PLANNING FOR PROGRESS

WHY NATIONAL BROADBAND PLANS MATTER

CISCO

ITU

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, policy pioneers and international 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. This report is a joint report by Secretariat of the Broadband Commission with Cisco.

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

ABOUT ITU

ITU is the leading United Nations agency for information and communication technology. For nearly 150 years, ITU has coordinated the shared global use of the radio spectrum, promoted international cooperation in assigning satellite orbits, worked to improve communication infrastructure in the developing world, and established the worldwide standards that foster seamless interconnection of a vast range of communications systems. From broadband networks to new-generation wireless technologies, aeronautical and maritime navigation, radio astronomy, satellite-based meteorology and converging fixed-mobile phone, Internet and broadcasting technologies, ITU is committed to connecting the world.

For more information about ITU, please access **www.itu.int.**

ABOUT CISCO

Cisco is the worldwide leader in IT that helps organizations seize the opportunities of tomorrow by proving that amazing things can happen when you connect the previously unconnected. Cisco designs and sells innovative networking solutions related to the information and communications technology (ICT) industry and provides services associated with these products and their use.

Founded in 1984, Cisco has pioneered the development of Internet Protocol (IP)-based networking technologies. Cisco products include routing, switching, and other network-based technologies, such as application networking services, collaboration, home networking, security, storage area networking, telepresence systems, unified communications (such as WebEx), unified computing, video systems, and wireless. Cisco also provides a range of technical support and advanced services. For more information and ongoing news, please go to **www.thenetwork.cisco.com.**

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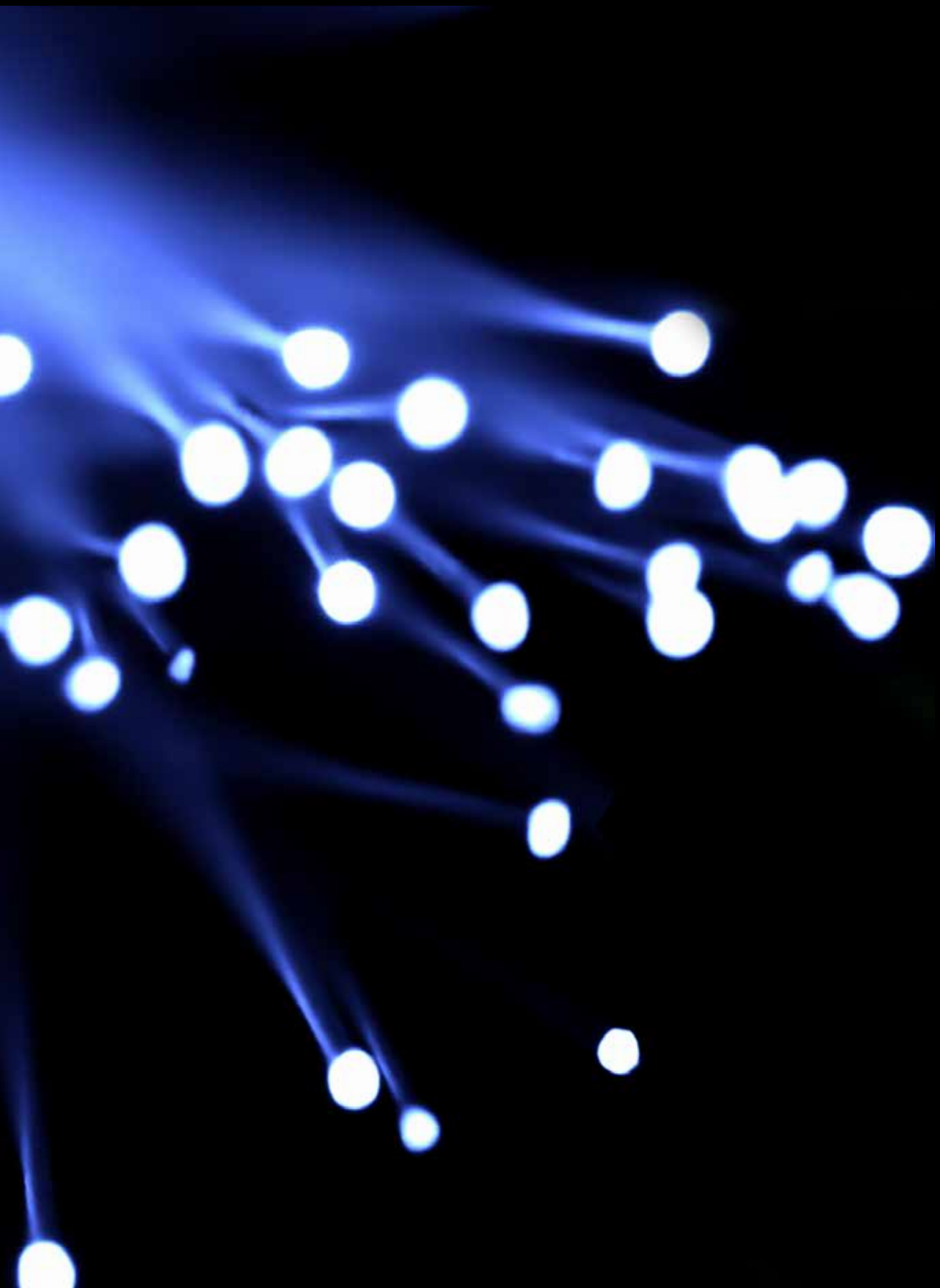

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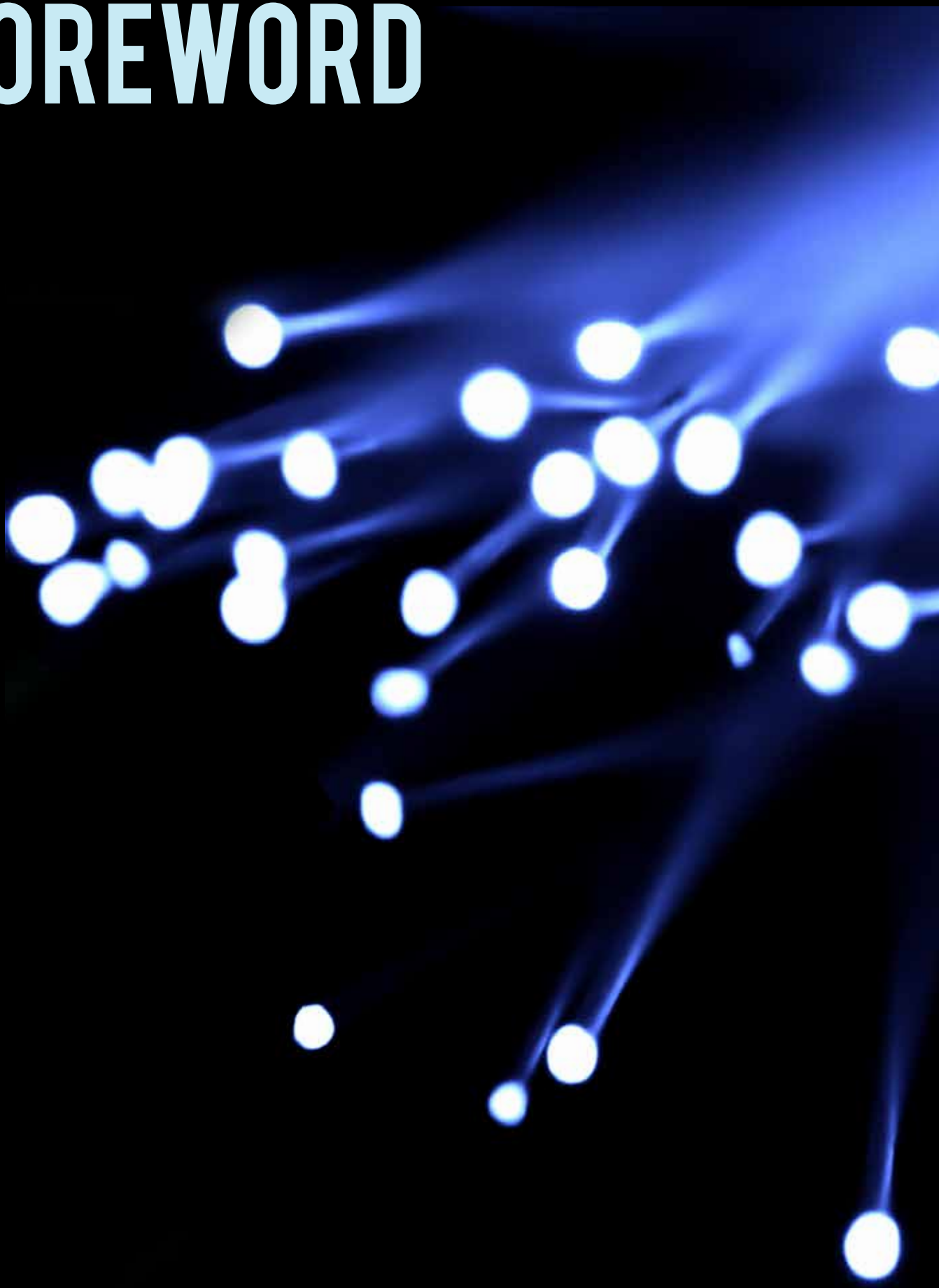


As Co-Vice Chair of the Broadband Commission for Digital Development, it is a great pleasure to publish this report – prepared in conjunction with Cisco – which demonstrates the importance of national broadband plans in helping to bring the benefits of broadband to all of the world's people.

This report is part of the ongoing work of the Broadband Commission, which was created in 2010 by ITU and UNESCO in response to UN Secretary-General Ban Ki-moon's call to step up efforts to accelerate progress towards meeting the Millennium Development Goals (MDGs).

As a high-powered platform of key policy pioneers, industry executives, thought leaders and academics, the Broadband Commission has campaigned actively to raise awareness of the social and economic benefits enabled by broadband networks, applications and services – including improved health and education services; a better standard of living; greater empowerment; and enhanced national competitiveness.

Broadband is a great deal more than just a technology – indeed, it is the gateway to a bright future where all countries can compete in the online digital economy; where governments can deliver innovative new e-government services; where the imaginations and skills of today's children will deliver the inventions and innovations of tomorrow.

In 2011, at the Broadband Leadership Summit, the Commission endorsed a set of advocacy targets covering broadband policy, affordability and uptake. This report looks specifically at the first target, which calls for broadband policy to be made universal by 2015, and examines the importance of policy leadership and the effectiveness and policy implications of national broadband plans.

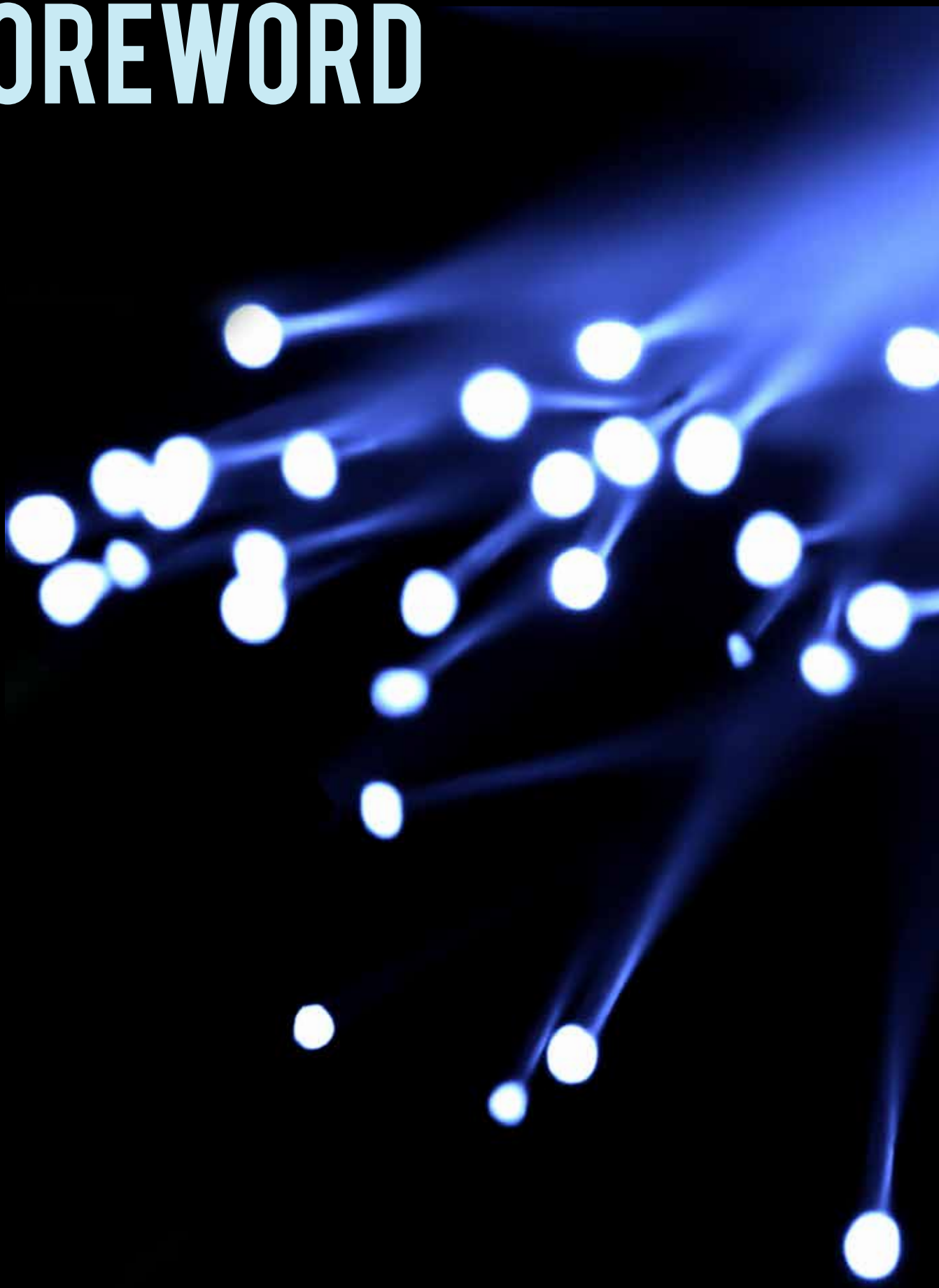
The report is a combination of comparative research, country case studies and statistical analysis – with the main finding being that the presence of a national broadband plan can lead to a significant increase in fixed and mobile broadband penetration.

As a result of its research, debates and analysis, the Broadband Commission believes that the full benefits of broadband are most likely to be realized where there is strong partnership between government, industry and other stakeholders, and where policy-makers engage in a consultative, participatory approach.

In reading this report, let me encourage you to think about ways in which broadband development can be accelerated in your country, to bring the benefits to all citizens and to deliver a better future for everyone.

Dr Hamadoun I. Touré
Secretary-General of ITU,
Co-Vice Chair of the
Broadband Commission

FOREWORD



The Internet is the most transformative technology of our generation and its development, even from the earliest days, has benefited from close partnership between government and private sector companies. That is why we are very pleased to continue our deep collaboration with the ITU/UNESCO Broadband Commission for Digital Development in our shared goal of fostering an Internet that benefits all of humanity. For nearly 30 years, Cisco has been at the heart of Internet infrastructure – moving the world to IP. Beginning as a multi-protocol routing company in 1984, we have focused on market transitions to help usher in successive waves of technological breakthroughs – from the transition to Internet protocol (IP) routing to voice-over-IP telephony to the explosion of cloud-based video over fixed and wireless networks.

We have always believed that the Internet will revolutionize the "Way We Work, Live, Play, and Learn". This has never been truer than it is today, with cloud and mobility coming together to deliver the Internet of Everything and unprecedented new opportunities.

Today, we believe we are in the midst of the next major evolution of the Internet – an Internet where people, processes, data and things all connect over an intelligent network that we call the Internet of Everything. Previously unconnected objects, such as automobiles, medical devices and industrial machinery, are increasingly linking to the Internet. But currently still less than 1% of all physical objects are connected to Internet. As this share rises, societies, economies and individuals will reap further benefits from network effects and increases in productivity.

While private sector companies develop and disseminate the innovations that advance societies, governments play a critical role by creating an overall vision for how technology can accelerate national development. National policy is crucial for setting an open and competitive playing field where the best ideas prosper. Market-based structures and incentives allow for innovation to flourish and benefit all stakeholders. And governments that prioritize economic and social development underpinned by policies that incorporate information and communications technologies (ICTs), particularly broadband, best position their countries for development.

National broadband plans are an important mechanism for governments to set this vision and strategy of how technology can move their own country forward. Among ICTs, broadband adoption has demonstrated the greatest impact on GDP growth and the use of broadband at the individual level has changed our lives in a myriad of ways. By prioritizing broadband, setting targets such as adoption, speed and quality, and identifying the critical policy measures to be implemented, governments signal not only their intention to create a dynamic environment where broadband can growth, but also their commitment to serve their constituents.

This following report clearly details how national broadband plans play a positive role in country development and articulates the crucial elements of a successful broadband plan. We hope this document can serve as a guide to all countries and help pave the way for increased emphasis on how broadband Internet is a tool for the betterment of our global society.

John Chambers
Chairman and Chief Executive Officer, Cisco Systems, Inc.

EXECUTIVE SUMMARY

In today's digital era, the role for broadband – and the benefits of broadband connectivity – in underpinning a country's progress have never been greater. That is why ITU and the ITU/UNESCO Broadband Commission for Digital Development have conducted research into the role of policy frameworks for broadband, in conjunction with Cisco.

This Report finds that there has been strong recent growth in Plans, with some 134 Plans in force by mid-2013. Plans may take different forms (e.g. legislation, policy framework, strategy and/or regulations) and vary in emphasis (e.g. IT, Information Society, ICT, Digital Agenda, or Broadband). Plans prior to 2005 tended to focus on Information Technology (IT) or Information and Communication Technologies (ICT). The Information Society proved most popular as the focus of Plans in 2007-2008, with broadband growing sharply as the focus of Plans from 2008 onwards. Most recently, Digital Agendas account for a small, but growing, number of Plans. However, all of these Plans share a common emphasis on the vital role of broadband in underpinning national competitiveness, and aim to extend national footprint of broadband networks and usage of broadband-enabled services and applications.

Although the nature of the Plan clearly matters (with important differences in status between binding statutory requirements, broad policy guidance or detailed regulations), this Report finds that the exact name of the plan or policy framework may not matter as much as other factors, such as political support, buy-in, quality (comprehensive, clear identification of priorities), and enforceability.

The full benefits of broadband for enhancing national competitiveness and empowering citizens are most likely to be realized where there is strong partnership between government, industry and other stakeholders and where governments engage in a consultative, participatory approach to the policy-making process, in conjunction with key stakeholders.

