds. There exist examples of Funds, in particular, which have:

- determined levies, over-collected and under-spent;

- determined levies and overspent, i.e. provided subsides for unsuccessful projects, or for inefficient use in projects;

- become involved in project *implementation,* through rolling out telecentres and in some cases networks;

- not made their collections, and disbursements public on a periodic basis; and

- submitted funds to a central fund in Treasury/Ministry of Finance where ICT sector contributions have been used to subsidise non-ICT sector projects (e.g. road projects, property projects)

By their very nature, and in light of the fact that they collect significant amounts of money from the ICT sector, Funds attract attention and risk. The most commonly identified risks facing publically funded projects include[45]:

- Implementation of projects that distort the market;

- Creating dependence on on-going funding (subsidies that are not "smart");

- Potential abuse of funds;

- Potential mismanagement of Funds;

- Favouritism; and

- Project failures which waste resources.

Source: Author and ICT Regulation Handbook

1.7.3 Disbursement Backlogs

Disbursing funds has been found to be a challenge that is equal to, or in many cases greater than collecting them. It is argued that between 1998-2006, only 26 percent of USAF funds collected globally had been redistributed to the ICT sector for use on universal access projects.[46]

Regulatel,[47] the regulators' association in Latin America, found that in the 13 Latin American countries with Funds, the amounts collected ranged from USD 1 million in Ecuador to USD 1,8 billion in Brazil at the time (now reported at over 5 billion).; and only 7 of the 13 countries have actually disbursed money from their funds. Notably, unlike the other countries which have disbursed under 45 percent of the money collected, Chile, Mexico and Paraguay had spent over 95 percent of the money collected. The picture painted in Sub Saharan Africa is a similar one.

Emerging markets such as Inia, Pakistan, Mexico, Brazil, Nigeria and Ivory Coast have fared well in respect of the ability to disburse the monies in the USAF. In addition, in the EU where public aid has been provided in terms of the Recovery Plan and through mechanisms other than USAFs, disbursement levels to date are quite high. In 2010, the European Commission adopted a record number of 20 decisions covering aid for broadband development in, among others, Catalonia, Finland and Bavaria, authorising the use of over €1.8 billion (USD 2.55 billion) of public funds for broadband development.[48] Excluding national funding (provided by a specific country on a country by country basis), between 2007 and 2013 a total of €2.3 billion (USD 3.25 billion) was allocated to broadband infrastructure investments and €12.9 billion (USD 18.3 billion) to information society services through the EU Structural Funds,; and a further €360 million (USD 510 million) was issued through the Fund for Rural Development and used for broadband funding. The EIB invested in 2009 €2.3 billion (USD 3.25 billion) (a total of €12 billion (USD 17 billion) in the last decade) in broadband infrastructure.

Table 4: Spending the Money...

Sample Disbursement of Universal Service Funds			
Country	**Collected (USD)**	**Disbursed (USD)**	**Comment**
Brazil	5.21 b	3.54 b	-
Hungary	13.2 m	12m	
Côte d'Ivoire	28.14 m	16.65 m	National Rural ICT Project
Nigeria	246.66 m	196.66m	Accelerated mobile expansion programme, ICT enabled learning programme, rural broadband internet programme
Rwanda	6.6m	3.68 m	One Laptop Per Child
Mexico	75 m	65 m	
Australia	148.59 m	148.59 m	-
India	6995 m	2305 m	Rural phones, broadband connectivity support and mobile services support
Japan	693.1 m	693.1 m	-
Malaysia	1.35 b	1.05 b	Community broadband centres and libraries

Source: ITU World Telecommunications Regulatory Database, based on country responses to the annual telecommunications/ICT regulatory survey.

While disbursement of funds is an achievement, it is important to understand what makes some countries able to disburse monies to projects swiftly and effectively. It seems that the common characteristics of markets with disbursement success stories such as Sweden, Pakistan, Finland and India include

- clear rules,

- effective public consultation processes, and

- transparent administrative processes.

