CREATING A FAVOURABLE ENVIRONMENT FOR ATTRACTING FINANCE AND INVESTMENT IN BROADBAND INFRASTRUCTURE

A REPORT BY THE BROADBAND COMMISSION WORKING GROUP ON FINANCING AND INVESTMENT

United Nations
Educational, Scientific and
Cultural Organization

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SEPTEMBER 2014

ABOUT

ABOUT THE COMMISSION

The Broadband Commission for Digital Development was launched by the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) in response to UN Secretary-General Ban Ki-Moon's call to step up efforts to meet the Millennium Development Goals (MDGs). Established in May 2010, the Commission unites top industry executives with government leaders, thought leaders and policy pioneers and international agencies and organizations concerned with development.

The Broadband Commission embraces a range of different perspectives in a multi-stakeholder approach to promoting the roll-out of broadband, as well as providing a fresh approach to UN and business engagement. To date, the Commission has published a number of high-level policy reports, best practices and case studies.

More information about the Commission is available at www.broadbandcommission.org.

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This Report has been written collaboratively, drawing on insights and rich contributions from a range of Commissioners and their organizations. It has been produced by Martin Cave and Andreas Avgousti, under the coordination of Ana Maria Rodriguez-Ortiz and Antonio Garcia-Zaballos (Inter-American Development Bank), with the support of the editorial team conformed by Félix Gonzalez, Phillippa Biggs, Jose Maria Diaz Batanero and Anna Polomska (ITU).

The report incorporates all the comments and contributions received by the following members of the Broadband Commission Working Group on Finance and Investment (listed in alphabetical order of institution, followed by alphabetical order of surname):

Florence Gaudry-Perkins (Alcatel Lucent)

Carlos Jarque (America Movil)

Robert Pepper (CISCO)

Reza Jafari (E-Development International)

Fredrik Wikner (Ericsson)

Amir Dossal (Global Partnerships Forum)

Anne Bouverot and **Belinda Exelby** (GSMA)

John Davies, Carlos Martinez, Christoph Legutko and **Krzysztof Janicki** (INTEL)

Jose Toscano and **Renata David** (ITSO)

Hamadoun Toure, Doreen Bogdan, Patricia Benoit-Guyot, Nancy Sundberg and **Youlia Lozanova** (ITU)

Paul Mitchell (Microsoft)

Christoph Steck and **Natalia Moreno** (Telefonica)

Jeffrey Sachs and **Joanna Rubinstein** (The Earth Institute)

Dr Hessa Sultan AL-JABER (Ministry of Information & Communication Technology, Qatar)

Gyan Chandra Acharya and **Ricardo Dunn** (Un Office Of The High Representative For The Least Developed Countries, Landlocked Developing Countries And Small Island Developing States) and **Jasna Matic** and **Suvi Linden**

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FOREWORD

We are witnessing one of the deepest transformation processes in our societies through the so-called Digital Economy Transformation. The broadband has emerged as the true backbone of this Digital Economy.

Aware of this reality, governments from around the world are introducing broadband in their economic development agendas as a flagship element to ensure that their citizens are digitally included (providing them with the same digital opportunities); and therefore, bridging existing social gaps.

Understanding Digital Economy as an ecosystem is critical, since it boosts sustainable economic growth (by creating companies, business opportunities, and more and better jobs; it facilitates social inclusion (by connecting and digitalizing citizens, businesses and public officers); and it fosters international competitiveness and integration.

Broadband infrastructure is a key piece in this ecosystem and the foundation of the Digital Economy. As such, the decisions regarding Broadband infrastructure need to consider coverage, defined as the required bandwidth, as well as its quality of service. Thus, consumers' exponential demand is requiring wider, more robust, and higher capacity networks; which has a clear impact on the investment that needs to be made and; therefore, poses a financing challenge to all stakeholders. Moreover, if demand elements of the ecosystem, such as devices, affordability or capacity building are considered, the investment and financing challenges are even bigger.

To achieve the goals of universality and affordability in Broadband, an effective cooperation between the stakeholders of the private and public sectors are essential, mainly in a highly capital-intensive sector, subject to public regulations. Equally important is to attract private and public capital, and that will require innovative financing solutions. I believe that this publication arrives at the best of times, since we are all in the middle of this Digital Economy Transformation. We have to jointly and promptly address the issue of strategic regulation and financing of Broadband, since the universality of access to digital technologies will become a critical element for the achievement of the Sustainable Development Goals.

I am deeply grateful to all commissioners who have provided useful and thorough inputs to this report. I would also like to thank the General Secretary of the International Telecommunications Union, Dr. Toure, and his team for the continuous support in the preparation of this report.

Dr Luis Alberto Moreno

President of the Inter-American Development Bank

EXECUTIVE SUMMARY

Executive Summary

The effective use of broadband networks, services and applications can provide transformative solutions to address the key challenges of our times, including eradicating poverty and malnutrition, attaining healthy lives for all or decoupling economic growth from the use and depletion of natural resources. To achieve these ambitious goals, broadband and information and communication technologies (ICT) must reach all people, in particular those facing social exclusion, living in remote locations or facing highest vulnerability to environmental and economic factors.

However, achieving the financing and deployment of broadband in these contexts has proved to be challenging, due to a combination of factors that make these markets less attractive for private investors. This meant that either governments end up being the sole source of funding, or needing to takes steps to attract investment or co-investment, so as to expand access to broadband to the least advantaged groups. For these purposes, co-operation across all range of agents in the ICT ecosystem, particularly governments and telecommunication operators, is imperative.

Through this report, the Working Group seeks to identify actions and policies that will encourage that cooperation and attract finance and investment in broadband. The recommendations are grouped under the following four areas of action:

1. Gaining access to low-cost private sector finance;
2. Introducing effective policy and regulation for the ICT sector;
3. Devising appropriate tax policies for the sector;
4. Selecting and implementing other interventions to underpin the investments to be made.

Area of action 1: Gaining access to low-cost finance

Access to low-cost finance is probably the most crucial of issues that limit the deployment of broadband networks in underserved areas. This applies to all projects, but in particular to those with a weaker commercial case, the very implementation of which may hinge on a low cost of finance. Public capital can be deployed to help finance such projects, but it is in short supply generally due to competing priorities.

McKinsey has estimated that over about 10 trillion US dollars will be needed to fund global telecommunications infrastructure investments up to 2030 (out of a total of an overall 62 trillion needed for infrastructure in general)[1] How can public policy and public capital best elicit private finance to make such investment happen? In the view of the Working Group, the following considerations should be put in place:

a) ensuring that the overall environment (political, regulatory, legal, financial etc) is stable and clear;

b) identifying a clear scope and targets for broadband projects;

c) leveraging scarce public capital and other resources to maximise their usefulness and effects;

d) allowing and encouraging the use of the most efficient technology, whether wireless or wireline;

e) carefully balancing obligations on coverage and the range of services to be provided against their impact on the attractiveness of the project;

f) examining other measures in parallel that can help the demand side of the project, such as public sector demand and demand aggregation;

g) selecting a suitable investment method, for example, a suitable form of public private partnership (PPP);

h) recognising and catering for the preferences of existing investor clienteles.

1 McKinsey Global Institute (MGI) January 2013 - Infrastructure productivity: How to save $1 trillion a year.

Area of action 2: Introducing effective policy and regulation for the ICT sector

Government policy and regulation of the ICT sector profoundly impact the viability of prospective investments. To achieve viability, the following steps should be taken to ensure stability in the sector and to keep the costs of capital low:

- **Reducing regulatory risk –** Infrastructure investors, including those in telecommunication networks, take on large risks in making long-term investments. For example, investors may be vulnerable to loss of value through changing policy or regulation. When making a business decision, investors will normally expect to recover their capital with appropriate compensation for the risks they run. Policy-makers and regulators can indirectly lower the cost of capital by limiting unanticipated policy changes and by providing stability in regulation. Even if changes may be politically or economically desirable, their impact of the change on investors' requirements for returns and stability needs to be considered.
- **Avoidance of regulatory capture –** Investors need to at least be confident that all actors will be treated equally. To achieve this governments and regulators must avoid favouring any particular party. Even-handedness of regulation should be accompanied by stability and transparency.
- **Dealing with market power –** A clear and effective framework must be in place that prohibits anti-competitive practices under either (or both) ex-ante regulatory and ex-post competition statutes. Difficult judgements may have to be made over whether conduct is justified or an abuse.
- **Access to spectrum –** It is vital that additional spectrum be made available to operators, if broadband prices are to be reduced and diffusion maximised. At the same time, individual operators need to secure long-term access to spectrum, if they are to justify their network investments. Operators need clear and transparent rules and the prospect of continuous access to spectrum to justify network investments. This does not mean free or subsidised access. Admittedly security of access to spectrum may restrict opportunities to take advantage of short-term government revenue opportunities, for example at the time of relicensing. Spectrum fees which capture monopoly profits and scarcity rents are an efficient way for governments of generating revenue without undermining investment. But governments must not restrict access to spectrum or deter collateral investment in networks. Spectrum fees can be organised a single payment due at the time of the auction or through annual licence fees over the life of the award.
- **Facilitating rollout and minimizing obstacles to market –** It is important to remove any difficulties in rolling out networks due to problems in obtaining rights of way or planning permissions, unclear division of responsibilities between different levels of administration, local authority delays or attempts by local authorities to extract additional income for themselves. Operators should be free of as many restrictions as possible in building their networks and access by operators to the market should be made as streamlined as possible. Moreover, there are measures that can be taken pro-actively in order to accelerate network rollout, for instance by facilitating access to passive utility networks or enabling co-deployment with developments in other networks, in particular when civil works are financed with public funds.

Area of action 3: Devising appropriate tax policies for the sector;

Taxation is an important tool of government policy which, if used effectively, can underpin the drive for investment in a country. The ICT sector has, in some cases, been seen as a convenient source, sometimes of excessive tax revenue. This has had adverse effects on the take-up of ICT technologies by firms and households, depriving the countries affected of some of the benefits that increased ICT use has to offer. In relation to taxation, the Working Group on Financing and Investment of the Broadband Commission has the following recommendations to make:

- **Broadband as a source of and a sink for government revenues –** Governments have to decide the net tax and revenue burden which they wish to impose on the ICT sector, since it makes little sense to simultaneously tax and subsidise broadband outputs or complementary products. Any increase of the net tax burden specifically imposed on the sector is likely to limit broadband investment and take-up, restrict future growth and reduce future tax revenues. It should also be remembered that, the extra damage which a given tax increase causes by distorting the economy's efficient operation tends to rise as the tax rate rises. Thus high tax rates have a disproportionately adverse effect. The overall balance between taxation of and promotion of ICT has to be decided as a key element of government economic strategy.
- **Choosing efficient taxes –** The structure of corporate and commodity taxes and tariffs (as well as of tax breaks) is as important as the overall level. The least damaging taxes or tariffs have the least effect on prices paid by customers, and thus affect take-up the least; some payments for spectrum fall into this category. A tax break which simply allows an operator to make excess profits is least effective. Each country should review its overall taxes on broadband from the standpoint of efficiency (how take-up is affected) and incidence (who really pays the taxes), and seek to generate better outcomes.

Area of action 4: Selecting and implementing other interventions to underpin the investments to be made.

The Commission also makes recommendations on a series of other interventions which have a positive impact in broadband investment:

- **Spectrum interventions to promote coverage –** Restricting spectrum release to drive up auction revenues is a policy which greatly damages broadband roll-out. However, auctions can be used to extend coverage, imposing a coverage obligation on one or more licences. This way the regulator or government is 'buying' more coverage by accepting lower receipts for that licence, which should go to the operator that can provide the coverage most cheaply. This is a competitive way of promoting roll-out. Its complexity and cost will depend on circumstances.
- **Universal service funds (USF) –** These funds (to which providers of telecommunication services contribute usually through surcharges and which tend to finance network or related expenditures or subsidise certain customers) need to be put to good use. They can be used to provide funding for certain aspects of telecom service provision, such as backhaul to sparsely populated or poor areas or even training in digital literacy. However, some USFs do not have the power to invest in broadband projects or have just accumulated large surpluses without investing their needed resources. In such cases we recommend that USFs become empowered to use available resources for broadband deployment as well as demand related actions. Managing funds is a complex process that adds to cost; however, the funds do not require large public investments and can be put to good use if properly set up and properly managed.
- **Public private partnerships (PPPs) -** Government partnerships with the private sector to implement a project, with both contributing capital is one of the methods adopted by many countries. Management is usually undertaken by the private partner. A PPP permits a blending of public and private capital and expertise. PPP schemes are in many cases a suitable vehicle for broadband investment but they are complex and usually last a long time thus care is needed to set them up carefully so that the public sector (and consumers in the country) get a good deal.
- **Input and infrastructure sharing –** Network operation and roll-out costs can be reduced by allowing operators to share inputs; either only 'passive' assets such as a mobile tower or dark fibre, or 'active' elements as well including electronic assets or even spectrum. Costs come down as a result of sharing, and these cost savings should be passed to customers.

Also, in some cases site sharing can increase competition by giving operators access to key sites, which otherwise they may have not had access to, allowing them to compete on quality of service and coverage. However, operators sharing inputs may be tempted to co-ordinate their retail pricing strategies or an operator excluded from a sharing arrangement may be weakened or eliminated. Extensive sharing can result in removal of any real differentiation or competition between providers. Passive sharing has strong apparent advantages and should be encouraged, in particular where the resulting savings in costs are likely to aid the realisation of a broadband investment project; more complete sharing has further potential advantages but carries more risks for customers and more care is needed. Sharing need not be complex to administer and involves few administrative costs.