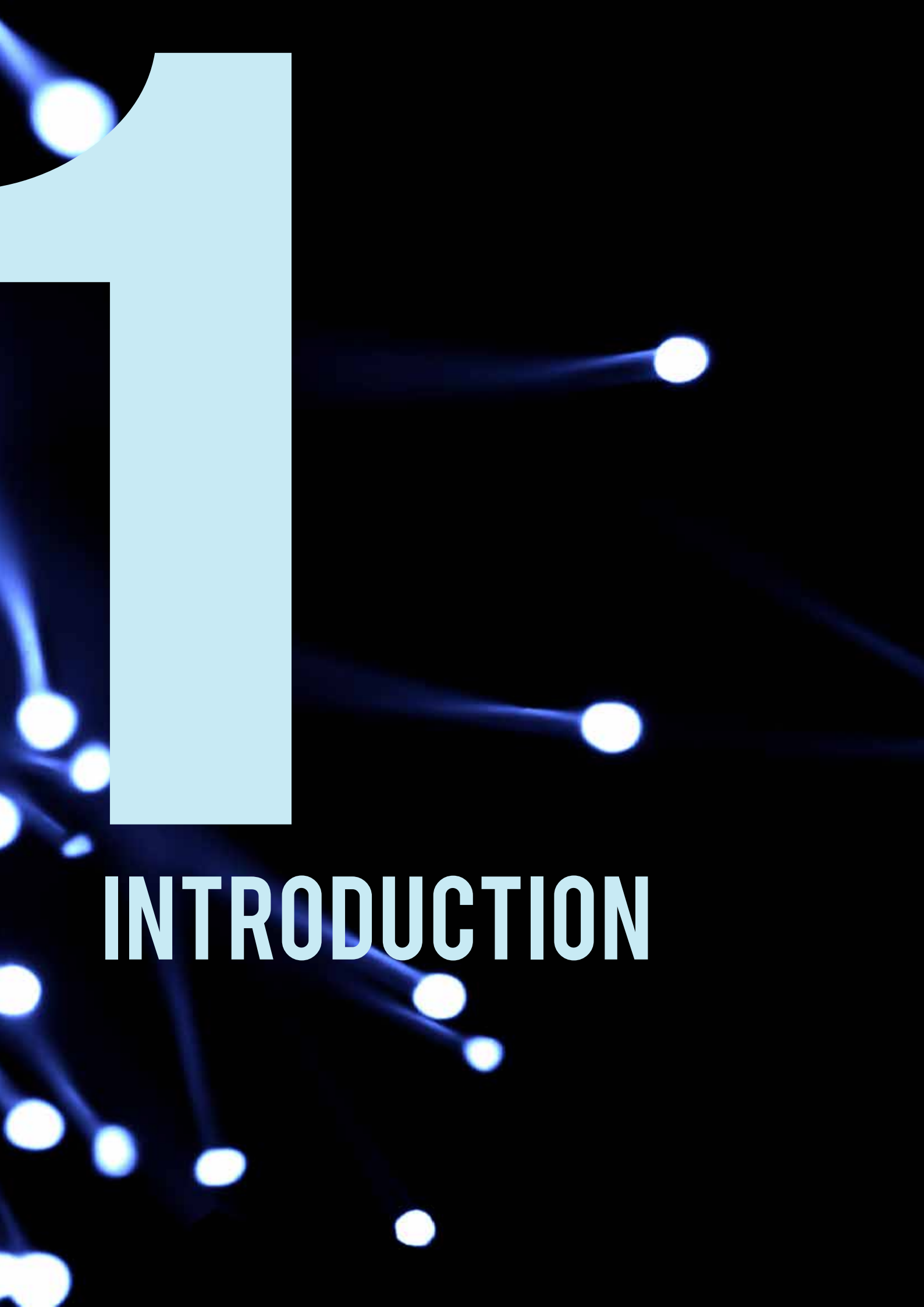
There is a need to move from 'silo thinking' to a more comprehensive point of view encompassing different sectors, in recognition of the nature of broadband as a cross-sectoral enabler. Implementation is still an issue, with broad-based buy-in by different stakeholders critical to a Plan's success. Some Plans have been produced as landmark events to help clarify mandates and/or put regulators on the map.

In a fast-changing technological environment, Plans should be regularly reviewed and updated. This Report finds that the average lifespan for superseded Plans is 8.4 years, while the lifespan for existing Plans currently in force is 7 years. Given evidence of such long lifespans, it is likely that Plans need to be updated more regularly to take into account the rapid shifts in the industry in revenue, pricing and technology. Revisions every 3-5 years are likely to balance the costs involved in policy-making with developments in a fast-changing industry.

Research conducted for this report suggests that the introduction or adoption of a broadband plan is associated with 2.5% higher fixed broadband penetration, and 7.4% higher mobile broadband penetration on average. This result is consistent with a National Broadband Plan focusing efforts across industry in coordination with policy-makers, emphasizing the role of broadband as a national priority, and signaling national commitment to the roll-out of broadband.

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 (where markets are generally more competitive).

Broadband Plans are one key means of dialogue, which should seek the views and engagement of all key stakeholders. Ultimately, there is no single way to improve broadband; there are many different ways, with different success factors, depending on existing country circumstances. 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.



1

INTRODUCTION

As countries liberalize their markets and integrate them into the global economy, their industrial performance increasingly depends on the competitiveness of their firms – both local and foreign-owned. Firm-level competitiveness determines the ability of economies to grow, create jobs, and increase exports. Competitiveness is vital across all sectors of the economy as firms face intensifying competition, both in their domestic markets and abroad.

Governments face a range of policy choices as they seek to raise national competitiveness. While short-term competiveness can be improved temporarily through actions such as wage cuts, loosening environmental standards, lowering taxation or the introduction of subsidies, the advantages such policies confer are at best transient. Rather, sustained competitiveness requires adopting long-term strategies to raise efficiency, boosting levels of skills and technology, and investing in critical infrastructure for a country's long-term future.

Today, Information and Communication Technologies (ICTs), and especially broadband networks and services, are vital for countries' economic growth[1]. They enable fast and efficient communications across countries and continents, driving success in today's global economy. Not only that, but ICT products and services are part of the higher-value high-tech sector in their own right, the sector which is growing fastest in international trade, and which can sustain faster growth in incomes. It is this dual role of ICTs and broadband – as enablers leveraging technological competitiveness across other sectors, as well as an economic sector in their own right – which makes ICTs critical for the overall competitiveness of nations. Broadband is essential for generating new skills and generating economic growth and technological change across the entire economy – from agriculture to finance, education, healthcare and modern services.

To accelerate the impact of ICTs and broadband on growth of nations, more can be done to liberalize telecommunication markets, encourage investment, make services more affordable and promote ICT skills and technological capabilities. Incentives are needed to build out broadband infrastructure, encourage the development of broadband-enabled applications and services, and build ICT skills and technological capabilities among firms. The question is how best to achieve this.

This report examines the use of National Broadband Plans (NBPs) as one of the key actions to maximize the impact of broadband. Given what is now known about the benefits of broadband, the impact of – and need for – coordination between Government policies and commercial strategies in the roll-out and use of ICTs have never been greater. A growing number of countries now recognize the importance of policy leadership and a clear cross-sectoral vision to maximize the economic and social returns to ICTs, as shown by the strong recent growth in the number of countries with National Broadband Plans.

At the Broadband Leadership Summit in 2011[2], the Broadband Commission for Digital Development adopted four targets, the first of which calls for countries to adopt a National Broadband Plan. Spurring broadband adoption through policy action can accelerate the spread of benefits from high-speed connectivity. However, government action must be targeted and carefully reasoned so as not to induce unintended outcomes such as crowding out private investment or inhibiting innovation and competition.

Policy-makers can play a powerful role in spurring broadband adoption by focusing on policies by:

- maximizing the positive outcomes (such as innovation, investment, access to information); or
- preventing negative activity (e.g., unfair pricing, consumer exploitation, breaches of privacy).

Effective policy-making promotes the positive outcomes, while minimizing cumbersome, confusing and/or changing regulations.

This Report provides an overview of the recent growth in National Broadband Plans. It examines the characteristics of what a 'good' plan comprises and what can determine maximum positive impact, with reference to examples. While exploring the central question of whether Plans matter, and whether Plans really have succeeded in making a difference, the report finds compelling evidence of a significant impact of broadband policy leadership on broadband adoption.

1 See, for example, Qiang & Rossotto (2009) and the World Bank's Information & Communications for Development Report 2009, which suggests that increases in broadband infrastructure are positively associated with an increase in economic growth.

2 Held in Geneva, Switzerland, in October 2011. More information about the summit is available at www.broadbandcommission.org/LeadershipSummit.aspx


2
WHAT IS A PLAN?

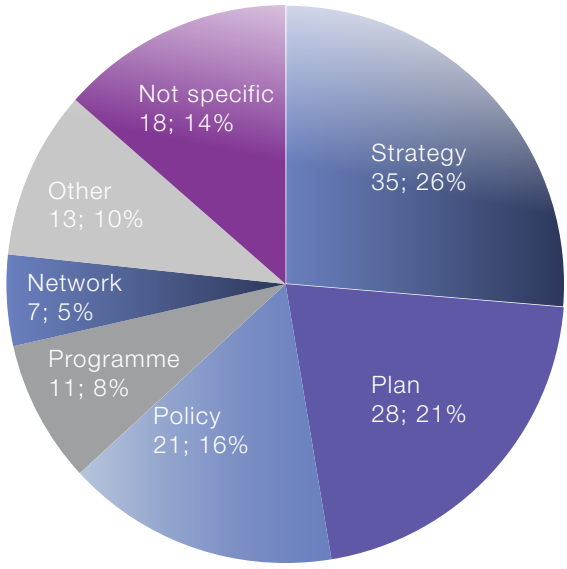
In order to investigate the impact of a National Broadband Plan, we must first define what exactly constitutes a Plan, and whether differences in the structure of Plans influence their outcomes. Countries seeking to strengthen their policy framework and create an enabling environment to nurture the growth and spread of broadband can choose among a range of options. The measures and process chosen often depend on a country's economic structure and institutional context.

Designing a National Broadband Plan can be a formidable task. Diverse interests are at play, all of them perfectly legitimate: the political priorities of governments, economic interests of companies and demand for affordable high quality services on the part of consumers. High impact Plans take into account all these interests, and go some way towards balancing them. Nonetheless, producing a National Broadband Plan can be a very fruitful and productive exercise. It can give focus and a sense of shared vision for the future of a country, in an area that has the potential to transform the economy, politics and social interaction.

Put simply, a Plan is a statement of clear vision for the development and future evolution of broadband, both as a sector in its own right, and with consideration of its relationship with other sectors. Pyramid Research (2011) notes that plans typically aim to establish a clear path to broadband accessibility and affordability for all, and are generally welcomed politically, as they help demonstrate that a government values the development of a knowledge society with citizens who are digitally literate[3]. Cisco (2013) finds that plans vary in their goals and policy recommendations, but converge on the objective of increasing broadband and ICTs in order to advance their economies. Cisco (2013) propose a taxonomy of broad-based, supply-driven, demand-driven, and emergent Plans, providing a clear methodology for categorizing national broadband and ICT plans according to the breadth of their policy options[4].

The actual terminology used by Plans varies, partly according to original language and translation - countries may have a Broadband Plan without calling it such, as plans sometimes carry a different name. Of the 134 Plans surveyed, the title of 'national strategies' is marginally favoured, with some 35 countries (a quarter of all countries with plans) calling it a Broadband Strategy. The title 'Plan' is directly cited by 28 countries. OECD (2012) views the term strategy as synonymous with Plan[5]. The title 'policies' is used by 21 countries, 'Projects' or 'Programmes' by 11, while 20 countries planned a Network or other names (e.g. Agenda, Initiative, Law or UAS). The titles were non-specific for 18 countries – see Figure 2.1.

Figure 2.1: Different Policy Instruments, 2013



Source: ITU World Telecommunication/ICT Regulatory Database

3 Pyramid Research, Latin America Telecom Insider, Vol.3, No.9, "National Broadband Plans Show a Diversity of Methods but a Unity of Purpose", December 2011.

4 World Economic Forum Global Information Technology Report 2013, Chapter 1.3 by Cisco.

5 Calvo, A. G. (2012), "Universal Service Policies in the Context of National Broadband Plans", OECD Digital Economy Papers, No. 203, OECD Publishing, available from: www.dx.doi.org/10.1787/5k94gz19flq4-en

Plans setting out policy guidance and/or the policy framework for telecommunications, ICTs and broadband can take several forms, with the choice of vehicle for policy depending on market structure, country circumstances and the institutional context (Figure 2.2). Plans also vary from presidential decrees to detailed vision documents, universal service directives or tangible laws and regulations passed by legislative measures:

Legislation

Enacted through Laws, Bills, Acts, or Executive Decrees, legislation carries obligatory status as a legal requirement or onus, usually approved by constitutional or executive bodies of State. Such Acts set out the framework within which telecom services are governed, as well as certain obligations of the State and other actors. In some countries, a constitutional right has even been established in relation to telecom services, defining the right of citizens to access telecom or broadband services.

Historically, telephony, and subsequently, telecommunication sectors, were usually governed by legislation in many countries, which defined the responsibilities of the State as owner and operator of national infrastructure. As such, Acts may take more time to formulate and be approved, but they often carry compulsory requirements, adding impetus to implementation and for enacting concrete change. Some countries have succeeded in maintaining their legislative bills for a considerable length of time (e.g. the United States, which still maintains its 1996 Telecommunication Act).

However, as the number of countries with regulatory bodies has increased, following market liberalization, the number of countries in which telecommunication services are governed solely by a legislative Telecommunication Act has dropped. More countries have brought in regulation and potentially more flexible policy instruments. The use of different policy channels in addition to existing legislation can offer greater flexibility, but also carries the potential for confusion or overlapping responsibilities.

Plan, Policy or Strategy

This form of policy framework does not generally carry compulsory requirements, but sets out a positive vision for the development of broadband and ICTs within a nation. It may not originate with the legislative, it should hopefully take less time (since it is not compulsory legislation), although participatory and consultative approaches needed to gain broad support and buy-in may not ultimately prove any easier. In terminology, the difference between a plan, policy or strategy is still hotly debated, with some viewing Strategy (or White Papers) as high-level principles, while policies spell out the policy measures for how the strategy is to be implemented. The OECD

Box 1: National Broadband Plans in OECD Countries

An increasing number of OECD governments have recently developed or updated specific strategies to achieve their national objectives. These strategies can be generically called National Broadband Plans (NBPs) and they aim to expand the footprint of broadband networks nationally. In countries with far-reaching broadband goals, the NBP involves the design and construction of entirely new high-speed broadband networks, but most other plans simply determine medium-term goals that may be achieved through enhancements of existing infrastructures. The increasing relevance of broadband and the commitment to deploy telecom infrastructure is already transforming universal service. Despite variation in goals and objectives in each country, NBPs and, more generally, the expansion of broadband networks, raise common concerns regarding universal service:

- **Broadband service in the scope of universal service.**
- **The role of mobile communications in universal service.**
- **Funding universal service objectives.**

Source: Calvo, A. G. (2012), "Universal Service Policies in the Context of National Broadband Plans", OECD Digital Economy Papers, No. 203, OECD Publishing, available from: www.dx.doi.org/10.1787/5k94gz19flq4-en

considers strategy and Plans as synonymous, noting that Broadband Plans typically contain infrastructure deployment targets aiming "to expand the footprint of broadband networks nationally" (Box 1).

Regulation

Focusing on universal service obligations (USOs) in particular, but also including a package of related regulations focusing on aspects of price and affordability, consumer protection and competition. Even though all countries and most Plans share goals of widespread availability of affordable broadband infrastructure, not all countries actually have USOs in force (e.g., Afghanistan, Lebanon, Libya, Mexico and South Africa).

Some countries have preferred to handle their requirements for the deployment of broadband by reinforcing or extending existing universal service regulations – for example, Andorra, Saudi Arabia, Switzerland, and Taiwan (PoC). This takes advantage of existing policy frameworks which are already known to stakeholders and may avoid creating another layer of policy, potential confusion and/or inconsistencies between old and new policy frameworks. The OECD (2012) notes that the decision to extend USOs to include broadband depends on a cost-benefit analysis[6]. Another aspect to this which some countries have adopted is to extend their Universal Service Definitions (USDs) to include broadband (e.g., Argentina, Canada, Ghana, India, Malaysia, Nigeria and Saudi Arabia).

Programmes

With greater focus on enactment and implementation, programmes to deploy broadband are usually mechanisms for funding and overseeing the roll-out of broadband, and/or building demand for broadband, sometimes for specific sectors. Countries may extend existing USF programmes or commitments.

A basic legal right

According to ITU data, some twenty countries have also made broadband and/or Internet access a right – either as a basic legal right, citizen's right or constitutional right (all of which carry different connotations, according to the legal framework in the country of origin). These include Costa Rica (2010), Estonia (2000), Finland (2010), France (2009), Spain and Switzerland (Box 2). The OECD notes that affordable access to basic communication services irrespective of income, location and physical ability have been considered a crucial component leading to greater social equality, leading "some to conclude that universal service or its components are a basic right", as the inability to access or use a given telecommunication service could create social exclusion. This debate has extended to include notions of Internet and broadband access as a human right, although this is more controversial (Box 2).

6 Calvo, A. G. (2012), "Universal Service Policies in the Context of National Broadband Plans", OECD Digital Economy Papers, No. 203, OECD Publishing, available from: www.dx.doi.org/10.1787/5k94gz19flq4-en

Box 2: Should Broadband/Internet Access be Considered a Right?

Since the beginning of the Millennium, governing bodies in several countries have in turn declared access to the Internet as a fundamental right. In 2000, Estonia's parliament passed a law declaring access to the Internet "a fundamental human right for its citizenry"[7]. France's highest court did the same in 2009[8], as did Costa Rica's Supreme Court in 2010, when it stated that citizens have "the right of access to the Internet or World Wide Web"[9].

Other countries have gone farther, detailing degrees of access. In Finland, a reasonably priced 1 Mbps broadband connection was made everyone's basic right in Finland as of July 1st 2010[10] and in Spain, every citizen was guaranteed the same speed at a reasonable price starting in 2011[11]. Greece's constitution now explicitly states that "all persons have a right to participate in the Information Society and that the State has an obligation to facilitate the production, exchange, diffusion, and access to electronically transmitted information"[12]. Public sentiment demonstrates broad public support for state guarantees of Internet access, even in countries where a right to access Internet is not explicitly guaranteed. A BBC survey of over 27,000 adults across 26 countries highlights that nearly 80% of respondents agreed that the "Internet should be a fundamental right"[13]. An INSEAD/WEF survey of over 5,400 Internet users in 13 countries suggested that a comparable majority of Internet users already using the Internet (70-80% of online Internet users) in different industrialized and emerging countries agreed or strongly agreed that Internet access should be "a fundamental right for all people", while around 20% of users did not have a defined opinion on the matter[14]. This result probably reflects the fact that the Internet quickly becomes indispensable to users, who are familiar with and enjoy the convenience and flexibility of its many diverse services, from browsing news services to purchasing books, music and flights online.

In 2011, the UN Special Rapporteur for Human Rights, Mr. Frank La Rue, examined the role of the Internet, and concluded that "the Internet has become a key means by which individuals can exercise their right to freedom of opinion and expression, as guaranteed by Article 19 of the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights". His report also notes that "by acting as a catalyst for individuals to exercise their right to freedom of opinion and expression, the Internet facilitates the realization of a range of other human rights"[15].

7 "Estonia, where being wired is a human right", Colin Woodard, Christian Science Monitor, 1 July 2003.
8 "Top French Court Declares Internet Access 'Basic Human Right'". London Times (Fox News). 12 June 2009.
9 "Judgment 12790 of the Supreme Court", File 09-013141-0007-CO, 30 July 2010. (English translation)
10 Finnish Broadband Policy, and "Finland makes 1Mb broadband access a legal right", Don Reisinger, CNet News, 14 October 2009.
11 "Spain govt to guarantee legal right to broadband". Reuters. "Conexión de 1 Mbps, un derecho en 2011". Technology, 18 November 2009.
12 Constitution of Greece, as revised by the parliamentary resolution of May 27th 2008 of the VIIIth Revisionary Parliament, English translation, Hellenic Parliament.
13 www.news.bbc.co.uk/2/hi/technology/8548190.stm
14 The New Internet World, INSEAD/WEF, available from: www3.weforum.org/docs/WEF_GITR_TheNewInternetWorld_Report_2011.pdf
15 "Report of the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression, Frank La Rue", available at: www2.ohchr.org/english/bodies/hrcouncil/docs/17session/A.HRC.17.27_en.pdf

In an op-ed in the New York Times in January 2012, one of the Internet's earliest pioneers and founding fathers, Vint Cerf, debated whether Internet access is a human right in itself, on the basis that "technology is an enabler of rights, not a right itself. He concluded that "the best way to characterize human rights is to identify the outcomes that we are trying to ensure. These include critical freedoms like freedom of speech and freedom of access to information — and those are not necessarily bound to any particular technology at any particular time"[16]. This approach has also been endorsed by the Internet Society (ISOC)[17].

