

REPORT FOR THE BROADBAND COMMISSION

# BROADBAND POLICY BRIEFING PAPER

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# 1 Introduction

This document is a briefing paper on broadband policy measures and recommendations to support the deployment of broadband and access to the digital economy. The paper highlights what governments and national regulatory authorities (NRAs) can do to foster broadband roll-out and take-up, and provides a difficulty/impact assessment framework of the measures considered. The paper reflects an international perspective, based on Analysys Mason's experiences from a wide range of developed and developing countries.

However, it is clear that each country has its own specificities and legacy situation which are likely to justify different priorities and approach. Therefore, this document does not aim to recommend a "one-size-fits-all" approach, but rather highlights the different tools that could be considered to foster broadband development.

The remainder of this document is laid out as follows:

- Section 2 provides an overview of the methodology we have used to analyse the commercial viability of broadband roll-out in the absence of any intervention, using a range of technologies.
- Section 3 provides an overview of the main types of policy that governments and NRAs can adopt to promote the development of broadband
- Section 4 presents in detail the different policy measures, including specific examples that have been implemented or included in national broadband plans
- Section 5 provides an impact assessment of these policy measures by providing an example of an assessment undertaken in an Eastern European country.

## 2 Broadband commercial viability analysis

It is now widely recognised that broadband is an essential pillar of a successful economy, and that the widespread availability and use of broadband has both economic and social benefits. As economies become increasingly reliant on digital networks, governments are therefore now looking to promote next-generation broadband networks.

Governments are implementing national broadband plans that define specific goals and the different policy instruments required to reach them. Indeed, governments have a large pool of policy options that they can use to support the development of high-speed broadband. The objectives set out in these plans typically address two areas: coverage and take-up.

In most countries, reaching ubiquitous or near-ubiquitous coverage of high-speed broadband is likely to require public funding, as the high costs of rolling out broadband infrastructure reduce the economic viability of high-speed broadband in areas of low population density.

Based on an existing methodology, which has been refined over decades of experience in the telecoms industry, Analysys Mason recently carried out research to explore the commercial viability of broadband coverage, defined as the maximum household/population coverage that could be achieved<sup>1</sup> economically (profitably) for each broadband technology (i.e. excluding public intervention or public funds) in several countries. The costs of deploying and operating a broadband network for each technology are a function of population density in a given area. As a general rule, the lower the population density, the higher the cost per person or household.<sup>2</sup>

The commercial viability of high-speed broadband technologies is assessed at a local level. At this level, we estimate whether or not a technology is viable by calculating the net present value (NPV) of a roll-out in this area over a specific period. The NPV is calculated on the basis of:

- capex required for high-speed network roll-out in that area
- annual revenue, based on the number of subscribers taking up the high-speed broadband service (which depends on a number of factors)
- annual operating costs (opex) to account for network operations and maintenance, as well as commercial operations
- annual cashflows (revenue less opex and capex), discounted at a specific annual rate to account for the operator's expected return on capital invested.

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<sup>1</sup> We define broadband coverage of an area to be commercially viable if the net present value (NPV) of this area is positive.

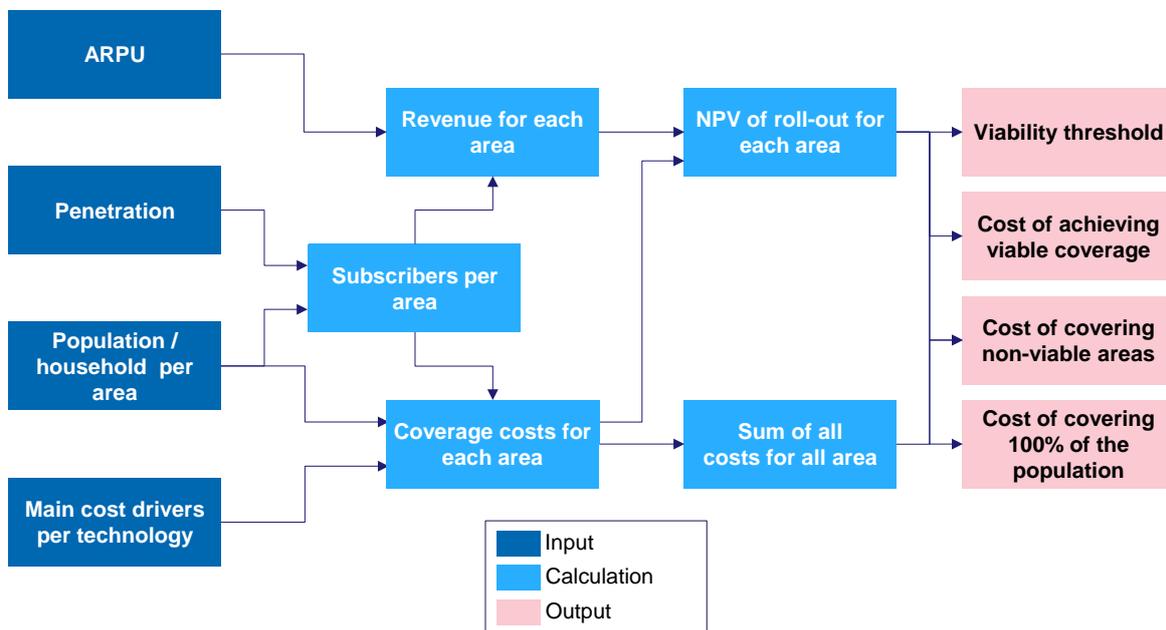
<sup>2</sup> This may not always be true. For instance, in the case of wireless technologies, in areas of very high population density it is necessary to increase the capacity of the network to satisfy the increasing demand for bandwidth. Thus, it may be more expensive to cover the higher-density areas than those areas with lower densities. However, outside very densely populated areas, the rule applies.

The NPV is the sum of the discounted cashflows over the specific period, to which a terminal value is added calculated using the perpetuity methodology.<sup>3</sup>

Therefore, the NPV includes all the costs and revenue that will stem from the deployment of a high-speed broadband network in the area. If the NPV is positive for a given high-speed technology, this means that the roll-out is commercially viable and operators can be expected to deploy this technology in the local area. The commercial viability of coverage at the national level is then calculated by replicating this analysis for all areas in the country.

The overall approach adopted for this analysis (for each broadband technology modelled) is illustrated in Figure 2.1 below.

Figure 2.1: High-level methodology used in the supply model [Source: Analysys Mason, 2015]



As illustrated in Figure 2.2, the incremental costs for fibre to the home (FTTH) and fibre to the cabinet (FTTC) increase quickly once household/population coverage exceeds a certain threshold (in this case 40–50%), resulting in a negative net present value (NPV) beyond such levels. Conversely, long-term evolution (LTE) maintains a positive NPV even with household/population coverage of more than 90% in this case.