In addition good governance is important – since its dismantling in 2010, the Pakistani Fund has not made

the same level of progress with respect to universal access and service.

It is critical that financing is provided in line with the good governance principles discussed earlier. In the United States, despite high levels of disbursement, utilization of funds by the Fund has been plagued by concerns around governance, prioritization and efficiency with respect to the use of the funds. The USA is reforming its Fund to address concerns, particularly in High Cost Areas, relating to the reasons for the increase
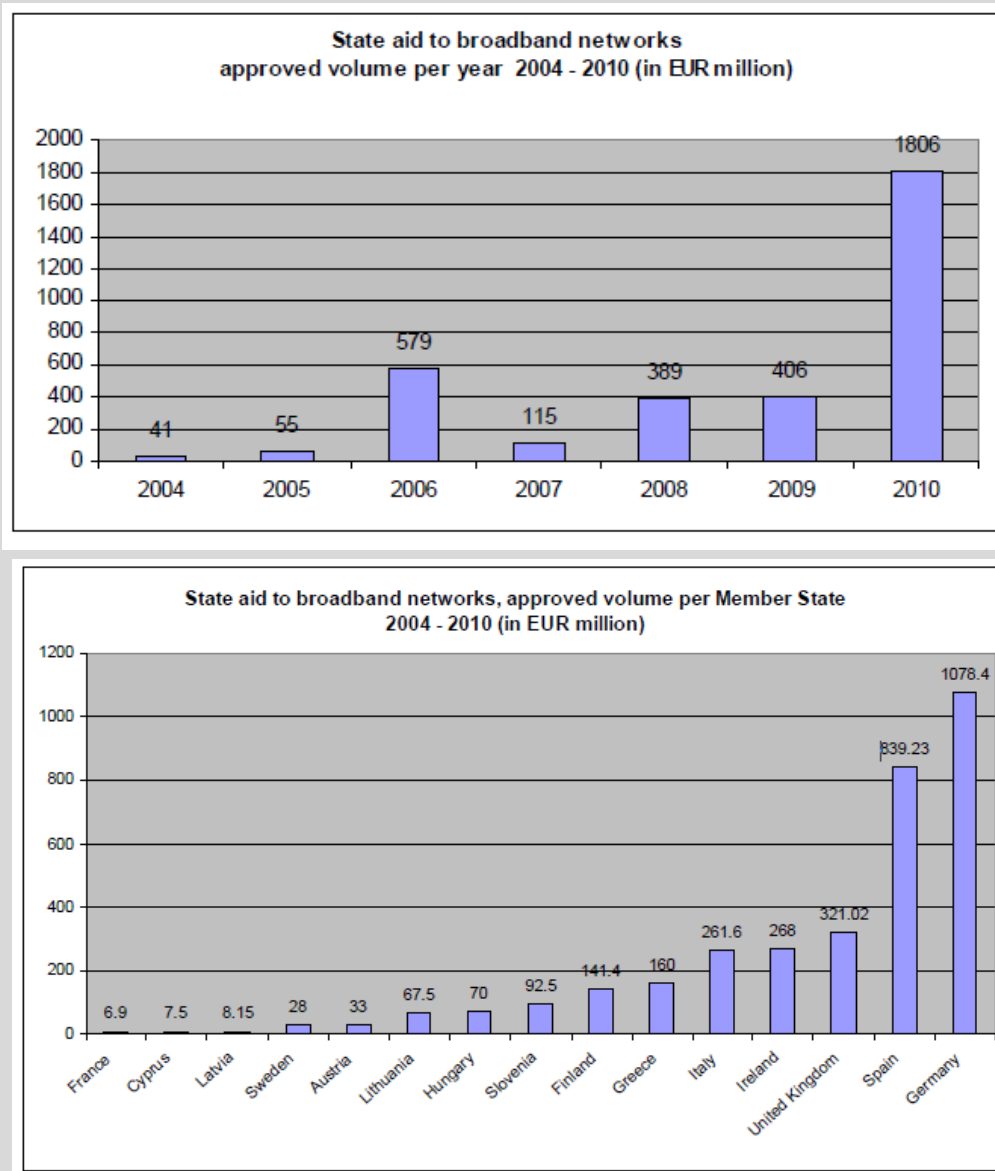
in subsidies in high cost areas over the past decade for these very reasons.

