



UNIVERSAL ACCESS AND SERVICE FUNDS IN THE BROADBAND ERA: THE COLLECTIVE INVESTMENT IMPERATIVE



The OLPC laptop being introduced to children in Haiti (Photo credit: One Laptop per Child, CC BY 2.0)

May 2015

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1. CONTEXT

The topic of universal access to Information and Communication Technologies (ICTs) and Services has received considerable attention in recent years, as the role of ICTs has become central to the economic and social development goals of governments around the world. Particular interest in this subject has focused on developing and emerging economies, and on the status and impacts of Universal Service and Access Funds (USAFs) as a key financing mechanism to spur ICT investment and expansion in unserved and underserved areas. As many countries adopt more comprehensive Broadband Strategies, the role of USAFs in spurring broadband infrastructure and market growth has taken on new significance, and new challenges.

This paper offers a summary perspective on the issues surrounding USAFs, particularly in the context of broadband development initiatives. It seeks to clarify some of the key questions surrounding the appropriate role that USAFs can play, and the capacity building and collaborative support that most Funds require to perform effectively.

2. UNIVERSAL ACCESS/SERVICE THEORY AND PRACTICES

2.1 Evolution of Universal Service Principles and Policies

The importance of ensuring universal availability and use of modern communications services has been recognised as a key element of public policies for more than a century. In pure economic terms, the “network externalities” that arise from expanding the base of users connected to such services ensure that increasing access results in greater overall value to all customers, suppliers, and society as a whole. From a social perspective, empowering citizens and communities to connect with each other, locally, nationally, and globally, magnifies the benefits of knowledge sharing and cultural integration immeasurably. These goals were implicitly understood even in the early stages of the development of telegraph and voice telephone networks, and were incorporated in the policies of public utilities such as American Telephone and Telegraph (AT&T), British Telecom, and most other original state-owned or sanctioned telecommunications operators throughout the 20th century.

As the telecommunications industry grew worldwide, these objectives were addressed initially in the context of the prevailing market structure, which accepted that telephone networks represented a “natural monopoly”. Governments and regulators therefore mandated that these operators cross-subsidise investment in high-cost or low-revenue services and market segments with excess profits and pricing from high-value segments. Under tight regulation, this model was moderately successful in ensuring universal basic telephone service (at least within advanced economies), while maintaining healthy industry incomes on average. However, as technological and policy advances reduced costs and broke down economic barriers to competition in telecommunications, the monopoly utility model – and cross-subsidisation of universal service – became unsustainable.

The era of widespread and growing telecommunications competition, beginning in the late 1980s, brought rapid innovation and meteoric cost declines to the industry, which combined to fuel exponential growth in customer demand. These trends helped greatly to expand universal access to communication services. Yet they also helped to highlight the lingering gaps that remained due to market failures, in both developed and, especially, less developed markets. The prototype policies for Universal Service Funds

(USFs) were drawn up to adapt the ongoing universality goals to these new market conditions.