<sup>3</sup>

The terminal value (TV) is included as telecoms networks hold a value beyond the ten-year period that we modelled here.

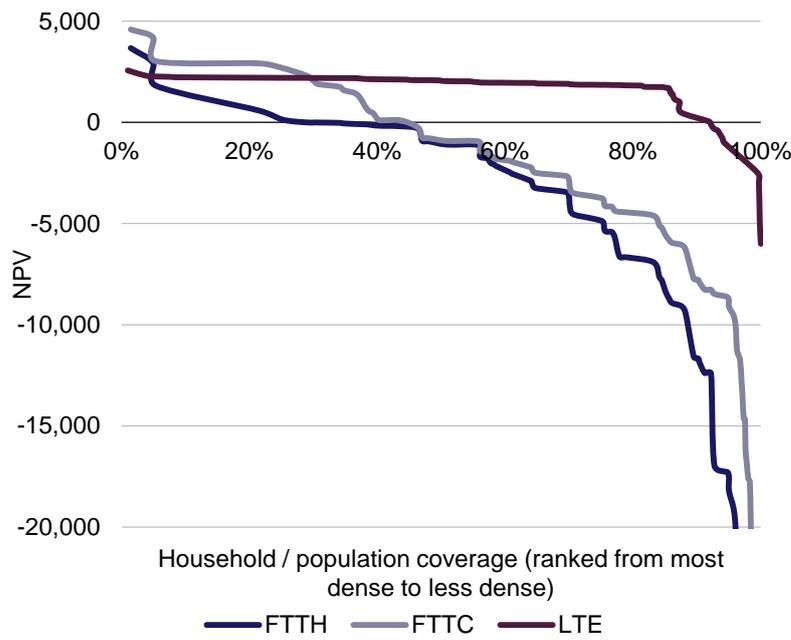


Figure 2.2: An illustrative example of commercial viability assessment when developing national broadband strategy [Source: Analysys Mason, 2015]

According to this commercial viability assessment, the deployment profile and commercial viability of broadband technologies differs greatly as roll-out extends from the early stages of deployment (most often in densely populated areas) towards near-ubiquitous coverage (most often in areas of low population density).

The results of some of our analyses of commercial viability as a percentage of household/population are provided in the figures below.<sup>4</sup> The results illustrated in these figures are based on analyses undertaken for the European Commission (EC), the European Investment Bank (EIB) and the Agency for Electronic Communications (AEC) in 2013, 2011 and 2015 respectively.

<sup>4</sup>

Results are based on previous public reports from Analysys Mason, including: "Evaluation of the market, business and financial aspects for the development of broadband access for FEMIP countries" for the European Investment Bank; "Project Madrid" for the Agency for Electronic Communications; and "The Socio-Economic impact of bandwidth" for the European Commission.

Figure 2.3: Commercially viable coverage of FTTH in different countries [Source: Analysys Mason, 2015]

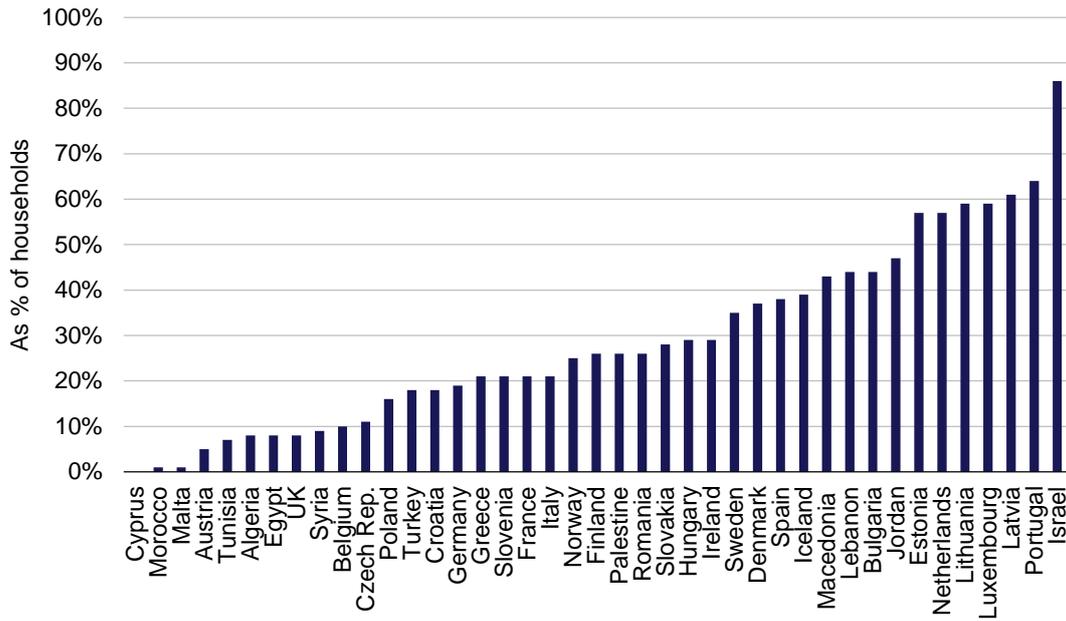


Figure 2.4: Commercially viable coverage of FTTC in different countries [Source: Analysys Mason, 2015]

