STRATEGIES FOR THE PROMOTION OF BROADBAND SERVICES AND INFRASTRUCTURE:
A CASE STUDY ON ROMANIA

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Strategies for the promotion of broadband services and infrastructure: a case study on Romania

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Preface

The past twenty years have been an extraordinary time for the development of information and communication technologies (ICTs) – with the 'mobile miracle' we have brought the benefits of ICTs within reach of virtually all the world's people. Through its technical standardization and spectrum management work, ITU has been at the forefront of technological change and is today committed to continue to drive positive change in the ICT sector and beyond. It is now time to make the next step, and to ensure that everyone – wherever they live, and whatever their circumstances – has access to the benefits of broadband. This is not just about delivering connectivity for connectivity's sake, or even about giving people access to the undoubted benefits of social communications. It is about leveraging the power of broadband technologies, and especially mobile technologies, to make the world a better place.

In 2010, ITU, in conjunction with UNESCO, launched the Broadband Commission for Digital Development to boost the importance of broadband on the international policy agenda and believes that expanding broadband access in every country is key to accelerating progress towards these goals by the target date of 2015. The Commission is co-chaired by President Paul Kagame of Rwanda and Carlos Slim Helú, President of the Carlos Slim Foundation. Some 60 Broadband Commissioners representing governments, industry, academia and international agencies contribute the benefit of their insights and experience to the Commission's work. At the Broadband Leadership Summit held in October 2011 in Geneva, the Broadband Commission recognized broadband as a critical modern infrastructure contributing to economic growth and set four clear, new targets for making broadband policy universal and for boosting affordability and broadband uptake. Innovative new models that promote competition, innovation and market growth are now needed to make the broadband opportunity reachable for all world citizens.

At ITU, the United Nations specialized agency for ICTs and telecommunications, we are committed to playing a leading role in the development of the digital economy through extending the benefits of advances in broadband and embracing the opportunities it unleashes. The three ITU sectors – Radiocommunication, Standardization and Development – are working together to meet these challenges and our collective success will be a key factor in ensuring the provision of equitable broadband access throughout the world. The ITU Broadband Reports represent one tangible contribution towards this commitment.

Dr Hamadoun I.Touré

Secretary-General, ITU

Foreword

Broadband has become a key priority of the 21st Century, and I believe its transformative power as an enabler for economic and social growth makes it an essential tool for empowering people, creating an environment that nurtures the technological and service innovation, and triggering positive change in business processes as well as in society as a whole. Increased adoption and use of broadband in the next decade and beyond will be driven by the extent to which broadband-supported services and applications are not only made available to, but are also relevant and affordable for consumers. And while the benefits of broadband-enabled future are manifest, the broadband revolution has raised up new issues and challenges.

In light of these developments, ITU launches a new series of ITU Broadband Reports. The first reports in the series launched in 2012 focus on cutting edge policy, regulatory and economic aspects of broadband. Other related areas and themes will be covered by subsequent reports including market analysis, broadband infrastructure and implementation, and broadband-enabled applications. In addition, a series of case studies will complement the resources already made available by ITU to all its many different types of readers, but especially to ICT regulators and policy-makers.

This new series of reports is important for a number of reasons. First of all, the reports will focus on topical issues of special interest for developed and developing countries alike. Secondly, the various reports build on ITU's recognized expertise in the area augmented by regular feedback from its Membership. Last but not least, this series is important because it provides a meaningful contribution to the work of the Broadband Commission for Digital Development. The findings of the ITU Broadband Reports will trace paths towards the timely achievement of the ambitious but achievable goals set recently by the Commission as well as provide concrete guidelines. As broadband is a field that's growing very fast, we need to constantly build knowledge for our economies and societies to thrive and evolve into the future.

For these reasons, I am proud to inaugurate this first series of the ITU Broadband Reports and look forward to furthering ITU's work on the dynamic and exciting broadband ecosystem.

Brahima Sanou

Director, ITU Telecommunication Development Bureau

1   Introduction

This case study aims to provide insights into efforts by the Government and the communications regulator to stimulate the development of broadband infrastructure and services in Romania. It covers the period 2007-2012 i.e., from the point of Romania's accession into the European Union (EU) on 1 January 2007 until today.