- **Innovation –** Governments and regulators are not typically innovators, so this intervention is both a "negative" one (the avoidance of unnecessary limitations on firms' innovative activity) and where possible a positive one though measures that foster innovation. Innovation to reduce costs or introduce new services is a prominent feature of the ICT sector. Many innovations involve services which customers may not know they want. Existing suppliers may seek regulation to oppose new competitive threats. These should generally be resisted. Governments and regulators should have a bias against placing obstacles in the way of making new products and services available to customers, rebuttable only by strong evidence of detriment to a significant group of customers or stakeholders. Innovation is usually a positively disruptive force.
- **Demand management –** In addition to influencing the firms supplying the broadband service, interventions can also impact customers, typically through aggregating demand for broadband among public bodies, promoting e-commerce, providing key public services online and implementing digital literacy initiatives and of course through increasing their ability to buy a broadband service. These interventions can focus upon target customers, for example, school students or users of government-provided health or education services and are not tied to a particular supplier. However, seeking to influence demand management is an indirect way to achieving the investment aims in the sense that it is assumed that a firm will identify the demand and will be able to supply the required service. Some combination of demand and supply side measures may be desirable, and an appropriate mix should be considered, the former being particularly useful for targeted interventions, such as diffusing service to late adopters. Interventions of this type can be varied in terms of the amounts that may be invested. Irrespective of the amount though they tend to be complex.

Conclusions

Broadband is a crucial means to finding transformative solutions to the development goals of our day, by virtue of its potential to bring about change in the nature of almost every act of production and consumption, whether public or private, including production of vital services with public value such as education, health and cultural services. It is vital that appropriate general steps are taken to encourage investment in broadband networks as well as specific interventions which have a positive impact in broadband investment.

The Working Group on Financing and Investment of the Broadband Commission has sought through this Report to provide practical and helpful advice on the range of possibilities available, and on how to make best use of scarce resources (especially, public capital and spectrum) to encourage investment in broadband.

1 INTRODUCTION

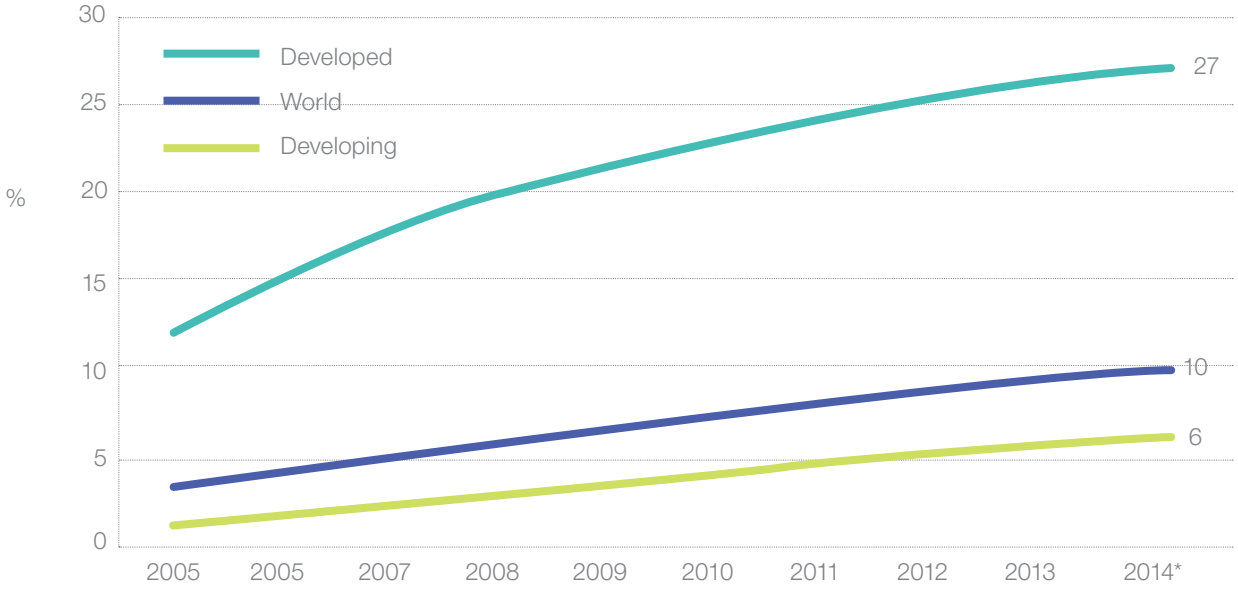
1. Introduction

The effective use of broadband networks, services and applications can provide transformative solutions to address the key challenges of our times, including eradicating poverty and malnutrition, attaining healthy lives for all or decoupling economic growth from the use and depletion of natural resources.

Since 2010, the Broadband Commission for Digital Development has been raising awareness on the role that information and communication technologies (ICT), and in particular broadband networks, services and applications, play to address these challenges, accelerating the achievement and monitoring of global social and economic development goals, including the Millennium Development Goals (MDGs). Since ICT and broadband cut across other industrial sectors as supporting infrastructure, they enable improvements in speed and scale in implementing solutions that can improve living standards, social fairness, and environmental sustainability, as well as drive down costs and improve service delivery.

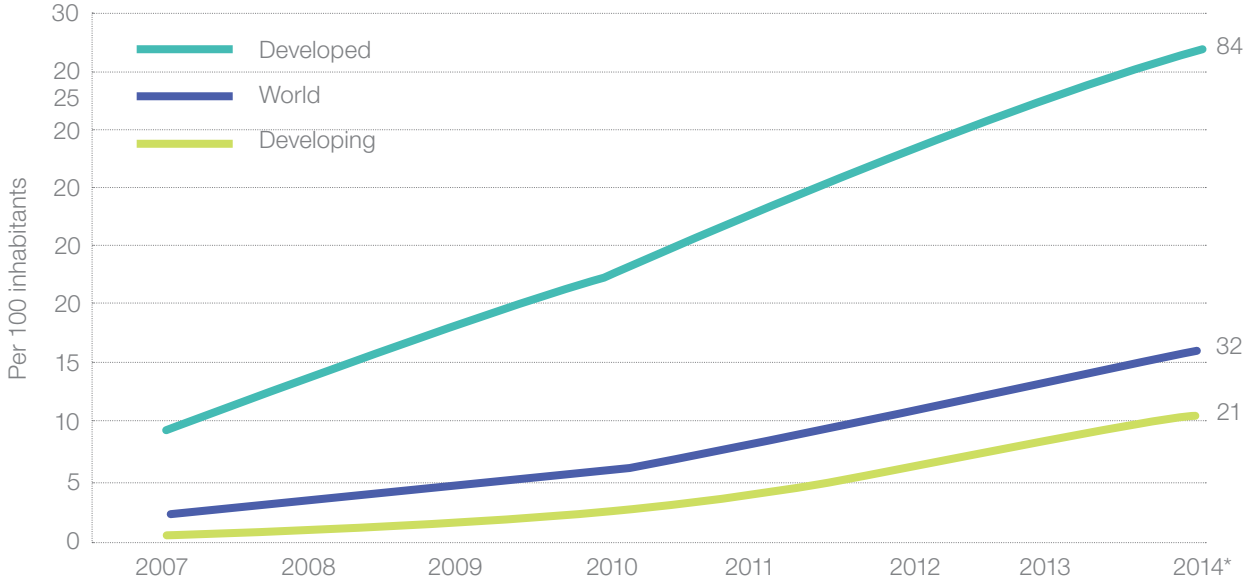
Although global access to ICT and broadband (fixed and mobile) has notably improved, this access is uneven, with developed countries benefitting from a significant better access to this key infrastructure (see Figures 1 and 2). This significant "digital divide" highlights that more is needed to realise the full potential of broadband and ICT. By actively leveraging these technologies to address global challenges, better solutions can be delivered more rapidly, where they are needed, provided there is a concerted effort from all sectors and a supportive policy framework.

Figure 1 - Active Fixed Broadband Subscriptions



Note: *Estimate
Source: ITU World Telecommunication/ICT Indicators database

Figure 2 - Active Mobile Broadband Subscriptions



Note: *Estimate
Source: ITU World Telecommunication/ICT Indicators database

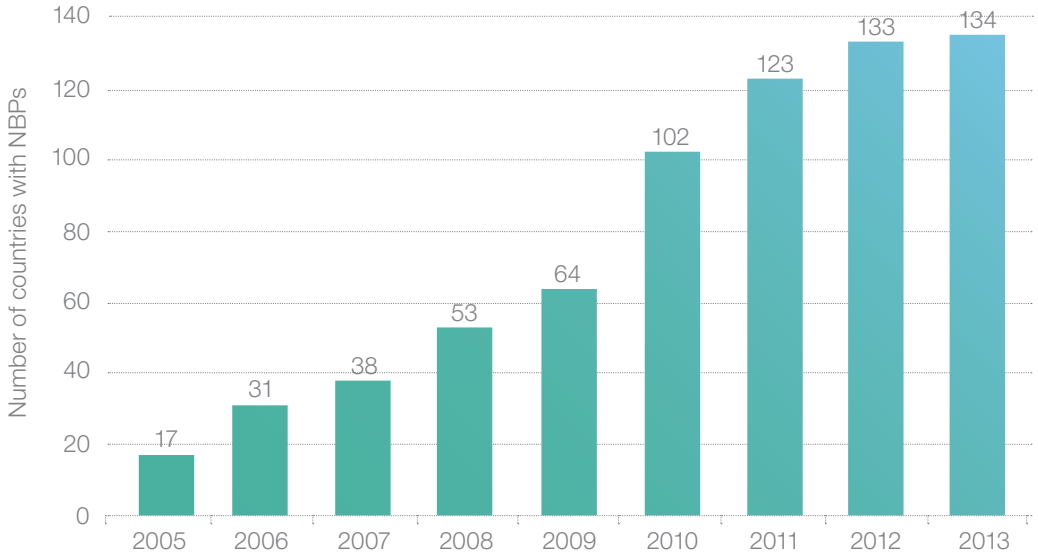
However, the deployment of broadband in these contexts has proved to be challenging, due to a combination of factors that make these markets less attractive for private investors. This leaves governments having either to take steps to create a more favourable environment so as to entice private investors or to become themselves the main or even sole source of funding to expand access to broadband to the least advantaged groups. For these purposes, co-operation across all range of agents in the ICT ecosystem, particularly governments and telecommunication operators, is imperative.

A vehicle to achieve this cooperation, previously highlighted by the Broadband Commission, is the role of governments to develop and implement comprehensive and detailed national plans to foster broadband from all perspectives. Developing and implementing such plans can achieve the alignment of political, institutional and regulatory structures to pursuit these goals. These will include establishing a level playing field amongst all actors in the ICT ecosystem as well as 'smart' policy interventions to support the implementation of national public policies. These must go beyond investment in ICT to cover, for example, the training of education (for educators and students), health and other public sector workers, of entrepreneurs and others in the labour force.

Over the last decade, the number of countries with such plans has been increasing steadily (see Figure 3). Research conducted by ITU and CISCO in 2013[2] indicated that the introduction or adoption of such national broadband plan is associated with 2.5% higher fixed broadband penetration on average, and 7.4% higher mobile broadband penetration on average. The same research also found that a competitive market is also associated with a higher broadband penetration, with a stronger impact for mobile broadband – competitive markets may be associated with broadband penetration levels some 1.4% higher on average for fixed broadband and up to 26.5% higher on average for mobile broadband.

2 "Planning for progress. Why national broadband plans matter" ITU, CISCO (2013). http://www.broadbandcommission.org/publications/Pages/planning-for-progress.aspx

Figure 3 – Countries with National Broadband Plans



Source: ITU/UNESCO Broadband Commission for Digital Development

Broadband Plans are one key means of dialogue, which should seek the views and engagement of all key stakeholders. However, there is no single way to improve broadband, and Broadband Plans should be viewed as part of a process towards building consensus around a vision for the development of broadband within a society, rather than the final outcome itself.

Taking previous work of the Commission as starting point, this report will identify further actions and policies of cooperation to attract finance and investment in broadband, putting special emphasis in bridging the digital divide and in expanding access to broadband to the areas and sectors of the population for which mobilizing such investment is more challenging.

The mandate of a finance ministry involves two activities in particular – getting capital as cheaply as possible and spending it wisely. It is generally agreed that for governments, the best way forward, is for most of the capital required to finance the universal availability of broadband to come from private sources: the experience of mobile voice over the past twenty years has shown that private capital can be deployed to spread communications services on a global, if not universal, basis – essentially because many customers exhibit a significant willingness to pay for such services. And governments whose finances are under great strain will want to have recourse to private capital to fund investment in such a marketable service as broadband. As a result, it is vital to consider how best, through policy and regulation, to secure such private funds.

To prepare for this report, the Working Group on Financing and Investment has devoted significant attention to the lessons from experience in many different countries of taking steps to attract capital cheaply and making wise use of scarce resources (especially, public capital and spectrum) to encourage the spread of broadband. The Working Group on Financing and Investment has sought to take a practical approach: it has sought to provide practical and helpful advice on the range of possibilities available, how to assess the options available for increasing the supply of capital and making wise use of scarce resources.

The report proposed four areas of actions for governments to mobilize investment in Broadband. These are grouped under the following headings: Gaining access to low-cost private sector finance (presented in Chapter 2); Introducing effective policy and regulation for the ICT sector (presented in Chapter 3); Devising appropriate tax policies for the sector (presented in Chapter 4); and other interventions that can be used to affect the value chain in a broadband network development project (presented in Chapter 5).


2
GAINING ACCESS
TO CAPITAL

2. Gaining access to capital

Where possible, governments and regulators will usually seek to mobilise funds[3] from the private sector for investment in broadband networks. Broadband projects must be made appealing to several clienteles of capital providers – including infrastructure and sovereign funds – which have so far made a limited contribution to the supply of capital to telecommunications. Funding to finance infrastructure comes ultimately from investors, including pension funds and similar financial institutions which have long-term liabilities (for example, to pay pensions) and which seek long-term relatively low risk assets to match these liabilities[4]. This section seeks to identify possible groups of investors in broadband projects and to set out some of the considerations that they will have in mind in deciding whether or not to invest in a specific project.

Before finding the possible investors, the question that is bound to be asked is "how much is needed?" This is not really a question that can be answered globally in the abstract in a top-down fashion, for the simple reason that each country's needs and priorities are different and, to some extent, autonomous. The question has greater relevance at the level of a country or region where the authorities have the ability to establish policy priorities, to devise within their own constraints an implementation plan for a particular period, and to plan for or provide the required public and private inputs. By way of indication as to the likely levels of investment that are needed to meet different broadband targets at a regional level, a 2014 World Bank Report estimated[5] that for the Middle East and North Africa region, 28 - 35 billion US dollars would be required. For the EU, the estimated investment requirement for superfast broadband services to the whole of the EU ranges between 115 billion US dollars[6] and 360 billion US dollars[7]. At a national level for France, the amount is estimated at 24.4 billion US dollars[8] and for South Africa, 0.332 billion US dollars[9]. At a regional level, given that in some areas the push for broadband comes from regional or local authorities, the figures range from 0.21 billion US dollars for Milan in Italy to 0.77 billion US dollars for the Asturias in Spain[10].