2.1.1 Collective Investment

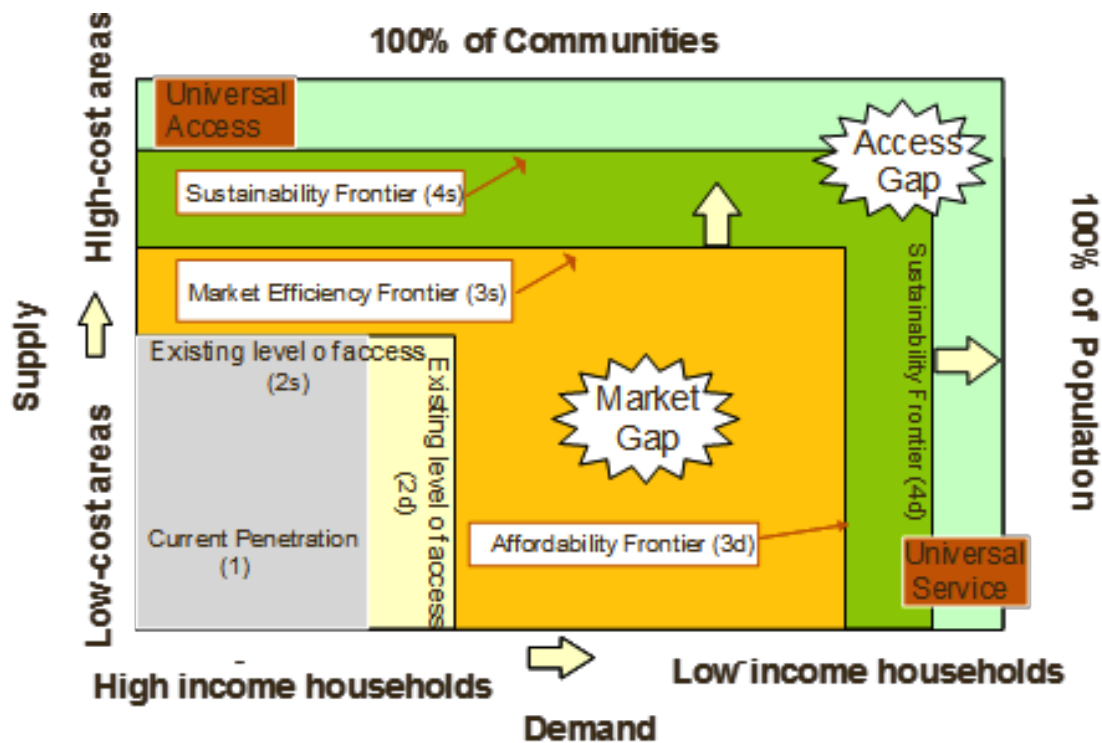
While mechanisms differ, the principles of USAFs are largely the same in most countries: the Fund collects mandatory contributions from firms operating in the competitive telecommunications market, then re-allocates those funds back to the sector, specifically to support targeted investments and other relevant subsidies for market segments (geographic and/or demographic) that have been overlooked or avoided by those same operators, acting on their own business strategies. The USAF provides financial incentives to particular contractors from the industry – typically through competitive bidding processes – to make the needed investments and to operate services for these unserved or under-served areas and groups. Ideally, the new services will become commercially sustainable following a fixed initial subsidy, although there are also cases of permanently subsidised services.

In this respect, USAFs represent a fundamentally different policy approach than traditional business taxation and government expenditures. Properly administered, a USAF in practice serves as a type of “collective investment” vehicle for the telecommunications industry as a whole, not a social welfare redistribution of private income. USAFs provide a mechanism for ensuring shared contribution by sector firms in market development that will ultimately benefit them all. Network externalities and interconnections dictate that, even when only one operator may receive a subsidy and develop a commercially viable service within a given area, all operators and other ICT suppliers will see increased business (e.g., inter-regional call revenues, equipment purchases, demand stimulation in general) arising from these service expansions. But since these benefits may be slower to materialise and spread across the entire sector, each individual provider may not perceive the incentive to invest independently. The USAF approach overcomes this market failure and also helps to ensure the wider social benefits of connectivity. Properly implemented, USAF policy thus achieves a “win-win” for industry and society alike.

2.1.2 Access Gap Theory

One theoretical framework for USAF interventions is the “Access Gaps Model,” which addresses the concepts of “*market efficiency gaps*” and “*true access gaps*” in ICT markets (see Fig. 1). These represent the intangible boundaries between areas where a given service is currently available, where market conditions *should* be able to provide service on a cost-effective, commercially sustainable basis, and areas where access will not likely be provided entirely by the market, without some form of subsidy or stimulus.