This case study has been developed in the context of the activities of the *ITU/UNESCO Broadband Commission for Digital Development*, with the cooperation of ITU's Regulatory and Environment Division to address the eight Millennium Development Goals (MDGs). It underlines the importance of broadband and ICTs in achieving the MDGs and therefore aims to assist countries in meeting the Broadband Challenge and Broadband Targets 2015 adopted by the *Broadband Commission for Digital Development* in October 2011. The Broadband Targets 2015 consist of a set of four targets for making broadband policy universal and for boosting affordability and broadband uptake:

- **Target 1: Making broadband policy universal**. By 2015, all countries should have a national broadband plan or strategy or include broadband in their Universal Access/Service Definitions;
- **Target 2: Making broadband affordable**. By 2015, entry-level broadband services should be made affordable in developing countries through adequate regulation and market forces (for example, amount to less than 5% of average monthly income);
- **Target 3: Connecting homes to broadband**. By 2015, 40% of households in developing countries should have Internet access;
- **Target 4: Getting people online**. By 2015, Internet user penetration should reach 60% worldwide, 50% in developing countries and 15% in Least Developed Countries (LDCs).

Romania provides an interesting case, particularly in relation to Targets 1 and 2, because, unlike most EU countries, ubiquitous availability of fixed infrastructure had not been achieved at the point of market liberalization in 2003 nor by the point of EU accession in 2007 and has still not been achieved today. The availability of fixed infrastructure provides a significant challenge to policy-makers in making available the benefits of new information and communication technologies (ICTs) to all Romanians. The key challenge in Romania is to ensure and promote the development of broadband infrastructure and services, particularly in more remote rural areas, where significant funding may be required to achieve the goal of ubiquitous access to broadband services. This is a challenge replicated in many ITU Member States.

To understand the particular challenges facing Romanian policy-makers, this study begins with an assessment of the market structure and the demographic and regulatory structure in Romania in 2007 (Chapter 2). It analyses the main regulatory initiatives (Chapter 3) and policy initiatives (Chapter 4) undertaken to stimulate the availability of broadband infrastructure and services. In Chapter 5, an assessment is made of the evolution of broadband penetration and, finally, in Chapter 6, the author presents his view of key learning points emerging from the Romanian experience.

2   Background – situation in 2007

At the point of its accession to the EU on 1 January 2007, Romania had a population of around 22 million inhabitants, living mostly in urban centres such as the capital Bucharest (around 2 million inhabitants) and other major cities, such as Cluj, Timisoara and Constanta. Nevertheless, in comparison with most other EU Member States, a greater proportion of the population is spread across the country with around 55% of inhabitants living in rural areas. With some 238,400 square kilometres, Romania is the ninth-largest country of the European Union by area, and had the seventh-largest population of the EU. Income levels in Romania were relatively low, with a Gross Domestic Product (GDP) per capita on a purchasing power parity basis of about 40% of the EU average (US$ 14,000 in Romania, compared with an average of US$ 33,700 for the EU). Income was also skewed to urban areas, with average income per household 36% higher than in rural areas.

The Romanian market structure in 2007 differed significantly from most other EU countries: fixed line penetration as a percentage of the population was around 20%, compared with an EU average of 53% (see Table 1), low by EU standards. The incumbent Romtelecom was also relatively late to launch DSL services in 2005. Partly as a consequence, alternative carriers entered the broadband market either using existing infrastructure (e.g. cable operators) or new infrastructure (e.g. fibre-based Internet Service Providers or ISPs – the so-called 'neighbourhood networks'). Mobile penetration in early 2007 far exceeded fixed penetration, although it was still lagging behind the EU experience. Finally, the TV subscription rate was relatively high: more Romanian households had access to cable infrastructure than to fixed telephony infrastructure in 2007.

Table 1: Penetration rate key telecommunications services Romania (September 2006)

	Cellular-penetration rate (population) - Sep 2006	
3	ITALY	133.0%
8	CZECH REPUBLIC	115.4%
	AVERAGE EU25	103.2%
20	HUNGARY	95.5%
21	POLAND	88.7%
27	ROMANIA	74.4%

	Broadband penetration rate (population) Sep 2006	
	AVERAGE EU25	15.7%
13	ITALY	13.6%
18	CZECH REPUBLIC	9.6%
21	HUNGARY	8.6%
23	ROMANIA	5.5%
24	POLAND	4.5%

	Fixed-penetration rate (population) - Sep 2006	
	AVERAGE EU25	52.6%
13	ITALY	48.4%
19	CZECH REPUBLIC	36.0%
20	HUNGARY	34.9%
22	POLAND	31.9%
27	ROMANIA	20.4%

	Subscription TV-penetration rate (HH) - 2005	
11	HUNGARY	64.0%
12	ROMANIA	63.5%
	AVERAGE EU25	55.1%
15	POLAND	53.3%
22	CZECH REPUBLIC	24.6%
23	ITALY	20.6%

Source: ANRCTI (now ANCOM).