This funding can come from a variety of sources, and can take the form of equity and debt[11]. Some will come via standard corporate financing. Some from development banks. Some from public capital. Financial resources are not the only thing that is needed; other inputs such as expertise are required too. The report next reviews certain of these non-government sources of funds and also discusses the role of credit rating agencies.

2.1 Infrastructure funds

It is convenient to distinguish telecommunication investment of different durations and payback periods:

Table1. Investing in Different Network Layers[12]

Service	Payback
Services, content and applications	< 3 years
Active network	5-7 years
Passive network	10-25 years

3 References to funds in this report embrace both funds as the ultimate source that pays for the infrastructure and financing, in terms of the provision of capital for a specified period of time which may not be co-terminous with the project as a whole. The two are interrelated as lower cost of capital / financing costs reduce the amount of funding required to cover the lifetime cost of the project in question.

4 Private equity investors are a less likely source of funding for projects of this nature, as they are more inclined to invest in projects which give them a high level of return and an opportunity to exit after short periods of time (3-5 years). One should also be aware that funds typically only invest in a project if it exceeds certain thresholds, follows a certain investment model that is well-understood and replicates structures for which there is proof-of concept.

5 "Broadband Networks in the Middle East and North Africa: Accelerating High-Speed Internet Access" http://www.worldbank.org/en/region/mena/publication/broadband-networks-in-mna. and related entry by one of the co-authors https://blogs.worldbank.org/arabvoices/broadband-mena-what-will-it-take-expand-internet-access. This amount was estimated so as to roll out 10 Mbps for 100% of population and 30 Mbps for 50% of population, using a combination of FTTC and LTE technologies. It represents the majority of all the investments needed to complete the needed backbones, backhaul and international connectivity but does not include the cost of the last mile connectivity.

6 Europe's broadband investment needs: Quantifying the investment needed to deliver superfast broadband to Europe by Point Topic Ltd.

7 EC (2011) A Budget for Europe 2020 – Part II: Policy fiches, COM (2011) 500, Brussels, 29.6.2011.

8 Europe's broadband investment needs: Quantifying the investment needed to deliver superfast broadband to Europe by Point Topic Ltd.

9 Enrico Calandro, Mpho Moyo, (2012) "Investment models and regulatory constraints for broadband backbone roll-out in selected African countries", info, Vol. 14 Iss: 4, pp.21 – 35

10 Broadband – Delivering next generation access through PPP. European PPP Expertise Centre 04/2012.

11 In proportions which are affected to some degree by credit rating agency assessments.

12 "The State of Broadband 2012: Achieving Digital Inclusion for All", available at: www.broadbandcommission.org

It is probably only the last category that would mainly interest infrastructure funds, but this category is estimated to comprise about 80% of total investment. What needs to be done to open up this potentially important form of finance from infrastructure funds? If the risks associated with a wireless or wireline telecommunication network are compared with an electricity distribution network, for example:

i) the telecommunication network may have, on average, a shorter physical life,

ii) the telecommunication network is subject to greater economic obsolescence, as a result of faster technological change,[13]

iii) the telecommunication network is often subject to greater competition and more detailed regulation.

There is limited scope for changing the first two characteristics (and, of course, no reason to constrain the sector's fast rate of technological change). However, it should be possible to take into account the third point, when considering the different finance options and possible ways to make investment more attractive.

Reducing competition and more detailed regulation than electricity does not entail eliminating competition: to do so could risk cutting customers off from future service improvements. However, it may be appropriate to identify activities within the telecommunication value chain, which may merit different treatment and to seek low-cost funding for them from infrastructure funds subject to appropriate safeguards.

Candidates for this form of treatment include: tower companies (where it is efficient to share towers); backbone networks (which in certain regions may also have 'natural monopoly' properties); and shared wireless or wireline access networks. This aspect is therefore taken into account in the discussion below on infrastructure sharing and on the role of public private partnerships (PPP).

13 Although technological change can also help prolong the use of existing infrastructure through new innovations, as has occurred with copper networks.

2.2 Sovereign wealth funds

Sovereign Wealth Funds (SWFs) are another possible source of financing for telecommunication infrastructure projects. SWFs are investment funds owned by the governments of sovereign states and funded mainly by foreign exchange and reserve assets[14]. Traditionally, SWFs have invested in securities in major markets, but after the financing crisis and also due to the low returns in developed countries, their investment scope has broadened to include other asset classes and developing countries. One of the assets classes in which SWFs invest is infrastructure, with 53% of them actively investing in the telecommunication sector generally[15].

However, there are several obstacles which may need to be overcome in order to establish the environment needed for the SWFs to invest, including: political risks, lack of knowledge and experience, regulatory restrictions, and investment conditions. There may also be a problem arising due to the "agency" being used to manage the SWF. The owner of the SWF is a government, but the agency managing it may have different objectives (for example, financial vs. social returns, promoter vs. owner).

2.3 Bilateral and multilateral development banks

Another source of funds, more likely to be loans but none the less important enough to be considered, can be bilateral and multilateral development banks and agencies. These organisations may lend for long-term projects, in some cases, at preferential rates, focusing their resources on projects with high economic development impact. Equally important is the fact that they can provide research, consulting, and other resources, usually through non-refundable grants as well as expertise and knowledge which can be very useful for example in a public private partnership (PPP) process[16].

14 Examples of some of the most notable SWFs investing in infrastructure are the Abu Dhabi Investment Authority, the China Investment Corporation, Dubai World, GIC of Singapore, the Kuwait Investment Authority and others.

15 Preqin – 2014 Sovereign Wealth Fund Review. Examples of such investments include China Investment Cooperation (CIC) acquiring a stake in e-commerce business Alibaba Group and satellite operator Eutelsat, the Singaporean Temasek with a significant share in SingTel and Bharti Airtel and Qatar Holdings in Qtel (ICEX Spain Trade & Investment – Sovereign Wealth Funds 2013. http://itemsweb.esade.edu/wi/Prensa/ESADEgeo_SWF_Report_2013.pdf).

16 Examples include the IDB projects in Peru (that will finance the development of backhaul and last mile networks in the rural regions of Junín and Puno as well as health and education pilot programs and a review of the regulatory framework) and Nicaragua (that will finance the development of backbone, backhaul and last mile networks all over the country, as well as equipment for health, education and government services and a review of the regulatory framework).

2.4 The role of credit ratings

Credit ratings can have a direct impact on the cost of capital of a company, and for this reason they cannot be ignored. Rating downgrades can lead to an increase in the cost of debt, causing firms, among other things, to deleverage and cut investment[17]. Governments and regulators need to consider how their actions affect credit ratings. For example, in its Global Telecommunications Industry Rating Methodology,[18] Moody's lists five key factors that it weights in assessing credit risk for companies in the telecommunication industry:

1. Scale and Business Model, Competitive Environment and Technological Positioning,

2. Operating Environment,

3. Financial Policy,

4. Operating Performance, and

5. Financial Strength.

With regards to the operating environment, for credit rating purposes alone, the regulatory and political framework carries 8% weight. Moody's states it considers: '(i) support for return on investment; (ii) predictability; (iii) regulatory barriers to entry, such as propensity for additional licenses or concessions to be issued; and (iv) level of reliance on a regulated revenue stream or service subsidies' when examining this factor. And it goes on to say that 'The predictability of the regulatory environment is a key issue for all players in a particular regulated market'[19]. The impact of regulatory change on the credit rating of a company can be seen, for example, in the case of France Telecom (FT) and the downgrading of its rating in 1996 from Aaa to Aa1 on the basis of the proposed change of FT's legal status to a regular corporation subject to common law[20] as part of the opening of the telecommunication market process undertaken at the time.

17 The Real Effects of Credit Ratings: The Sovereign Ceiling Channel – Almeida et al, 16/5/14 http://business.illinois.edu/halmeida/Ratings.pdf

18 28 December 2010 https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_129659

19 Global Telecommunications Industry Rating Methodology ibid page 12.

20 Langohr, Herwig, and Langohr, Patricia. Rating Agencies and Their Credit Ratings: What They Are, How They Work and Why They Are Relevant. Hoboken, NJ, USA: John Wiley & Sons, 2010 at 199. The book reviews, inter alia, the changes to FT's ratings at different stages in response to changes to the market conditions and investment decisions made.

2.5 What will help attract these sources

When all the sources of possible non-governmental finance identified above – as well as the rating agencies – examine a project, investors typically take into account the same things - the business case for investing in a specific project, broader concerns such as general economic conditions, political stability, and sector-specific issues. Investors differ in terms of the level of the return they expect, the risk that they are prepared to take, the number of years over which they expect to recoup their investment, and, in some cases, additional public policy issues which they take into account.

We consider below certain sector-specific actions which are likely to encourage the flow of investment funds. However, it is clear that the flow of private capital is likely to be enhanced by promoting broader economic, social and political stability, providing maximum certainty to investors, achieving clarity over what obligations the government is accepting, and hence over what risks private capital in subject to, and packaging projects in ways likely to make them attractive to a particular investment clientele, such as infrastructure funds.

3

CREATING A SUITABLE TELECOMS REGULATORY ENVIRONMENT FOR PRIVATE INVESTMENT

Return on investment is the major criterion that drives private investors. This will be based on the business case of the investment itself, as well as certain characteristics of the market that are conducive to ensuring the investment[21]. Getting such returns may not happen on every investment, since unexpected surprises occur with any project. But an investment will not go ahead without a positive expected return.

In a fairly capital-intensive industry like telecoms, this expected return must cover the project's cost of capital, which is normally based in large part on summing the price of the different risks to which the investment is subject, and adding that to the return available on a risk-free investment. In this context, the different risks can be thought of as including:

i. country risk, which reflects risks across the economy as a whole (including internal security issues, lawlessness, political instability, inflation, lack of protection of rights to property, including intellectual property, and so on);

ii. general sector risk, which expresses the volatility of returns to investment in the sector compared with economy as a whole.[22] In this respect, in most countries, the telecommunication sector is normally about the average of all sectors;

iii. project-specific risk, or the risk that the particular project will go wrong – for example, because the technology will not work;

iv. regulatory risk, or the degree to which the sector's regulators and policy-makers create or do not create uncertainties for investors, for which they seek compensation in their return

> *"To really make infrastructure investing attractive in a given jurisdiction, we need consistency and predictability of the regulatory framework. When you're investing (as I like to say) in quarter centuries (…) that regulatory framework and that consistency have to actually transcend any given government. Because the asset is going to outlive a government. If a jurisdiction can prove that and demonstrate that over a period of time, capital will find its way to that jurisdiction. (…)What we're worried about, though, is the risk that the regulatory environment might change. We're worried about the risks involved with certain promises or undertakings, (…) And so I think what government should be thinking about doing is, 'How do we create an environment that we can narrow that spread as tight as we can?'"*
>
> Mark Wiseman, president and CEO of the Canada Pension Plan Investment Board [23]

Given that risks i) – iii) are either the same for each country irrespective of the nature of the investment or project specific factors, this section looks at telecommunication regulatory risk. It asks what can be done in the regulation of broadband provision to reduce the 'regulatory risk'[24] component in the cost of capital and thus make it more attractive to a prospective investor. The issues covered are:

i. the stability and transparency of the regulatory framework,

ii. avoidance of regulatory capture,

iii. dealing with market power,

iv. access to essential resources, such as spectrum and numbers,

v. minimising obstacles, such as roll out difficulties (planning permissions etc.).

However, consistency and predictability in each and every aspect of the environment - be they political, economic, financial, legal or regulatory - are of the utmost importance to investors.

3.1 The stability and transparency of the regulatory framework

Like all other investors, investors in telecommunication networks are taking risks. However, the fixed location and long-term nature of investments can prove vulnerable to loss of value or even expropriation through regulation.

There are many ways in which, accidentally or deliberately, regulation might have this effect. The most obvious is simply expropriation by the government.

21 Such as country and economic/ fiscal stability, or attractive investment conditions.
22 This is often called systematic risk.
23 McKinsey Global Institute (MGI), 2013 Rethinking infrastructure: An investor's view http://www.mckinsey.com/insights/engineering_construction/mark_wiseman
24 Regulatory issues relating to finance, investment etc although equally important are outside the scope of this section.

Less obvious is the imposition of below-cost price controls. If this happens, then provided the regulator allows the firm to recover at least its costs of supply of the service going forward (i.e. the variable operating costs), production will continue. However, no-one who has seen this happen to a previous investor will want to repeat the experience. So when the current assets cease to work, they may not be replaced. If the firm is not allowed even to recover its forward-looking costs, immediate withdrawal might ensue (see Box 1).

Box 1. Telecommunications regulation in Jamaica

Following a change of government in 1972, the Public Utilities Commission in Jamaica, subject to very few constraints, bore down heavily on the privately owned Jamaica Telephone Company. As a result, the company was reluctant to invest without higher prices, which the Commission was unwilling to sanction absent higher quality of service. This led to a period of 'quasi-expropriation,' followed by renationalisation in 1975. As a result, there was no network expansion until well into the 1980s. Moreover, when the company was partially re-privatised in 1988, the government had to guarantee a very elevated rate of after-tax profits (17.5 to 20% per year) in order to attract a new investor.

Source. B Levy & P Spiller, Regulations, Institutions and Commitment, Cambridge University Press, 1996, p. 22-23, 47-50, 72.

As a result, investors in telecommunications are looking for commitments from governments and regulators that expropriation will not happen to their assets and although this cannot be guaranteed, there are various ways in which a strengthened commitment can be signalled, including:

- 'hard-wiring' various aspects of policy and regulation of the sector in legislation. For example, the law could include specific rules for setting service prices or for setting the cost of capital;[25]

- delegating implementation of more general legal provisions to an arm of executive government which is independent from politics, in other words to an independent regulatory body;

- using legally binding licence conditions, which set out the rights and responsibilities of providers, and also to set out mechanisms under which they can be changed.