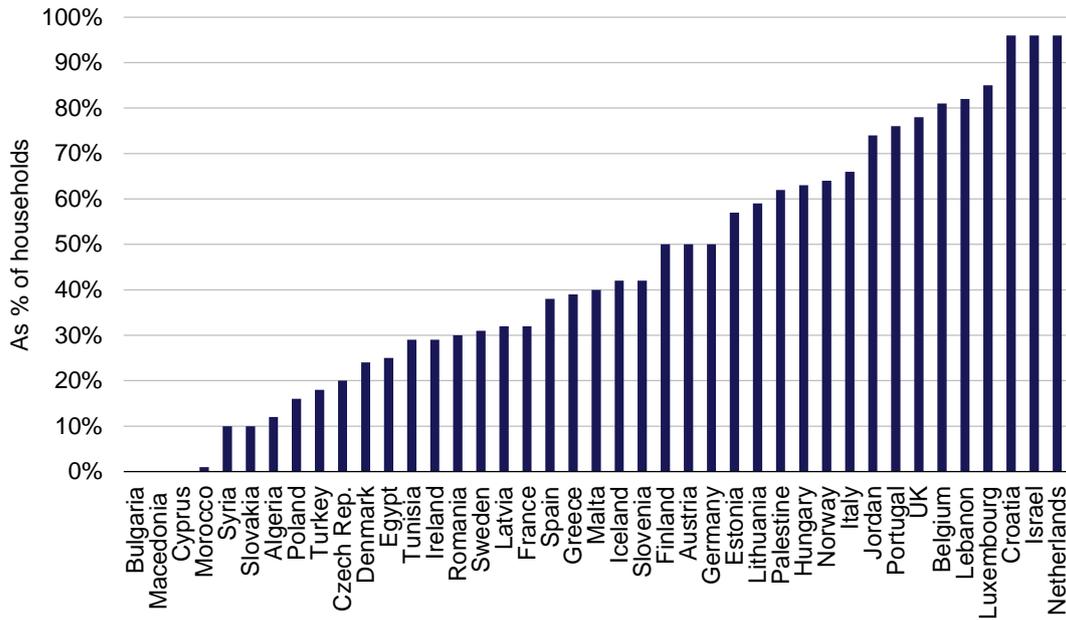
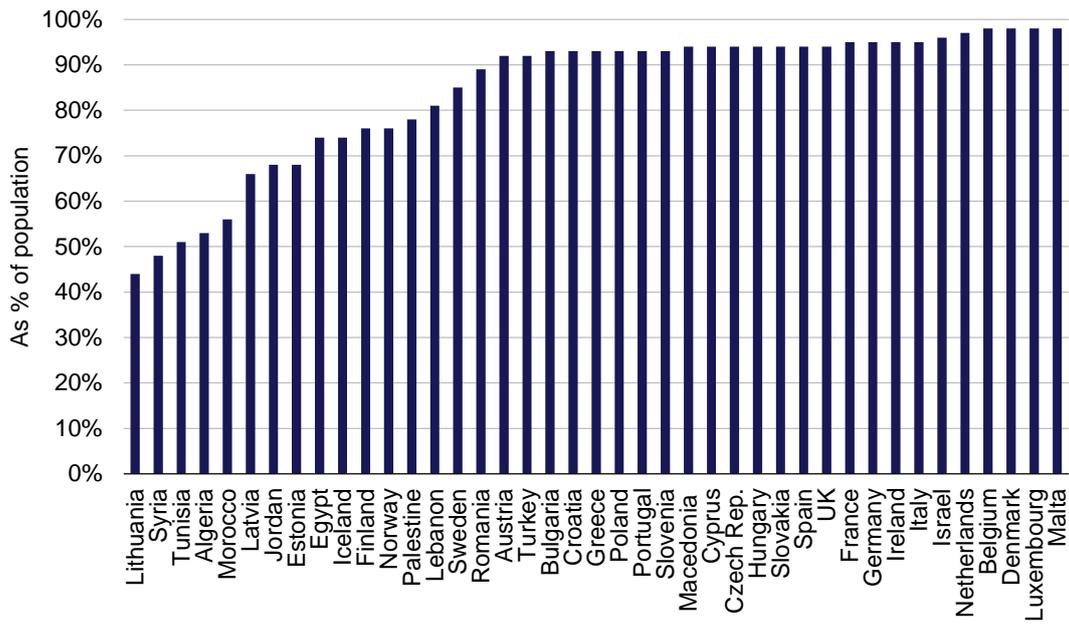


Figure 2.5: Commercially viable coverage of LTE in different countries [Source: Analysys Mason, 2015]

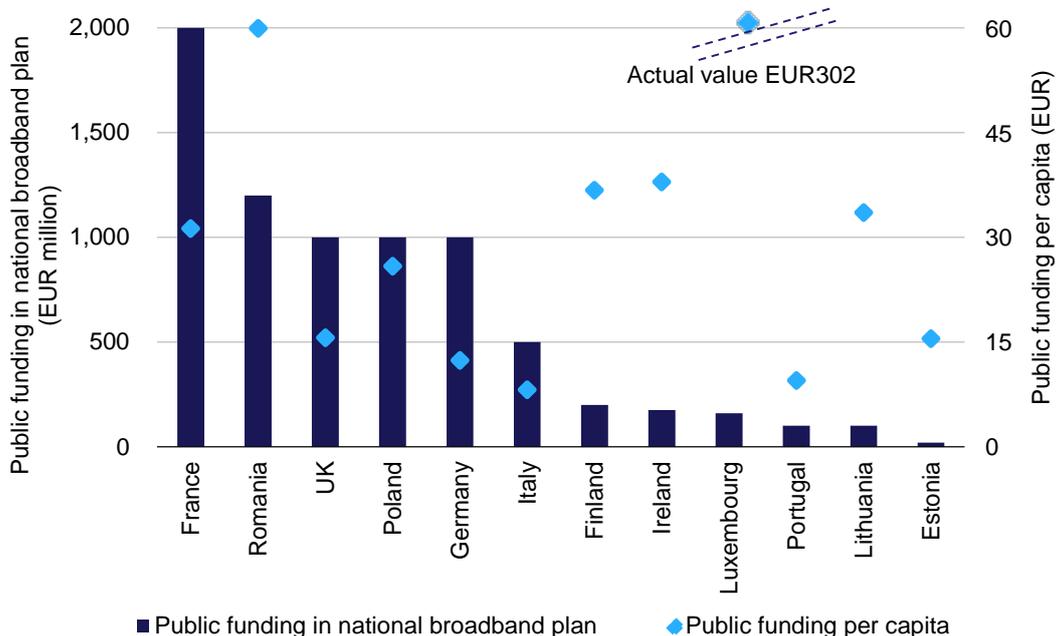


### 3 Overview of the main types of policy

In most countries, reaching ubiquitous or near-ubiquitous coverage of high-speed broadband is likely to require public funding, as the high costs of rolling out broadband infrastructure threaten the economic viability of high-speed broadband in low-density areas. For example, the EU has set aside a budget to accelerate the roll-out of broadband networks in low-density areas across the Member States. In addition, many governments have set funds aside to support network roll-outs in low-density areas.

Figure 3.1 below shows the level of public funding for the roll-out of broadband announced in some European countries. National funding is mostly distributed between EUR10 and EUR40 per capita, with larger European countries planning to spend EUR1 billion or more on high-speed broadband roll-outs. It should be noted that public funding at other levels (e.g. from local/regional authorities) is also likely to be available in most of these countries, and that EU countries which are not included here might also have some form of public funding for broadband (although this was not explicitly mentioned in their national broadband plan).

Figure 3.1: Public funding for network roll-outs as set out in national broadband plans [Source: National broadband plans, Analysys Mason, 2014]



Besides public funding, various policy options have been identified by governments, which can be classified under three main headings, as presented in Figure 3.2:

- **general measures** aimed at improving the overarching regulatory and policy framework
- measures to develop the **supply side** – i.e. measures aimed at increasing the availability of broadband to end users

- measures to develop the **demand side** – i.e. measures aimed at increasing citizens’ interest in broadband services and fostering take-up.