Human rights may be viewed as deeply desirable aspirational ideals (although for many people, human rights are universal and non-negotiable), although respect for human rights and enforceability may be more complex. In reality, as the outcomes and goals of human rights become increasingly indistinguishable from their means of delivery, the distinction between outcomes and technological enablers may become less important. As Governments and people demand a right to access the Internet, the onus is on policy-makers to determine how best to deliver on this promise, and on what terms. National policies, and broadband plans, are one tool to ensure this promise of universal access is carried out.

Source: Cisco and ITU, based on various sources.

16 "Internet Access is not a Human Right", Vint Cerf, 4 January 2012, op-ed in the New York Times, available at: www.nytimes.com/2012/01/05/opinion/internet-access-is-not-a-human-right.html?_r=0

17 "Fundamental human rights are about the ability to speak and be heard - rights that are enabled by technology but are not the technology itself. Rather than binding human rights to technologies that will certainly evolve, we should focus our efforts on ensuring that the fundamental human rights to receive and impart information are never constrained" – Ms. Lynn St Amour, CEO of ISOC to the WTPF Strategic Dialogue, "Building our Broadband Future", Geneva, Switzerland, 13 May 2013.

The choice of whether a Broadband Plan should have statutory status, be updated as regulations or as a Plan (one-off or a rolling Plan) depends on the objectives, time and resources available. Countries have faced a similar conundrum with regards to spectrum – while the roles and responsibilities for spectrum are often defined by legislation, the detailed allocation of spectrum is often defined by specific regulations, which can be updated more rapidly and regularly.

These policy tools are not exclusive, with many countries adopting a combination of measures in a pragmatic approach to whatever works best. The review of the experience of different countries suggests that there is no single – or 'correct' – way to improve broadband; many different ways have proved successful, in response to different market situations.

For example, the Republic of Korea began early with strong State involvement prioritizing the development of 'informatization' and digital industries. The Government introduced the 1995 Framework Act on Informatization Promotion, which was revised several times, including in 1999 and 2006, followed by the First Master Plan for Informatization Promotion and Cyber Korea 21 setting out a vision for the twenty-first century. ICT policy in the Republic of Korea has been characterized on regular and heavy State involvement.

The United States, however, has maintained its original Telecommunication Act from 1996. Although the U.S. has regulated voice services, data service (including the Internet) have essentially flourished outside existing regulatory frameworks, until the launch of the U.S. National Broadband Plan by the Federal Communications Commission (FCC) in 2010.

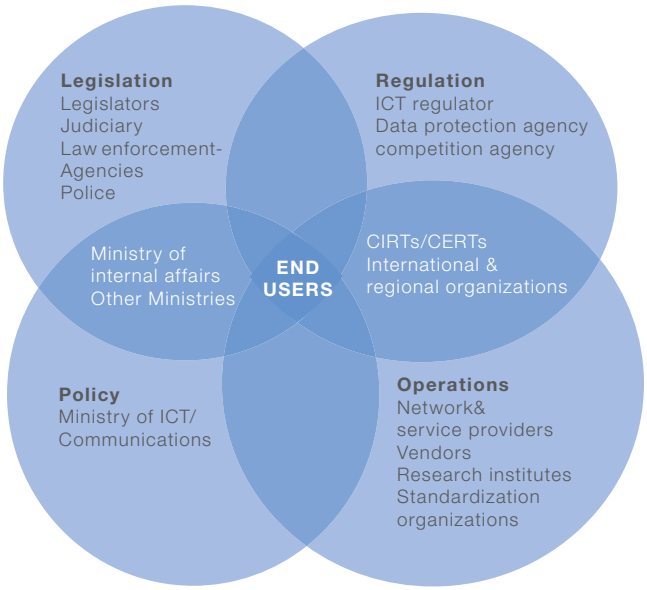
In an effort to speed broadband deployment further, President Obama issued an Executive Order[18] in 2012 to accelerate the construction of broadband infrastructure throughout the U.S. by implementing a "dig once" policy for the U.S. Federal Government. Brazil's National Plan has been signed into effect by a Presidential Decree to enforce it (Box 3).

Ultimately, while the nature of the Plan clearly matters (with differences between binding statutory requirements, broad policy guidance or detailed regulations), the exact name or focus of the plan or policy framework may not matter as much as its political support, buy-in by all stakeholders, its quality (including comprehensive, clear identification of relevant issues and priorities), and implementation. Indeed, Pyramid Research concludes "clear plans with multiple layers of resource support are most likely to succeed".

The nature of the Plan also varies significantly according to who developed them, who owns them and who is responsible for implementation and/or follow-up. The development stage is crucial for soliciting buy-in from all parties, including government, businesses, civil society and individuals. The degree to which the plan was crafted based on consultation often impacts whether key constituents support the final outcome.

More often than not, the final authors of the plan are tasked with implementing its recommendations (although there are examples of plans that originate in one body of government and task other agencies with specific directives — such as Malaysia). Sometimes, the development of a Plan can help clarify the mandate or responsibilities of different institutions in the policy landscape. It may also prove to be a landmark event helping put a new Minister or newly-created regulator on the map, although it can also create institutional rivalries between the different bodies vying for visibility or even 'territory'. The ability to implement the ideas generated in the plan is predicated on the implementing agency's purview in policy making and their capacity to enact change. It often depends on the existing institutional context for the Plan and responsibilities between existing stakeholders (Figure 2.2).

Figure 2.2: The Institutional Context and Enabling Environment for Policy



Source: ITU/UNESCO Broadband Commission for Digital Development, in WEF GITR 2013.

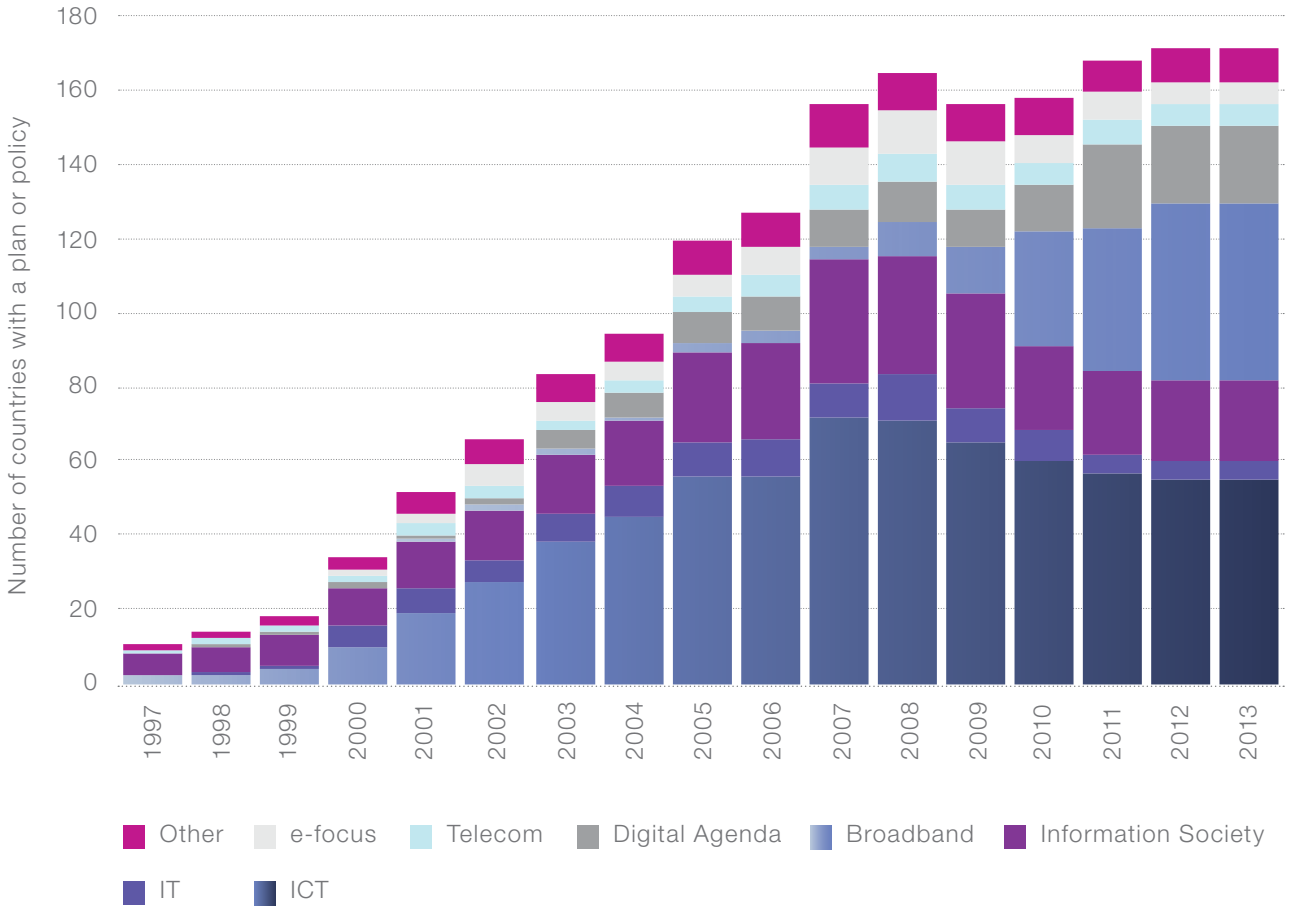
The design, the degree of consultation employed, the efficacy of the implementing agency and the type of policy vehicle used to present the plan all contribute to the overall immediate impact of the plan.

Plans have changed focus over time. Earlier policy measures produced between 2000 and 2008 generally tended to focus on the broader ICT/IT or the Information Society issues (as indicated by the blue and purple areas shown in Figure 2.3). A growing number of policy measures and Plans between 2008-2013 have focused explicitly on broadband (shown in pale blue in Figure 2.3), while even more recently, plans have focused on broader, cross-sectoral considerations of the Digital Agenda[19] (shown in grey in Figure 2.3). Plans prior to 2005 tended to focus on IT/ICT. The Information Society was most popular as the focus of Plans in 2007-2008, with broadband growing sharply as the focus of Plans from 2008 onwards. Most recently, Digital Agenda account for a small, but growing, number of Plans. Although clearly related, National Broadband Plans focus mainly on infrastructure, while Digital Agendas include broader additional considerations of content, services and applications.

18 "We Can't Wait: President Obama Signs Executive Order to Make Broadband Construction Faster and Cheaper", 13 June 2012, White House press release, available at: www.whitehouse.gov/the-press-office/2012/06/13/we-can-t-wait-president-obama-signs-executive-order-make-broadband-const?goback=%2Egde_135547_member_124845613

19 Examples include Chile's Digital Agenda 2004, Digital Czech Republic 2011, Estrategia Ecuador Digital 2.0 in 2011, France's Digital Plan 2010, Digital Gabon 2011, Greece's Digital Strategy 2006, Hungary's Digital Renewal Action Plan 2010, Italy's Italia Digitale plan 2010, Mexico's Digital Agenda 2011, Oman's Digital Strategy, United Kingdom 2005, Uruguay Digital Agenda 2008-2010.

Figure 2.3: Focus of Different Policies & Plans, 1997-2013



Note: This chart is based on desk research into the growth in plans available online. Many countries obviously had Telecommunication Acts or Bills in place prior to 1997; not all of these are currently available online.

Box 3: The Experience of Brazil With its National Broadband Plan

Brazil began the development of its National Broadband Plan (NBP) in 2009 by preparing a working document which aimed to assess the existing challenges, establish a shared vision of the future, and set out planned actions to realize this vision. Although this document was not the NBP per se, it resulted from extensive consultations conducted by Government with the private sector and public research groups. This working document focused the debate, and enabled this shared vision to translate into actions on many fronts and identified a range of solutions in response to the challenges of implementing advanced infrastructure throughout a vast country, and considered how to address the specific needs of people in different income brackets, in both urban and rural areas.

The 195-page working document provided an initial diagnostic and analysis relative to other countries, along with proposed targets, goals, and action lines to achieve its objectives, and guidelines for their implementation. Additionally, but equally importantly, the document included an initial assessment of the actual costs, to both the Government and to the private sector. It also pointed to actions on many fronts, including:

- targets for infrastructure deployment to reach end-users,
- regulatory measures to promote infrastructure sharing and competition, as well as
- tax reductions on telecommunications equipment and services.

All these actions aimed at increasing affordability, spurring investment and ultimately increasing broadband penetration. Although technology-neutral, the study identified solutions for fixed broadband and mobile broadband, as well as new satellite capacity to address the needs of rural and remote populations. These solutions should address the specific demands across the population, including those who can afford a computer or tablet, those with a smartphone, and even those whose only realistic possibility to have broadband Internet access is at a walk-in community telecentre.

In May 2010, Brazil unveiled its final Plan, which was formally approved by a Presidential Decree. The implementation of the plan was entrusted to the Steering Committee of the Digital Inclusion Program. Later, in November 2010, the Steering Committee published a separate document, providing additional information.

The NBP set out an action plan and agreed targets, goals and estimates of the costs involved. It is also vital to communicate the Plan to a wider audience, which was accomplished through a series of meetings - the Brazil Connected Forum, allowing for greater visibility of the Plan among the general public.

Within Government, the action plan translated into initiatives via legislation introduced by Congress, decisions by the Executive Branch of Government. New legislation has provided tax exemptions on broadband infrastructure equipment and smartphone handsets. An entry-level tax-exempt fixed and mobile broadband service plan is now available from all major telecom operators.

Anatel has introduced a series of structural measures, including open competition in the cable market, regulatory holidays for fiber optic investments, a requirement for reference offers in the wholesale market from players with significant market power (SMP), as well as promoting Internet Exchange Points (IXPs). In 2012, the agency also successfully auctioned licenses for mobile broadband in the 450 MHZ frequency band (for rural coverage) and the 2.6 GHz frequency band (for urban coverage), taken up by the four major mobile operators in Brazil.

The private sector has responded by accelerating the deployment of infrastructure. There has been significant uptake in both fixed and mobile broadband services – fixed broadband is now available in all 5,565 municipalities of the 27 states in Brazil. Since 2009, total fixed broadband subscriptions have doubled from 10 million to 20 million lines in service. Mobile 3G services now reach 3,376 municipalities in all states, currently covering 89% of the country´s population. Mobile broadband has exploded from 7 million lines in service in 2009 to 70 million today. Mobile 4G services were recently launched in April 2013 in major State capitals, with extensive coverage targets over the next few years. Twelve thousand community telecentres have now been equipped and provided with broadband Internet access. Two major upcoming sporting events have also helped focus the drive towards meeting broadband deployment targets: the 2014 Football World Cup and 2016 Summer Olympic Games.

The implementation of the Brazilian National Broadband Plan is an ongoing process that will certainly require revisions from time to time. Technological developments offer new solutions to the ever-increasing demand for bandwidth, as video becomes the driving attraction in new applications. Infrastructure – and policy – have to keep pace with these developments.

Source: Daniel Cavalcanti, ANATEL.

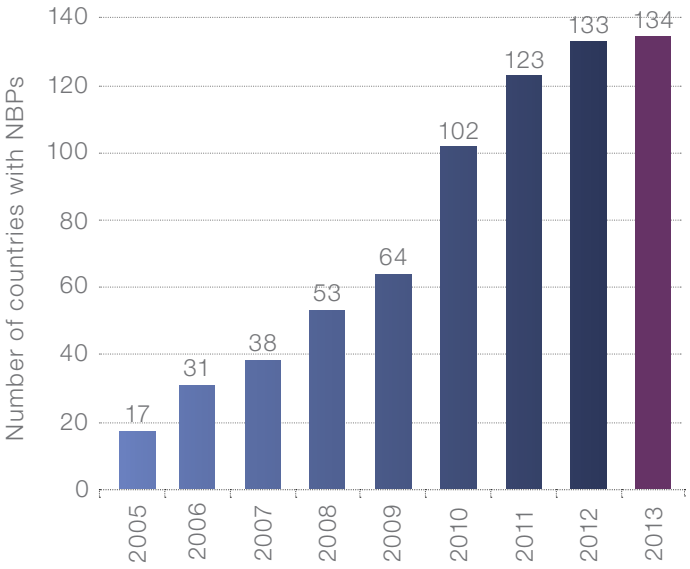
3

THE ROLE OF POLICY LEADERSHIP

Policy leadership can help highlight the role of broadband in national development, provide an enabling environment for private investment, coordinate dialogue and encourage work across different sectors and Ministries. Over recent years, policy decision-makers, a growing number of communications Ministries and national regulators have made broadband a policy priority. The number of broadband plans and policies, as tracked by ITU and the Broadband Commission, has more than doubled since December 2009 (Figure 3.1). The number of countries with national broadband plans exploded with a step-level increase in 2009-2010, when at least a dozen countries included broadband network investment in their countercyclical fiscal stimulus measures[20] with broadband infrastructure investments a priority component in many countries' economic stimulus plans[21].

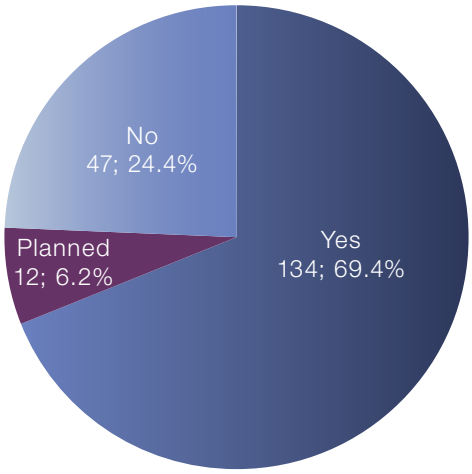
By the start of 2013, some 134 or 69% of countries had a national plan, strategy, or policy already in place to promote broadband (excluding the telecommunication policies and Information Society strategies in Figure 2.3 above); while 12 countries or 6% are planning to introduce such measures in the near future (Figure 3.2). However, 47 or a quarter of all countries still do not have any broadband plan, strategy or policy in place (Figure 3.2). Of those countries with plans, achieving progress in implementation may be more challenging or slower than envisaged. The number of national regulatory bodies also continues to grow – by 2013, 160 countries had national regulatory bodies, up from 152 in 2008 and 124 in 2002 (ITU Trends in Telecommunication Reform 2013[22]).

Figure 3.1: A Growing Role for Policy Leadership



Source: ITU/UNESCO Broadband Commission for Digital Development.