The World Bank study[26] referenced in Box 1 identifies a range of options appropriate to countries with different constitutional arrangements, political traditions and competencies, concluding that there is no 'one-size-fits-all' solution. There is, however, a major role for capacity-building in this area.

In this context, the role of the regulator can be seen as that of representing, directly or indirectly, the interests of consumers or end-users of the service in reaching a fair arrangement with private investors. Under the terms of the 'deal' with the regulated firm, regulators prevent investors from using market power to reap excess rewards. But equally, regulators offer some commitment that, if the regulated firm operates efficiently, it will be able to recover its costs, including its cost of capital. The point is that a bargain of this kind is (to use the expression employed in Australian regulation) in 'the long-term interests of end-users.'

This does not mean that a regulated firm has to be cosseted and guaranteed profits above the cost of capital, or allowed to earn its cost of capital, however incompetent it is. All that is required is an expectation of gaining an adequate return from efficient operation. There will be room for debate in each country about what a fair return is, but this can be tackled and often resolved in a consultative way based on established theory and practice elsewhere.

Nor is it necessary that regulators offer a cast-iron guarantee that regulation will never change over the lifetime of any investment, which would clearly be difficult to achieve in a fast-moving sector like

25 In Mexico in 2013, such provisions – some of them highly specific - were embodied in amendments to the Constitution itself. Article 28 of the Constitution as amended was labelled 'the Constitutional Amendment in Telecommunications'.

26 B Levy & P Spiller, Regulations, Institutions and Commitment, Cambridge University Press, 1996.

telecommunication. But change or 're-regulation' has to be handled carefully, to avoid frightening the investors.

The following sections discuss in more detail particular aspects of regulation which can be reviewed and possibly amended with the aim of introducing additional predictability. In process terms, the two recurring themes are: i) the need for regulated firms to be consulted on changes and to receive adequate notice of their implementation; and ii) that regulation should be based on well-established economic and legal criteria.

3.2 Avoiding regulatory capture

New investors in a country should be assured that, at least, they will be treated equally to government-owned enterprises or the incumbent operator (even if it is in private ownership). A certain preferential behaviour can be manifested in what is known as "capture of the regulatory authority", which often treats the incumbent operator as the national champion or manifests itself as a reluctance to challenge it due to the commercial and political power it may still have; or the regulator may be staffed by people who came from the incumbent, with resulting concerns as to where their allegiance lies.

Regulatory capture may be more visible when there is no independence, as in the cases where the incumbent operator and regulatory authority are under the control of the same ministry. Some forms of capture can be very obvious and may be solved with structural changes or even legal sanctions.

Another possible source of capture arises from the regulator's reliance on the industry, and in particular the incumbent, for information. This has been expressed thus: 'regulators require a good deal of information in order to carry out their functions …. The primary, and best, source of such information will often be industry... This gives the regulated firms a degree of leverage over regulatory procedures and objectives, a leverage that, over time, produces capture.[27] This is a real danger which, if unrecognised, can result in the regulator acting as a servant of the regulated firm. It can be countered by more assertive demands for information from those being regulated and by triangulating data sources via requests to other operators or benchmarking.

In all cases, it is important that the investor (whether an incumbent or a new entrant) is treated fairly and in a manner that is conducive to the development of the industry.

3.3 Dealing with market power

The regulator in many countries has to face dealing with either one dominant operator (in the case of fixed networks) or a small number of powerful operators (in the case of mobile networks). Governments may vary in their enthusiasm for promoting competition, but if effective competition is not present, they will certainly have to worry about abuse of market power and the impact that this may have on attracting new investors.

Where the framework includes wholesale or retail price controls, it is necessary to ensure that the price control methodology is properly structured and that it does not create distortions or, even worse, have unintended anti-competitive effects. At the same time, an appropriate return on capital must be allowed if private investors are to continue investing in the sector and rolling out new technologies. This can be particularly important, for example, at the time of agreeing the underlying contract of a public private partnership which is likely to specify prices.

Effective competition needs effective protection, particularly at the early stages of market opening. Competition rules that offer protection from anti-competitive behaviour by a dominant incumbent or a collusive group need to be in place and enforced if an investor is to decide to enter a market.

Effective competition requires two main elements:

a) clear rules, and

b) effective enforcement by the appropriate authorities.

The anti-competitive practices likely to be proscribed, either by general competition, if it exists, or by telecommunication legislation, usually include, among others, predatory pricing, undue price discrimination, excessive pricing, margin squeeze, or refusal to supply, or other strategies to foreclose the market.

27 R Baldwin, M Cave, M Lodge - Understanding Regulation 2nd ed., 2012, p 108.

One final key area concerns the importance of dispute resolution and the effectiveness of the authorities in this regard.[28] Disputes between the operators or complaints filed against dominant operators are a normal feature of the competitive process and nothing to shy away from. However, one of the common areas of complaint by new operators and their investors is that regulators are slow to resolve such cases. This may be due to resources, regulatory capture, inexperience or even a cultural issue. It remains true, however, that long-standing disputes undermine the ability of the market to develop and for that matter for investors to enter it.

3.4 Access to spectrum

Spectrum assignment – including the cost of the resource and the process with which it will be made available – is of key importance for wireless operators. It is thus important that the authorities make spectrum available using transparent and fair rules. It is also important that national spectrum policies – in terms of release, pricing and usage – are clear and stable, so investors know what resources they can obtain, how and at what cost. Also with proper and transparent spectrum policies, investors will know which other parts of the spectrum may be released in the future, as these can affect not only its own business plans, but also the choice of technologies used for rolling out services. As noted in 3.1 above, this does not mean that nothing can ever change, but significant changes should be accompanied by consultation, adequate notice and a demonstration of the advantages of the change.

The most important policy issue concerning spectrum concerns the nature and amount of spectrum which is made available to operators. The benefit of unused spectrum is lost forever, so governments or regulators should, as a default, operate a policy of making available for use any spectrum for which there is demand. Keeping spectrum off the market will deprive operators – and, more importantly, their customers – of its benefits. Regulators need to carefully balance the release of new spectrum for exclusive use by operators, licensed shared use models, as well as unlicensed uses such as WiFi. This is becoming an important issue with the freeing up of spectrum as a result of the switch from analogue to digital television ("digital dividend") and the availability of a band which is particularly efficient for mobile communications. This "dividend" opens up new opportunities and new challenges for governments which must decide whether, and on what basis, to allocate spectrum and whether to focus on facilitating new entry or on maximising auction revenues.

Public authorities are in many countries the only supplier (or effectively, the monopolist supplier) of spectrum and may be tempted to use their market power to restrict the availability and increase the price. In doing so, a government is going beyond the reasonable policy, discussed in section 4 below, of capturing the scarcity rents of spectrum, arising because some bands are better that others, and entering the territory of capturing monopoly rents, by restricting supply. The crucial difference is that capturing scarcity rents does not increase prices to end-users, whereas creaming off monopoly rents does. And the harm done to end-users by the government behaving as a monopolist will exceed the monetary value of additional revenue.

Where the State abuses its market power in spectrum, the outcome is generally bad for the country as a whole, because in the end, consumers suffer, and because investment and coverage are reduced. The auction process should have clearly defined objectives, which might be maximising coverage or capacity, or keeping prices down, subject to revenue constraints. The choice should be explicitly, and ideally transparently, made since there is likely to be a conflict among objectives.

In addition, recent controversy has revolved around two spectrum relicensing and pricing issues about which governments and regulators should be aware, namely:

a) at the time that a licence is about to expire, should the licensee intending to carry on its business have to compete again in an auction, or should it be possible for the licence to 'roll over'? In deciding this issue, proper weight should be given to the effects on the market by possibly new entry, the need to maintain service for consumers and to avoid stranding network investments.

b) changes to the spectrum fee: whether an additional fee is required to change the technology employed, and whether, and in which circumstances, it is legitimate to raise the annual component of the fee.

3.5 Minimising obstacles, such as roll out difficulties (planning permissions etc.)

A common area of complaints by operators are the difficulties that they face in rolling out their networks (fixed or wireless) due to problems in getting rights

28 The same concern also exists at a court level for general commercial disputes.

of way, planning permissions, or local authorities causing delays or attempting to extract additional revenues for themselves, as well as objections from residents and pressure groups when installing an antenna. The ability to roll out a network fast and in an efficient manner can be hampered by these obstacles. Clear, efficient and enforceable rules (even if they are stringent, for example, in the areas of public safety and environmental protection) can ensure that the investment is made within the planned timescales and that coverage obligations are met on time. Mechanisms can be introduced that reduce bureaucratic inefficiencies, including exemptions for small installations, collocations or certain site upgrades, 'one-stop shop' licensing procedures and tacit approval.

Such concerns about obtaining rights of way were partly why the Indian Government decided when rolling out the National Optical Fibre Network to set up Bharat Broadband Network Limited, a public sector entity, so that it could obtain easier rights of way and access to fibre networks[29].

It is important that the rights of operators to such access must be clear and non- discriminatory, otherwise new entrants in particular will not be able to establish their networks. Ensuring rights of way is an important element in the sector - so much so, that in the EU this is provided by Directive 2002/21/EC. More recently, and in recognition of the fact that a significant proportion of the cost of investing in broadband networks is represented by the cost of civil engineering works increased by inefficiencies and problems in the roll-out process, burdensome administrative permit granting procedures the EU has also provided through a new directive for additional measures to reduce the cost of deploying high-speed electronic communications networks[30].

Another area where the issue of rights of way has led to a conflict of interest – in particular in relation to broadband – has been the case of municipal networks. Municipalities may be reluctant to issue permits to network operators if they themselves are installing infrastructure. Such conflicts appear to have arisen in Ireland (in a municipality that is a beneficiary of a project partly funded by EU Structural Funds), as well as in Luxembourg[31].

The fact that easing restrictions can have a major impact on network roll-out can clearly be seen from the example quoted in the Broadband Networks in the Middle East and North Africa: Accelerating High-Speed Internet Access World Bank Report[32] of Sofia, Bulgaria (see Box 2).

Box 2. Sofia, Bulgaria - Small aerial cable networks

In 2005, Bulgaria had slightly above 1 percent broadband penetration, one of the worst penetration levels in Europe. In the following years, "broadband LAN [local area network] has developed into the dominant type of access technology in use". The incumbent operator, Vivacom, had stalled the development of digital subscriber line of any type (xDSL) up to 2005, and because "access to the copper and ducts network was impossible, ISPs and CATV [community access television] firms decided to find their own way to launch broadband with self-constructed small aerial cable networks". These networks, concentrated in Sofia and in the main cities, were built "on an amateur basis and with minimal regulation by local or national governments." Broadband penetration in Bulgaria in December 2012 stood at 47.6 percent.

Adapted from Broadband Networks in the Middle East and North Africa: Accelerating High-Speed Internet Access. World Bank Report

29 See Box 14 section 6.2 on Universal Service Funds.

30 Directive 2014/61/EU seeks to promote the joint use of existing physical infrastructure and to enable a more efficient deployment of new physical infrastructure so that broadband networks can be rolled out at lower cost. It establishes minimum requirements relating to civil works and physical infrastructure. EU Member States must apply this Directive from 1 July 2016 at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0061 and the related Impact Assessment Document - Measures to reduce the cost of deploying high-speed electronic communications networks http://ec.europa.eu/digital-agenda/en/news/impact-assessment-accompanying-document-proposal-regulation-european-parliament-and-council .

31 EARNEST foresight study 2007 on regulatory issues.

32 https://openknowledge.worldbank.org/handle/10986/16680 .

4

TAX AND OTHER PAYMENTS TO THE GOVERNMENT BY MOBILE OPERATORS;

4. Tax and other payments to the government by mobile operators

Operators need to finance their investment in networks. The funds, as noted above, for urban areas come predominantly from private sources, whereas for rural areas the share of funding from public sources is usually higher.

However, network operators have further links with public finance and with public policy. Firstly, they collect taxes for the government; secondly, they pay for the spectrum which they use; and thirdly, government policy and legislation may restrict the degree to which they can generate revenues.

All these things must be reconciled or balanced, if the over-arching goal of increasing connectivity is to be combined with other public policy objectives. Thus it may prove contradictory or counterproductive for the government to contribute funding to a PPP providing backhaul, while simultaneously restricting the traffic it can carry by taxing it excessively. Nor will excessive spectrum fees or artificially inflated auction revenues encourage the spread of mobile broadband.

4.1 Taxes & spectrum charges

Although countries seeking to increase connectivity have numerous and urgent other calls on public expenditure, investment in connectivity has the capacity to raise future incomes and tax revenues. Moreover, the various forms of taxation and its equivalents such as tariffs differ in the degree to which raising them distorts and damages economic activity.

In the developed world, with ubiquitous or significant coverage of fixed networks, recent policy has focussed on subsidising fibre. In the developing world, where fixed lines are a rarity outside major towns and cities, the debate has focussed on taxing mobile phones. Governments are displaying some ingenuity in extracting money from the sector through tax revenues over and above standard value-added tax or equivalent rates and normal business taxes on profits[33]. For example:

1) Many countries have a specific ad valorem (percentage) tax on telecommunication bills (mobile, fixed, or particular components of the bill such as a monthly charge), calls (perhaps of a particular type) etc. These options will have different effects;

2) A fixed charge tax per time period can be imposed on a customer's bill. This might be a fixed amount per month on post-paid mobile contracts;

3) A specific tax on handsets, sometimes to accumulate revenue to remunerate content producers;

4) Sector-specific tariffs and import duties on handsets;

5) Sector-specific tariffs on other telecommunication equipment;

6) A termination charge imposed on calls coming into a country;

7) A tax or excessive charges for spectrum. A spectrum charge is not strictly a tax but suppose a government or spectrum regulator from one day to the next simply raises spectrum usage charges by, say, 20%. Or suppose (more probably) it withholds available spectrum in an auction in order to raise the price. Both effects would, in important ways, be the equivalent of a tax. This may be a particularly important form of the government appropriating revenue from the sector, but it largely escapes notice as a fiscal measure.