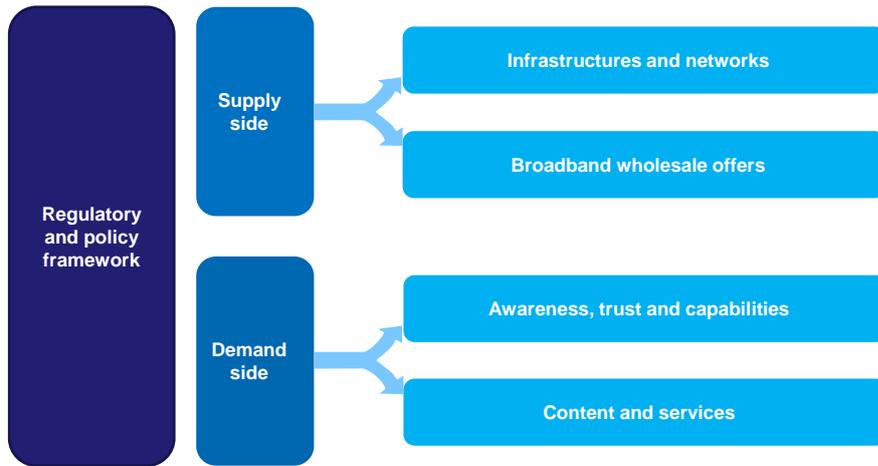


Figure 3.2: Main types of policy to promote the demand for and supply of broadband networks [Source: Analysys Mason, 2015]

These different types of policy vary in terms of their impact on broadband development, as shown in Figure 3.3.

Figure 3.3: Impact of different types of policy [Source: Analysys Mason, 2015]

Area	Potential impact	Policy type			
		Infrastructures and networks (supply)	Broadband wholesale offers (supply)	Awareness, trust and usage capabilities (demand)	Content and services (demand)
Coverage	Increased coverage	✓	-	-	-
Take-up	Quality of service improvement	✓	✓	-	-
Take-up	Price reduction	✓	✓	-	-
Take-up	Higher penetration	✓	✓	✓	✓
Take-up	Usage stimulation	-	-	✓	✓

## 4 Policy measures to promote the development of broadband

As mentioned in the previous section, the various policy measures can be classified under three main categories:

- general measures, which are discussed in Section 4.1
- supply-side measures, which are discussed in Section 4.2
- demand-side measures, which are discussed in Section 4.3.

### 4.1 Regulatory and policy framework

A first, generic step in the promotion of broadband in a country is to ensure that a clear regulatory and policy framework is put in place. This helps policymakers and legislators to:

- articulate their targets and key priority areas
- identify sectors where public actions are needed, and set aside public funding if required
- provide stakeholders in the ICT sector with a clear, long-term plan, and a stable and foreseeable legal and operational environment, which is key to attracting investors.

In particular, governments/public authorities should aim to create a more favourable environment for broadband development by focusing on:

- streamlining administrative processes and facilitating interactions between operators and public authorities, for example by
  - defining a national, unique process to allow deployment of networks on publicly owned infrastructure (right of way)
  - reducing or suppressing fees for the use of public property
  - simplifying the process for launching a new operator
- ensuring that the telecoms market remain competitive, as a healthy competitive market will drive prices down and improve the quality of service, to the ultimate benefit of consumers
- guaranteeing enough powers and independence for the regulator – it is important that the regulator is able to take the necessary decisions within the legislative framework, that it is in a position to enforce these decisions, that it can arbitrate disputes between operators, and that it is able to function quickly enough to be efficient
- avoiding restrictions on issues such as VoIP, innovation and access, so that end users and companies can continue to benefit from the positive effects of net neutrality.

## 4.2 Supply side

This section presents examples of supply-side measures that can be taken to promote the supply of broadband networks and services, and high-speed broadband in particular. Regulators may need to work closely with operators and other policy-makers to ensure that coverage obligations or infrastructure-sharing requirements are fully understood, and that adequate follow-up and enforcement mechanisms are available.

### 4.2.1 Infrastructure and networks

*Sharing of telecoms infrastructure* Measures to promote the sharing of existing telecoms infrastructure among players that would benefit operators through a reduction in roll-out costs typically include:

- Compiling a civil infrastructure register with an index of the location and characteristics of all the infrastructure components of existing communications networks that are suitable for pooling. This facilitates infrastructure sharing (e.g. Germany, Croatia, Albania)
- Mandating the incumbent to provide duct-and-pole access to reduce roll-out costs for alternative operators (e.g. UK, Slovenia).

*Co-deployment and co-investment* Measures to enable co-ordination and joint investment in the roll-out of communications networks by telecoms operators, possibly in conjunction with utilities/promoters, typically include:

- Promoting the joint construction of electronic communications networks during the construction of other infrastructure, such as water supply or sewage systems (e.g. Slovenia, Croatia)
- Mandating operators that plan to deploy new communications infrastructure to offer the possibility of joint investment to other communications operators (e.g. France).
- Imposing an obligation to set up electronic communication networks in all new dwelling developments (e.g. UK)
- Allowing the development of public–private partnerships for the roll-out of communications networks, especially in areas with lower profitability (e.g. Spain, Slovenia, Albania)
- Providing financial support to upgrade the data transport infrastructure (backbone) in rural and isolated areas where economic space for operators is insufficient (e.g. UK, Germany, Slovenia)

- Implementing a comprehensive public portal with information on the topics of planning, funding and overall business models for broadband Internet, to assist non-specialist stakeholders (such as local authorities) to invest in broadband deployments (e.g. Germany, France).

*Access to non-telecoms infrastructure*

Measures can be introduced to allow operators to use non-telecoms civil infrastructure in the deployment of communications networks. These include giving the NRA legal powers to mandate access to infrastructures (e.g. duct, poles) owned by entities outside the telecoms sector (e.g. public domain, utility sector, railways) (e.g. UK, France, Germany, Romania, Slovenia).

*Spectrum assignment*

Actions to define a clear and efficient spectrum policy to encourage the development of mobile broadband typically include:

- Assigning the digital dividend spectrum (the 790–862MHz band) to high-speed broadband mobile communications (e.g. most European countries)
- Implementing spectrum refarming measures to allow more advanced technologies to use frequencies already assigned to existing technologies (e.g. Montenegro)
- Promoting full technological neutrality when assigning frequencies (e.g. Croatia, Albania).

*Spectrum trading*

NRAs can introduce a mechanism for the transfer of spectrum rights, to improve flexibility in the use of frequencies (e.g. Montenegro, UK).