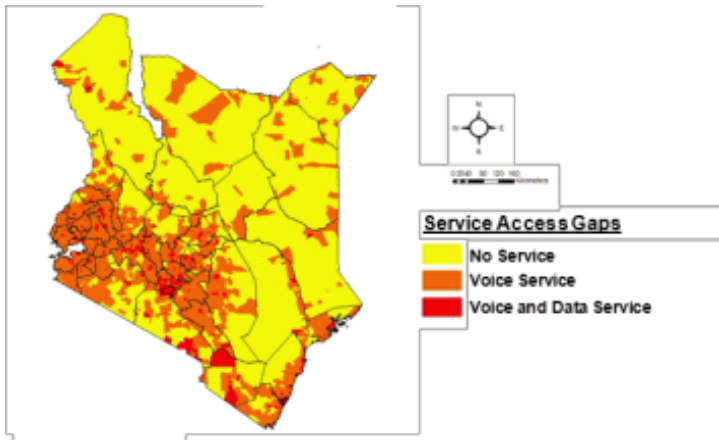
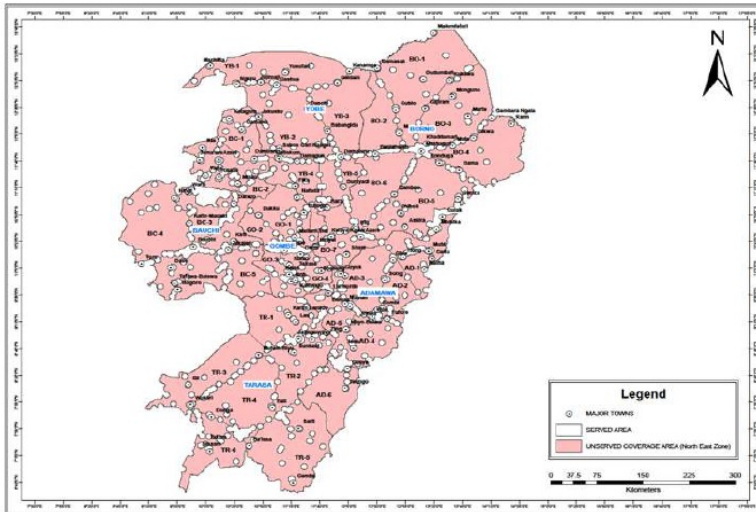
Figure 1: Access Gaps Framework



The USAF’s role is to identify these different gaps, and help bring together the resources needed to close them (see Box 1).

Box 1: Gap Analysis

Sophisticated study of network and signal coverage can identify the locations and size of gaps in access to ICT services, and provide a basis for targeting USAF subsidies and priority projects. The examples below illustrate results from mobile network gap studies in Nigeria and Kenya.



2.2 USAF Implementation Challenges

As telecommunications technology, markets, and policies have continually evolved, USAFs have faced a range of constantly shifting challenges, with mixed results in different contexts. The early and most well established Funds, such as the USFs in the

United States and Canada, were largely successful in ensuring telephone connectivity throughout their societies, even to extremely remote regions, while managing the transition to highly competitive markets.¹ Similarly, the European Union's Directives on Universal Service have helped to expand telecommunications access dramatically throughout the continent.² At the same time, the most prominent early Funds established in emerging economies in Latin America – in Chile, Peru, and Colombia, for example – also demonstrated the effectiveness of the collective investment model, bringing public telephone services to thousands of previously unserved villages, with private operators often leveraging the Funds' subsidies to build out infrastructure well beyond the initial Universal Service targets.³

In other countries, however, USAFs have run into a number of impediments to achieving their mandates to spur telecommunications sector growth and create more equitable access. Some administrations have established the mechanism for collecting contributions into a Fund, without successfully developing the procedures for allocating and disbursing the money back to the sector in an efficient and timely manner. In some extreme cases, Funds have been set up that have collected money without ever disbursing anything, in effect transferring the income to general government revenues as the equivalent of tax collections. Other Funds have displayed uneven track records in terms of the proportion of funds disbursed in relation to total amounts collected. The administration and monitoring and evaluation of Fund-financed projects have also sometimes been inadequate.