There is quite a wide variation in the level of telecommunication taxation across the world. A study by Deloitte (2011)[34] has calculated taxes as a proportion of the total cost of ownership (TCMO)[35] and the total cost of mobile usage (TCMU)[36] as well as the tax as a proportion of handset price. The breakdown into these three categories is as shown in Figure 4, which illustrates the extent of taxation in each case.

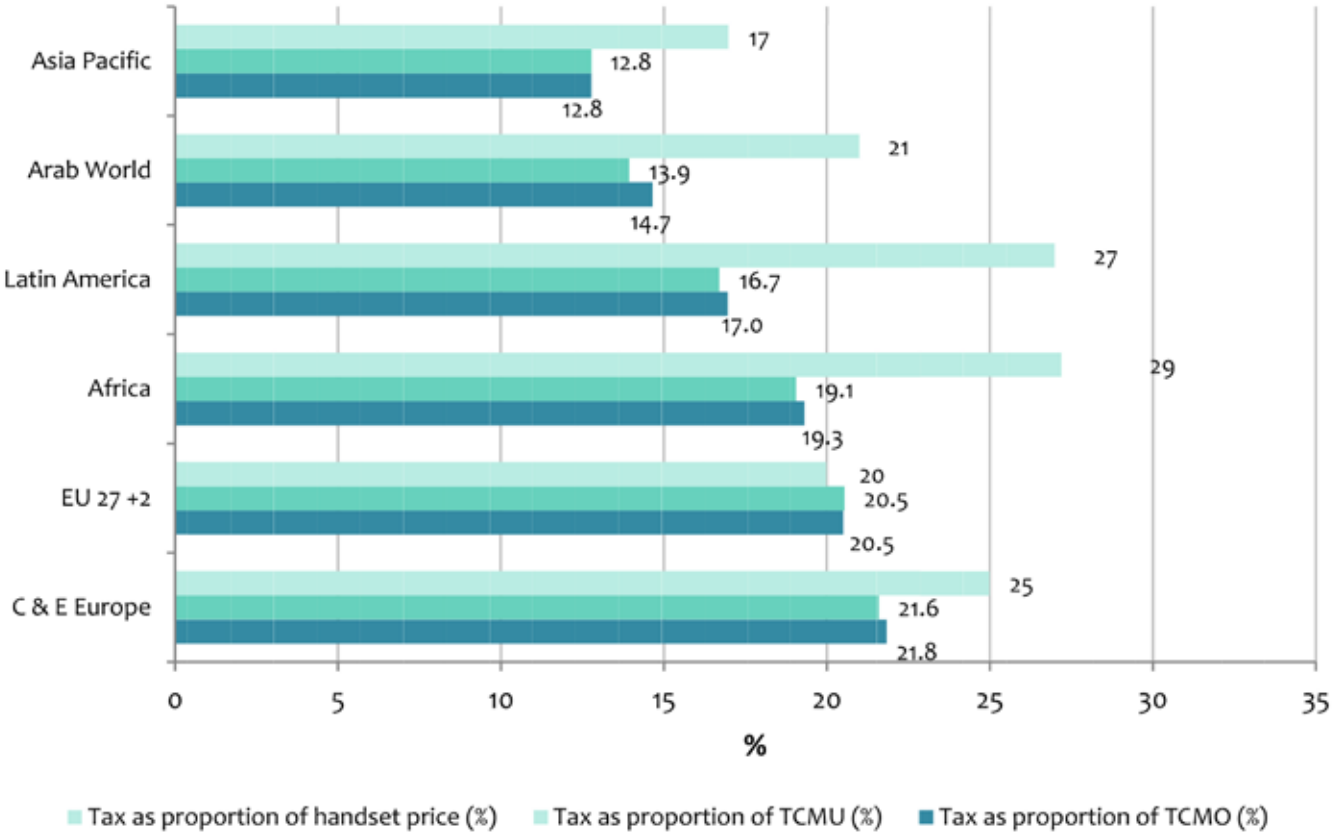
33 The tax regime for business includes aspects such as corporation taxes, imposts on repatriated profits, tax holidays, exemptions, etc. These can effectively be sector-specific.

34 The Study used 2011 data from a sample of 111 countries in Europe, Central and Eastern Europe, Africa, Latin America and Asia for pre-paid and post-paid mobile users.

35 (TCMO) - an estimate of how much it costs annually to own and use a mobile line consisting of handset, connection, rental and usage costs of a mobile telephone to end-users, defined as the monetary sum required to be connected to telecom services, taking into consideration the price of the handset, services (calls and SMS).

36 An estimate of the total cost of rental and usage.

Figure 4: Taxes as a proportion of mobile prices. Data source: Deloitte (2011)[37]



Cumulative service tax rates are not generally collected for other sectors in this form, making inter-sectoral comparisons impossible[38].

It is important to ensure that taxation on telecommunication does not have the opposite effect of what the aim should be and as such it is useful to evaluate taxes on telecommunication within the normal framework for considering taxes in general. Telecommunication services should not be candidates for taxes imposed on price-inelastic luxury goods, but would normally be candidates for inclusion in the substantial set of goods and services subject to the predominant or standard rate. However, in jurisdictions where taxes are hard to collect, taxes are often levied on large and often international firms, which to operate, they have to be located within the national territory. Telecommunication networks fall into this category[39].

The second factor, operating in the opposite direction, is that that telecommunication is to an exceptional extent an engine for growth in the economy as a whole, and if a service has a positive spill-over effect, there is a case for taxing it at lower rates than other services.

37 Note: TCMU is total cost of (mobile) usage; TCMO is the total cost of ownership.

38 Across regions the data show that Central and Eastern Europe records the highest tax as a proportion of TCMO - 22%, including all direct taxes applicable to handsets and services, i.e. VAT, import duties, various sales taxes and extra telecom taxes, followed by European Union (20%). Africa records the highest tax as a proportion of handset cost - on average 29% - closely followed by Latin America with 27%. Asia Pacific records the lowest figure for tax as a proportion of TCMO (13%) thanks to low VAT rates and limited mobile-specific taxation. The highest rate of tax (48%) is encountered in Turkey. China at 3% has one of the lowest rates.

39 This is a very important practical consideration. In particularly turbulent developing countries, the share of total tax revenues coming from telecommunications can approach 40%.

However, individual taxes and charges differ in their 'efficiency,' defined loosely as the degree to which they have an adverse effect on the way economic and social objectives are achieved.

In standard tax analysis, the damage done to economic efficiency by taxes grows disproportionately as the tax rate rises.

Based on certain assumptions, doubling the tax rate will roughly quadruple the harm inflicted by the tax[40]. This means that the very high rates of taxation noted above are doing serious damage. As a corollary, lowering them even slightly would improve matters significantly, in addition to the resulting spill-over benefits (see Box 3).

Box 3. Tax cuts on mobile phones in Kenya

Kenya's mobile market has grown significantly over the last few years. Competition has increased with the introduction of the two additional Mobile Network Operators, and this has contributed to a price drop of over 70% over the last four years [to 2011]. Coverage has increased to 96% of the population.

As a result, in Kenya, consumers, businesses and government continue to benefit from the positive developments in the mobile sector. Estimates indicate that, in 2011, the mobile communication industry employs almost 250,000 people in Kenya.

This also highlights the importance of the mobile sector to the productivity of the economy as a whole. MNOs contribute to such increase by providing services such as Mobile Banking, M-agriculture, M-education, and have also contributed to a number of social projects in Kenya's rural areas.

In June 2009, the Kenyan government, recognising the importance of enhancing access to mobile telephony, decided to exempt mobile handsets from VAT. This has generated significant benefits for many Kenyans. Handset purchases have increased by more than 200% since the removal of VAT and penetration rates have increased substantially, from 50% to 70%. This successful policy confirms that consumption taxes can have a significant impact on consumer behaviour in Kenya.

Source. Shortened from Deloitte, Mobile Telephony and Taxation in Kenya, 2011, available at http://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/mobiletelephoneandtaxationinkenya.pdf

40 The key assumptions required are that supply is highly elastic and that the demand curve for the service is linear (a straight line). The latter assumption is almost invariably true as an approximation over a limited range of price changes.

Taking this into account, it is generally best to tax something which will not have an effect on the supply or the supply price of the final service – something which is, in economic jargon, a scarcity 'rent' or supplementary profit for a firm.

This is where a charge on spectrum comes in[41]. Access to prime spectrum can generate extra profits for an operator; it can be 'a licence to print money'. Extracting that extra profit by a spectrum fee or through an auction can, if it is done competently, gain the government revenue without raising prices. This can be accomplished by an auction.

There is, however, a great danger associated with this approach: the government may be tempted by the prospect of substantial and relatively easily collected revenue deliberately to restrict the availability of spectrum to make it more valuable at auction or to achieve a higher fee. The government deliberately restricting the availability of spectrum to make it more valuable at auction or to achieve a higher fee would cross the boundary between an efficient charge for scarcity and inefficient monopolistic exploitation and would be very detrimental to the achievement of universal connectivity.

Except in the case of taxing scarcity rents, can anything be said about the relative 'efficiency', in the sense above, of different forms of taxes and tariffs? One thing that governments had found easy to tax was incoming international calls. However, as IP spreads, enforcing a distinction in tax rates across different services becomes increasingly difficult. The differentiation of rates between broader categories (such as data consumption and connection/address) may still be feasible, and there is room to look for efficient options in this area.

It is also important to apply the same efficiency approach to the offering of corporate tax breaks, or departures for the standard tax regime, which often result from tax competition and which can take many different forms including accelerated depreciation and tax holidays. The latter form is subject to widespread criticism[42].

In short, working out an efficient tax and tariff regime which is acceptable to Governments, industry players and the public requires a country-by-country analysis. The clearest result is that spectrum auctions or fees can in some circumstances avoid adverse effects, but these carry the risk of the government succumbing to the temptation to gain even more revenue by restricting spectrum availability. In other respects, more detailed work is needed to help choose what to tax and at what level. In any event, it is necessary to prevent any adverse consequences arising from taxes negating the benefits of the use of taxation revenues.

41 See also the discussion in 3.4 above.

42 See, for example, Michael Keen and Mario Mansour, Revenue Mobilization in Sub-Saharan Africa: Challenges from Globalization, 2009, p. 14, available at http://www.frp2.org/english/Portals/0/Library/Tax%20Policy/Revenue%20MOb.pdf


5
INTERVENTION
TOOLS

5. Intervention tools

Assuming broadband and investment targets have been selected by a government or regulator (where market forces have not or not expected to be active) and that general regulatory governance and tax regimes conducive to investment have been established (sections 3 and 4), it is then necessary to select appropriate tools to help achieve the targets. This section examines some of the tools that may be available to governments, communities or international institutions, what these tools may be used for (to support demand or supply) and which of these may be best suited to particular circumstances. Examples are given of where these tools were used, successfully or less so, with a view to identify possible problems that may arise and how to avoid them. In the following sections, the report examines:

1. roll-out requirements in spectrum auctions;
2. universal service funds;
3. public/private partnerships;
4. input or infrastructure sharing;
5. innovation;
6. demand management.

Needless to say, one tool will not fit all situations, given that each tool must be used to meet specific needs in specific circumstances. Given the nature of this report, these are examined at a high level. The table below categorises the tools discussed below (except 'innovation') with respect to which activity in the value chain they predominantly relate to.

	USF	PPP	Coverage obligation	Spectrum acceleration	Input sharing	Demand-side
Retail	x					x
Backhaul/		x				
backbone					x	
Spectrum			x	x	x	
Local Access		x	x	x	x	

5.1 Roll-out requirements in spectrum auctions

When spectrum licences are assigned via an auction process, governments often insert coverage or roll-out requirements as a condition in one, several or all of the licences. The intention of such conditions is to take coverage beyond the level to which normal commercial considerations would take it. Coverage is normally measured in terms of the percentage of the population which receives service, or it can be defined as the geographical area which is served. Clearly, coverage requirements are not uniform for all countries or even across different regions in the country. They should meet the situation and needs of the country. Governments can simply impose an obligation to roll out the network to rural areas first (as in the case of Germany, for example, in the auction for the 800 MHz licenses), or they can be more specific, as in the case of Sweden where the coverage obligation in one license in the 800 MHz auction was to provide service of at least 1Mbit/s or better to a list of stated addresses identified as being broadband 'not-spots', lacking any other forms of broadband connection[43].

43 Janette Stewart - Mobile broadband coverage – balancing costs and obligations. http://www.analysysmason.com/About-Us/News/Newsletter/Mobile-broadband-coverage--balancing-costs-and-obligations/

The general approach though is to set those coverage requirements based on population or geographic coverage[44]. This coverage benefit is not won at a zero cost. Bidders in auctions can be considered to base the maximum they are prepared to offer for a licence on the stream of profits they expect to get from it. If they have to serve uncommercial[45] areas or customers, the maximum amount they are prepared to bid will go down by the amount of the expected loss from serving uncommercial areas. Depending on the nature of competition for the licences, the actual amount which they pay may also go down, with a resulting adverse effect on the public finances. The regulator or government does not know exactly what level of revenue it may have to forgo from the auction as a cost for the coverage obligations that the bidder is required to meet (and which it would not meet if it was simply left to it to decide on a purely commercial basis) until the auction is completed[46].

There is a range of issues which can arise in designing, monitoring and enforcing coverage conditions. The government or regulator has to be sure that the investment and operating expenditures to provide the specified coverage are forthcoming; the need for certainty requires them to monitor the operator's coverage and to penalize those operator(s) which fail to provide service over it. This is important since the government is offering the spectrum at a lower price in return for an expanded coverage. Thus there must be a credible plan in place to deal with non-performance. This plan must take into account the possibility that an operator may make a bid based on the expectation that, if it gets into financial difficulties, it will not be held to account for the extra coverage. It may be necessary to have in reserve a remedy in the licence which allows the regulator to require the licensee to divest itself of the licence by selling it to a third party, possibly together with any collateral investment wanted by a potential purchaser. Alternatively, as was done in the case of 4G licences in Germany, the operator may be required to build the network first in non-commercial areas. An interesting approach to using roll-out obligations was used to provide broadband in underserved areas in Chile (where the geography makes coverage particularly challenging) in the 2014 700 MHz auction, where bidders had to commit to providing coverage in 1,281 rural/isolated locations and along 13 highways totalling 854 km within 18 months[47].