*Coverage obligations*

New spectrum licences can be designed in a way which will increase the availability of broadband networks and services at a national level. Measures typically include:

- Including coverage obligations in licences for spectrum in low-frequency bands (e.g. 800MHz, 700MHz), to extend broadband coverage to areas where it is not economically viable for operators to do so (e.g. Croatia, France, Germany)
- Ensuring that coverage obligations are monitored and enforced, and if necessary applying less stringent obligations to new entrants so that they are not prevented from operating profitably (e.g. UK)
- Implementing geographical regulation (where the requirements vary depending on the region), to adapt licence obligations to the competition conditions in specific areas of the market (e.g. Poland).
- Considering the relevance of imposing a universal service obligation,

requiring an operator to provide basic broadband. The economic cost of this could be met by a fixed contribution from different operators in case of unfair burden on the operator that is in charge of providing services (e.g. Finland, Spain, Sweden).

*Imposition of technical standards* Measures can be taken to eliminate uncertainty regarding the technical specifications for broadband roll-out projects, to help achieve economies of scale, improved quality, or access to new markets. These typically include:

- Defining standards for new housing developments to be built with a high-speed broadband connection (e.g. UK)
- Defining standards for deployment of new network elements to be shared by all operators, such as ducts or in-building fibre (e.g. France).

#### 4.2.2 Broadband wholesale offers

*Wholesale and retail markets* Measures can be introduced to promote competition to allow potential new operators to successfully enter the market. These typically include:

- Mandating access to the communications network of operators with significant market power (SMP) at various levels, both passive and active (unbundling of fibre and copper local loop, regional bitstream, national bitstream), to ensure alternative operators are able to choose what level of investment to make, and how much control they have over their network (e.g. most European countries).
- Mandating additional products to facilitate network deployment for competitors (e.g. dark-fibre products, leased lines, national transport links) (e.g. most European countries).
- Monitoring and enforcing regulatory obligations, and conducting regular and relevant analysis of markets, in order to adapt to changes in the competitive situation (e.g. most European countries).

### 4.3 Demand side

This section presents examples of measures that can be implemented on the demand side, to facilitate the use of broadband by the largest number of citizens possible and increase the amount and attractiveness of digital content and services in order to foster citizens' interest in ICT. In certain developing countries it may still be necessary to demonstrate the benefits of ICT services (e.g. gaining access to online services, providing remote diagnosis, news reporting or entertainment) to help create more demand for broadband take-up.

We have identified two categories of measure:

- measures aimed at facilitating the use of broadband by the largest number of citizens possible, by increasing
  - their awareness of the possibilities of ICT
  - their trust in ICT (security, transparency, protection)
  - their capability to actually use the new services
- measures aimed at increasing the amount and attractiveness of digital content and services, to foster citizens' interest in ICT.

### 4.3.1 Awareness, trust and capabilities

#### *Broadband mapping*

A publicly accessible mapping tool could be developed, displaying the availability and speed of retail broadband connections on a nationwide basis. This would enable citizens to see the current status of broadband services at a particular location, including the availability of basic or high-speed broadband, and facilitate the identification of areas where there are market gaps (e.g. Spain, France).

#### *Transparency and control*

Transparency requirements could be set up for operators, to enhance information, control and trust for end users in relation to broadband. Such measures typically include:

- Setting up transparency requirements for ISPs regarding the speed delivered at the point of sale (e.g. UK, Poland)
- Giving end users the ability to measure the parameters of the broadband service provided, to ensure they correspond to the offer (e.g. Poland)
- Mandating broadband contracts to be structured in a clear, understandable and accessible manner (e.g. Poland)
- Setting up legislation and procedures to define the rights of broadband subscribers, and facilitate the processing, handling and resolution of complaints against operators regarding contracts and service (e.g. Poland)
- Publishing an annual monitoring report detailing the measures already implemented, their impact on the ICT sector and the future steps and actions to be taken (e.g. Germany).

#### *Communication*

Marketing campaigns can be designed to encourage the widespread use of digital services. Measures that may be taken in this regard typically include:

- Conducting public campaigns to promote the digital economy and raise awareness of the benefits of using the Internet (e.g. Spain, Bulgaria, Poland)
- Informing users on the opportunities offered by digital television (e.g.

many European countries).

*Trust and security* Measures can be introduced to improve security for users of digital services and increase their confidence in these technologies. These typically include:

- Creating a commission on radio frequencies and health matters, to increase confidence in environmental safety and in the fact that the use of the radio spectrum will not affect public health (e.g. Spain)
- Developing services such as e-identification, signature devices and digital identity services to protect identity and respect privacy (e.g. Montenegro)
- Implementing laws to protect consumers and ensure the responsible handling, management, storage and control of personal data by any entity (e.g. Albania)
- Ensuring appropriate security in the field of electronic transactions (e.g. Spain)
- Adapting copyright laws to the digital sphere (e.g. UK, Croatia).

*E-inclusion and ICT literacy* Measures can be implemented to foster access to, and use of, ICT content and services by the vast majority of the population. These typically include:

- Increasing the usability and accessibility of services, in line with international web accessibility standards (e.g. Spain, Montenegro, Poland)
- Enabling access to groups with special needs, and ensuring that everyone has the opportunities, skills and knowledge to use online services; this could involve providing support for ICT training and education, both in schools and for adults (e.g. Spain)
- Setting up public information access points, for people who are disadvantaged, whether due to geography, weak economic conditions, a low level of digital skills, or limited infrastructure (e.g. Romania, Albania)
- Providing financial subsidies or social tariffs to citizens who could not otherwise afford to use communications services (e.g. Belgium).

#### 4.3.2 Content and services

*E-education* Measures to connect schools and universities and develop the use of ICT in the education sector by all stakeholders typically include:

- Providing ICT training for teachers (e.g. France)
- Creating new educational tools, content and services adapted to the digital world, for students, teachers and parents (e.g. France, Italy, Romania)
- Enabling access to public academic training offered online (e.g. France)

- Promoting the digitalisation of universities and schools, by providing ubiquitous high-speed Internet access and offering connectivity to students (e.g. Italy, Montenegro)
- Increasing the range of academic and professional qualifications available in the ICT sector, for example by defining new degrees and qualifications to adapt to the evolution of the digital economy (e.g. Spain, France)
- Introducing digital learning in the classroom, for example with digital interactive blackboards or tablets (e.g. Italy, Poland).

#### *E-administration*

Measures can be introduced to make the most important administrative services available online to the whole population, to streamline and simplify administrative processes. These typically include:

- Creating an online platform to provide access to the most heavily used public administration services, e.g. tax forms, payment of fines, applications for services, complaints, reports, social security (e.g. most European countries)
- Implementing progressive digitisation of administrative registers and processes, to shorten processes and reduce the paperwork (e.g. Albania)
- Setting up an aggregation platform for job offers and CVs from job seekers (e.g. France)
- Training civil servants (at both national, regional and local level) on the use of digital services (e.g. Poland).