The disbursement approach will depend on the project being undertaken. This is important to note upfront and in the operating manual to ensure transparency, clarity and stability in the framework. In Uganda the level and process framework was decided upfront, and based on the level of subsidy required. A higher subsidy (above $100,000) requires:

- A larger project

- A more complex, more open process for larger subsidies (open tender)

- Fewer Bidder eligibility restrictions (international and local)

In another case, in Ireland, the UAS scheme design for the provision of broadband using public financing involved detailed considerations of the requirements that should be placed on the successful tendered, and how these would affect the broadband market (so as not to distort it).

Figure7: EU Disbursement – Approved State Aid for Broadband in EU (2004 – 2010)

State aid to broadband networks
approved volume per year 2004 - 2010 (in EUR million)

State aid to broadband networks, approved volume per Member State
2004 - 2010 (in EUR million)

Source: EC State Aid Scoreboard, Spring 2011 http://ec.europa.eu/competition/state_aid/studies_reports/2011_spring_en.pdf

In developing countries the disbursement problem does not tend to be one of overfunding specific projects, in part due to the fact that unlike the United States, most developing countries and emerging markets have adopted the least cost subsidy approach to financing projects. In developing countries the challenges around disbursement have related primarily to fund management and administration and have included issues such as under-spending, carrying over funds from year to year, and depositing funds with national Finance departments which has led to the funds being used to finance non-ICT projects and initiatives.

1.7.4   Speed of Financing

Another challenge with respect to the utilization of the Fund is the speed of financing. In Latin America, Regulatel found that there are 5 main reasons for countries being slow to finance projects, namely:

- where the Fund is located with the regulator, the regulator doesn't prioritise universal service;

- the speed of the political process, governments fail to pass enabling legislation, or hold back approvals for funds to be spent;

- the time needed to design, evaluate and assess and implement projects is significant;

- Since the projects are often considered 'public investments' they are subject to lengthy approval processes as any other process utilising public funds;

- disbursements may be subject to additional constraints from third party organizations such as the IMF and World Bank

These challenges are not unique to Latin America and have been evidenced in specific Fund cases in Sub Saharan Africa and Asia.

1.7.5   The Future is Expensive

Recently, as countries have begun to focus on infrastructure rollout including broadband and fibre optic network rollout, and the rollout of Next Generation Networks it has been found that while these projects will increase universal access from either a supply side (e.g. fibre optic networks) or a demand side (e.g. telecentres, school or clinic connectivity), the monies available in the Fund, or anticipated to be collected by Funds, are not likely to be sufficient to finance rollout. As a result, for larger and more costly projects, regulators and policy makers are finding that Funds 'don't work' or where they have not been tested it is likely that they 'won't work' – they are not appropriately placed to finance or otherwise support the projects – and alternative funding mechanisms become necessary.

Thus, even where Funds remain relevant, it is recognized that they are not well suited to address all universal service and access challenges, due to high investment requirements and particularly high cost infrastructure projects. The risks set out above are true of financing of universal access projects in the ICT sector generally regardless of the type of funding.

1.7.6   The Bright Side

Rather than seeing the potential weaknesses of Funds as an indication that they are doomed; or considering that the presence of other financing options is a challenge to the viability of a USAF model, these additional sources of universal access funding can be seen as partners of Funds – their role is complementary to that of the national USAF. Whether the commitment to provide access arises from license conditions, a Public Private Partnership contract, or a concession or contract arising from a USAF bidding process, it is clear that the private sector is considered the main delivery arm for universal access. The role of the public sector, in the form of the regulator in the case of license conditions, the relevant national,

provincial or local/municipal government department in the case of a PPP, or the Fund Administrator in the case of a USAF project, is to provide vision and guidance to meet social and developmental needs, to act in the public interest, and to select appropriate partners to work with in achieving such objectives.