It should not be assumed that these sanctions are easy to apply or that they provide an easy answer. Withdrawing spectrum or revoking a licence can result in leaving part of the population without coverage and a decision to give more time for coverage requirements can result in competitors complaining or even filing legal challenges, as they had to incur the relevant costs to meet their obligations. As such, the authorities are usually called upon to select from the following types of sanctions:

a) A warning to the licensee and remedial action;[48]

b) order specific performance of the obligation by a certain date;

c) impose a fine for the failure;

d) withdraw the spectrum granted; and/or

e) revoke the licence[49].

44 For examples please see the November 2013 Radio Spectrum Policy Group – Report on Improving Broadband Coverage gives a picture of the proposed coverage of selected countries using the different bands but also demonstrates the differences in coverage set even within the EU member states due to their different needs http://rspg-spectrum.eu/_documents/documents/meeting/rspg26/rspg11_393_report_imp_broad_cov.pdf and the 14/3/14 report of the Electronic Communications Committee of CEPT Doc. ECC (14)019 where obligations in some cases cover not only coverage by population but also upload and or download speeds etc.

45 'Uncommercial' refers here to serving groups who impose additional costs of service which exceed the additional revenues which they bring (including any additional revenues generated by others trying to get in touch with them).

46 It might be possible to collect bids for alternative levels of coverage, and then choose the one which offers the best 'value for money'. However, this complicates the auction process considerably.

47 'Analysis: Chilean 700 MHz auction provides first step in South America,' Policy Tracker, 26 March 2014, and http://www.subtel.gob.cl/component/content/article?id=5205

48 UK - Warning and remedial action - In 2008 Ofcom issued O2 with a deadline to meet its 3G rollout obligation to ensure coverage at least 80 per cent by the end of 2007. If O2 did not met the rollout obligation by the end of June 2008, Ofcom would shorten the term of its 3G licence by four months, equivalent to a fine of at least £40m. In May 2008, Ofcom confirmed that the licensee complied and no action was taken. (Source – Ofcom press releases www.ofcom.org.uk).

49 Revocation - Germany - The Telefónica/Sonera venture in Germany under the "Quam" brand bid for and obtained a 3G licence for €8.4 billion in 2000. The license was subject to a coverage requirement of 25% of the German population by end of 2003 and 50% by 2005. In 2004, the German regulator became aware that Quam was not rolling out the network revoked its license and refused to refund the fee paid for it. The licensee challenged the revocation in court but the German Federal Administrative Court decided that the German telecoms regulator was justified in revoking the license for failure to meet the build-out requirements, without refunding the €8.4 billion license fee. source- http://www.hlspectrumreview.com/2011/08/articles/mobile-and-fixed-wireless/german-court-confirms-3g-license-revocation-with-no-fee-refund/

5.2 Universal service funds (USFs)

Before or at the time of market liberalisation, in many countries, it was recognised that boosting coverage is likely to require some regulatory intervention to ensure levels of service in rural and remote areas, where the market may not deliver coverage and leave consumers without service. In many countries, this problem has been dealt with through the imposition on the operators (usually the incumbent) of a 'universal service obligation' (USO), requiring it to provide certain services to all consumers. The aims of USOs are encapsulated in the words "Availability, Affordability, Accessibility, Awareness".

The concept of USO when applied in a competitive context became coupled with the possibility of the operator providing the USO service being compensated for meeting this obligation. In order to provide a level playing field, and to share the costs of providing non-commercial services, a USF can be set up in some form or another. USFs are typically funded via some form of contribution mechanism from telecommunication operators. In the majority of cases, each operator is required to contribute a percentage of annual revenues. In addition to operator contributions, there can be other sources of funds (including, for example, one-off or regular government grants or contributions from international organisations and/or "regulatory sources", such as fees from licensing, from spectrum auctions, and even direct consumer contributions).

With contributions or levies from operators as the main source of fund revenue, a series of obvious questions arises, including:

- how should revenue be calculated?
- alternatively, should contributions be based on profit?
- is the fund contribution tax deductible, thereby depriving the government of revenue?
- is the revenue base fair and pro-competitive, given that levies may have a disproportionate impact on new entrants?[50]
- what effect will the contributions have on service prices?

Given that USFs have a role to play, one must ensure that they are set up and operated efficiently. Two recent studies[51] that appeared in 2013 (one surveying 69 USF and the other one surveying 64 USF) identify examples where USF have worked adequately or where the situation may be conducive to their use. At the same time, it seems that that is also a very high number of USF encountering problems, or failing to achieve their goals. 26% of the funds surveyed were inactive[52] and some 22% exhibited low activity;[53] thus 48% were not operative or under operating. The ITU (2013) report found that only 27 of the 69 funds surveyed permitted use of their fund for broadband deployment. The proportion in the GSMA report was similar.

A USF must have a proper structure and proper policies (including an effective legal and regulatory framework), autonomy, openness, effective management and mode of operation and accountability. All these play a role in its success. And the success and proper operation of the USF are crucial if it is to invest in broadband infrastructures or demand. It is also useful to focus upon two major points: (i) the policies of the fund[54] and (ii) the importance of technological neutrality.

50 A new entrant has to survive on thin margins, whereas an incumbent may have profits arising from its old monopoly position.

51 ITU – USF and Digital Inclusion for All Study 2013 and the GSMA Survey of USF 2013 – although similar in many respects, there appear to be some differences between these two studies e.g. number of funds surveyed.

52 26% according to the ITU Study.

53 i.e. with less than 5 applications of the USF in progress or completed.

54 The policies of the USF need to reflect the needs of the country. An example where the difference in needs/policy is reflected in the scope of the USF is the EU, where the financing mechanism for the provision of universal service obligations only becomes active once the designated universal service provider has provided the USO and is thereby subject to an unfair burden. Consequently in the EU USF is not available per se for the usage of Member State governments. However, some Member State governments have (had) specific 'programmes' for increasing coverage/ take-up of broadband in particular in rural areas. But the financing did not fall under the specific universal service rules of the EU framework.

As noted above, only 27 out of 69 USFs in one study could use their resources for broadband development even if they wanted to. It is therefore important to ensure that a USF has that flexibility and its management has the capacity for effective use of its resources. As the ITU study states: *"There are many funds that have adequate resources to help finance broadband deployment but the funds sit idle because they cannot be disbursed for this purpose."*[55] Obviously given the importance of funding broadband and the measures which underpin its roll-out and demand, subject to individual country needs, the USF framework must either specifically provide for such funding (either as part of the definition of what Universal Service is or through such other appropriate express statement of scope) or be structured and be empowered in a flexible way so that the Fund may include it in cases that this is appropriate.

Where USFs exist, one should look to them to see what role they can play in broadband development not only in infrastructure, but also in programs relating to subsidies for subscriptions, devices, content, and digital training. An interesting example of the use of USF and other funding sources at the different stages (initially contributions by the operators through a USF and later direct government funding) can be found in the Swedish approach[56].

The case studies below (Boxes 4 - 6) examine some varied examples of how USF have been set up and used.

55 Para 3.12.

56 Sweden: Universal service fund for broadband. The Swedish broadband strategy was divided into three stages. In the first stage, a 2 Mbit/s service was to be made available nationwide by the end of 2010. In the second stage, at least 40% of households are then to have access to 100 Mbit/s by the end of 2015. In the third stage, coverage is then to rise to 90% of households by 2020. For the first stage of the broadband strategy, the Swedish government set up a universal service fund (USF) that received contributions from all telecommunication companies. This fund aimed to provide EUR 100 m for rolling out 2 Mbit/s services to commercially unviable areas. In the second stage of the broadband strategy, the Government was to provide a further EUR 24 m to fund the installation of infrastructure in rural areas between 2010 and 2012.

Box 4 - Colombia – Fondo de las Tecnologías de la Información y las Telecomunicaciones (FTIC).

Colombia has been identified as one example of best practice in the development and administration of USF. It is a financially autonomous entity with projects awarded transparently through a public bidding process (least cost subsidy) implemented in a timely and transparent manner. The legislative framework is broad with its objective to support all programmes and projects, which would allow all residents of Colombia to have universal access to ICTs. The Fund produces a four-year plan with targets, detailed project descriptions and the projected associated cost of the projects.

All fixed and mobile operators contribute a percentage of their gross revenues of national and international long-distance and mobile services to the USF, as well as a percentage of net revenues from fixed telephone, VAS etc. In addition, the fund has contributions from the use of scarce resources such as spectrum and from any successful bids for any new services.

All projects to be financed by the Fund are awarded in a public bidding process open to all interested participants. The bidding and award process generally takes about two and a half months to complete.

From a broadband perspective, the Fund has commenced a national connectivity project that encompasses a National Fibre-optic Project (PNFO) with an approximate budget of USD 226.8M aiming to provide coverage for the 39 million Colombians who belong to the three lowest socio-economic strata, boost coverage for SMEs, quadruple the number of Internet connections and triple the number of connected municipalities.

What is interesting is that the plan includes a "Complementary High Speed Connectivity Project" to cover communities that will not be covered by PNFO above and where connectivity is to be provided by microwave, satellite, etc. This is an example of using alternative technologies as part of meeting the targets of rolling out broadband. The plan also includes other elements such as free access to the Internet in educational institutions and community access in Population Centres etc.

The Colombian Fund is also a good example of a demand-side support programme where given the fact that in some of these regions, this is the first time that inhabitants have access to advanced telecommunication services they also provide a training component focusing on the use of computers, faxes, etc., the use of computer tools, of e-mail etc.

In addition, content generation is promoted as well as the access to such content through websites with links to newspapers, institutional magazines, local cultural events, museums and libraries, search engines, links with consumer complaint entities, etc.

ITU – USF and Digital Inclusion for All Study - 2013

GSMA - Survey of USF - 2013

Box 5 – India's National Optical Fibre Network.

A different example where USF resources are used is the National Optical Fibre Network (NOFN) being implemented in India. The NOFN will be used primarily to provide broadband connectivity to village-level bodies. An entity was set up (Bharat Broadband Network Limited or BBNL) with a view to carry out this plan. BBNL is to be a wholesale bandwidth provider, which would provide non-discriminatory access to the NOFN infrastructure to all Service Providers and a licence has been granted to it.

The project is financed using the universal service fund (USF) at a cost of USD 4 billion. The India USF was noted in the GSMA report as being one of the top 10 countries holding funds in excess of USD 30 million, constituting 0.23% of India's GDP.

The project in question sought to connect 250,000 local administrative regions and aimed to deliver ICT based goods and services to rural households by private service providers. It was due to be completed by December 2012. Despite support, the project has been delayed potentially partly due to lack of interest by the private players.

The question that arose is whether this was the best vehicle to finance such a project? There are views on both sides. The new entity had to ensure non-discrimination when providing the service to operators, obtaining access to existing fibre networks, getting rights of way etc. versus those who argue that the set-up is such because private operators are not in favour of leasing their fibre networks or even sharing information with the new entity, but probably more importantly because of the absence of interest from the private players in using the services of BBNL.

Would that have been different if the project were a PPP? Apparently BBNL had initially been modelled as a PPP, but later it was decided to implement it with government money as it was considered that the private sector may not want to contribute in the early stages of the project.

Sources:

P. Vigneswara Ilavarasan and Nalini Srinivasan - National Optical Fibre Network of India: A Position Paper March 2014 http://broadbandasia.info/wp-content/uploads/2014/04/NOFN-India_11-April.pdf K. K. Minocha - National Optical Fibre Network - Empowering, Rural India by democratising information through Broadband 4th April 2012 https://www.itu.int/ITU-D/asp/CMS/Events/2012/ITP2012/K_Kminocha_Broadband.pdf

Box 6 - 1Malaysia Netbook

Another example of a country where the USF has supported the demand side of Internet/ broadband is the 1Malaysia Netbook project of The Universal Service Provision Fund (USP) of Malaysia. The USF is supported by a contribution of 6% from the designated services of all licensees of their weighted net revenue.

The "Komputer 1Malaysia" initiative was announced in 2010 under the National Broadband Initiative (NBI), aimed at providing netbooks to underserved groups from underserved areas in view of boosting up the broadband access service take up per household in accordance with the National Broadband Plan (NBP). The goal of this project is to ensure that communities living in underserved areas are connected to mainstream ICT and bring about socio-economic development for those communities in the various sectors such as education, business, agriculture, health, amongst others. The project is part of USD 315.4 million total funding.

During Phase 1 of the project, the recipients of the netbooks were 123.000 secondary students whose household income is less than approximately USD 925 and reside in a district where there are established Community Broadband Centres. The project is expected to result in an increase of 9% in broadband penetration levels.

Sources: 1Malaysia Netbook Official Portal and GSMA USF Study

5.3 Public/private partnerships (PPPs)

USF involve a cross-subsidy among users. An alternative form of direct subsidy is the public private partnership or PPP[57]. This term covers several different options. Applications to broadband also cover many different elements in the value chain. PPPs are thus a widely used and flexible form of intervention, embracing a range of different cost- and risk-sharing arrangements.

Typically (and necessarily in jurisdictions where State aid rules govern this form of intervention), the public body runs a competition to identify the private partner. That competition and the resulting PPP can take different forms. And each different form of PPP can be used to plug gaps in available finance arising where, for example, the business case is not attractive enough to a private investor acting alone. Adopting the PPP "classification" of The European PPP Expertise Centre (EPEC)[58], the different types of such relationships can be grouped into four main types:

Private design build and operate (PDBO). This form of PPP is most suitable where the demand for broadband is sufficient to attract the private sector, but where additional financial support may be required at the early stages of the investment in the form of public funds in order to create an acceptable case for investment. The private sector builds and operates the infrastructure, but is subject to obligations such as coverage.

57 A USF can, but need not, provide the public funds in a PPP.

58 The description of the types of PPPs is adapted from the "Broadband - Delivering next generation access through PPP" http://www.bei.org/epec/resources/epec_broadband_en.pdf .