Over the past decade, a series of international reports and studies have examined the trends of USAF establishment, operations, collections, disbursements, and effectiveness, with mixed findings from various Funds around the world.⁴ While these studies have

¹ <https://www.fcc.gov/encyclopedia/universal-service>
<http://www.crtc.gc.ca/eng/contribution.htm>

² <https://ec.europa.eu/digital-agenda/en/universal-service>

³ <http://www.ictregulationtoolkit.org/en/toolkit/docs/Document/3511>
<https://www.itu.int/pub/D-REG-TTR.6-2003>

⁴ <http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/ITU%20USF%20Final%20Report.pdf>
<http://www.gsma.com/publicpolicy/wp-content/uploads/2013/04/GSMA-USF-Main-report-final1.pdf>

covered a wide range of diagnoses and prescriptions, there are several common threads that can provide lessons regarding the factors that most influence favourable and unfavourable USAF outcomes. Among these, the main conditions leading to dysfunction and records of low or non-disbursement are typically tied to the legal and political environment surrounding the Fund's creation and oversight. In some countries, establishment of the Fund itself, as well as the criteria and procedures for collecting and managing the contributions, has been impaired by legal disputes between players in the telecommunications industry and government, or between conflicting parties within the government. These conflicts can be compounded by a lack of clarity in enabling legislation and regulations regarding the Fund's mandate and operations, particularly where the Fund administration is not granted reasonable autonomy in its planning and spending decisions. Such confusion is not unusual in any country, and especially in many recently liberalised markets and developing societies, where the challenge of effectively navigating competing stakeholder interests – particularly when large sums of money are involved – can be particularly difficult.

2.3.1 Capacity Requirements

Where legal or political barriers to Fund performance can be reasonably overcome, however, it is clear that the most significant factor influencing Fund outcomes is the institutional capacity of the agency or unit charged with implementing the USAF strategy. In many respects, a USAF can be seen as equivalent to any other major financial institution, such as a commercial bank or investment fund: it manages large capital assets, evaluates and defines projects for investment opportunities, and provides financing to implementing contractors, whose operations must be overseen and evaluated to ensure the Fund's resources are well spent. In fulfilling this mission, the agency managing the USAF should thus employ human and technical resources of comparable quality and magnitude to similar organisations in the public and private sector. Such needed resources should include, for example:

- Appropriate and trained personnel, with sufficient skills and resources to perform the various essential roles (e.g., finance, market analysis, procurement, project management, monitoring and evaluation, etc.);
- Strategic planning and internal operating procedures, which guide management and staff, as well as public stakeholders, in the Fund's mission and activities;

- Adequate technical resources and support, such as internal equipment and software, field personnel and equipment, access to outsourced expertise, etc.;
- Cooperation with the ICT industry and government, to obtain necessary sector data, regulatory and policy support, and collaboration on partnership projects;
- Autonomy and authority in both administrative budgeting and allocation of Fund resources, without undue political interference or constraints and delays in budgeting and spending.

The models implemented by some of the world's most effective Funds, such as in Pakistan, Colombia, Mongolia, and elsewhere, demonstrate the importance of adequate Fund management capacity in effectively utilising USAF contributions and achieving ICT access objectives. In many cases, Fund administrations have benefited from targeted technical assistance by the World Bank, USAID, and other international agencies seeking to help improve USAF performance, with demonstrably positive results.⁵

Box 2: Pakistan's Universal Service Fund

Pakistan established an autonomous Universal Service Fund in 2007, operated by an independent state company with a mandate to allocate Fund resources toward achieving universal access to both basic telecommunications and advanced services, including broadband. The Fund is financed by a 1.5% levy on telecom operators in Pakistan. In its first five years of operations the So far Pakistan USF financed build-out of broadband Internet access to over 200 nearly 300 previously unserved towns and cities, as well as 800 about 1,100 high schools, colleges, and libraries. Fund investments have also supported extension of over 3,000 5,000 km of fiber optic backbone into remote areas of the country. (<http://www.usf.org.pk/>)

www.usf.org.pk

Regardless of past track records and trends, however, Universal Access/Service policies and funding are now facing new challenges in the wake of rapidly changing technology and market conditions. The next section examines the impact of these trends.