As such, in addition to fulfilling their current mandates where this has not been done, as stated in the ITU-infoDev ICT Regulation Toolkit, USAFs in the next generation could move in two main directions, namely:
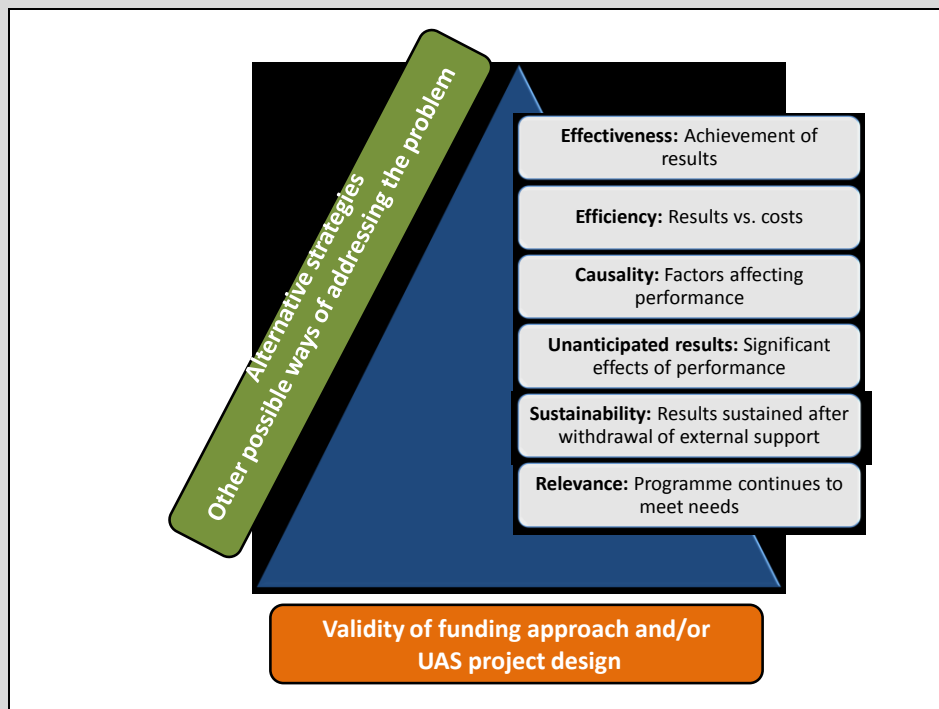
- An increase in importance and role as a facilitator and coordinator which acts as stimulating force for the market, piloting innovative rural service and application concepts, creating demand for advanced ICT connectivity and services (e.g. through financing broadband access for schools, more direct support of users and applications) and an enabling environment; and

- A funding mechanism for broadband networks into rural and unviable areas through support both at the retail end (e.g. shared access), as well as at the wholesale end (e.g. through intermediary network facilities such as backbones, wireless towers and other passive infrastructure).

These approaches will be most effective if pursued in collaboration with other ICT sector financiers such as NGOs and development partners which can furthermore play a critical role in financing and facilitating applications and capacity building rather than network reach.

1.8   Monitoring and Measuring: Ensuring a Return in Investment ("ROI")

Financing universal service and access must be approached in a strategic and coherent manner for it to be effective and deliver the desired ROI which can be defined by the public sector in terms of not only revenues, but social and economic impact. Universal service and access funding's role does not end at the allocation of monies regardless of what type of funding is provided and through what model, i.e. a PPP, equity funding or public funding– the UAS financier should follow the projects that have been implemented, monitor them and evaluate them. Only through an analysis of the effectiveness and efficiency of the funding and the related projects can a proper assessment be made. This includes considering what was expected to happen, and the unintended consequences, both negative and positive, of projects driven by public funding.