Figure 3.2: Status of Countries/NBPs, Start 2013



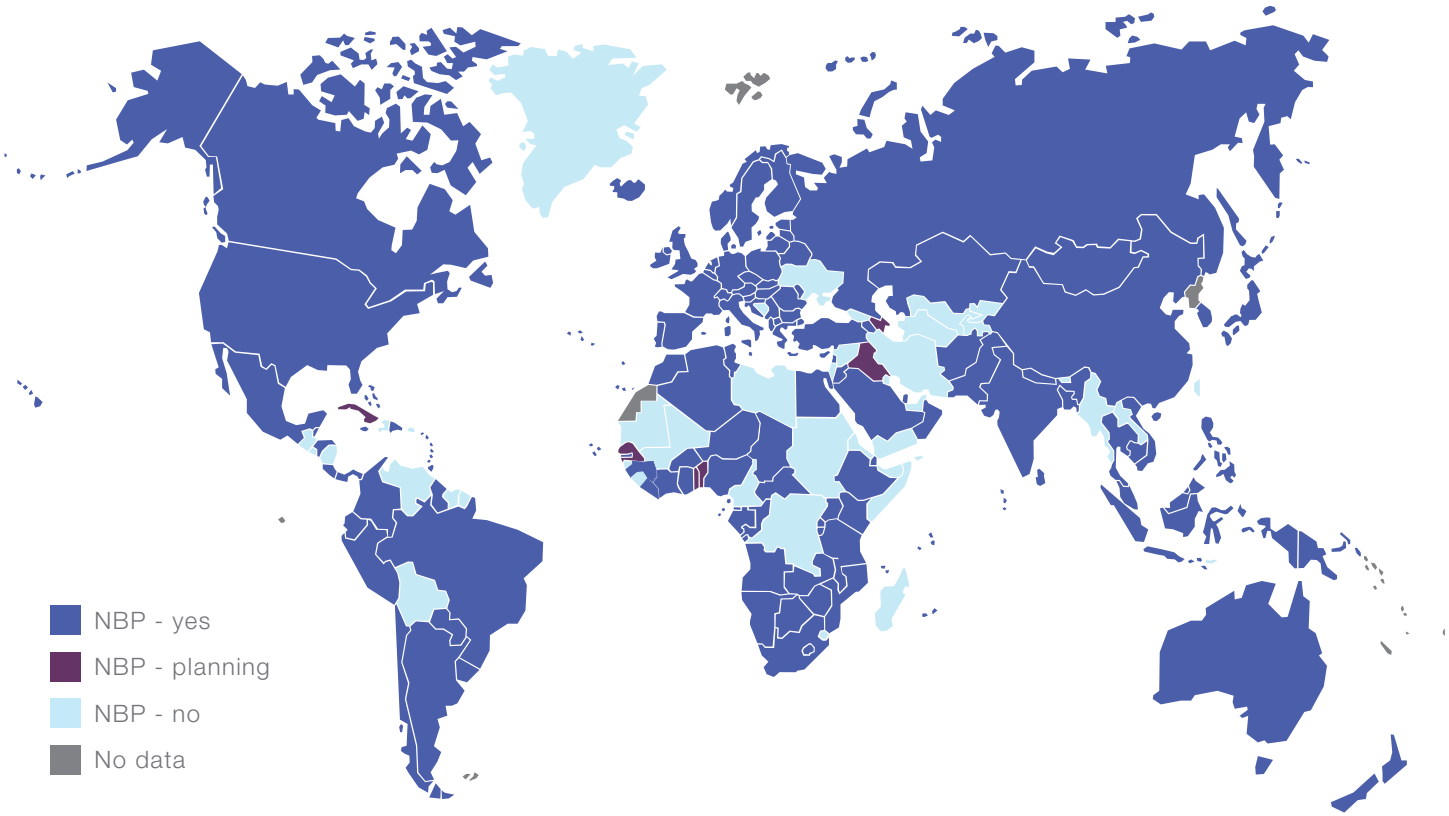
Source: ITU/UNESCO Broadband Commission for Digital Development.

20 State of Broadband 2012, UN Broadband Commission 2012.

21 "Confronting the Crisis: ICT Stimulus Plans for Economic Growth", ITU, Geneva (2009): www.itu.int/osg/csd/emerging_trends/crisis/confronting_the_crisis_2.pdf

22 ITU "Trends in Telecommunication Reform 2013", ITU, Geneva.

Figure 3.3: World Map according to status of National Broadband Plan (NBP)



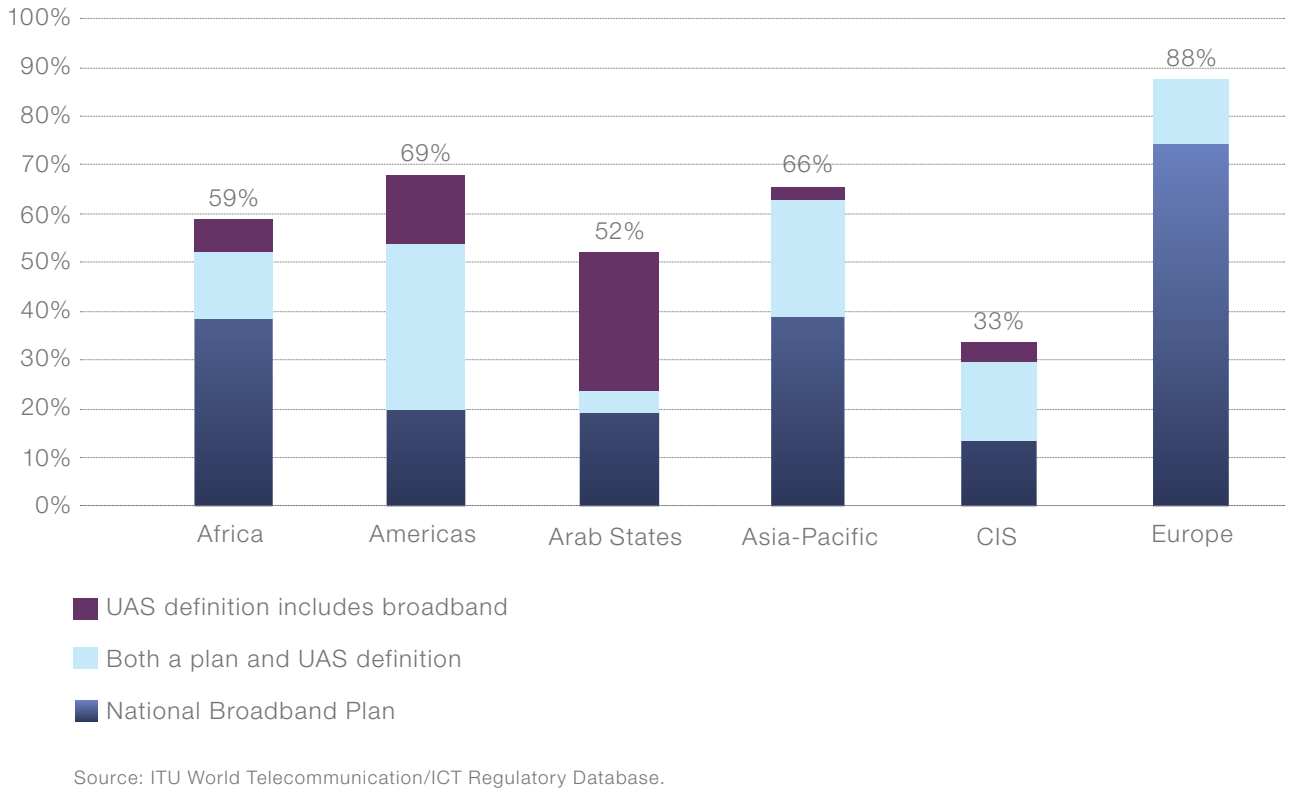
Source: ITU World Telecommunication/ICT Regulatory Database; The State of Broadband 2013 (forthcoming). Countries aiming for a Plan include Azerbaijan, Benin, Cape Verde, Comoros, Cuba, Iraq, Marshall Islands, Micronesia, Senegal, Solomon Islands, Togo and Vanuatu.

Important differences in approach are evident between regions (Figures 3.3 and 3.5). Europe has a marked preference for National Broadband Plans, with 38 or 88% of European countries having a Plan and/or universal access and service (UAS) definition (Figure 3.4). Africa was well-endowed with national plans from early in the first decade of the new millennium, partly because ICTs have been included in IMF/World Bank Poverty Reduction Strategy Papers (PRSPs). The region with the fewest National Broadband Plans is the Arab States, which have generally revised their Universal Service Objectives (USOs) to include broadband. The Americas and Asia-Pacific were the regions most likely to make use of both a Plan in combination with a UAS definition (Figure 3.4).

More and more developing countries are including broadband in their definitions of universal service. In 2010, 99 or just over two-thirds of the 144 developing countries had a universal access/service (UAS) definition. Of those, 49 had included Internet dial-up within their definition, but only 36 out of the 99 countries included broadband in their definition of UAS. This is a dramatic improvement on the situation just five years earlier, in 2005, when just 21 developing countries included Internet dial-up in their UAS definitions and only one included broadband. Including broadband in definitions of universal access and service signals a policy commitment to digital inclusion for all. However, this may not always find favour with the private sector. In a consultation carried out by BEREC in 2012 on its draft Broadband Promotion Report, several private sector companies expressed their concerns that universal service may not be an appropriate tool to achieve broadband targets. BEREC noted that this is an issue to be decided by Member States in view of their specific national circumstances, and expressed its willingness to work with the EC to establish guidelines for minimization of any 'eventual market distortions arising from the implementation of Universal Service measures'[23].

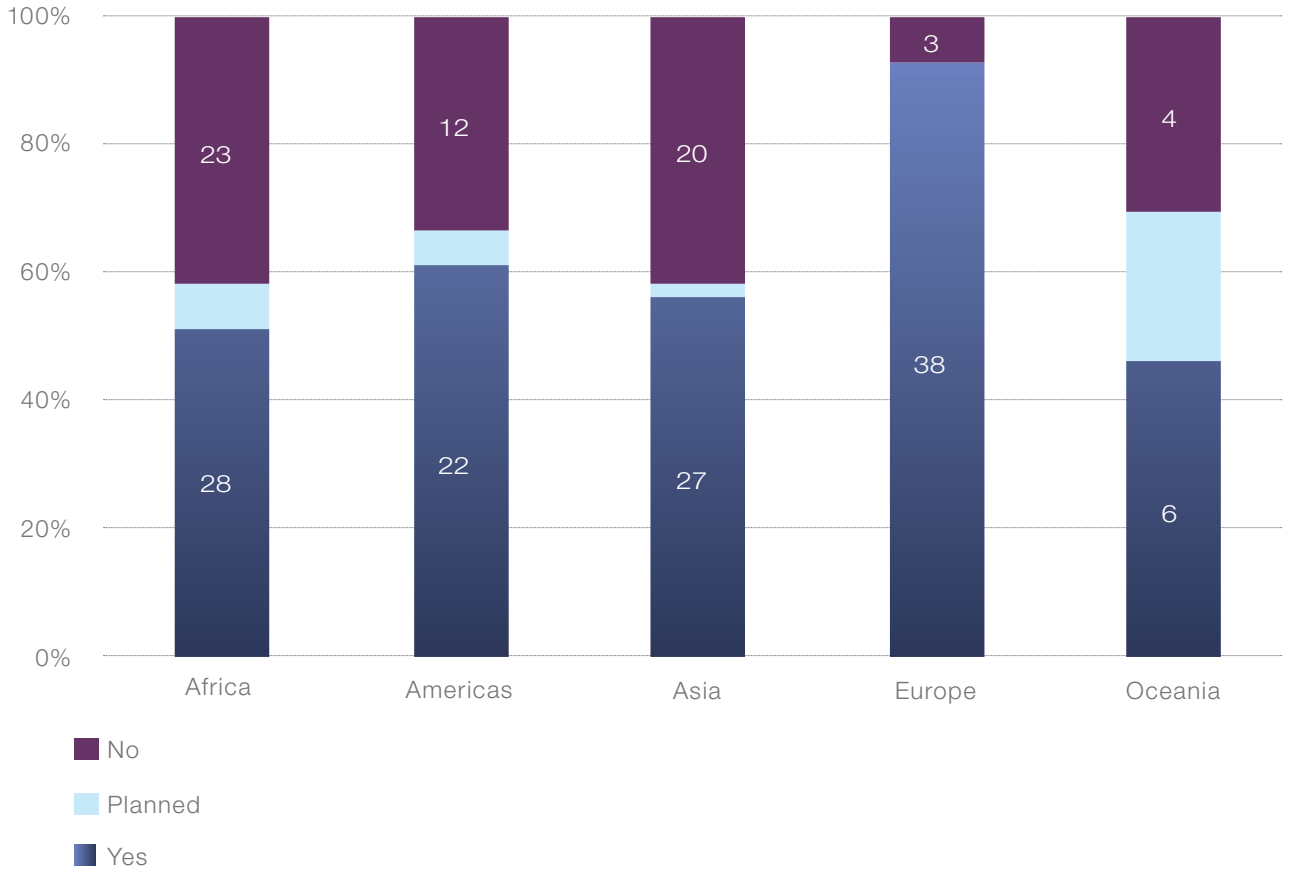
23 Pages 4 and 5, "BEREC Report of the Consultation on the Draft BEREC Broadband Promotion Report", February 2012, available from www.berec.europa.eu/eng/document_register/subject_matter/berec/reports/51-berec-report-on-the-consultation-on-the-draft-berec-broadband-promotion-report

Figure 3.4: Regional Differences in the Choice of Policy Instrument



Source: ITU World Telecommunication/ICT Regulatory Database.

Figure 3.5: Regional Status of Countries with NBPs



Source: ITU World Telecommunication/ICT Regulatory Database.

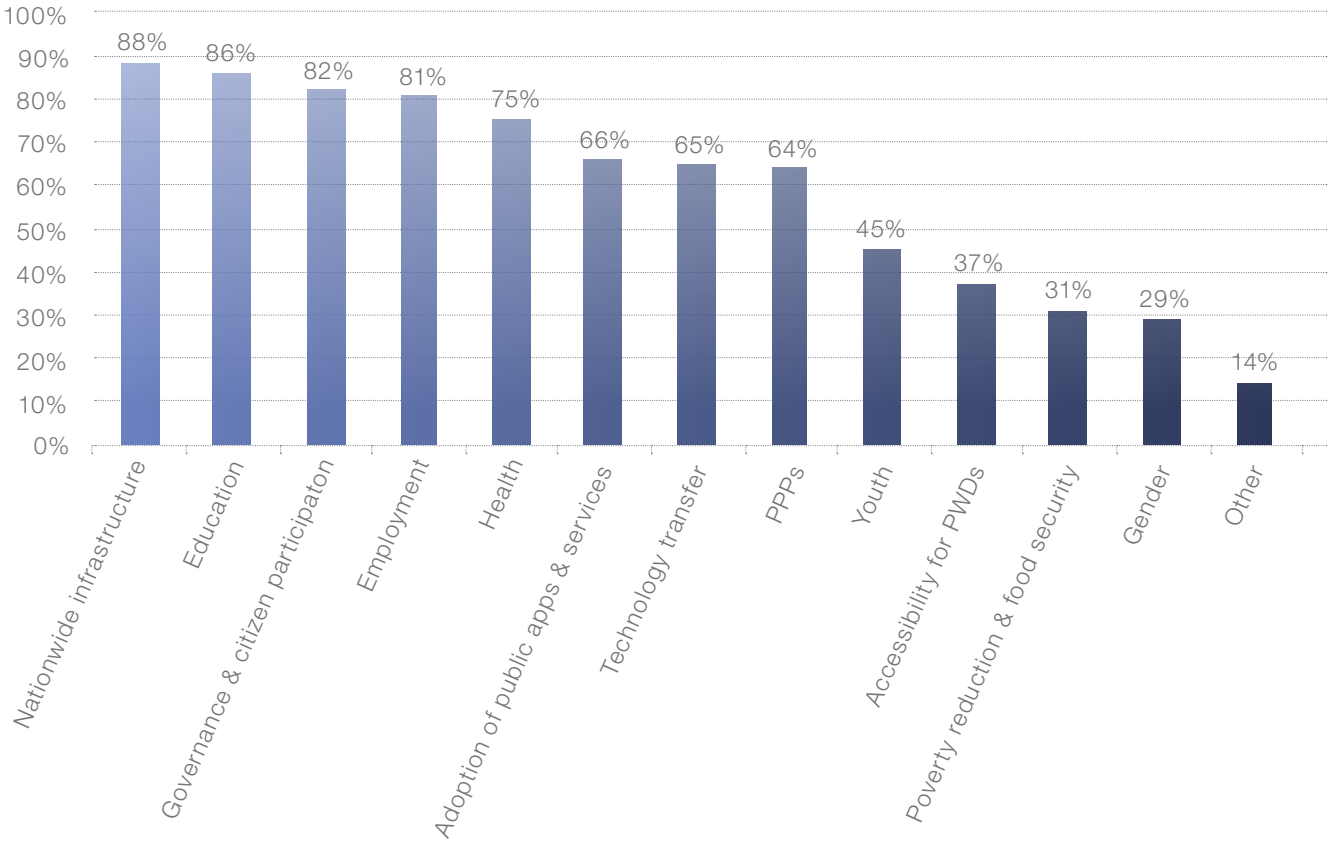
4

SCOPING NATIONAL BROADBAND PLANS: WHAT DO PLANS COVER?

Nearly nine Plans out of ten reference broadband infrastructure deployment targets. Consistent with original visions of Plans as blueprints for extending the national footprint of broadband infrastructure, 88% or nearly nine-tenths of all Plans address the nationwide deployment of infrastructure, including universal service (Figure 4.1). Two-thirds of all Plans reference the delivery of public services and adoption of broadband services and apps, while 58% of Plans reference household targets.

However, recently Plans are extending to consider a wealth of other issues, consistent with a move from consideration of just infrastructure to cross-sectoral issues, reflecting broadband's vital role in leveraging progress across other sectors. Examining in more detail the sectoral goals contained in the National Broadband Plans, education is the top priority in most Plans, referenced in 86% of all Plans around the world[24]. Around 80% or four-fifths of all Plans contain references to e-government and citizen participation and employment, reflecting the utility of broadband networks for accessing information and government services, creating and accessing jobs, and participating in citizen processes. Three-quarters or 75% of all Plans address health and healthcare delivery. PPPs, technology transfer and innovation are referenced by six out of ten Plans, while issues of accessibility, environmental sustainability, poverty reduction and gender are referenced by a much smaller proportion of Plans, at around a third of all Plans (Figure 4.1). ICTs are themselves important drivers of innovation, which can boost service delivery[25]. Here, more than ever, the vital importance of broadband as a cross-cutting platform for the delivery of services in many other sectors is apparent.

Figure 4.1: What Exactly do Plans Focus on?



Source: ITU/UNESCO Broadband Commission for Digital Development.

24 For a good overview of the issues and considerations raised for the effective integration of broadband into education, see the "Technology, Broadband and Education" report of the Broadband Commission Working Group on Education, chaired by UNESCO, February 2013, at: www.broadbandcommission.org

25 Shaw & Lanvin (2012), "Broadband, Inevitable Innovation and Development", WIPO/INSEAD Global Innovation Index 2012: Stronger Innovation Linkages for Global Growth.

4.1. Plan Efficacy

The specific policy actions identified in a plan determine the breadth to which the broadband adoption is effected by supply- side and/or demand-side prescriptions. Cisco's previous analysis has identified policy options on both the demand- and supply-sides and developed a taxonomy of broadband Plans. Supply-side measures include: (1) spurring competition and investment; (2) allocating and assigning spectrum; (3) reducing infrastructure deployment costs; (4) core network expansion modalities; and (5) policies that increase inclusive broadband availability. Demand-side measures include: (1) increasing the affordability of devices and access; (2) government leadership in broadband use and online activity; (3) increasing ICT skills; (4) spurring online and local content (including applications, new technologies and services); (5) as well as ensuring consumer protection and empowerment[26].

Combining the depth of the plan, based on the supply and demand side policy recommendations, with the execution ability of the plan (including the policy vehicle and implementation agency discussed above) allows us to analyze plans along two dimensions, in a notional matrix of efficacy shown in Figure 4.2.