#### *E-health*

Measures can be implemented to leverage the potential for providing online access to the health sector and encourage the use of new services. These typically include:

- Improving the coordination, quality and security of health care inside and outside hospitals, through the use of information systems which allow health professionals to access patient medical records from anywhere (e.g. France, Italy)
- Implementing the digitisation of health services and processes, such as: e-prescriptions, clinical reports with digital signatures, diffusion of electronic prescription cycles, online appointment booking, online payments, online medical reports and digital sickness certificates (e.g. Spain, Italy)
- Developing a public online portal to provide healthcare information and services (e.g. Montenegro)
- Connecting pharmacies to a regional or national health information system (e.g. Italy)
- Developing telemedicine services via videoconferencing (e.g. Romania).

*High-quality online content* The State can be involved in initiatives to develop high-quality and local online content, in order to attract a wide public audience. Measures typically include:

- Offering digital access to cultural content that is the responsibility of the State, for example through digitisation of national archives, virtual museum visits or online publishing (e.g. France, Poland, Italy)
- Providing financial support for the creation of digital content of high value, such as content in the national language, or audiovisual digital content (e.g. Albania, Spain)
- Defining quality standards for the broadcasting of programmes by public service broadcasters (e.g. most European countries)
- Adopting laws to protect intellectual property online and address the issue of online copyright infringement, to reduce the illegal downloading of Internet content (e.g. Croatia, UK).

*Support to the industry* Steps can be taken to support ICT businesses, as a way of stimulating the development of new and innovative services or products. Measures typically include:

- Providing funds and/or training for companies involved in the digital sector and for companies working on the creation, production and distribution of digital content (e.g. Romania)
- Creating ‘digital hubs’ to concentrate enterprises in the digital sector, to stimulate competitiveness and growth (e.g. France)
- Defining public priorities in the digital R&D domain, and providing financial support to related projects (e.g. France)
- Setting up a broadband centre of excellence, to deliver advice and information on broadband development, and make proposals on the implementation of measures (e.g. Germany)
- Supporting the establishment of ICT incubators to provide help and services to companies which are developing digital content and services for future commercial exploitation (e.g. France)
- Reducing the level of VAT imposed on products and services in the ICT sector (e.g. Albania).

*E-commerce* Measures to develop the use of e-commerce typically include:

- Defining standards and certifications for e-commerce (e.g. Spain)
- Adapting trade laws to the specific requirements of e-commerce (e.g. many European countries)
- Simplifying the administrative process involved in opening an online business (e.g. Spain).

*E-justice*

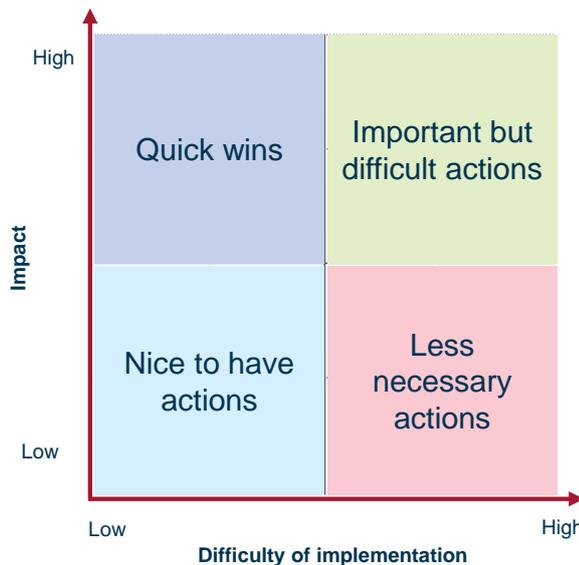
Measures to enable the judicial system to benefit from the use of ICT services typically include:

- Implementing legal guidance and information services online (e.g. Spain)
- Allowing citizens to pre-register minor complaints online (e.g. France)
- Implementing the digitisation of legal case files to reduce paperwork and simplify the exchange of information (e.g. Poland).

## 5 Impact assessment of policy measures

Governments and regulators clearly have a broad range of supply- and demand-side policy options that they can use to support the development of broadband – particularly high-speed broadband. It is important for governments to select the most relevant policies that reflect their own particular market situation and to assess each policy in terms of its potential impact and the difficulty of implementing it, as these factors can vary considerably by country.

Figure 5.1 illustrates how such an assessment might be presented. Typically, many regulators and governments could begin by implementing the ‘Quick wins’ in the immediate term before moving onto the ‘Important but difficult actions’, followed by the ‘Nice to have actions’ over the longer term. The ‘Less necessary actions’ may also be considered (as they have some impact), depending on the resources available, but the difficulty of implementation could mean they are unlikely to be addressed, depending on the market.



*Figure 5.1: High-level classification of suggested policies, based on impact on future market development and difficulty of implementation [Source: Analysys Mason, 2015]*

Below, we provide a summary of analysis we carried out for a specific Eastern European country, and summarise the logic we used to come up with a recommended set of policy measures.

### *Identification of relevant measures*

*Sharing of telecoms infrastructure* A large majority of European countries have taken measures to ease the sharing of telecoms infrastructure between operators.

In this context, we believed that a measure **stimulating operators to mutualise their mobile network infrastructure** (active as well as passive) would be relevant. This would typically be done in low-density areas. It could allow operators to achieve cost savings, and therefore have a positive impact on LTE coverage. Implementation can be relatively complex between operators,

especially for active sharing, but there are several examples of MNOs which have set up network-sharing arrangements in Europe.

*Co-deployment and co-investment* This category spans a large spectrum of measures that have been taken at a national level in several European countries. In the country which we analysed, we did not recommend a measure related to co-deployment and co-investment, as:

- We were not aware of alternative operators in the country concerned who were willing to deploy FTTH networks alongside the incumbent operator
- Measures involving public financial subsidies for roll-outs required “political” decisions that we were not in a position to comment on
- Measures mandating the roll-out of fibre when constructing new premises or other infrastructure are difficult to assess without detailed geographical information.

*Access to non-telecoms infrastructure* Around half of European countries have taken measures to allow operators to use non-telecoms civil infrastructure (e.g. duct, poles owned by entities such as public domain, utility sector, railways) for the deployment of communications networks.

For the country we analysed, we considered a measure **allowing operators to re-use ducts and poles owned by non-telecoms entities**. This could have a strong impact on the cost of FTTH deployments (as digging to install fibre represents a large part of the roll-out costs), and thus could improve the commercial viability and ultimately the coverage of FTTH networks in the country.

*Spectrum assignment* Several spectrum bands for mobile broadband have already been allocated in most European countries. In addition to the bands already assigned to mobile operators in the country we studied, there is another band which would be suitable for LTE and has also been designated as an LTE spectrum band in most European countries.