Figure 1: Monitoring and Evaluation: Measuring 'ROI'

Alternative strategies
Other possible ways of addressing the problem

Effectiveness: Achievement of results

Efficiency: Results vs. costs

Causality: Factors affecting performance

Unanticipated results: Significant effects of performance

Sustainability: Results sustained after withdrawal of external support

Relevance: Programme continues to meet needs

Validity of funding approach and/or UAS project design

Source: Adapted from Core Evaluation Objectives, ILO, 2007.

1.9   Conclusion

In conclusion, while the technologies that are being introduced today are new and their applications are innovative, it is increasingly clear that the fundamentals relating to achieving and financing universal service and access remain essentially the same. Unlike in the 1990's when universal service funds were first being developed, and alternative funding models were still being explored, ICT sector policy makers, regulators and Fund Administrators now have almost two decades of experience with universal service and access policy and with financing universal service and access to draw upon as they tackle the challenge of bridging of the impending broadband divide.

This paper has introduced the various types of ICT financing and in particular has considered the different flavours of public funding and how they apply in a broadband context. It has demonstrated that while properly constituted and managed Funds are a viable option, they are not the only option for financing high cost networks in what are considered 'high risk areas'; nor are they the only approach to financing the demand side – users, devices and content. A positive return on investment depends on having the private sector play its part in rolling out, and where feasible, self-financing broadband rollout. Achieving high ROI relies furthermore on having the right policy and regulatory framework in place – one that does not distort the market. Thus equity investments, financial incentives and subsidies, and PPPs can best be applied only where the market is well understood, where it is clear what supply side and demand side levers need to be pushed in order to get the desired result.

To achieve this, in addition to good governance and good project design, monitoring and evaluation are key. These are factors that have been present in successful USAF frameworks, where Fund Administrators have had successes in collecting sufficient funds, and disbursing them in a manner that is aligned with the universal access and service strategies and definitions in place, and to meet the national goals and targets which increasingly include access to narrowband internet and broadband.

1   The World in 2010, ITU www.itu.int/ITU-D/ict/material/FactsFigures2010.pdf

2   The World in 2010, ITU www.itu.int/ITU-D/ict/material/FactsFigures2010.pdf

3   Throughout this paper, reference to broadband implies a speed of over 256 Kbits/sec which is the minimum broadband definition.

4   Defined as over 256 Kbit/second.

5   World Bank based on TeleGeography and Wireless Intelligence Databases

6   ICT Regulation handbook, Chapter 5 dealing with Universal Access and Service www.ictregulationtoolkit.org/en/Section.3116.html

7   Internet Policy, www.i-policy.org/2010/09/costa-rican-constitutional-court-declares-internet-access-a-fundamental-right.html

8   assemblee-nationale.fr/13/dossiers/protection_information_consommateurs.asp

9   Communication from the European Commission, European Broadband: investing in digitally driven growth (2010), available at: http://ec.europa.eu/information_society/activities/broadband/docs/bb_communication.pdf (Last visited March 29, 2011).

10   See Katz, GSR 2010 where the concept of "critical mass theory" with respect to broadband is discussed. In terms of the theory, due to network effects, the economic impact of broadband is said to increase exponentially with penetration of the technology.

11   Qiang, Christine Zhen-Wei, and Carlo Rossotto. 2009. "Economic Impacts of Broadband." In Information and Communications for Development 2009: Extending Reach and Increasing Impact. World Bank Publications; and Katz, ITU GSR 2010 www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/GSR10-paper1.pdf

12   Katz, ITU GSR 2010 www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/GSR10-paper1.pdf

13   Brazil – Bill 1481/07 proposes to allow resources from the Fund for Universal Telecommunications (FUST) to be used to extend broadband coverage.

14   Communication from the Commission: Community Guidelines for the application of State Aid Rules in Relation to Raid Deployment of Broadband Networks, 2009/C235/04, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2009:235:0007:0025:EN:PDF

15   South African National Treasury's Public Private Partnership Manual ppp.gov.za/Documents/Manual/Main%20Intro+Contents.pdf

16   "market efficiency gap" and "true access gap" as discussed.