PPP Joint-Venture - This form of PPP is a joint venture between the public and private sector. A larger financial commitment is made by the State, region or municipality and a smaller financial commitment is undertaken by the private partner, together with the construction and operation of the network. During the early stages of the investment, the public sector has greater control of the project, which shifts over time to the private sector, which ultimately takes full control subject to meeting agreed targets. This type of PPP is better suited for projects that need initially high levels of investment, and which will not be self-financing for some time; thus the public sector initially makes a large financial commitment, but the private sector then takes responsibility until the network becomes self financing. One example of this PPP approach is the Auvergne project in France, where the regional authorities provide the funding for the required infrastructure paying the operator for a ten-year period. The operator designs, operates and commercialises the network on behalf of Region. Another example is the Banda Ultralarga project in Lombardia, Italy[59].

Public Outsourcing / GOCO - 'Government Owned – Contractor Operated' ("GOCO") PPP model. It involves the construction and operation of broadband infrastructure with public funding and a private sector operator being appointed to take responsibility for implementing the infrastructure and subsequently operating the network. In addition, the private company also has responsibility for marketing wholesale and, in certain cases, retail services. One example of this approach is the metropolitan networks project in Ireland, where the metropolitan access networks are managed by private operator for a period of 15 years and where the funding was provided 10% by local and regional authorities, 45% by the EU Regional Policy Fund and 45% by the Irish Government. The infrastructure remains in state ownership.

Public DBO – where the public sector develops the infrastructure for broadband services in a conventional way under individual contracts. The design, implementation and operation of the network itself are all directly managed by the public sector. A separate publicly owned company is established that makes the network available to private service providers on a competitive basis. One example of this structure is the Asturcon PPP in Spain which is implementing and managing the wholesale network itself in order to keep control of its roll-out objectives and to manage the network directly. A wholly public-owned, special purpose company has been established (GIT), which offers wholesale services to private service providers.

The PPP usually lasts for a long period. During the course of its roll-out, services, prices and other terms and conditions are usually governed by the initial contract. This creates significant pressure to get the initial contract right. It is a tool that, when properly used, can spur the development of broadband in areas that otherwise it would not reach. However, the contractual burden on the public body is onerous, and if the framework is wrong or if not enough parties are interested in bidding for it, the outcome may prove inefficient[60].

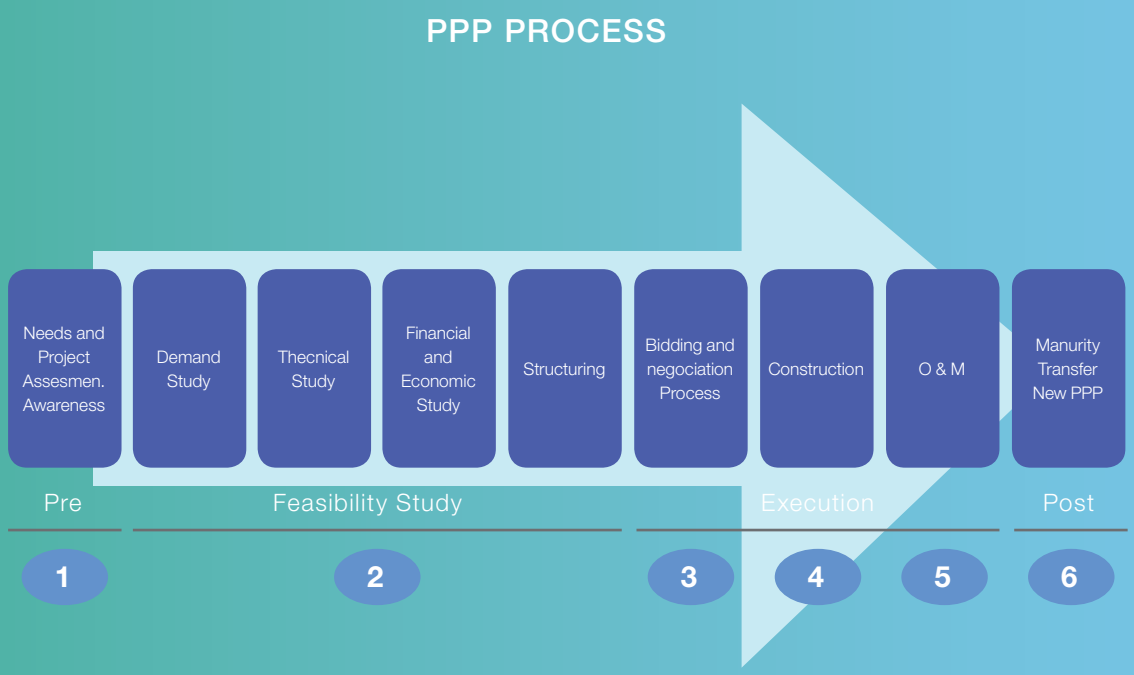
59 Project BUL is a joint venture between Regione Lombardia and the four main telecom operators in the regions. The project aims to bring FTTH to 50% of the population of Lombardia, covering 167 of its 1546 municipalities (excluding the Milan municipality). The project is intended to help operators overcome market entry barriers, develop demand and enable services that will improve productivity, efficiency, competitiveness and quality of life.

60 See the UK National Audit Office report on 'The Rural Broadband Programme", July 2013, available at http://www.nao.org.uk/wp-content/uploads/2013/07/10177-001-Rural-Broadband_HC-535.pdf concerning a PPP for rural broadband in the UK.

Box 7. A PPP for backbone in Peru

In December 2013, the government of Peru awarded the contract to design, deploy and operate the national backbone network to TV Azteca. The project will require an investment of around U.S. $ 400 million and will involve the deployment of over 13,000 kilometres that will connect Lima with 22 regional capitals and 180 provincial capitals, and will provide broadband telecommunication services in line with the requirements of open, equal access and neutrality, established by the Peruvian regulatory framework.

The IADB helped the government with the Feasibility Study phase (Demand, Technical, Financial and Economic studies, and the structuring).



The PPP model used has been a twenty-year concession, with the transfer of the assets to the government at the end of the contract and with the possibility of total or gradual renewal. Since the project was not profitable at the beginning based on initial estimations, the government decided to provide a Minimum Revenue Guarantee to make the project bankable. In the case where demand may exceed the estimations, TV Azteca and the government of Peru will share the profits derived from the deviation from the base case. Also TV Azteca should reserve capacity to attend the demand from the State National Network (Red Nacional del Estado) which includes the Research and Education National Network (Red Nacional de Investigación y Educación).

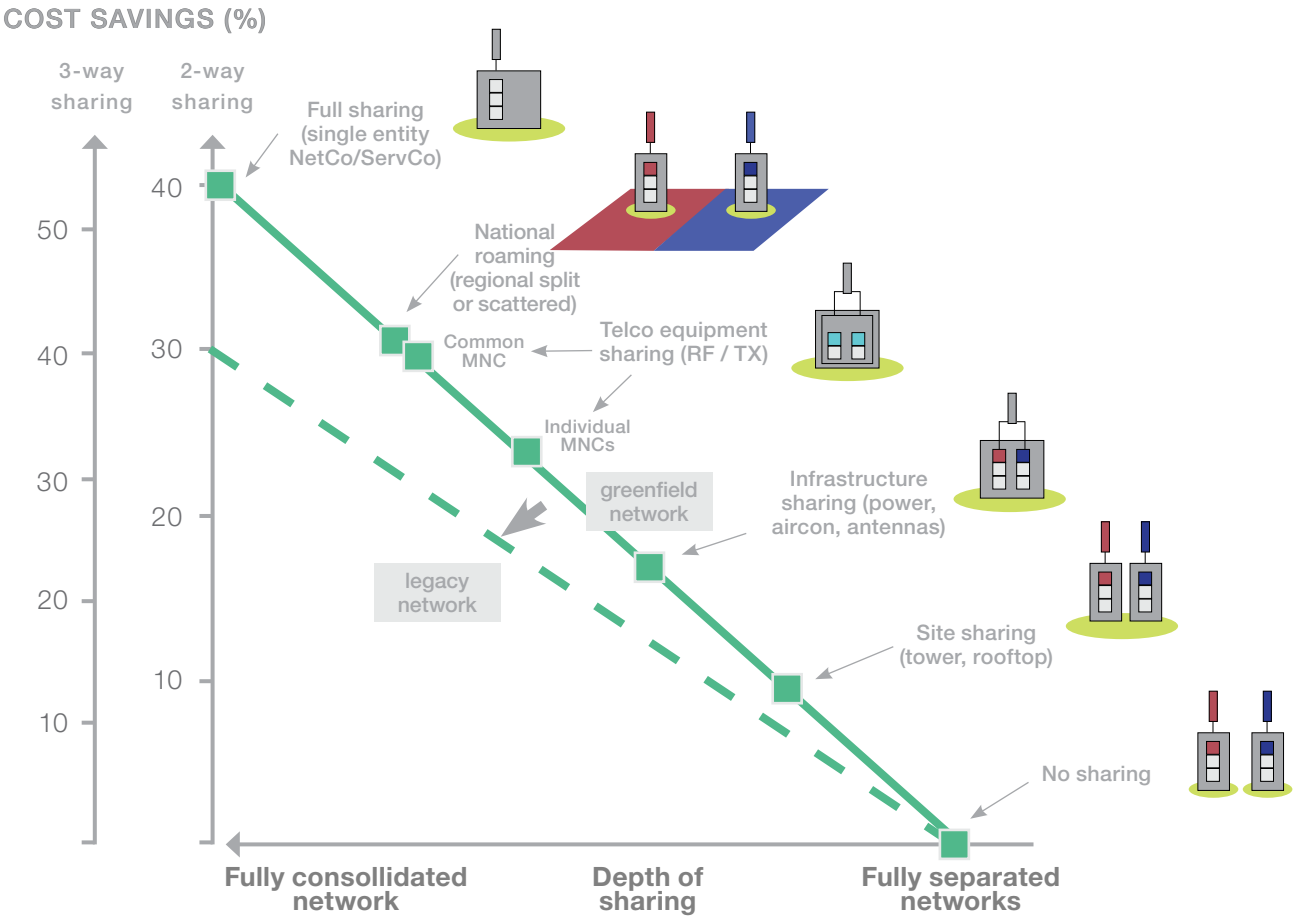
5.4 Input or infrastructure sharing

Network costs can be reduced where firms share network elements. In fixed telephony, this can be the result of competition enhancing measures imposed by the regulator, such as mandatory unbundling, for example of local loops. In mobile networks, upon which this report chiefly focuses, impetus for network sharing often comes from the operators themselves, which seek a competitive advantage by cost reduction through cost-sharing/network-sharing agreements. The inputs in question can range from sharing of towers to sharing of a full radio access network. Voluntary and self-financing schemes differ from PPPs, where public capital is required to build an asset which would otherwise not be funded, as it would not be profitable for a commercial entity.

Infrastructure sharing can help avoid costly duplication and can promote access by participants to an input at a lower unit price than would otherwise be achieved. Indeed, competition authorities, confronted with cost efficiencies claimed for a proposed merger, often ask whether the same benefits can be achieved via a cost-sharing arrangement.

However, some competition and regulatory authorities have concerns about the possibility that network-sharing will chill competition; thus in Europe, sharing has in the past been limited to certain passive assets, such as towers. Sharing of the full radio access network, or of spectrum, has been viewed with suspicion. Exceptions have been made in remote areas – where there is no scope for duplicated networks, a shared network supporting rival retail services may be preferable to a single integrated monopolist in terms of choice, price and take-up rates. Figure 5 below illustrates the estimations of one mobile operator (Vodafone) for likely cost savings from sharing[61].

Figure 5: Vodafone estimates of potential cost savings from network sharing.



61 "Network Sharing in Vodafone" presentation to the GSMA http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/06/Vodafone1.pdf

Considerations to be taken into account include:

- Sharing is common in the case of mobile networks, particularly with respect to assets used for local access (for example, towers, antennae, spectrum). Sharing can extend to (usually fibre) networks providing backhaul to and from towers;

- in relation to fixed networks, there has been substantial discussion of private operators agreeing to share a next-generation access network, but these have generally foundered as a result of the sums involved and strategic differences among potential partners, which can make it difficult to agree on the technology to choose;

- evidence on achieved capital expenditure (capex) and (operating expenditure (opex) saving is limited for reasons of commercial confidentiality.

Another issue which arises is how to protect rival operators which do not participate in sharing arrangements. Suppose there are two larger mobile operators and two smaller ones, with a lower level of coverage. A sharing agreement between the two large operators will further disadvantage the smaller ones. Or suppose three operators agree to share, but a fourth is excluded. Regulators need to be vigilant and prepared to deal with possible anti-competitive consequences from such sharing agreements.

In summary, input sharing is a powerful means of reducing costs, and thus potentially reducing prices. Provided certain regulatory safeguards are in place, its advantages are considerable – examples of network sharing arrangements are given in Boxes 8-9.

Box 8 – Local access sharing examples

France - *In France, Orange, Bouygues and SFR are sharing RAN for the covering of about 3,000 smaller towns. See the joint BEREC/RSPG Report on Infrastructure and spectrum sharing in mobile/wireless networks, available at: http://rspg-spectrum.eu/_documents/documents/meeting/rspg25/rspg11-374_final_joint_rspg_berec_report.pdf*

Romania - *Vodafone and Orange have extended their agreement to share sites in August 2013 in Romania, where they have agreed to invest together in 4G roll-out which will also allow the two operators to extend their reach in rural Romania, thus providing coverage in underserved regions of the country. See: http://finance.yahoo.com/news/vodafone-orange-share-network-212001437.html*

Spain - *Orange and Vodafone Spain agreed in 2007 to share 3G infrastructure in towns with fewer than 25,000 people in 19 provinces across the country. The agreement, which covers 1,000 base stations, will allow both operators to increase coverage by around 25%, while reducing the estimated total number of sites needed by around 40%. The parties estimated that within four years they would share around 5,000 base stations. The agreement was further extended more recently when in January 2014 when the two operators announced the integration of their mobile networks in addition to an agreement they entered into in July 2013 to share their fibre-optic infrastructure. The first stage of the new agreement will apparently result in each operator dismantle around 1,000 base transceiver stations (BTS) in less populated areas and move its equipment to its partner's infrastructure. Source – Telegegraphy.com and telecompaper.com*

Box 9 - An African tower company

Eaton Towers is a leading African tower company. Founded in 2008, Eaton is an independent London-based infrastructure-sharing company owning and managing towers across Africa. Eaton Towers is a fast-growing company offering tower sharing on more than 1,500 towers in Ghana, Uganda and South Africa.