Figure 4.2: Plan Efficacy Based on Impact of Policy Vehicle and Breadth of Policy Actions

Source: Cisco, adapted from World Economic Forum Global IT Report 2013, Chapter 1.3.

26 World Economic Forum Global IT Report 2013, Chapter 1.3.

Plans in the lower left region of the matrix of efficacy are limited in policy recommendation and the ability of the policy vehicle to enact change. Examples of these types of plans include recommendations that are presented by legislative study groups or government departments without a mandate to issue broadband relevant directives.

Plans that are just as limited in the breadth of policy actions, but which may have much more direct impact include presidential decrees focused on a few particular policy issues associated with broadband adoption. Plans may also contain an extensive set of policy recommendations, but may be more limited in their impact, if such plans formulated by legislative study groups or public policy institutes outside the formal governing process, with minimum enforceability for their recommendations.

The optimum combination for spurring wide ranging change to adopt broadband in a rapid and deliberate manner are those plans that fall in the upper right quadrant – these plans are both extensive in the breadth of policy actions and take effect via a policy vehicle with immediate impact. These plans may take the form of a wide-ranging telecom policy packages engaged by legislation, or an extensive national broadband plan formulated, and implemented, by an independent national regulator. Brazil is a good example of a Plan which has received broad endorsement and take-up among a range of different stakeholders through consultation and negotiation, with excellent market results (Box 3). Box 4 sets out some of the general characteristics of a good plan.

Box 4: Characteristics of a Good Plan

- **Best practice cases for broadband plans are by now broadly well-established. In his chapter for Trends in Telecommunication Reform 2012, Horton (2012) suggests that Plans should:**
- **Escape 'silo thinking' and apply across a range of different sectors;**
- **Make the case for broadband, specific to the needs and economic structure of that country, based on thorough market analysis and benchmarking (see Section 4.3 and Box 5);**
- **Be developed in consultation and based on consensus with a broad range of stakeholders. However, to ensure effective implementation, Plans should also assign a coordinating agency responsible for implementing the plan overall which nevertheless 'owns' the Plan, in conjunction with other involved bodies[27];**
- **Consider the vital issue of enforceability/execution. Who is responsible for enacting the Plan? Who will monitor progress? How will implementation be funded?**
- **Consider both demand and supply side considerations. This may mean supporting the development of human skills, literacy, and demand among, for example, schools and SMEs, as well as taking into account the role of Government in driving demand in many developing countries;**
- **Be forward-looking over a timescale of maximum 3-5 years (as longer time horizons may be difficult to predict in a fast-changing industry).**
- **Be broadly technology-neutral. Plans can include technology-specific measures (for example, consideration of spectrum issues to facilitate the roll-out of mobile broadband). However, there should be no major implications in terms of favouring specific technologies over others.**
- **Contain detailed, measurable goals and strategies to allow evaluation of progress. They may often also contain consideration of 'special interest groups', such as schools, hospitals, universities, diverse languages and access by minorities or people with specific needs.**
- **Address related legislation – e.g. privacy and data protection, security and digital signature, Government Interoperability Framework to ensure that e-government systems all work together.**
- **Probably the hardest balance to strike is the balance between high-level strategic direction and detail, as it contains important options and input, but allows the various implementing agencies some flexibility in how they should go about implementation.**

Source: Adapted from "Setting National Broadband Policies, Strategies and Plans", chapter by Dr. Bob Horton (2012), ITU "Trends in Telecommunication Reform 2012", ITU, Geneva, available from www.itu.int/ITU-D/treg/publications/trends12.html

27 Kelly and Rossotto (2012), Broadband Strategies Handbook. World bank publications; 1 edition, 2012 – available at https://openknowledge.worldbank.org/handle/10986/6009

4.2. Lifespans of Plans

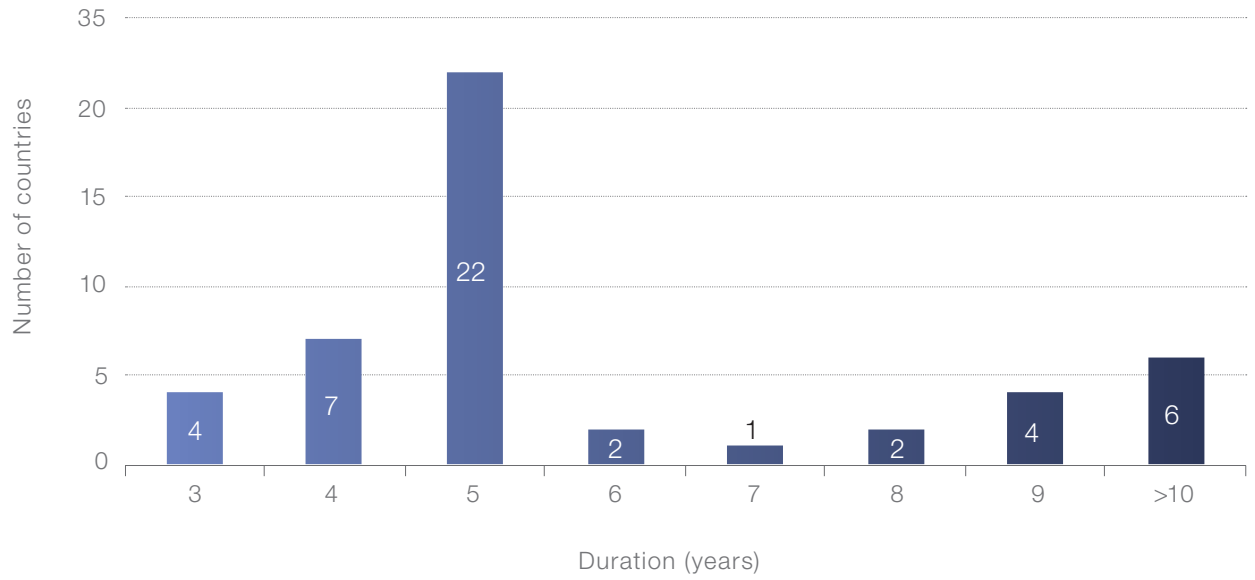
In a fast-changing industry, Plans should be regularly reviewed and updated. Over the sample of Plans analysed, of those countries that have updated their Plan, the average lifespan of a superseded Plan (which has been replaced or updated) was 8.4 years. Of those countries with Plans currently in force by April 2013, the average age of an existing Plan still currently in force is 7 years by 2013, despite massive changes in the industry since 2006. In an industry undergoing rapid change and seismic shifts in revenue, pricing and technology, policy frameworks are likely to become outdated more rapidly, and need to be updated more regularly.

Around fifty countries have introduced Plans for a specific time period set out in the title. The durations of these 'rolling plans' differ between 3-14 years, with five-year periods proving the most popular timespan[28].

Indeed, this was the length of time mandated by the eEurope Plus Plan for Action, which required each ountry to establish five years plan from 2001 (e.g., as followed by Poland, with its ePoland Strategy from 2001-2006). Over twenty countries with rolling plans opted for a five-year period for their rolling plan (Figure 4.3). Time periods sometimes follow parliamentary or political terms of office, where there is clear ownership of a Plan.

While some countries have carried out direct updates simply rolling forward existing Plans, most countries refine the focus of their Plans. For example, the Philippines Digital Strategy 2.0 replaced the former Philippines ICT Roadmap after five years. While the new Plan builds on its predecessor with similar strategic thrusts, the new Plan contains a more in-depth focus on specific areas (Box 5).

Figure 4.3: Duration of Rolling Plans



Source: ITU/UNESCO Broadband Commission for Digital Development.

28 This finding concurs with Pyramid Research's finding that five-year Plans are most popular in Latin America – Pyramid Research, Latin America Telecom Insider, Vol.3, No.9, "National Broadband Plans Show a Diversity of Methods but a Unity of Purpose", December 2011.

Box 5: Changing Focus for Rolling Plans

The Philippines Digital Strategy replaced the Philippines ICT Roadmap, which retained continuity in the same broad themes (e-government, cyber-services, human capital, infrastructure), but developed a more in-depth focus, specifically on the Business Process Outsourcing (BPO) industry, marginalized communities and universal service.

Table 1: The Changing Focus of Plans in the Philippines

Four major areas of the Philippine Strategic Roadmap for the ICT Sector 2006-2010	The four strategic thrusts of the Philippine Digital Strategy (PDS) for 2011-2016
1. ICT Infrastructure	1. e-Government for greater efficiencies and effectiveness in the delivery of social services and minimizing opportunities for corruption.
2. Cyber-services	2. All people should have access to Internet and its opportunities [universal service].
3. Human capital development	3. Support for growth of the IT/BPO industry in areas outside Metro Manila & Metro Cebu.
4. e-Governance	4. "Investing in People" for marginalized communities.

Source: Philippine Digital Strategy 2011-2016 and Philippine Strategic Roadmap for the ICT Sector 2006-2010; "The Economic Impact of Broadband in the Philippines" case study, available from www.itu.int/ITU-D/treg/broadband/BB_MDG_Philippines_BBCOM.pdf

4.3. Definitions and Benchmarking

"Without data, there is no visibility. Without visibility, there is no inclusion" (UNDP Human Development Report 1995). Without data, it is difficult, if not impossible, to make a convincing case for the state of digital connectivity across a nation, and the inclusion of remote or marginalized communities in ICT policies, plans and strategies. Moving from ideas to action, however, requires detailed planning, choosing viable options and determining how best to fund investments in a self-sustaining manner. Observations need to be substantiated by benchmarking, quantifying the scope and intensity of the digital divides across a country, and evaluating the challenge in bringing all regions or communities online to achieve equality in digital opportunity. Benchmarking and comparison with internationally comparable ICT indicators is helpful in informing ICT policy-makers, telecom operators, business and customers themselves, to enable them to assert their right to ICT access.

A considerable number of plans include research to make the case for the benefits of broadband and benchmarking to evaluate where broadband connectivity is good within the national footprint, and where it needs to be improved. Some four-fifths or 80% of all Plans refer to the nationwide roll-out of broadband infrastructure, and the majority do so through the use of benchmarking or situational analysis and targets. Some Plans refer to broadband generically or sometimes define broadband (usually in terms of access speeds). Many Plans set targets for coverage or the statement of an aspirational goal for a minimum speed (for example, the United Kingdom's Digital Agenda defines a national minimum speed of 2 Mbps – see Box 7).

To date, national broadband plans often provide targets for rolling out broadband to populations or priority groups and communities – often in phases with rolling targets for specified years; often with specified speeds; sometimes for specified technologies. Countries have varied in the boldness of their targets (Box 6). Targets may be defined in terms of population coverage (e.g., in Estonia, EstWin is a PPP that aims to make 100 Mbps wide-band Internet available to every citizen by 2015), households or premises passed (e.g., Brazil, Germany, Finland) or geographical area (e.g., the UK).

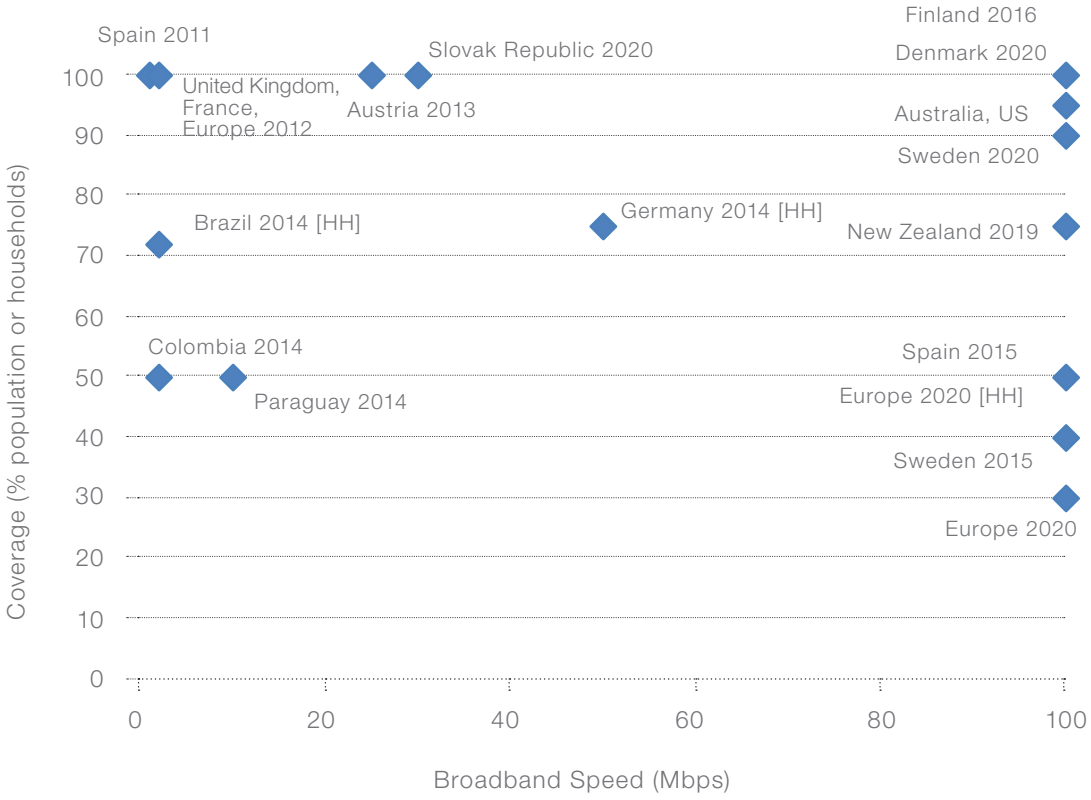
In contrast to positive analysis of the present or future desired situation, some Plans go one step further and benchmark existing gaps in terms of deficiencies or problems encountered and the additional action or investments needed to bridge the gaps. One example is the UK's Digital Britain Plan (Box 7).

Box 6: Targets Set by National Broadband Plans

Setting national targets for coverage and broadband speed can signal a clear commitment by Governments (and regulators) to establishing advanced and modern infrastructure. National targets may also represent an ambition towards universal service (where they refer to 95-100% coverage), embodying social and public policy objectives within commercial and competitive markets. Countries should take care, however, to ensure that national targets do not become a blunt tool that fails to take into account the needs and geography of certain areas (e.g. for remote or rural areas). The targets of most countries have remained technology-neutral, and not specified technologies. Targets should also be relevant, measurable and realistic, rather than abstract and overly ambitious.

The goals and targets set by some countries prior to 2009 have in retrospect proved optimistic, in view of the continuing economic slowdown. In most instances, countries have not abandoned the target, but deferred the timescale (for example, South Africa).

Figure 4.4: Targets Set by NBPs



Source: ITU research.

Note: Australia's targets specify 100% geographic coverage, with 93% at 100 Mbps and 7% at 12 Mbps. The EU has a dual objective for 2020 of 30 MB for all EU households and 100 MB for 50% of EU households. [HH] denotes a household target.

Box 7: Gap Analysis in the United Kingdom's Digital Britain Plan

The UK's Digital Britain Plan outlines an expectation that competitive, market-led investment in fibre will deliver next-generation services to a significant proportion of the country, and benchmarks the gaps.

UK Broadband Availability

Our analysis of broadband availability is as follows:

We estimate that today 89% of homes can readily get a 2 Mbps (or higher) broadband service from cable, ADSL or wireless means. This means that 11% or about 2.75m, homes cannot readily get a 2 Mbps (or higher) broadband service today.

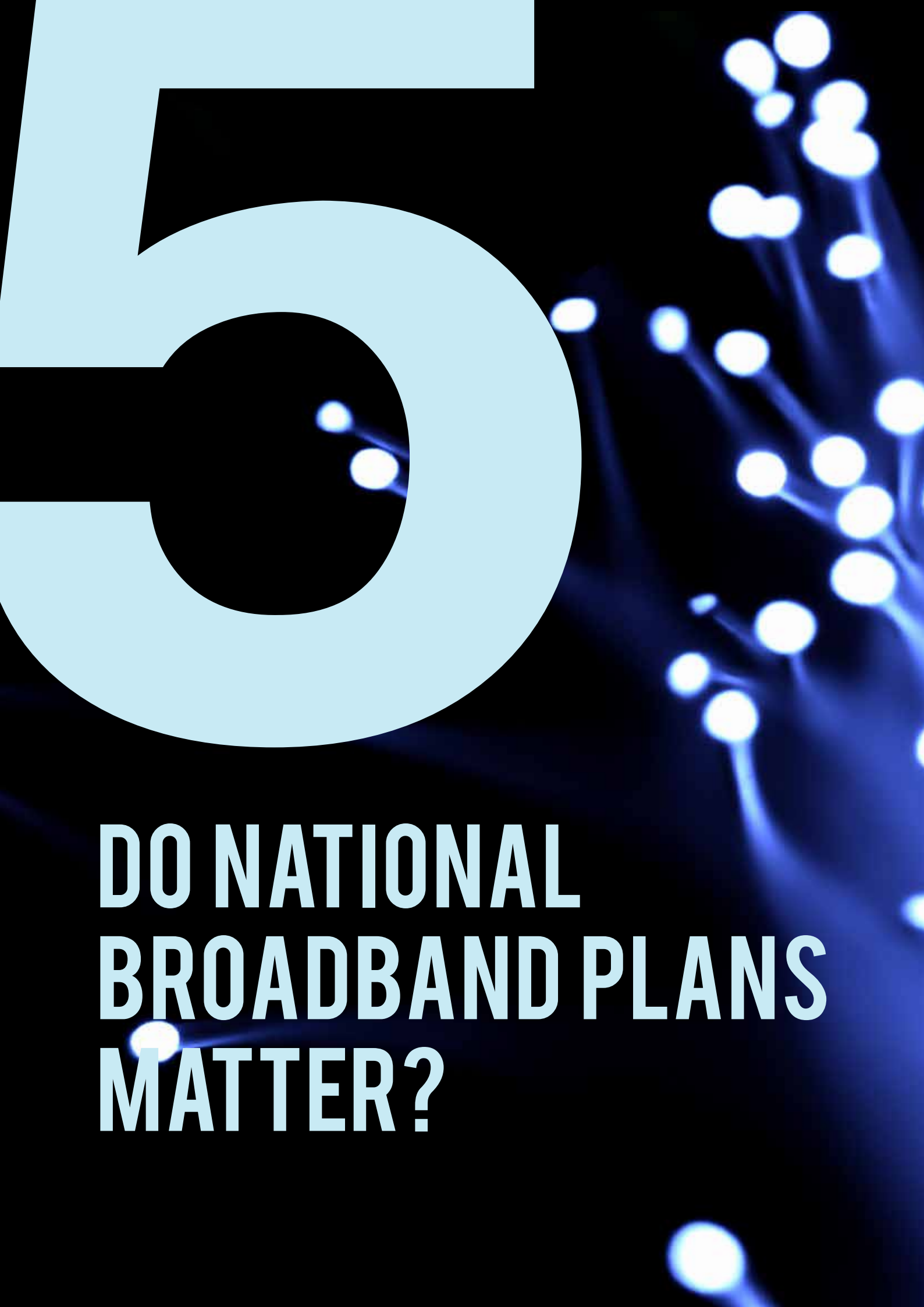
We believe the main reasons that prevent these 2.7m homes from getting a 2Mbps broadband service are:

- **Problematic home wiring (1.9m homes);**
- **Random network effects (300k homes); and**
- **Telephone line too long (550k homes).**

Having considered what the potential solutions might be, our initial conclusions are as follows:

- **Home wiring problems resolved by market/self help (800k homes);**
- **Home wiring problems resolved under USC (1.1m homes);**
- **Random network effects resolved by special inverstigation (100k homes);**
- **Long telephone line resolved by FTTC upgrade (420k homes); and**
- **Residual random network effects and long lines resolved by wireless/satelite (330k homes).**

Source: UK Digital Britain – final report.