⁵ See e.g., http://pdf.usaid.gov/pdf_docs/pbaaa338.pdf

3.0 UNIVERSAL ACCESS IN THE BROADBAND ERA

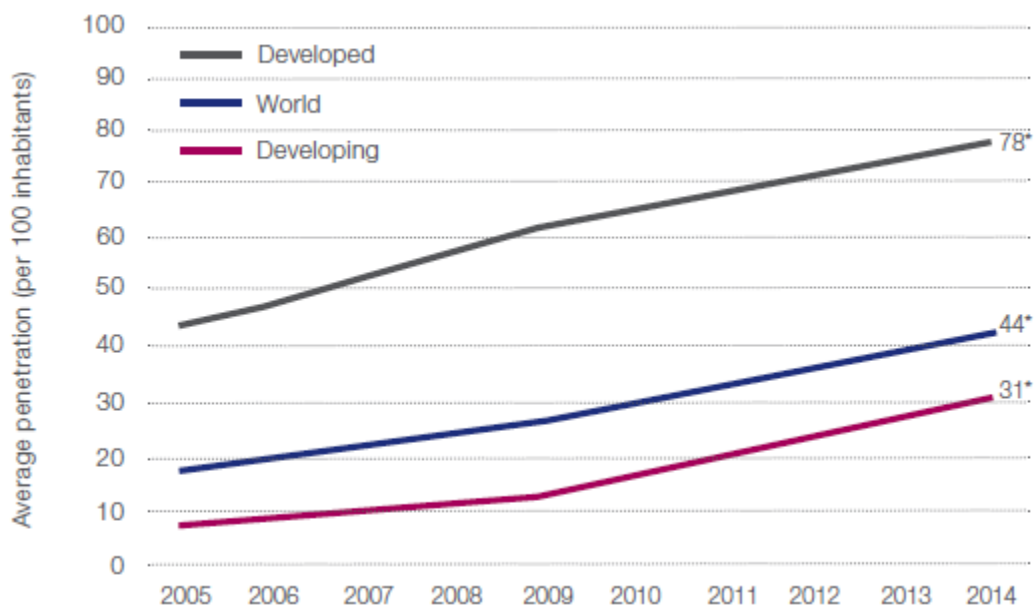
3.1 The broadband ecosystem and development strategies

The unprecedented advance of the Internet and broadband technologies, together with the accompanying transformational emergence of the global digital economy, have magnified the importance of universal access to ICTs, and highlighted the wide scope of the digital divide. The potential of broadband ICTs to spur economic growth and social opportunity is undeniable, and the integration of these technologies into all aspects of public and private life is one of the most dramatic and ongoing trends in the global economy.

Whereas the mobile revolution helped to expand access to voice (and text) communication to millions of new users largely through market forces, the same trends have been reversed in the digital broadband world. As high-end, well-to-do consumers, businesses, and economies have adopted broadband ICTs as the basis for wholly new structures of commercial and social interaction, lower income and isolated populations are becoming increasingly cut off from and marginalised by these 21st century paradigm shifts. Broadband Internet has blown wide open communications gaps that had been narrowing thanks to mobile phone expansion. While Internet penetration in the developed world has risen from about 40% to 80% over the past decade, penetration has yet to reach even 35%, on average, in less developed countries and the penetration rate in dozens of countries remains under 20% overall, with broadband usage far lower still (see Fig. 2).