We considered the impact of **assigning additional spectrum to mobile operators**. This measure would affect the LTE deployment costs.

*Spectrum trading* Around a third of European countries give mobile operators the option of transferring spectrum rights to improve flexibility and rationality in the use of frequencies.

The spectrum available in the country in question is largely sufficient to meet the needs of the three operators, both now and in the foreseeable future. Therefore we did not consider this measure in our analysis, as we

believed it would not have a significant impact on the supply of high-speed mobile broadband networks in the country.

*Coverage obligations*

Coverage obligations are a measure which is typically implemented in relation to LTE spectrum awards, to ensure that the highest possible share of the population can benefit from high-speed mobile broadband. As regards fixed broadband, some countries have considered including it in the universal service obligation (USO). However, such an obligation is typically limited to *basic* broadband services, as extending such a measure to high-speed fixed broadband networks would lead to operators incurring very high costs. For this reason, we did not consider a measure that would impose a coverage obligation for high-speed fixed broadband.

However, we chose to include a measure **imposing a near-100% coverage obligation for LTE** in the country. This measure did not appear overly costly due to the existing footprint of other mobile technologies, and it could have a direct impact on the availability of high-speed mobile broadband in the country.

*Imposition of technical standards*

Some European countries have taken measures to ease the roll-out of fibre networks by defining common technical standards (network topology, technology) to be used by players.

Given the limited size of the market, it was difficult to consider that the country in question could lead the definition of new technical standards. The main operators belong to international groups and/or are well aware of international standards and best practice. There was therefore no particular reason to believe that the operators needed any guidance on their technical strategy at this stage.

*Wholesale and retail markets*

All European countries have taken measures to promote competition and new entry in the broadband or high-speed broadband market by mandating access to incumbents' infrastructure, as competition is a key driver of innovation, investment and services take-up.

In the context of our analysis, we chose to include a measure **mandating access to high-speed fixed broadband networks at sustainable prices**. This measure:

- is likely to have a strong impact on the market
- can be effectively implemented by the regulator.

*Broadband mapping*

Some European countries have designed a publicly accessible mapping tool to display the availability and speed of retail broadband connections on a national scale.

Although initiatives of this kind are likely to reinforce awareness among the population (e.g. by allowing people to find out whether they are eligible for high-speed broadband services), we believe they would not have a major impact on overall demand for broadband, and so have not included them in our analysis.

*Transparency and control*

A few European countries have set up transparency requirements for stakeholders to enhance information control in relation to broadband service (typically regarding the nature and quality of the service available to end users, as well as contractual rights and obligations of clients).

Such measures appeared interesting in terms of end-user protection, but we believed they could be addressed in the more general context of consumer protection law, and would not have a major impact on the general public demand for broadband or high-speed broadband access. We therefore excluded them from our analysis.

*Communication*

Many European countries have designed marketing campaigns to encourage the widespread use of digital services.

Considering that more than 30% of the population of the country studied had never used the Internet as of 2014, communication measures could increase the overall demand for broadband and high-speed broadband services. Our analysis therefore included a measure to **undertake public campaigns to promote the digital economy and raise awareness of the benefits arising from the use of the Internet.**

*Trust and security*

Some European countries have tried to improve security in the use of digital services and increase confidence in these technologies. Such measures are likely to have a direct or indirect impact on the demand for broadband service. However, their impact on broadband development is hard to quantify. Therefore we did not include a measure of this type in our analysis.

*E-inclusion and ICT literacy*

A large number of European countries have taken measures to foster access to and use of ICT content and services by the majority of the population. These measures are very relevant to the demand for broadband and high-speed broadband services, as

- they can increase the share of the population which has used and is able to use the Internet (demand for broadband)
- stimulate the skills of people so that they use a larger array of services online and recognise the value of high-speed broadband.

We therefore included three measures in our analysis:

- **ensuring everyone has the opportunities, skills and knowledge to use online services** (e.g. support for ICT training and education, both in schools and for adults)
- **setting up public access points providing information on the use of digital services, for people who are disadvantaged (whether due to geography, weak economic conditions, a low level of digital skills, or limited infrastructure)**
- **providing public subsidies or “social tariffs” to the low-income population** (typically for fixed broadband access).

These are practical measures that can be taken by public authorities, and that can have an impact on public demand for broadband services.

*E-education,  
e-administration,  
e-health, e-justice*

A large proportion of European countries have implemented actions to favour the use of digital services in public-sector areas, such as administration, education, health or justice.

These kinds of measure are of interest to governments, e.g. because of their potential to deliver significant efficiency gains and cost savings. However, as well as being particularly difficult to quantify, analysis to isolate the impact on broadband or high-speed broadband (rather than Internet usage as a whole) can also be quite speculative. We therefore did not include any measures from these categories in our analysis.

*High-quality online  
content*

Some countries have taken actions to support the development of high-quality online content, to attract a wide public audience. Such measures appear relevant in stimulating demand for broadband services, as a way to access this content.

In the context of our analysis, we chose to include a measure **providing financial support for the creation of high-value digital content**, for example content in the national language, or audiovisual digital content. It would be practical to implement this measure using the legislative model adopted in most European countries; for example, through regulation of the public service broadcaster’s role in content creation. We believe that this measure could affect the demand for broadband and high-speed broadband services.

*Support to the  
industry*

Governments regularly take action to support ICT businesses, to stimulate the development of new and innovative services or products. The support may be financial, but it may also be related to ways of enhancing the digital ecosystem as a whole (e.g. simplifying the administrative burden on digital companies).

In the context of our analysis, we included a measure that would involve

**cutting VAT for products and services in the ICT sector.** Such a measure could be justified on the grounds that access to telecoms services represents a ‘necessity’ for citizens, and would make broadband offers affordable to a larger part of the population, which would directly increase demand for broadband and high-speed broadband access services.

#### *E-commerce*

Although the development of e-commerce appears beneficial for businesses and the overall economy, few countries have taken steps to promote the use of e-commerce. As well as being particularly difficult to quantify, any attempt to isolate the impact on broadband or high-speed broadband (rather than Internet usage as a whole) can be quite speculative. Therefore we did not include measures of this type in our analysis.

#### *Impact assessment of the relevant measures identified*

Below we summarise the main measures that we identified, whose impact on the development of the broadband market and high-speed broadband market we assessed:

- M1: Mobile network **sharing**
- M2: **Access** to non-telecoms infrastructure
- M3: **Spectrum** assignment
- M4: **Coverage** obligation
- M5: Mandating wholesale next-generation network (NGN) access at sustainable **price**
- M6: Measures to increase the number of Internet **users** such as public campaigns to promote the digital economy and support the creation of digital content of high value
- M7: Measures to increase the Internet **skills** of the population, such as ensuring that everyone has the opportunities, skills and knowledge to use online services and setting up public access points providing information on the use of digital services
- M8: Providing subsidies or **social tariffs** to low-income citizens
- M9: Cutting **VAT** for services in the ICT sector.