17   2009/10 Budget Vote Speech, Deputy Prime Minister and Minister of Finance, June 2009. www.statehousekenya.go.ke/economy/budget2009-2010.pdf

18   www.ictregulationtoolkit.org/en/PracticeNote.3157.html

19   www.fiberopticmania.com/2011/04/access-fiber-optic-network-cost.html; and OECD, Public Rights of Way for Fibre Deployment to the Home (2008) at www.oecd.org/dataoecd/49/9/40390753.pdf

20   KPLC. "KDN leases KPLC dark fibres" Press Release, March 18, 2010. www.kplc.co.ke/fileadmin/user_upload/kplc09_files/UserFiles/File/Press%20Release%20-%20KDN%20leases%20KPLC%20dark%20fibres.pdf

21   www.bmwi.de/English/Redaktion/Pdf/broadband-strategy,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf

22   Effective Regulation: Stimulus Plan for the ICT sector, GSR 2009 (page 4).

23   www.ucc.co.ug/rcdf/index.php

24 www.broadband.gc.ca/pub/program/ index.html

25 http://ec.europa.eu/competition/consultations/2009_broadband_guidelines/index.html

26 Economist Intelligence Unit's Government Broadband Index (gBBi) which assesses countries on the basis of government planning, as opposed to current broadband capability; and A Hepworth and L Wilson, Taxpayers Lead the World in Funding Labor Broadband Bill. The Australian, www.theaustralian.com.au/national-affairs/taxpayers-lead-the-world-in-funding-labor-broadband-bill/story-fn59niix-1226003302845

27 Australia, USA, Canada, France, Italy, Czech Republic, Bulgaria, South Korea and Oman (see GSM Association Universal Service Report).

28 Lie, Eric. 2007 GSR Discussion Paper: Next Generation Networks and Universal Access – The Challenges Ahead.

29 Katz R, 2009.

30 www.ictregulationtoolkit.org/en/Publication.3512.html

31 www.ashurst.com/publication-item.aspx?id_Content=5690

32 www.telegeography.com/products/commsupdate/articles/2011/03/10/i3-africa-announces-plans-to-connect-2-5-million-homes-to-fibre-within-five-years/

33 www.ptclworkers.com/news/ptcl-and-usf-join-hands-for-development-of-telecommunication-services/

34 www.ictregulationtoolkit.org/en/Section.3289.html

35 Connect a School, Connect a Community – **Error! Hyperlink reference not valid.**

36 www.ictregulationtoolkit.org/en/Section.3286.html

37 USF Pakistan Success Story, Pravez Iftikhar, USF CEO, presentation (www.itu.int/ITU-D/asp/CMS/Events/2010/Thailand-Broadband/Session4_Parvez_Iftikhar.pdf

38 http://infodev-study.oplan.org/the-study/folder.2006-02-02.6810074519/5-3-overview-of-types-of-financing-models/

39 Sepulveda, E. ITU Report on Universal Service Funds in the Sub-Saharan Africa Region (2010).

40 **Error! Hyperlink reference not valid.**

41 EU/ITU Universal Service and Access Toolkit for SADC, 2011.

42 www.gcbpp.org/files/Academic_Papers/Wallsten_global_reverse_auctions.pdf

43 New Models for Universal Access, page 202.

44 New Models for Universal Access, page 203.

45 www.ictregulationtoolkit.org/en/Section.3296.html

46 GSM Association, 2009.

47 Regulatel membership comprises 19 Latin American regulatory agencies from Central and South America and Mexico. The organization was created in 1997 "to promote cooperation and coordination of efforts, and to promote the development of telecommunications in Latin America." Its structure includes a Plenary, a President, the General Secretary and a Management Committee. See www.regulatel.org/

48 See Complete list of EC decisions at http://ec.europa.eu/competition/sectors/telecommunications/broadband_decisions.pdf