Figure 2: Proportion of households with Internet access

(Broadband Commission Report 2014, citing ITU data)



3.1.1 Ecosystem Essentials

These disparities are far less likely to diminish solely through market forces, at least not with anything close to the speed of mobile telephone service growth. Analysts and policy makers recognise that effective access to broadband Internet capabilities involves an extensive set of interdependent elements, often identified as the “Broadband Ecosystem”.⁶ These components include both supply-side prerequisites (e.g., high capacity telecom infrastructure, equipment and devices, power grid, data storage and backhaul, etc.) and demand-side incentives (e.g., relevant and appealing applications and content, public awareness and end-user capacity building, affordability programs, institutional adoption), as well as critical public policy directives to create the framework for all of these features to be harmonised. Whereas implementation and adoption of cellular telephony has involved a relatively one-dimensional series of infrastructure investments and customer responses, critical mass adoption of broadband

⁶ See, e.g., <http://www.infodev.org/articles/broadband-strategies-handbook>

will require all of the components of the ecosystem to develop synergistically. This is what has happened over the past decade-plus in the most economically advanced markets, where the market foundations for the ecosystem's evolution were already in place; but these prerequisites are systematically absent in most underdeveloped economies, and especially among rural, low-income, and other disadvantaged populations.

With respect to the access gap analytical framework underlying Universal Access policies, this multidimensional broadband industry structure adds layers of complexity to the assessment of such factors as market efficiency, sustainability, and subsidy needs. For a robust ecosystem to take root and ultimately reach self-sustaining levels of socio-economic integration, there will need to be a combination of the basic technological foundations (largely supply-side) and a variety of demand-side inputs, which may evolve over time. The calculus as to total capital costs required to close identified gaps must take into account much more than just telecom network buildout to unserved locations; they must consider costs of devices, of institutional connectivity and even internal networking, of cloud data storage and transmission, and even of data security considerations. Estimates of demand response and related revenue projections will be far more uncertain in many cases as well.

In many markets, for example, broadband customer take-up has been quite slow, even in areas where services (*e.g.*, wireless broadband, public telecentres) are quite widely available.⁷ To competitive service providers, there may be little incentive to invest further in expanding networks or cultivating new broadband customers, if the current experience in existing coverage locations produces little evidence that the services will be profitable. These views create a self-fulfilling result, whereby operators' lack of investment, both in making new broadband services available and in marketing and promoting those services, ensures that substantial demand growth will not materialise. Even where broadband service access becomes available, for example through 3G network expansion, operators may not invest sufficiently in providing affordable smartphones, relevant applications, or customer awareness and capacity building to stimulate the natural ecosystem growth cycle, as any anticipated revenue growth from

⁷ See, *e.g.*, <http://a4ai.org/wp-content/uploads/2014/03/USAID-GBI-Final-Report-Ghana-Digital-Divide-Study-FINAL.pdf>

these efforts may be slow, longer-term, and shared with other firms not making similar investments.

In this environment, many governments have recognised the need to coordinate policies, plans and programs to support universal broadband objectives at a higher level than traditional telecommunications policy and regulation. There has been a growing trend toward the adoption of national broadband strategies, which seek to institutionalise such coordination across a wide cross-section of stakeholder groups – from public ministries and agencies, to local governments, corporate suppliers, small and medium enterprises, and citizen consumers of all types. Broadband ICTs represent a critical input to nearly every sector and, as a result, these strategies seek to define a set of integrated programmes, projects, and policies that will help catalyse broadband ecosystem development throughout society. The most robust strategies involve not merely high-level objectives and principles, but practical implementation and action plans that place specific responsibilities on all stakeholders to contribute to the collective goals of accelerating broadband growth and adoption nationwide. These broadband strategies address questions of which agencies, companies, or organisations will take lead responsibility for various concrete initiatives, and include monitoring and evaluation frameworks, as well as funding and financing sources.