5

DO NATIONAL BROADBAND PLANS MATTER?

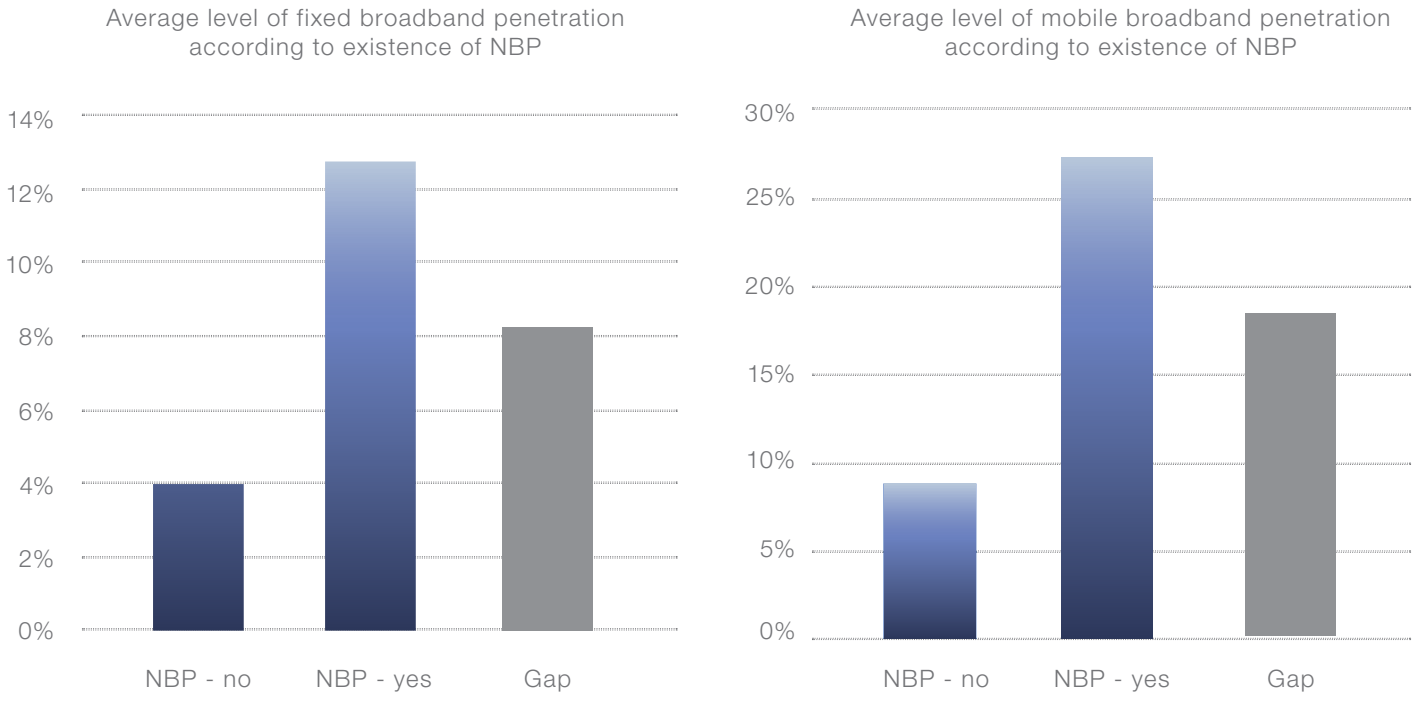
A mounting body of evidence is demonstrating the impact of NBP implementation on broadband penetration. The mention above of Korea's early leadership in IT promotion and planning is an often-cited example. Since the mid-1990s when Korea began its first information infrastructure initiative, the country has become a world leader in broadband adoption. This development has spurred economic growth across a range of sectors and since 1995, Korea's per capita income has more than doubled (from $11,620 in 1995 to $25,050 in 2012) according the IMF's World Economic Outlook (April 2013).

Singapore is another example, as the small island state has had national IT related plans in place since 1985 (starting with the National Computerisation Plan and most recently the iN2015, issued in 2006). Over this period the country has significantly advanced its ICT environment. In 1980 Singapore was still at an early stage in ICT development as it had only 22.2 fixed lines per 100 people; substantially below other countries such as Australia (32.3 fixed lines per 100 people) and New Zealand (36.1 fixed line per 100 people). But today, Singapore stands atop several measures of ICT and broadband adoption, such as the 2013 Networked Readiness Index where Singapore ranks second worldwide out of 144 countries.

Other country examples include Spain, where Plan Avanza, launched in 2005, has been credited with helping to double Internet usage and broadband fixed line penetration, as well as driving a culture change that is spurring broadband adoption[29].

In addition to anecdotal examples, the Broadband Commission has investigated the role of National Broadband Plans in driving broadband penetration in both fixed and mobile broadband subscriptions through statistical analysis. Based on simple observation of the statistics, those countries with National Broadband Plans are observed to have an average fixed broadband penetration of 12.7%, or 8.7% higher than countries without a Plan, which have an average fixed broadband penetration of 4% (Figure 5.1, left chart). For mobile broadband, those countries with National Broadband Plans are observed to have an average mobile broadband penetration of 27.5%, or 18.6% higher than countries without a Plan, which have an average mobile broadband penetration of 8.9% (Figure 5.1, right chart).

Figure 5.1: Differences in Broadband Penetration According to the Presence of a NBP, 2013



Source: ITU World Telecommunication/ICT Regulatory Database.

29 Lanvin, Torres Mancera, Busquets. "Promoting Information Societies in Complex Environments: An In-Depth Look At Spain's Plan Avanza". Global IT Report 2010. Chapter 2.1. WEF.

However, these simple descriptive statistics give no indication whether having a Plan in place actively drives broadband penetration higher – differences in income between countries mean that Figure 5.1 may implicitly just divide the group into higher-income countries which can afford to roll out broadband and design a Plan, and lower-income countries which are less able to roll out broadband and less likely to be able to afford to consult on a Plan, or introduce one.

In order to examine the interplay of many different variables and their relationship with broadband, the ITU/UNESCO Broadband Commission and Cisco developed a model investigating how fixed and mobile broadband penetration varies with economic level of development (income), geography, regulation, competition, the presence or absence of a NBP and private sector participation and their role influencing the uptake of broadband

5.1. Choice of Model

The analysis was conducted through econometric modeling using panel regressions of up to 165 countries based on data for a ten-year period from 2001-2011, testing linear correlations between broadband penetration and NBPs using panel regressions and Generalized Least Squares (GLS) estimation, assuming fixed effects (Box 8).

One potential problem is endogeneity (or reverse causation) – in some instances, rapid growth in broadband penetration could create incentives or otherwise induce countries to introduce a NBP – having first experienced the initial benefits of broadband, Governments or regulators may be encouraged to introduce a Plan as a means of facilitating further growth in the market.

Panel data regressions are a powerful statistical technique which can help address this problem by examining variations in a cohort of data observations over a time period to examine the relationships between variables more closely. Panel regressions also minimize problems of omitted variable bias (the omission of important variables) and multi-collinearity (the co-variation or inter-dependence of variables modeled as independent).

Panel regressions have the advantage of discounting known and unknown country fixed effects – these are structural or geographic framework conditions (e.g. institutional environment) which generally hold constant over the time period examined. Such background 'fixed effects' may be important for each country, but they do not enter into the variations studied across the cohort, as they hold constant.

Fixed and mobile broadband penetration were modeled as two separate dependent variables, as they follow distinctly separate growth patterns – fixed broadband has been available for several decades (through various technologies), while mobile broadband's growth curve only started in 2001 and shows stronger growth since 2007. Fixed and mobile broadband were therefore modeled separately to avoid losing important variations in the model through averaging distinct phenomena together. Box 9 presents the results for fixed broadband penetration and Box 10 for mobile broadband penetration.

It is well-established that broadband penetration varies with levels of national development, therefore, Gross Domestic Product (GDP) per capita was included in the model to control for the differences in economic resources between developed and developing countries that play a role in driving penetration levels up. The presence (or absence) of a NBP was included in order to assess the environment of policies devoted to broadband in a country.

Differences in levels of urbanization reflect geographical barriers or isolated localities that could affect the costs and deployment of broadband, especially fixed. This variable controls for demographic changes (e.g. migration) that could increase urban population and therefore raise demand for broadband that does not derive from national policies, GDP per capita or competition.

The degree of competition (for both the fixed and mobile market) was represented by the Herfindahl-Hirschman Index (HHI), which is commonly accepted as a measure of market concentration. More concentrated markets (and less competitive markets) are represented by a HHI approaching 1 (for a full monopoly).

Box 8: Panel Data Regression Models for Exploring Variation in Broadband Penetration

Two models are presented here: one for fixed broadband penetration and other for mobile broadband penetration. Both models test variations between broadband penetration and a number of variables for a cohort of up to 164 countries over a ten-year period from 2001 to 2011 using ordinary least squares (OLS) estimation and Generalized Least Squares (GLS) estimation (which allows for non-normal distributions in the coefficients).

$$p_{jt} = \alpha + \beta X_{jt} + c_j + u_{jt}$$

For j = 1,....n and t = 1,.... T, where p_{jt} is the dependent variable, broadband penetration in country j in period t; α is the constant of the estimation; X_{jt} is a 1×K vector of explanatory variables to be enumerated below; β is the matrix of coefficients that describe the size of the effect the explanatory variables have on p_{jt} ; c_j stands for unobserved heterogeneity (country individual effects) with variance σ_c^2. It could be viewed as unobserved country characteristics natural environments or unique economical and socio-political structures and institutions that are constant over the time period and in its influence on p_{jt}. Finally, u_{jt} stands for an idiosyncratic error term with variance σ_c^2 with the usual properties.

- Fixed broadband penetration (Pf): Fixed broadband penetration is the dependent variable and refers to the number of subscriptions for high-speed access to the public Internet per 100 inhabitants, as reported by the ITU. High-speed Internet is defined as downstream speeds equal to, or greater the, 256 kbit/s.
- Mobile broadband penetration (Pm): this is the second dependent variable and refers to the sum of standard mobile-subscriptions and dedicated mobile-broadband subscriptions to the public Internet per 100 inhabitants, as reported by ITU.
- National Broadband Plan (NBP) – a binary variable signifying presence or absence. It refers to the existence of national policy instruments in a country to promote broadband from 2001-2011, as reported by the ITU Regulatory Knowledge Center of the ITU and as assessed by the Broadband Commission for Digital Development.
- GDP per capita – level of income or GDP per capita in current US$ from 2001-2011, as reported by the World Bank.
- Urbanization – proportion of the total population living in urban areas as defined by National Statistics Offices (NSOs), and collected by the World Bank).
- Competition for the fixed broadband and mobile telecom market were modeled separately. The Herfindahl-Hirschman Index (HHI) is a measure of market concentration calculated for fixed broadband and the whole mobile market, by subscribers and by operator - HHI f and HHI m, respectively. The HHI is calculated by squaring the annual percentage market share of each firm competing in the market, and summing the resulting numbers in an index for 2001 to 2011, as calculated by the authors.
- Regulator – presence or absence of an ICT regulator, as reported by ITU.
- Domestic credit to private sector (Pcredit): This independent variable refers to domestic credit taken out by the private sector as a percentage share of GDP for 2001-2011, as reported by the World Bank.

Source: ITU/UNESCO Broadband Commission for Digital Development.

The regulatory variable is included to assess the impact of regulation on broadband penetration. As it is difficult to quantitatively measure the quality of regulation, this variable was a simple binary variable for the presence (or absence) of an independent regulatory authority.

Domestic credit to private sector (Pcredit) is a proxy variable used to assess how active a role the private sector plays in a country. It includes estimates of assets available to the private sector (e.g. loans, purchases of non-equity securities, trade credits and other accounts that establish a claim for repayment).

5.2. Results for Fixed Broadband

For fixed broadband, the panel regression model for 158 countries has a high explanatory power of 70% and the majority of variables included are significant (Box 9 and Appendix 4). NBP is highly significant in the model and to have a positive effect in Pf. Factoring out the effects of all other variables, countries with a NBP are found to be associated with a 2.5% higher fixed broadband penetration with all other variables are held constant. Notably, the NBP coefficient is the largest absolute coefficient.

GDP per capita is an important variable, as it controls for differences in income between countries that could be responsible for driving penetration up. Although the effect of simply GDP per capita when all the other variables are held constant is positive and highly significant, it is not in fact sizeable.

Urbanization has a highly significant coefficient of 0.6, suggesting that a 1% increase in urban population is associated with an increase of +0.6% in fixed broadband penetration. This finding of a significant relationship reflects the problem of 'last-mile' connectivity in remote areas, and suggests that the costs of deploying fixed (wired) broadband in isolated areas are a major barrier to boosting fixed broadband penetration in a country.

The results of the effects of competition in the fixed broadband model are interesting. The sign of the coefficient in Herfindahl-Hirschman Index (HHI) of the fixed broadband market is, as expected, statistically significant and negative, suggesting that more concentrated markets for fixed broadband are associated with lower fixed broadband penetration.

The move to a HHI of 1 (or monopoly market) is associated with a reduction in fixed broadband penetration of 1.4%. A competitive market is therefore a relevant variable and plays a role in driving broadband penetration.

The presence of a regulator is not significant in the model, and is not associated with higher fixed broadband penetration, when all other variables are held constant. This does not mean that a regulator does not affect levels of penetration. The model only has data for the presence or absence of a regulator, which fails to reflect the complexity and quality of the regulatory environment. This does not exclude a role for the regulator in driving change via any of the other variables – for example, the Body of European Regulators for Electronic Communication (BEREC) has suggested that "one of the NRAs' most important role [in formulating strategies to promote broadband] is to increase competition by making access possible for entrants"[30].

Domestic credit to the private sector is found to be highly significant in the model, with a positivecoefficient of 0.08, suggesting that countries with a larger proportion of financial activities (which may translate into greater investment) have higher fixed broadband penetration. The estimation suggests that an increase of 1% in the domestic credit to the private sector as a share of the GDP is associated with fixed broadband penetration 0.08% higher on average, ceteris paribus.

30 Page 16, "BEREC Report of the Consultation on the Draft BEREC Broadband Promotion Report", February 2012, available from: www.berec.europa.eu/eng/document_register/subject_matter/berec/reports/51-berec-report-on-the-consultation-on-the-draft-berec-broadband-promotion-report

Box 9: Panel Regression Results Investigating Variation in Fixed Broadband Penetration

Variable	Coefficient	Statistical Significance	Interpretation
NBP	2.499	Highly significant (1% level)	An increase of 1 in NBP, which corresponds to the adoption of a NBP, is associated with a 2.5% increase in P*f*, holding all other variables constant.
GDP p.c.	0.000583	Highly significant (1% level)	An increase of USD 1,000 in GDP per capita is associated with a minimal increase of 0.6% in P*f*, holding all other variables constant.
Urbanization	0.590	Highly significant (1% level)	An increase of 1% in urban population is associated with a 0.6% increase in P*f*, holding all other variables constant.
Regulator	0.364	Not significant	The coefficient is not statistically significant.
Pcredit	0.0808	Highly significant (1% level)	An increase of 1 in Pcredit is associated with a 0.08% increase in P*f*, holding all other variables constant.
HHI*f*	-1.396	Significant (5% and 10% levels)	An increase of 1 in HHI*f*, a move to a full monopoly, is associated with a decrease of 1.4% points in P*f*, holding all other variables constant.

Source: ITU/UNESCO Broadband Commission for Digital Development.

5.3. Results for Mobile Broadband

For mobile broadband, the results from the GLS regression of 164 countries indicate that the model constructed has a reasonable explanatory power (approximately 30%) for a panel regression and that the majority of variables included are significant (Box 10 and Appendix 4).

In this model, the presence of NBP was found to be significant and associated with a mobile broadband penetration on average 7.4% higher, when all the other variables are held constant.

The results for competition in the mobile broadband model are highly revealing of the dynamics in the mobile environment. The sign of the coefficient in HHI of the mobile broadband market is also, as expected, negative, indicating that more concentrated mobile broadband markets are associated with lower mobile broadbabd penetration. Here, the impact of a competitive market is found to have a much bigger impact than in the fixed broadband model, with the single largest coefficient observed of -26.5. This suggests that countries with a monopolistic mobile broadband market are associated with a 26.5% lower mobile penetration, holding other variables constant. According to these results, a competitive mobile broadband market plays a central role in driving mobile broadband penetration.

The results of GDP per capita in the mobile model are similar to those in the fixed model. The coefficient of GDP per capita is found to be significant and positive, but not sizeable. In contrast to the fixed model, the urbanization coefficient are not significant. This could be evidence of the fact that mobile broadband deployment incurs into lower costs than fixed broadband and that the stages of urbanization in a certain area do not affect significantly the penetration of mobile broadband when all other explanatory variables are held constant.

As in the fixed model, the regulator variable has not resulted in a significant coefficient in either estimation. Again, this does not mean that the presence of a regulator is irrelevant – rather, that these results could be explained by a simple dummy variable and cannot adequately capture differences in the presence, role and activities between regulators.

Domestic credit to the private sector is found to be highly significant in the model, with a positive coefficient of 0.5. These results suggest that countries which have a bigger proportion of financial activities, which can be assumed would be translated in investment, are associated with higher fixed broadband penetration by 0.5%, ceteris paribus.

If this relationship were causal, the introduction of a National Broadband Plan could enhance broadband penetration by focusing attention on key issues, establishing a consensual vision about how to improve broadband, and getting partners onboard with this vision. Even in industrialized countries which already have high broadband penetrations, NBPs can still play an important role as a clear statement of national policy priorities (for example, the U.S. National Broadband Plan successfully focused attention on the issue of spectrum).

Box 10: Panel Regression Results Investigating Variation in Mobile Broadband Penetration

Variable	Coefficient	Statistical Significance	Interpretation
NBP	7.435	Highly significant (1% level)	An increase of 1 in NBP, or the adoption of a NBP, is associated with a 7.4% increase in Pm, holding all other variables constant.
GDP p.c.	0.00193	Highly significant (1% level)	An increase of USD 1,000 in GDP per capita is associated with a 2% increase in Pm, holding all other variables constant.
Urbanization	0.307	Not significant	The coefficient estimated is not statistically significant.
Regulator	-3.923	Not significant	The coefficient is not statistically significant.
Pcredit	0.458	Highly significant (1% level)	An increase of 1 in Pcredit is associated with a 0.5% increase in Pm, holding all other variables constant.
HHIf	-26.49	Significant (10% level)	An increase of 1 in HHIm, a move to full monopoly, is associated with a decrease of 26.5% points in Pm, holding all other variables constant.

Source: ITU/UNESCO Broadband Commission for Digital Development.

6

FINANCING PLANS AND PPPs

National Broadband Plans usually set out a vision for the development of broadband within a country, but there is a need for funding to turn this vision into action, and plans should also contain solid consideration of the financing and investment driving growth in broadband. Plans can help mobilize resources from the public and private sectors for investment and expansion of broadband services – for example, by raising awareness of the importance of broadband, by demonstrating commitment to the development of the ICT sector, or by clarifying expectations vis a vis the role of the State compared with the role of the private sector. One key issue is whether public agencies should participate in development of broadband; and if so, should there be partnership with private players?

The World Bank (2012) notes that, for broadband network investments, "the private sector will lead the necessary investment, but it cannot do it alone. Governments must create the enabling environment and, under the most challenging conditions, be prepared to lead"[31] . Following the financial crisis, as many as fifty Governments identified investments in broadband infrastructure as a key component of their economic stimulus plans, partly due to evidence suggesting multiplier effects to investments in broadband infrastructure[32]. However, given the slow economic recovery, and with many Governments pursuing austerity measures, the question of how to fund the broadband deployment persists, especially for harder-to-reach rural and remote areas.