Eaton is backed by Capital International, one of the largest and most successful investors in emerging markets and by DPI, the specialist African-focused fund.

African mobile network operators are facing increased demand for voice services, driven by price competition and for data services, as more customers demand smartphones and Internet access.

Network build and operating costs are significantly higher in Africa, yet revenues per customer are falling and regulators are seeking additional rural coverage and improvements in quality of service. Therefore mobile network operators are actively seeking to reduce capital and operating costs.

Approximately 50% of towers in Africa are owned by five big operator groups: Vodafone, Orange, MTN, Airtel and Etisalat - all of whom are implementing tower-sharing strategies.

To date Vodafone and Orange have selected Eaton as their partner for tower sharing transactions in Africa.

Sources:

http://eatontowers.com/

5.5 Innovation

Government policy-makers and regulators are not normally qualified or well-suited to have a direct impact on the appropriate direction or specific characteristics of ICT innovations. As most innovations are used predominantly in countries other than where they originate, the key issue for most governments is how to encourage the adoption of these innovations rather than innovation itself, or more particularly, how to become a fast follower.

However, general government tax and spend policies may have an impact. Policy-makers and regulators should also be aware that competition is a good driver for innovation, in terms of inventions and of first and subsequent commercial applications, although the effects of such innovations may lead to the creation of temporary 'winner takes all' dominant players.

Instead, the priority for governments and regulators is more likely to be preventative – i.e. to prevent legislation and regulation from being an obstacle to innovation. This may be harder than it sounds, since existing producers often have both the motive and means to discourage new developments.

One example of an innovation requiring the removal of regulatory restrictions is the use of unlicensed spectrum to deliver broadband services (see Box 10).

Box 10 - Investing in New Approaches to Connect Rural Kenyans

This initiative aims to provide affordable Internet & electricity to rural Kenya. The USAID Global Broadband and Innovations (GBI) Program works with NetHope members, USAID Missions and private partners to deliver high-speed, low-cost Internet access and improve the quality of life in underserved rural areas around the world. In Kenya, broadband penetration is very low and nearly 72% of Kenyans are without Internet.

In partnership with the Kenyan Ministry of Information and Communications (MIC), Microsoft East Africa, and Mawingu Networks, Ltd., GBI implementing partner NetHope are supporting the 'Mawingu' project, Kiswahili for cloud, to introduce broadband into rural Kenya. The initiative delivers solar-powered wireless broadband access to hospitals, schools and less populated rural communities (some lacking even basic electricity) to support economic growth, education, healthcare and e-government services — empowering millions with opportunities that were never before possible without access to technology. The project teams use innovative low-cost, low-power wireless broadband solutions to extend access, employing redundant or unused spectrum bands previously reserved for television broadcasting (also referred to as TV white spaces or TVWS).

Public institutions are currently being set up with solar-powered access in Laikipia County, Central Kenya. Work is expected to continue through 2014.

Source:

Available at http://nethope.org/assets/uploads/Mawingu-V3.pdf

Another fairly recent application is the use of Wi-Fi hotspots to provide inexpensive connectivity in villages. Thus in India, the backhaul network built with USF funding (described above) can be used as a staging post for such hotspots. It has been suggested that these Wi-Fi hotspots would be more effective if power limits were relaxed, increasing their range in areas where spectrum is not heavily used and thus no interference issues will arise.

Innovation is, of course, not confined to network developments, as the following examples show (see Boxes 11 - 12). Another innovative and very well-known service innovation is the use of the network for monetary transfers, pioneered in Kenya under the name M-pesa[62].

62 Ignacio Mas and Dan Radcliffe, Mobile Payments Go viral: M-PESA in Kenya. Journal of the Capco Institute of Financial Transformation, 2011

Box 11 - UNESCO project to increase reading via mobile phones

The barriers to reading can be partly broken down through greater access to mobile phones.

While UNESCO research indicates that hundreds of thousands of people in countries like Ethiopia, Nigeria and Pakistan are reading on mobile devices, very little is known about individual readers. This information gap hampers efforts to expand the footprint of mobile reading and realize the educational and socio-economic benefits associated with increased reading.

Drawing on findings from a year-long study, this report explains the habits, preferences and demographic profiles of mobile readers in seven developing countries. By painting a picture of how mobile reading is practiced today and by whom, it offers insights into how mobile technology can be leveraged to better facilitate reading in countries where literacy rates are low.

The study identified that all demographic groups would likely benefit from increased engagement with mobile reading.

In order to better reach the target groups described above, mobile reading advocates should adopt three broad strategies for extending the benefits of mobile reading to more people:

1) diversify mobile reading content and portals to appeal to specific target groups;

2) increase outreach efforts to create opportunities for potential users to experiment with mobile reading and learn about its benefits; and

3) lower cost and technology barriers to mobile reading.

Source:

UNESCO, Reading in the mobile era, 2014. Available at http://unesdoc.unesco.org/images/0022/002274/227436e.pdf

Box 12 – Ehealth in Africa - SAHEL (Satellite African eHEalth validation) project

Another area where innovation through broadband is making a change is access to health services. Broadband satellite Internet service is one such means used to provide through solar-powered, self-contained Internet terminal equipped access to community nurses to health centres for training, diagnosis and advice on local health issues.

Such an example is the consortium project of a number of industrial firms and non-governmental health organisations to provide broadband internet access via satellite for the SAHEL (Satellite African eHEalth validation) project. This project aims to develop ehealth services in the most underserved regions of African. With no terrestrial connection required the solar-powered satellite broadband equipment provides a fast, reliable Internet connection even in the most remote locations. The SAHEL initiative uses satellite broadband service for three applications:

- *Medical eLearning (training for healthcare professionals in rural areas),*
- *Clinical eServices (links rural dispensaries and treatment centres to medical centres of excellence) and*
- *Computerised Health Management System (manages patients' files and collects medical data to monitor epidemics).*

The project is currently being deployed in two hospitals, one in Eastern Senegal, and the other in Kenya.

Sources:

websites of participating players.

5.6 Demand management

Supply-side measures of the kind described above can be accompanied by demand-side measures such as aggregating demand for broadband among public bodies to provide an established initial market for services; promoting e-commerce as a way to facilitate widespread adoption of broadband by businesses; instituting digital literacy initiatives to increase participation in the broadband market and where appropriate funding users' access to broadband services. The beneficiaries of schemes where funding is involved can be households which receive a subsidy to buy a device such as a PC or a tablet – an important issue given the cost to a low-income family. Expenditure on health and education also provides another vehicle to increase demand for broadband services and to instigate a supply response.

Subsidising demand guards against some of the risks associated with the 'build it and they will come' approach. On the other hand, the demand-side approach has a more complex transmission mechanism: instead of simply subsidising the construction of a network, the intervention creates or expands demand, and then leaves it to a supplier to meet it[63].

63 An analogy with the provision of housing illustrates this: a supply-side measure subsidises specific suppliers and thus lowers the price of new houses. A demand-side measure increases buyers' spending power, to which suppliers may (or may not) respond by increasing supply.

A study by Belloc and others[64] has identified and tested the effects of several supply and demand-side policies. The demand-side ones considered are:

- Public demand for specific broadband-based services;

- Incentives to business demand;

-Incentives to private demand;

- Demand subsidies which reduce the price to the buyer of broadband or a complementary good such as a device; and

- Demand aggregation policies, which seek to enhance the profitability of network roll-out by co-ordinating the potential demand of consumers in order to ensure efficient resource allocation and the obtaining of economies of scale.

Belloc et al (2012) used data for 30 OECD countries covering the period 1995-2010 to unpick the respective contributions of demand and supply side policies. Based on their data set, it appears that demand-side policies have a greater statistical effect on broadband penetration than supply-side policies. Secondly, an optimal policy is likely to contain elements of both. Thirdly, it appears that supply-side measures may be effective in the early stages of diffusion, but 'mopping up' late adopters with lower incomes or a lower willingness to pay for broadband may require more targeted demand-side measures.

Demand- and supply-side can go hand-in-hand, as is the case with New Zealand's Rural Broadband Initiative, which contributes to the costs of a fixed and a mobile operator and includes a component to finance the provision of high speed broadband to rural schools and other centres. Uganda's ICT strategy contains important elements of this approach.

Boxes 13 and 14 provide examples of demand-side programmes in the Republic of Korea and New Zealand, respectively[65].

Demand-side measures (although not only these) may be prime candidates for funding through an Output-Based Aid (OBA) approach which expressly links performance/delivery/outputs with payments. Making payments explicit and performance-based ensures that funding is properly targeted – usually, this process is the result of a competitive tender and helps achieve the best possible price in a transparent manner. Output-Based Aid also has the added advantage of providing an incentive to the operator to meet the targets on time and in a measurable manner given that in most cases it will finance the work/service and will be reimbursed only when it can demonstrate delivery. One example of this approach is the delivery of telecommunication services in rural Mongolia where this method was used[66].

64 F Belloc, A Nicita and M A Rossi, 'Whither policy design for broadband penetration? Evidence from 30 OECD countries. Telecommunications Policy 36 (2012) 382-398.

65 Promoting the use of Internet in schools and increasing the use of the service by students is a common tool by governments to promoted broadband demand. Examples can be found in the United States though the Schools and Libraries Program of the Universal Service Fund which gives discounts to eligible schools and libraries for Internet access, Colombia (see the case study of USF being used for that purpose) and Malaysia in the study of USF of the 1Malaysia Netbook scheme.

66 See The Global Partnership on Output-Based Aid at www.gpoba.org

Box 13 – Demand-Side programmes in the Republic of Korea

The Republic of Korea is considered as an example of a success story. In the case of Korea, there were both supply and demand side initiatives to promote the use of broadband.

On the demand side, the government's broadband initiatives have included the following:

• Aggregating demand for broadband among public bodies to provide an established initial market for services;

• Promoting e-commerce as a way to facilitate widespread adoption of broadband by businesses;

• Providing key public services online and encouraging the development of applications such as e-learning to promote widespread public use of broadband;

• Implementing digital literacy initiatives to narrow the digital divide and ensure maximum participation in the broadband market.

Following the initial roll-out of broadband networks, there were additional policies adopted to support the demand, such as:

• e-government policies to develop and promote public services;

• enhancing e-government services and increasing public and business participation;

• initiatives to promote e-commerce, e-working, and e-learning;

• introducing ICT infrastructure and the Internet in all schools, and to create online education programs;

• improving digital literacy and access to ICT though for example:

- subsidies for computers;

- loans to build high-speed rural Internet networks;

- Online education programs targeted at previously unreached groups (such as home-makers, the elderly, and people with disabilities).

Source:

Building broadband: strategies and policies for the developing world / Yongsoo Kim, Tim Kelly, and Siddhartha Raja. 2010 The International Bank for Reconstruction and Development / The World Bank.

Box 14: New Zealand – Project PROBE, delivering broadband to rural schools

Promoting the use of Internet in schools and increasing the use of the service by students is a common tool by governments to promoted broadband demand. This tool was also adopted by New Zealand as part of project PROBE (Provincial Broadband Extension), a government initiative to ensure, inter alia, that all 900 rural schools in 14 regions had access to broadband Internet services.

The project was provided with NZ$45m by the Government and was led by a Steering Group composed of officials from Education, Economic Development, Prime Minister and Cabinet, Health, the State Services Commission, and a project management firm.

PROBE funding was made available up to the amount of the lowest compliant bid, but each region could choose to make additional investments alongside and choose a different bid if they wished.

Each tenderer was required to:

- *meet service specifications and pricing for a period three years from the completion of the service installation contract;*
- *meet specified milestones during the rollout;*
- *conduct test service performance parameters;*
- *establish regional partnership programmes (where required by the regions) to leverage PROBE for optimum regional outcomes, including the exploration of telecommunications infrastructure beyond the scope of PROBE;*
- *be willing to work with the Ministry of Health to provide connections with general practitioners ("Health Link").*

In the majority of areas, services have been provided through wireline technology. In one area, the service was provided through satellite services which were purchased from commercial satellite providers, and in another, the service was provided through wireless technology. PROBE was complete by the end of 2005 having provided broadband access to 891 schools.

Sources:

Project PROBE Case Study A case Study of Project PROBE, delivering broadband to rural schools 2006-01-11 http://unpan1.un.org/intradoc/groups/public/documents/other/unpan022353.pdf

WSIS STOCKTAKING & PARTNERSHIPS: ACTIVITY DETAILS

http://www.itu.int/wsis/stocktaking/scripts/documents.asp?project=1103489275&lang=en

THE RISE OF THE STATE: BROADBAND POLICY IN NEW ZEALAND 2000-2011 By Jordan Tracy Carter http://researcharchive.vuw.ac.nz/bitstream/handle/10063/2399/thesis.pdf?sequence=1


6
CONCLUSIONS

6. Conclusions

Through this report, the Working Group on Financing and Investment of the Broadband Commission for Digital Development seeks to identify actions, policies and regulatory approaches which will enhance cooperation between market players and public authorities to encourage financing and investment in broadband. The measures identified are primarily designed to promote private investment, thus permitting public capital efficiently to be deployed to meet the needs of disadvantaged groups and those in remote areas - where funding from private investors is harder to attract, but where the need for connectivity is at least as great.

There is no 'silver bullet' or single action which can accomplish this task of mobilising capital. Instead, action is required in each of the four areas identified:

- making investments attractive to capital providers;

- introducing effective policy and regulation in the ICT sector;

- devising appropriate tax policies for the sector; and

- undertaking a range of actions aimed at encouraging and facilitating broadband deployment.

The Working Group on Financing and Investment believes that these actions are an essential pre-requisite to unlock the potential of broadband to solve the key development challenges of our times.

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