Box 3: Broadband and Universal Service in Malaysia

Malaysia has been proactive in launching national broadband strategies for more than a decade, including the 2004 National Broadband Plan, supplemented by the 2007 National Broadband Initiative. Under these plans, the Universal Service Provision Policy and Fund has been a key contributor, as implemented by the Malaysia Communications and Multimedia Commission (MCMC). The USP program has successfully implemented a wide range of projects that have helped to expand broadband access in rural and underserved areas throughout the country. Specific initiatives include:

- Malaysia Internet Centres: Sustainable public access centres that provide connectivity, training, and content development for local communities;
- Malaysia Wireless Villages: Connecting over 5,000 villages with wireless Internet access;
- Community Broadband Libraries: High-speed Internet connections to rural libraries;
- Malaysia Netbooks: Providing free netbooks to low-income students and households, with over 1.4 million distributed to date.

<http://usp.skmm.gov.my/>

3.2 The role of USAFs in broadband strategies

In the context of national broadband strategies, USAFs have an important role to play, though some aspects of the traditional USAF model and approach may need to be modified – to be at once both expanded and more targeted – to fit most effectively within the larger strategic broadband development landscape. The core mandate of Universal Access/Service Fund policy remains the same: to channel collective industry financial resources toward investments that will fill gaps in access and stimulate overall market expansion. With so many intersecting elements feeding the evolving broadband ecosystem, however, the specific options for achieving that mandate are many and varied.

Box 4: Ghana's GIFEC and Nigeria's USPF

The Ghana Investment Fund for Electronic Communications (GIFEC) is one the most well established and successful Funds in Africa. GIFEC has received several awards from international agencies for its performance and effectiveness, and has recently achieved some of the highest levels of Fund disbursement in the world. Key projects have focused on a wide range of targets, including rural telephony, community information centers, access for schools, libraries, and post offices, and even ICT for sustainable fishing.

<http://www.gifec.gov.gh/>

Nigeria's Universal Service Provision Fund (USPF) is one of the largest Funds, which has collected hundreds of millions of dollars. In recent years, USPF has adopted a new Strategic Management Plan which has unlocked spending to support extensive new investments in infrastructure and public access projects. These have included hundreds of new base stations, School Knowledge Centers and Community Resource Centers, fiber backbone network, inter-university connectivity, and programs for e-health and e-accessibility. USPF has also developed an extensive national "cluster" database which identifies characteristics of access gaps throughout the country (see Box 1).

<http://www.uspf.gov.ng/>

At any given moment, a particular region, market segment, or target user group might face deficits in access to one or multiple key resources that the commercial market has failed to deliver. These can include infrastructure, equipment, applications, skills, awareness, and other vital inputs on either the supply- or demand-side. The USAF should, in principle, be one of the primary vehicles for reducing or eliminating any of those shortfalls. But the scope of potential needs is typically too great to expect even the most robust Fund to shoulder all of requirements unilaterally. Coordination among strategic partners and programmes must determine the best use of the Fund's resources in each unique context.

Some of the main options for a USAF's areas of focus within a broadband strategy include:

- Infrastructure expansion: Capital investment in construction of high-capacity telecommunications networks to reach remote, unserved areas. This may include support for extending fibre optic backbone links, as well as broadband “last mile” connections (wireline or wireless) into locations where low-speed or voice-only networks may be deployed. Such infrastructure investments might also incorporate buildout of electric power grids and access roads where needed.
- Rural community broadband connectivity: Support for dedicated broadband access connections, and related resources, for local community institutions in rural areas, such as schools, health clinics, libraries, and local government offices. Such projects may often include public access facilities such as community ICT centres and public WiFi signals, among other options.
- Affordable ICT device programmes: Discounts, payment options, co-financing, and other strategies to assist customers, including individual consumers and local public or small business organisations, to purchase the types of high-end devices needed to take full advantage of broadband services. Such a programme would typically be undertaken in coordination with parallel initiatives, such as broadband in schools, or local access connectivity in general.
- Other demand stimulation initiatives: Programmes to support public awareness and interest in adopting broadband services, where industry outreach and customer support may be inadequate. These may include community “digital literacy” initiatives to accompany deployment of broadband access (e.g., “follow the fibre” programmes⁸); publicity campaigns attached to the launch of e-government or e-education projects; support for small entrepreneurs developing targeted ICT applications, etc. Again, the Fund’s contribution would be aligned with those of other stakeholders, providing financing and expertise to fill specific identified demand-side gaps.