There is a significant body of evidence to suggest that private and competitive markets have successfully accelerated service delivery to a large majority of customers, accelerating market growth, enhancing innovation, boosting subscriptions and reducing prices[33]. However, evidence is growing that private, competitive market provision does not always provide last-mile access to every subscriber, mainly due to the higher marginal costs of providing last-mile access, which increase dramatically for connecting up the last subscribers, threatening the commercial viability of serving these areas (Figure 6.1).

The UK's Digital Britain Plan acknowledges "the emerging industry consensus" that "despite welcome investment and competition, the economics of NGN broadband deployment mean that there will remain up to a third of the country – both homes and SMEs – not served in the way that the rest of the country is by the fixed telecom market" (Box 11), effectively acknowledging that it may not prove commercially viable to provide the entire country with broadband, leaving up to one-third of the country to be financed and/or serviced with broadband by alternative means.

Most Plans acknowledge the costs and difficulties of universal service – indeed, this is the specific problem which many Plans aim to address. The market segment or proportion of a country that is difficult to serve in a commercially viable way varies between different countries according to population distribution and geography. This proportion that may prove commercially unviable to connect can be defined by market share, size of anticipated revenues, % population, or geographical coverage – for example, it is identified as one-third of the geographical area of the country in the U.K. (Box 11) or the final 5% population coverage in Finland (Box 12).

In its 2012 consultation, BEREC also noted that "there is a clear role for both private and public investments to incentivize broadband promotion. In order to promote an efficient use of public money, to avoid a "crowding out" effect of private investments and to prevent market distortions, public funds are expected to focus in geographic areas where investment in normal market conditions is not feasible and or/in demand-side activities that could enhance broadband adoption and usage"[34].

Indeed, one difficulty with proposing more extensive State funding is that private players may become reluctant to invest, if they get the feeling that State is moving in – the so-called 'crowding out' argument that public sector investment may discourage the private sector from investing (although relatively few Plans consider this argument directly in these terms). In view of scale of investments needed for NGN, as well as the objectives (e.g., programmes and projects to connect schools), many Plans nevertheless envisage some sort of State involvement, with the main differences between Plans evident in the mechanisms chosen.

31 "Partnerships for Broadband: Innovative public private partnerships will support the expansion of broadband networks", Doyle Gallegos, June (2012), available at: www.siteresources.worldbank.org/INFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/1221297_Broadband_PolicyNote_LowRes.pdf

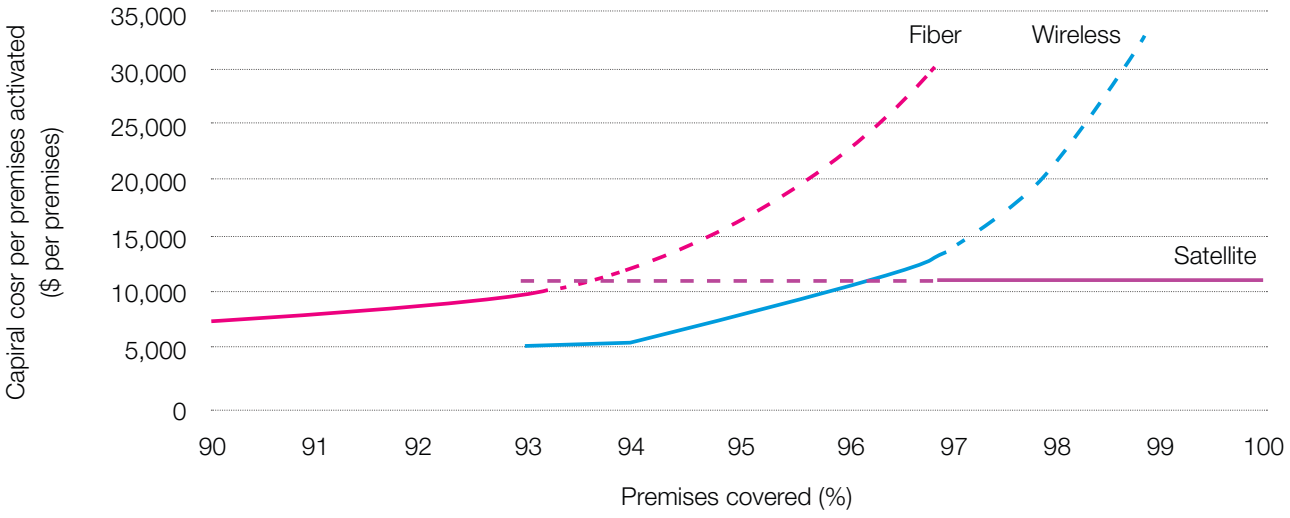
32 "Confronting the Crisis: ICT Plans for Economic Growth", ITU, Geneva, 2009.

33 ITU "World Telecommunication Development Report 2002: Reinventing Telecoms", at: www.itu.int/ITU-D/ict/publications/wtdr_02/

34 Page 8, BEREC consultation; available at: www.sberec.europa.eu/eng/document_register/subject_matter/berec/reports/51-berec-report-on-the-consultation-on-the-draft-berec-broadband-promotion-report

Figure 6.1: The Costs of Connecting the Last Subscribers

A comparison of marginal connection costs for connecting the last subscribers reveals some interesting trends. Although satellite may have higher overall costs per subscriber for connecting subscribers initially, the marginal costs of connecting additional subscribers are zero. Conversely, fibre and wireless may have lower costs for the bulk of first subscribers to be connected, but for the last subscribers to be connected, the marginal costs escalate quickly. The graph below demonstrates the step changes in incremental roll-out costs once fibre-to-the-cabinet (FTTC) and fibre-to-the-home (FTTH), wireless and satellite reaches 60-70% population coverage.



Source: the Broadband Stakeholder Group, quoted in the Digital Britain Plan.
Note: Amounts quoted in UK pounds sterling.

Among the Plans reviewed, nearly half cite the use of PPPs to fund broadband deployment, while around 40% envisage the use of Government grants and other direct financial subsidies. A quarter cite the use of USFs and a fifth the use of a dedicated broadband development fund (Figure 6.2). In a recent ITU study of PPPs, government grants were used to support around half the broadband projects identified in the report[35]. The Arab States stand out for recourse to PPPs, while Europe is the region where countries have resorted least to the use of USFs, partly due to geography and competition concerns (Figure 6.3). The World Bank (2012) notes that PPPs take a variety of forms, including privatization, Initial Public Offerings (IPOs), management and concession contracts, Business Process Outsourcing (BPO) and network leasing[36].

BEREC and the FTTH Council (2012) note that PPPs should (a) properly identify economic and social targets (b) effectively match the resources and competences of different partners and (c) design a network in line with different areas' geographical constraints and (d) define the expected demand and services required.

In view of the costs of connecting the last subscribers (Figure 6.1), and given that the significant investments and extensive benefits of broadband connectivity, it is likely that both public and private sector involvement may be needed. Policy-makers and industry should ensure solid consideration of financing mechanisms is included in broadband Plans, as national competitiveness is at stake.

35 "Developing successful public-private partnerships to foster investment in universal broadband networks", ITU (2013).

36 "Partnerships for Broadband: Innovative public private partnerships will support the expansion of broadband networks", Doyle Gallegos, June (2012), available at: www.siteresources.worldbank.org/INFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/1221297_Broadband_PolicyNote_LowRes.pdf

Box 11: Digital Britain Plan – Funding Connections to the Final Third

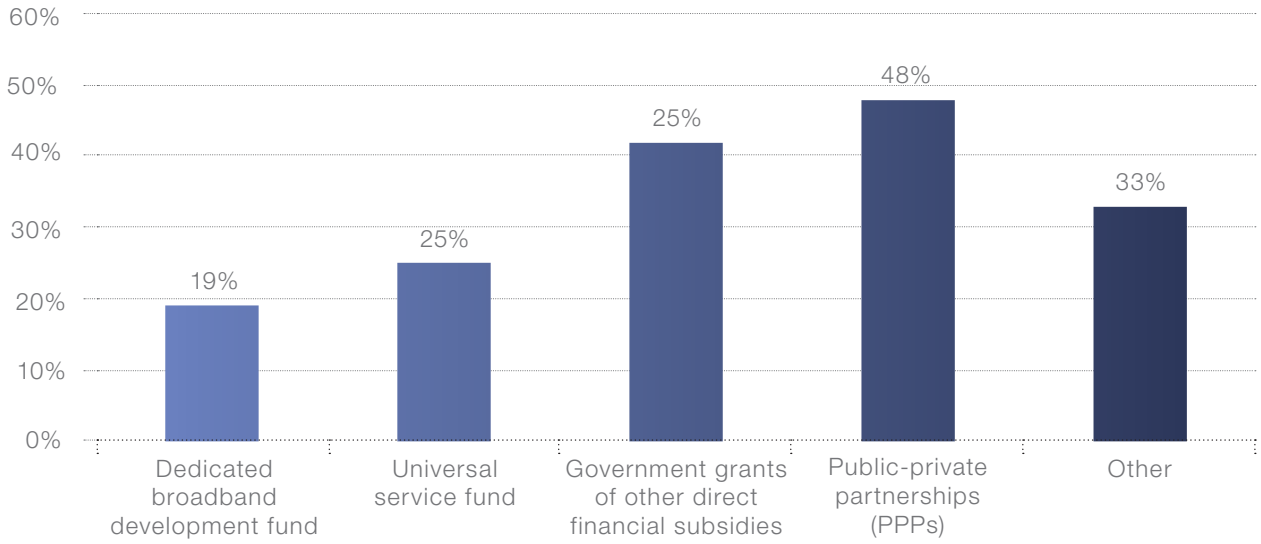
We welcome the significant investment by Virgin Media and BT plc's competitive response via its commitment to developing NGN broadband services. We can be confident of BT's investment leading to coverage matching the cable footprint and possibly extending to a certain proportion of the population beyond this. But we cannot ignore the emerging industry consensus that, despite this welcome investment and competition, the economics of NGN broadband deployment mean that there will remain up to a third of the country – both homes and SMEs – not served in the way that the rest of the country is by the fixed telecom market.

In summary, given the expected rates of return, it seems unlikely, particularly in a period when capital markets are severely constrained, that private investment or publicly available financing will provide the investment necessary to roll out NGA such that coverage can reach ADSL or mobile coverage levels.

The increasingly widespread conclusion from industry and economic analysis is that there is no obvious means whereby the market, unaided, will serve the final third of the population. We therefore propose a Final Third Project to deliver at least 90% coverage of Next Generation Broadband for homes and businesses by 2017 (and it is hoped, accelerate the expansion of the boundary of market provision from 50% to the two-thirds coverage level). The Final Third project would need to focus resources on geographic areas where the market would not otherwise invest and to subsidize only that activity which contributes to next-generation broadband deployment. For this reason, we do not believe that tax incentives for investment would be the best means of delivery. A form of targeted subsidy is likely to be more effective and deliver better value for money.

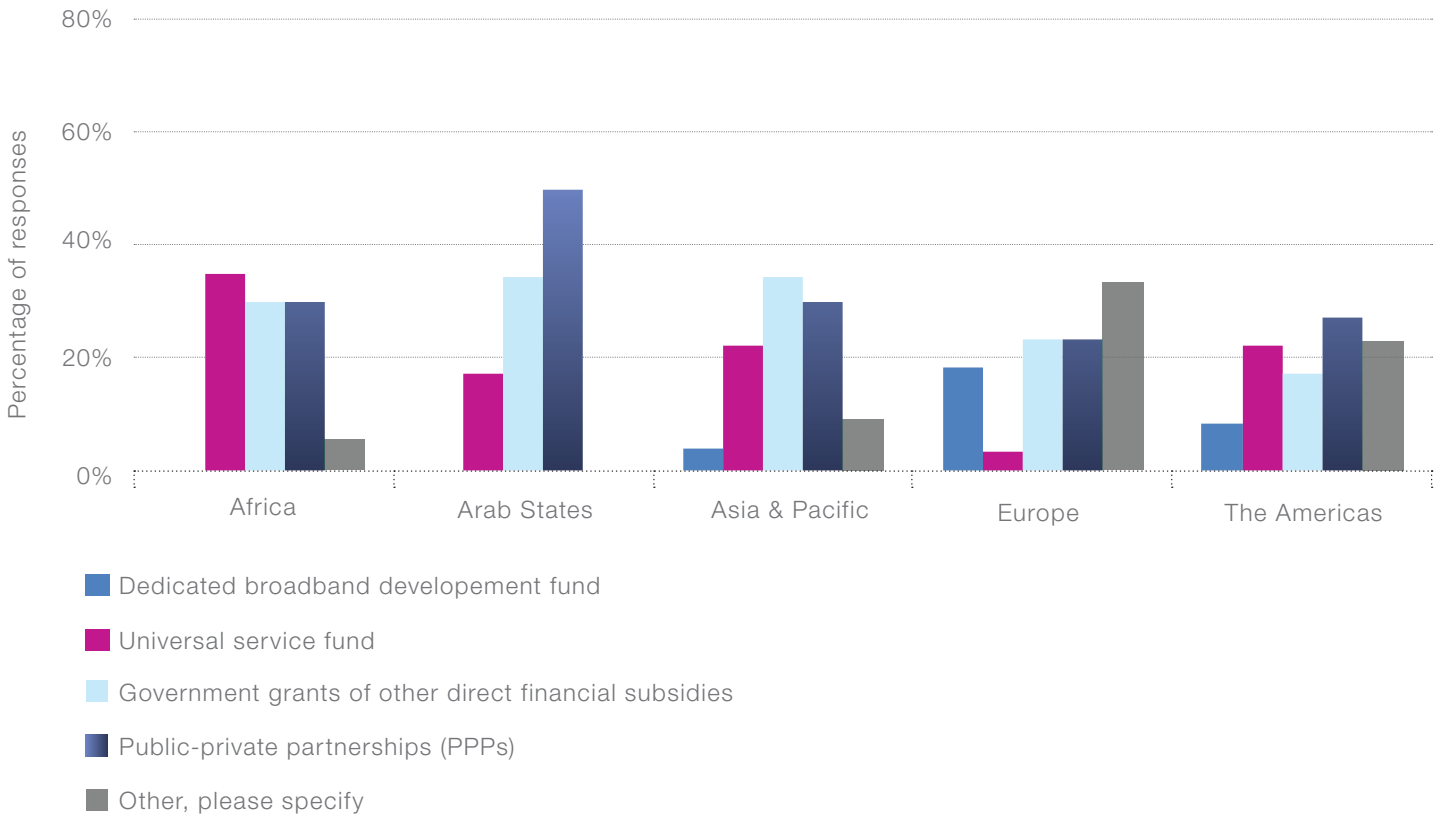
Source: UK's Digital Britain Plan.

Figure 6.2: Means of Financing Broadband Plans, 2012



Source: ITU World Telecommunication/ICT Regulatory Database.

Figure 6.3: Means of Financing the Broadband Plans, by Region 2012



Source: ITU World Telecommunication/ICT Regulatory Database.

Box 12: Universal Service - Financing the Last 5% of Population Coverage in Finland

In Finland, the market is expected to connect built-up areas with a population coverage of around 95% with broadband. Financing 99% coverage requires the use of public subsidies in funding high-speed connections to around 130,000 households in non-built up areas, for some 800 projects worth an estimated EUR 400 million. For these areas, the telecom operator will pay at least one-third of the project costs, with the remaining two-thirds divided between: (1) the State (EUR 66 million has been reserved for broadband subsidies in the State budget); (2) the EU Rural Development Programme will fund Finland's broadband projects at EUR 25 million; and (3) municipalities - EUR 50 million, at around 8%, 22% or 33% of the project according to economic capacity, population density and implementation costs and as defined in a Government decree.

The roll-out of broadband in sparsely populated areas is progressing well. Regional councils have already chosen implementers for 160 projects, with 25 projects granted aid, and over ten complete. 80% of municipalities are also funding projects. The greatest challenge has been finding contractors for projects – telecom operators have so far submitted bids in only half the projects open up for competitive tendering. Despite the two-thirds public subsidy, broadband projects in sparsely populated areas have not attracted the interest of large nationwide telecom operators.

Smaller operators (such as cooperatives, municipal network companies and local telephone operators) may be more willing to accept modest profits on longer timescales, compared to large companies. However, they often face problems arranging finance, with insufficient capital of their own, forcing them to borrow. They have requested guarantees from municipalities, for example, many of which have been hesitant to underwrite debt, due to the risks involved. This situation markedly improved in 2011 when Finnvera, a state-owned financing company, started funding broadband projects. In November 2012, the decision was taken to pay half of all subsidies to be granted in advance. This advance payment should give small operators a better chance of implementing projects and increase telecom operators' interest in broadband projects.

Source: Finnish Ministry of Transport and Communications, based on the Finnish National Broadband Plan.

7 CONCLUSIONS

There has been strong recent growth in Plans, with some 134 Plans in force by mid-2013. Plans may take different forms (legislation, policy framework, strategy and/or regulations) and present a different focus on different aspects (IT, Information Society, ICT, Digital, Broadband). Plans prior to 2005 tended to focus on IT/ICT. The Information Society was most popular as the focus of Plans in 2007-2008, with broadband growing sharply as the focus of Plans from 2008 onwards. Most recently, Digital Agendas account for a small, but growing, number of Plans. However, all these Plans share a common emphasis on the vital role of broadband in underpinning national competitiveness, and aim to extend national footprint of broadband networks and usage of broadband-enabled services and applications.

Although the nature of the Plan clearly matters (with important differences in status between binding statutory requirements, broad policy guidance or detailed regulations), the exact name of the plan or policy framework may not matter as much as other factors, such as political support, buy-in, its quality (comprehensive, clear identification of priorities), and enforceability.

The full benefits of broadband for enhancing national competitiveness and empowering citizens are most likely to be realized where there is strong partnership between Government, industry and other stakeholders and where Governments engage in a consultative, participatory approach to the policy-making process, in conjunction with key stakeholders.

There is a need to move from 'silo thinking' to a more comprehensive point of view encompassing different sectors, in recognition of the nature of broadband as a cross-sectoral enabler. Implementation is still an issue, with broad-based buy-in by different stakeholders critical to a Plan's success. Some Plans have been produced as landmark events to help clarify mandates and/or put regulators on the map.

In a fast-changing technological environment, Plans should be regularly reviewed and updated. Given the average lifespan for superseded Plans of 8.4 years and for existing Plans currently in force of 7 years, Plans should be updated more regularly to take into account the rapid shifts in the industry (in revenue, pricing and technology). Revisions every 3-5 years are likely to balance the costs involved in policy-making with developments in a fast-changing industry.

Research conducted for this report suggests that a competitive market may be associated with a higher broadband penetration, with much 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).

The introduction or adoption of a broadband plan is associated with 2.5% higher fixed broadband penetration, and 7.4% higher mobile broadband penetration on average. This result is consistent with National Broadband Plans focusing efforts across industry in coordination with policy-makers, emphasizing the role of broadband as a national priority, and signaling national commitment to the roll-out of broadband.

Broadband Plans are one key means of dialogue, which should seek the views and engagement of all key stakeholders. Ultimately, there is no single way to improve broadband; there are many different ways, with different success factors, depending on existing country circumstances. 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.