In Figure 5.2 below we present a framework for a high-level classification of our suggested main recommendations in terms of:

- likely impact on market development
- difficulty of implementation, in terms of cost, timescales, legal complexity or political implications, and likelihood of success.

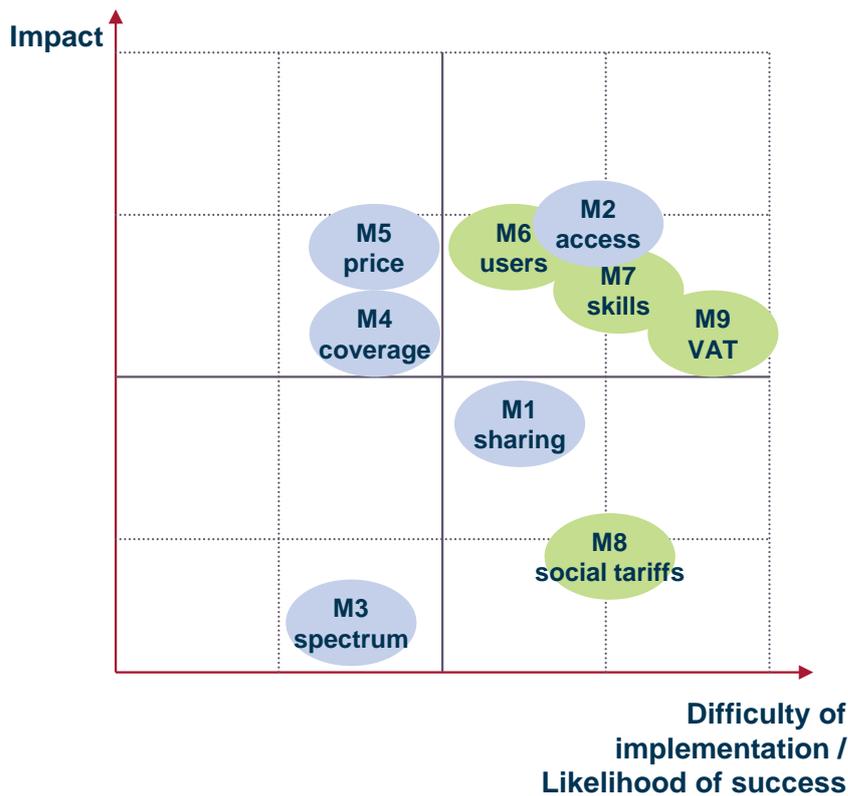


Figure 5.2:  
Classification of the suggested measures by impact on future market development and difficulty of implementation<sup>5</sup>  
[Source: Analysys Mason, 2015]

The impact of each measure in the country under study was assessed by identifying the different parameters that should be varied in our broadband market model<sup>6</sup> to estimate the likely impact of these measures on broadband take-up and coverage.

The classification shown above is aimed at defining intervention priorities, as discussed below.

*Recommendations with highest impact and lowest difficulty of implementation: quick wins with highest priority (“quick wins”)*

- **M5** (mandating wholesale NGN access at sustainable price): this measure should have a major impact on the take-up of high-speed broadband services, as it would give alternative operators the opportunity to compete with the incumbent operator, which had already deployed its own infrastructure. Therefore, this measure would stimulate competition in the high-speed broadband market. In addition, this measure was in line with the NRA’s objectives and work undertaken to mandate wholesale NGN access and could therefore be implemented in the short term.
- **M4** (coverage obligations): this measure would be easy to implement as it simply requires adding coverage obligations to the next spectrum award for mobile services. This measure

<sup>5</sup> Supply-side measures are displayed in blue and demand-side measures in green.

<sup>6</sup> The main broadband market model is designed to estimate the development of the broadband market in the country, both from the demand side (take-up and penetration) and the supply side (technology roll-out), in the absence of any specific intervention in the market.

might not have a sizeable impact on the take-up of high-speed broadband services, but it would ensure that the whole population was covered by at least one high-speed broadband network (i.e. it would reduce the digital divide).

*Recommendations with highest impact and highest difficulty of implementation: long-term actions with high priority (“important but difficult actions”)*

- **M2** (access to non-telecoms infrastructure): this measure could have a significant impact on the take-up of high-speed broadband services as it would reduce the costs of rolling out FTTP. However, this measure would be difficult to implement in practice as it needs some collaboration among – and goodwill from – players outside the telecoms sector. Considered as best practice, this measure has been implemented in many European countries and is also recommended by the EC.
- **M6** (measures increasing the number of Internet users): this measure would have a major impact on the take-up of high-speed broadband services, by educating people about the benefits of using the Internet (in general) and high-speed broadband (in particular). This could be achieved through marketing campaigns; although it might take some time to achieve results, it is important for the long-term evolution of the market.
- **M7** (measures increasing the Internet skills of the population): this measure would also have a major impact on the take-up of high-speed broadband services. This could be achieved through the provision of training in schools and for the elderly. It might take some time to achieve results, but it is an important measure for the long-term evolution of the market.
- **M9** (cutting VAT for services in the ICT sector): this measure would also have a positive impact on the take-up of high-speed broadband services. However, it can be complex to implement in practice; because it will affect the government’s revenues, the government may need to identify alternative sources of revenue to compensate for this reduction in income.

*Recommendations with lowest impact and lowest difficulty of implementation: quick wins with lower priority (“nice to have actions”)*

- **M3** (spectrum assignment): this measure should be fairly easy to implement, by designating additional spectrum bands to mobile services, in line with the EC’s objectives. Even if the impact of this measure might not be observed in the short to medium term due to the rather low levels of data traffic in the country under study, it may become important in the medium to long term, when the proliferation of smartphones and local content will drive traffic usage upwards.

*Recommendations with lowest impact and highest difficulty of implementation: long-term actions with lowest priority (“less necessary actions”)*

- **M1** (mobile network sharing): the impact of this measure was expected to be relatively modest, as mobile operators already have a mobile network covering more than 99% of the population and have been awarded lower frequencies (i.e. 800MHz) to roll out their LTE networks. This measure would lead to further cost reduction for operators (although this would not necessarily be passed on to end users). Furthermore, the implementation of such a measure is not straightforward and should typically be based on commercial agreements rather than regulatory obligations.
- **M8** (providing subsidies or social tariffs to low-income citizens): this measure was also expected to have a modest impact. Its implementation can be complex, and requires an identification of the entity (or entities) that should bear the cost of providing these social tariffs.