⁸ <http://defindia.org/def-signed-mou-with-intel-to-follow-the-fiber-program-for-digital-literacy-mission/>

Box 5: Colombia's Vive Digital Program

Colombia's Ministry of ICT (MinTIC) has established an extensive national broadband ICT development programme, Vive Digital, which has made dramatic progress in connecting hundreds of remote communities and millions of new users.

The programme incorporates a combination of investment in infrastructure, establishment of public access centres, expansion of e-government services, development of content and applications, and user capacity building. The programme has been implemented under the Dirección de Conectividad, with financing via the national USAF mechanism (formerly Compartel).

<http://www.mintic.gov.co/portal/vivedigital/612/w3-channel.html>

When many USAFs in developing countries were established few would have predicted that little more than a decade later their focus would need to change from voice to broadband services. In the early years, many funds were solely focused on closing gaps to voice services that were invariably found in rural areas. As a result the legal acts that established them and outlined their functions did not, for example, have provisions for their use in the development of broadband services in urban areas. In some countries legislative and regulatory changes will be needed in order to give USAFs the flexibility to support initiatives and programmes outlined in broadband strategies. The amendments should reflect the technology neutral characteristics called for in licensing regimes being used in the broadband era.

Future proofing ICT policy frameworks is of course a complex task in a fast changing and dynamic sector, but it is important that countries intent on using USAFs give due consideration to factors that are set to impact broadband adoption.

The process for deciding exactly how best to utilise the USAF's resources in the context of an overall broadband strategy should be collaborative and consultative, taking account of the strengths and weaknesses of the various participants in the sector. This will vary from one country to another. Ideally, the Fund administration brings to the table a combination of generally available funds to help subsidise the most worthy investments, and the expertise to evaluate the status of broadband access gaps and the

most critical needs to be addressed. As an example, most countries will prioritise ICTs in education as a core objective of the national strategy: in one case, the Ministry of Education may take the lead on procuring computer equipment for schools, while the USAF may concentrate on ensuring those schools have access to broadband connectivity. In another country, however, the Ministry of Education may not have sufficient budget to purchase computers, and the Fund may be asked to contribute directly to these costs. Similar options may apply to software, curriculum development, teacher training, etc. The broadband strategy should identify the most appropriate role(s) for the Fund, based upon the interests, resources, and collective priorities of all stakeholders.

3.3 USAFs are a vital tool to achieve Universal Broadband

As broadband ICTs become further entrenched as a critical engine of socio-economic development and opportunity, there is a growing need for governments, industry suppliers, citizens, and other stakeholders to embrace new avenues of cooperation and shared responsibility to stimulate growth of this sector. USAFs can represent an important mechanism to promote such cooperation, ensuring equitable participation by all major firms, competitive opportunities to develop needed resources, and a focus on underserved markets. As a central partner in the larger broadband strategy process, the USAF can channel funding where it can be most effective in closing gaps and enhancing demand, helping to accelerate the virtuous cycle of broadband ecosystem expansion. To achieve these lofty goals, however, USAF policies and administrations throughout the developing world require substantial commitment to building their internal planning and operational capacity, while both political and industry forces must embrace, rather than hinder, the Funds' unique role and responsibilities.