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LIST OF ACRONYMS AND ABBREVIATIONS

BEREC	Body of European Regulators for Electronic Communication
BPO	Business Process Outsourcing
CEO	Chief Executive Officer
GDP	Gross Domestic Product
GLS	Generalized Least Squares
HHI	Herfindahl-Hirschman Index
ICTs	Information and Communication Technologies
ISOC	Internet Society
ITU	International Telecommunication Union
IXP	Internet Exchange Point
MDGs	Millennium Development Goals
NBP	National Broadband Plan
NGN	Next-Generation Network
NRA	National Regulatory Authority
NSO	National Statistical Office
PPP	Public-Private Partnership
SMEs	Small-and Medium-Sized Enterprises
SMP	Significant Market Power
UAS	Universal Access and Service
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	Universal Service Directive
USF	Universal Service Fund
USO	Universal Service Obligations

APPENDICES

Appendix 1: Broadband Plan Development Process

There is no single method to create a national broadband plan. Just as a policy may be most appropriate in one context but ill advised for another, the process for developing a national broadband plan will depend on unique political and economic characteristics of a country at a particular point in time. However, the steps below can be used as a guide to consider the various elements of a national plan, as well as the sequencing in plan development.

1. Determine the convening and implementing bodies – as detailed in this report, the convening and implementing agencies play crucial roles in the success of the plan. The jurisdiction of the implementing agency (e.g., government ministry, regulator, legislative committee) will determine if the policy recommendations in the plan are immediately actionable. The more the actions identified in the plan fall under the purview of the convening and/or implementing bodies, the greater the likelihood of impact of the plan.

2. Identify the consultative approach – the extent to which stakeholders are supportive and informed of the details of the plan will impact the ability to implement the plan. The extent of consultation in plan development ranges from informational (public announcement of the completed plan with very limited input except from groups associated with the convening agency), consultative (one or more time windows open for public commentary on a published draft plan) or active participation (iterative process of consultation through workshops, public consultations and joint reviews of drafts).

3. Landscape assessment, benchmarking and identification of binding constraints – assessing the degree of broadband adoption, benchmarking versus relative comparators and identification of critical binding constraints are all necessary in order to develop a relevant courses of action in the national broadband plan. Broadband and ICT adoption should be measured, as well as the various components of infrastructure (international, national and access capacities and prices), market structure (in wireless, wireline and broadband) and technologies utilized, as well as relevant business and regulatory factors.

4. Goal setting – once a rigorous assessment of the broadband landscape is complete, as well as benchmarking versus relevant comparators, those components factor into the establishment of goals and targets for the national broadband plan. Plan goals gain much attention so it is important to set feasible targets based on rigorous analysis. Goals tend to focus on coverage/adoption, speed targets (important to consider not just download speeds but upload and latency) or economic impacts (such as employment targets or industry building).

5. Identify possible policy interventions – once the constraints to broadband market development have been highlighted, the next step is to match possible policy interventions. This includes reviewing 'best practices' as well as various menus of policy interventions that apply to particular bottlenecks and constraints in the market being reviewed.

6. Match and filter policy actions on the basis of impact and feasibility – while some actions may be very impactful, they may require significant investment (either financial or political will). Other actions may be more feasible though impact may be less. The process of filtering the different policy options available leads to the final recommendations put forth in the plan.

7. Plan launch and implementation – the launch process may include a window of public consultation while the completed plan is still in draft form. A high level launch can help to draw attention to the overall goal of focusing on increasing broadband adoption and spur public interest and momentum that feeds into the implementation stage.

Appendix 2: Selected Economies With National Broadband Policies, 2013

Economy	Policy available?	Year policy was adopted	Title/details
Afghanistan	Yes	2008	Afghanistan National Development Strategy: 1387 – 1391 (2008 – 2013)
Albania	Yes	2008	E-Albania
Algeria	Yes	2008	E-Algérie 2013
Andorra	Yes	2009	Universal Access Service
Angola	Yes	2010	White Book of Information and Communication Technologies, Livro branco das Tecnologias da Informação e Comunicação – LBTIC
Antigua & Barbuda	Yes	2012	GATE 2012
Argentina	Yes	2010	Plan Nacional de Telecomunicaciones - Argentina Conectada
Armenia	Yes	2008	Government Of Republic Of Armenia Decree No35 On Approving The Information Technology Sector Development Concept Paper
Australia	Yes	2010	National Broadband Network
Austria	Yes	2010	Broadband Austria - Breitband strategie 2020
Azerbaijan	Planning		
Bahamas	Yes	2003	Policy Statement on Electronic Commerce and the Bahamian Digital Agenda
Bahrain	Yes	2010	National Broadband Network for the Kingdom of Bahrain
Bangladesh	Yes	2009	Broadband National Policy Act 2009
Barbados	Yes	2010	National Information and Communication Technologies Strategic Plan of Barbados 2010-2015
Belarus	Yes	2011	National programme on accelerated development of services in the field of information and communication technologies for 2011–2015
Belgium	Yes	2009	België : digitaal hart van Europa
Belize	Yes	2011	ICT National Strategy

Economy	Policy available?	Year policy was adopted	Title/details
Benin	Planning		
Bhutan	Yes	2008	National Broadband Master Plan Implementation Project (NBMIP)
Bolivia	No		
Bosnia and Herzegovina	No		
Botswana	Yes	2004	Botswana's National ICT Policy
Brazil	Yes	2010	National Broadband Plan (Plano Nacional de Banda Larga - PNBL)
Brunei Darussalam	Yes	2008	National Broadband Blueprint
Bulgaria	Yes	2009	National strategy of broadband development in Republic of Bulgaria
Burkina Faso	Yes	2006	Lettre de politique sectorielle 2006-2010
Burundi	Yes	2011	Burundi/ ICT : National Projects for Broadband Connectivity Burundi Community Telecentre Network (BCTN)
Cambodia	Yes	2011	2015 ASEAN ICT Master PLAN / Cambodia ICT development Strategy 2011-2015
Cameroon	No		
Canada	Yes	2010	Broadband Canada: Connecting Rural Canadians
Cape Verde	Planning		
Central African Rep.	Yes	2006	Politique, Stratégies et plan d'actions de l'édification de la Société de l'Information en République Centrafricaine
Chad	Yes	2007	Plan de développement des technologies de l'Information et de la Communication au Tchad or PLAN NICI

Economy	Policy available?	Year policy was adopted	Title/details
Chile	Yes	2010	Strategy for Digital Development La Agenda Digital del Gobierno de Chile para el período 2010-2014 / ICT as a part of Chile's Strategy for Development:Present Issues and Challenges
China	Yes	2010	Three Network Convergence – National Government Investment
Colombia	Yes	2011	Live Digital - Vive Digital
Comoros	Planning		
Congo (Dem. Rep.)	Yes	2009	Document de la Politique sectorielle des télécommunications et des technologies de l'information et de la communication (TIC) West Africa Cable System (WACS)
Costa Rica	Yes	2012	Estrategia Nacional de Banda Acha
Côte d'Ivoire	Yes	2010	Objectifs Strategiques du Government de Côte dÍvore en Matiere de Telecommunications et de TIC
Croatia	Yes	2011	National broadband development strategy in the Republic of Croatia, Strategy for Broadband Development in the Republic of Croatia for 2012–2015
Cuba	Planning		
Cyprus	Yes	2012	Digital Strategy for Cyprus
Czech Republic	Yes	2011	Digital Czech Republic - State policy in electronic communications
D.P.R. Korea	No		
Denmark	Yes	2010	Digital work programme by the Minister of Science, Technology and Innovation.
Djibouti	Yes	2004	Plan d'action national pour l'exploitation des TIC en République de Djibouti pour le développement national, EASSy
Dominica	No		
Dominican Rep.	Yes	2007	Conectividad Rural de Banda Ancha E-Dominicana (includes rural broadband connectivity program)

Economy	Policy available?	Year policy was adopted	Title/details
Ecuador	Yes	2011	Estrategia Ecuador Digital 2.0 and Broadband Plan
Egypt	Yes	2011	National Broadband Plan – A Framework for Broadband Development
El Salvador	No		
Equatorial Guinea	Yes	2010	GITGE (Gestor de Infraestructura de Telecomunicaciones de G.E.)
Eritrea	No		
Estonia	Yes	2006	Information Society Development Plan 2013
Ethiopia	Yes	2005	ICT Policy
Fiji	Yes	2011	National Broadband Policy
Finland	Yes	2005	Broadband 2015 Project, Kainuu Information Society Strategy 2007-2015
France	Yes	2010	Plan national très haut débit
Gabon	Yes	2011	Digital Gabon: vaste Programme de réformes multi sectorielles dont la finalité est de faire du Gabon un Pays Emergent, à travers les pilliers suivants : Gabon Industriel, Gabon vert et Gabon des Services.
Gambia	Yes	2008	The Gambian ICT4D-2012 Plan
Georgia	No		
Germany	Yes	2009	Breitbandstrategie der Bundesregierung
Ghana	Yes	2010	Broadband Wireless Access
Greece	Yes	2006	Digital Strategy 2006-2013
Grenada	Yes	2006	Information and Communication Technology (ICT) 2006-2010 / A Strategy And Action Plan for Grenada
Guatemala	No		
Guinea	Yes	2009	Plan National de frequences/ Plan de développement de l'infrastructure nationale d'information et de communication de la République de Guinée 2001 – 2004
Guinea-Bissau	No		

Economy	Policy available?	Year policy was adopted	Title/details
Guyana	Yes	2011	E-Guyana
Haiti	No		
Honduras	Yes	2010	Resolución NR 005/10 – Normativa que regulará la prestación de servicios de telecomunicaciones con conectividad de banda ancha
Hungary	Yes	2010	Digital Renewal Action Plan
Iceland	Yes	2005	Telecom Policy Statement 2005-2010
India	Yes	2011	National Optical Fibre Network
Indonesia	Yes	2010	Priorities Of The Ministry Of Communication And Information Technology Year 2010-2014
Iran	Yes	2002	TAKFA Plan
Iraq	Planning		
Ireland	Yes	2008	Ireland's Broadband Strategy
Israel	Yes	2012	The Communication Initiative: fiber-based national broadband network
Italy	Yes	2010	“Italia Digitale” Digital Italy Plan
Jamaica	Yes	2007	National ICT Strategy
Japan	Yes	2010	New Broadband Super Highway (Haraguchi vision II)
Jordan	Yes	2007	National ICT Strategy of Jordan
Kazakhstan	Yes	2010	Program of ICT Development
Kenya	Yes	2006	ICT Masterplan 2012-2017
Kiribati	No		
Korea (Rep.)	Yes	2009	Ultra Broadband Convergence Network
Kuwait	No		
Kyrgyzstan	No		
Lao P.D.R.	No		

Economy	Policy available?	Year policy was adopted	Title/details
Latvia	Yes	2005	Broadband development strategy for year 2006-2012
Lebanon	Yes	2008	Lebanese Broadband Stakeholders Group (LBSG)
Lesotho	Yes	2005	ICT Policy for Lesotho
Liberia	Yes	2010 - 2015	Government of Liberia's Policy for the Telecommunications and Information Communications Technology (ICT)
Libya	No		
Liechtenstein	Yes	2006	Communications Act – Law on Electronic Communication
Lithuania	Yes	2005	Strategy of Broadband Infrastructure Development in Lithuania in 2005-2010
Luxembourg	Yes	2010	Stratégie nationale pour les réseaux à « ultra-haut » débit - « l'ultra-haut » débit pour tous
Macao, China	No		
Madagascar	No		
Malawi	Yes	2003	An Integrated ICT-led Socio-Economic Development Policy for Malawi
Malaysia	Yes	2010	National BB Implementation NBI
Maldives	No		
Mali	No		
Malta	Yes	2012	Provision of access at a fixed location
Marshall Islands	Planning		
Mauritania	No		
Mauritius	Yes	2012	National Broadband Policy 2012-2020 (NBP2012)
Mexico	Yes	2011	Digital Agenda
Micronesia	Planning		

Economy	Policy available?	Year policy was adopted	Title/details
Moldova	Yes	2010	Hotărâre cu privire la aprobarea Programului de dezvoltare a accesului la Internet în bandă largă pe anii 2010-2013
Monaco	No		
Mongolia	Yes	2011	National program on Broadband Network up to 2015 year
Montenegro	Yes	2012	Strategy of electronic communication sector in Montenegro, Strategy for the Development of Information Society 2012-2016 - Montenegro - Digital Society
Morocco	Yes	2012	Plan national pour le développement du haut et très haut débit au Maroc
Mozambique	Yes	2006	National ICT Policy Implementation Strategy 2002 and 2006 - Digital Inclusion in Mozambique
Myanmar	No		
Namibia	Yes	2009	Telecommunications Policy for the Republic of Namibia
Nauru	No		
Nepal	No		
Netherlands	Yes	2010	Digital Agenda
New Zealand	Yes	2010	Ultra-fast broadband initiative, Five Point Government Action Plan for faster broadband
Nicaragua	No		
Niger	Yes	2005	Plan de développement des Technologies de l'Information et de la Communication au Niger / Plan NICI du Niger
Nigeria	Yes	2013	National ICT Policy 2013-2018
Norway	Yes	2001	Action plan on Broadband communication
Oman	Yes	2012	National Broadband Strategy
Pakistan	Yes	2007	National Broadband policy 2004, National Broadband Programme 2007
Panama	Yes	2008	National ICT Strategy 2008-2018
Papua New Guinea	Yes	2011	National ICT Policy and PNG LNG Fibre cable project

Economy	Policy available?	Year policy was adopted	Title/details
Paraguay	Yes	2011	Paraguay 2013 Conectado y Plan Nacional de Telecomunicaciones – PNT
Peru	Yes	2010	Plan Nacional para el Desarrollo de la Banda Ancha en el Péru
Philippines	Yes	2011	The Philippine Digital Strategy, Transformation 2.0: Digitally Empowered Nation
Poland	Yes	2010	Mega–Bill: The act on supporting the development of telecommunications services and networks
Portugal	Yes	2010	Digital Agenda 2015 (2010-2015)
Qatar	Yes	2011	Qatar's National ICT Plan 2015: Advancing the Digital Agenda Qatar National Broadband Network (Q.NBN)
Romania	Yes	2007	The Regulatory Strategy for the Romanian Electronic Communications Sector for 2007-2010
Russian Federation	Yes	2010	Information Society Strategy / Information Society Programme
Rwanda	Yes	2006	Regional Connectivity Infrastructure Program (RCIP)
S. Tomé & Principe	No		
Samoa	Yes	2010	Broadband Spectrum Plan
San Marino	No		
Saudi Arabia	Yes	2010	USF strategic Plan, Kingdom's strategy for the deployment of broadband services
Senegal	Planning		
Serbia	Yes	2010	Strategy for the development of broadband in the Republic of Serbia until 2012
Seychelles	No		
Sierra Leone	No		
Singapore	Yes	2005	Intelligent Nation 2015 (or iN2015)
Slovak Republic	Yes	2006	Operačný Program Informatizácia Spoločnosti (Operational program- Information society)
Slovenia	Yes	2008	Broadband Network Development Strategy (Strategija razvoja širokopasovnih omrežij v Republiki Sloveniji)

Economy	Policy available?	Year policy was adopted	Title/details
Solomon Islands	Planning		
Somalia	No		
South Africa	Yes	2010	Broadband Policy for SA
Spain	Yes	2010	Plan Avanza: Plan Avanza: 2005, Plan Avanza 2 aprobado el 16/07/2010
Sri Lanka	Yes	2012	e- Sri Lanka, 2012 - HSBB NBP
St. Kitts and Nevis	Yes	2006	National Information and Communications Technology (ICT) Strategic Plan
St. Lucia	No		
St. Vincent and the Grenadines	No		
Sudan	No		
Suriname	No		
Swaziland	No		
Sweden	Yes	2011	Broadband Strategy for Sweden
Switzerland	Yes	2007	The universal service with regard to telecommunications
Syria	No		
Tajikistan	No		
Tanzania	Yes	2004	National Information Communication and Technology Broadband Backbone (NICTBB)
TFYR Macedonia	Yes	2005	National Strategy for the development of Electronic Communications with Information Technologies
Thailand	Yes	2010	The National Broadband Policy
Timor-Leste	No		
Togo	Planning		
Tonga	Yes	2011	Tonga-Fiji Connectivity Project : Pacific Regional Connectivity Program (PRCP)
Trinidad & Tobago	Yes	2008	Trinidad & Tobago's National Information & Communication Technology Strategy-Fastforward-Accelerating into the Digital Future

Economy	Policy available?	Year policy was adopted	Title/details
Tunisia	Yes	2012	La Stratégie Tunisienne pour le Haut-Débit (Tunisia Broadband Strategy, TBS)
Turkey	Yes	2006	Information Society Strategy 2006 -2010, Ninth Development Plan 2007-2013
Turkmenistan	No		
Tuvalu	No		
Uganda	Yes	2009	Uganda Broadband Infrastructure Strategy National Position Paper
Ukraine	No		
United Arab Emirates	No		
United Kingdom	Yes	2010	Britain's Superfast Broadband Future, Broadband Delivery UK
United States	Yes	2010	Connecting America: The National Broadband Plan
Uruguay	Yes	2007	Ceibal Plan
Uzbekistan	No		
Vanuatu	Planning		
Vatican	No		
Venezuela	No		
Viet Nam	Yes	2010	Master Plan of Viet Nam, from 2010 to 2015 and Prime Minister's Decree 1755/QD-TTg on the approval of a National Strategy on Transforming Viet Nam into an advanced ICT country
Yemen	No		
Zambia	Yes	2006	National Information and Communication Technology Policy
Zimbabwe	Yes	2005	National Information and Communication Technology Policy Framework Connection to the undersea cable initiatives promotes broadband usage

Economies			
Hong Kong, China	Yes	2008	2008 Digital 21 Strategy – Moving Ahead
Chinese Taipei	Yes	2011	Broadband for Villages and Broadband for Tribes
Cook Islands	Yes	2003	National ICT Policy

Source: ITU/UNESCO Broadband Commission for Digital Development (www.broadbandcommission.org), based on the ITU ICT Eye regulatory database, available at https://www.itu.int/ITU-D/icteye/

Appendix 3: Descriptive Statistics of Dependent and Independent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max	Data Source
Pf	2124	5.4	9.4	0	71.6	ITU (2012)
Pm	580	12.6	23.2	0	216.1	ITU (2012)
NBP	2266	0.2	0.4	0	1	Broadband Commission (2012)
GDP per capita	2111	11754.7	19368.2	92.0	186242.9	World Bank (2012)
Pcredit	1915	51.2	48.8	0.7	319.5	World Bank (2012)
Regulator	2038	0.7	0.4	0	1	ITU (2012)
Urbanization	2266	56.1	24.4	8.5	100	World Bank (2012)
HHIf	1398	0.6	0.3	0.05	1	original
HHIm	2194	0.5	0.2	0.1	1	original
ICT/IS Plan	2036	0.8	0.4	0	1	Broadband Commission (2012)

Appendix 4: Regression Results

Fixed Broadband Model: Fixed-effects GLS

	Pf
NBP	2.499***
	(7.79)
GDP per capita	0.000583***
	(26.50)
Urbanization	0.590***
	(6.13)
Regulator	0.364
	(0.67)
Pcredit	0.0808***
	(10.55)
HHI*f*	-1.396*
	(-2.14)
_cons	-42.90***
	(-7.27)
Number of countries	158
R^2	0.701

t statistics in parentheses

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Mobile Broadband Model: Fixed-effects GLS

	Pf
NBP	7.435***
	(3.60)
GDP per capita	0.00193***
	(8.44)
Urbanization	0.307
	(0.23)
Regulator	-3.923
	(-0.57)
Pcredit	0.458***
	(3.86)
HHI*m*	-26.49*
	(-2.00)
_cons	-48.55
	(-0.62)
Number of countries	164
R^2	0.297

t statistics in parentheses

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

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