The starting point for Romanian policy-makers in developing their national strategy for the development of broadband infrastructure and services was fairly challenging, defined by the following key characteristics:

- The penetration of fixed telephony infrastructure is relatively low overall, with existing infrastructure largely concentrated in cities and larger towns;
- Romania's large rural population lives in areas, which often offer challenging operational circumstances for fixed network roll-out;
- A large number of alternative cable networks offer prospects for infrastructure-based competition in urban centres, but again have only limited reach for rural communities;
- Mobile operators such as Orange, Vodafone and Cosmorom (now Cosmote) offer extensive coverage of mobile networks with fast-growing subscriber bases;
- A growing number of small, locally-based ISPs use their own infrastructure to provide high-speed symmetrical data and content services – again, mostly in urban areas
- Compared to the EU average, Romanian citizens have a relatively low purchasing power. concentrated in urban centres.

It is in the context of this above market structure that Romanian policy-makers have defined their targets and initiatives for the development of broadband infrastructure and competition in the country. The key players in this context are the Ministry of Communications and Information Society (or MCSI using its Romanian acronym) and the national regulator for the communications sector, ANCOM - National Authority for Management and Regulation in Communications (formed from a merger of the Inspectorate General for Communications and Information Technology (IGCTI) and the National Regulatory Authority for Communications and Information Technology (ANRCTI)). MCSI is responsible for setting goals and developing strategies for the telecommunication sector, while ANCOM is the independent regulator of the telecommunication sector, with the primary responsibility of developing competition in the sector. ANCOM's mission is to protect the interests of the communications users in Romania, by promoting competition in the communications market, ensuring the management of scarce resources, encouraging innovation and efficient investments in infrastructure.[1]

Romania transposed the EU Telecommunications Directives into national Law as part of its accession to the EU and, as of 1 January 2007, was bound to the EU Telecommunications Directives (the "Acquis"), including the Authorisation Directive, the Access Directive and the Universal Service Directive. In addition, as an EU country, Romania was bound by the ICT Agenda set out in the Lisbon Treaty, followed by the EU Digital Agenda for 2020. This latter document sets out the vision that:

 "Europe needs widely available and competitively-priced fast and ultra-fast internet access. The EU aims to bring basic broadband to all Europeans by 2013 and to ensure that, by 2020, (i) all Europeans have access to much higher internet speeds of above 30 Mbps and (ii) 50% or more of European households subscribe to internet access above 100 Mbps."

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[1] http://www.ancom.org.ro/en/missionvisionvalues_4494.

3 Activities to promote investment in telecommunication infrastructure

3.1 ANCOM's regulatory strategy 2007-2010

3.1.1 ANCOM's role

With regards to electronic communications, ANCOM has the following main competencies[2]:

- Issuance and updating of general authorisations for electronic communications;
- Ensuring the harmonisation of the numbering resources at European level, in accordance with the relevant EU norms and regulations;
- Elaborating the Romanian numbering and radio frequencies plan and administering the national numbering and radio frequencies resources;
- Issuance of licences for use of the numbering resources and for the use of the radio spectrum for the provision of electronic communications services;
- Issuance of licences, technical approvals assignment authorisations for radio emissions;
- Issuance of rules and regulations regarding the use of numbering resources and radio spectrum;
- Collection of authorisation, issuance and other administrative fees charged from electronic communications networks/services operators and providers;
- Keeps the record of the use and authorisations issued for numbering resources and radio spectrum in the national Register of radio frequencies;
- Establishing of the relevant markets for electronic communications and determining the major electronic communications services providers on the market and their special responsibilities according to relevant legal provisions;
- Controlling the activity of the electronic communications services providers and applying sanctions and penalties for infringements of the relevant legal provisions;
- Regulating networks interconnection, licensing and authorisation and environmental protection in relation to electronic communications activities; and
- Resolving the disputes arising between electronic communications services providers and operators for the purpose of ensuring competition on the relevant market and users' protection.

ANCOM has three responsibilities of direct relevance to the development and availability of broadband infrastructure:

1. As the regulator of the telecommunication sector, ANCOM is tasked with the development of efficient competition in the broadband sector, both for retail and wholesale services;
2. ANCOM has responsibility for Romania's compliance with the EU Universal Service Directive (2002/22/EC). While broadband services do not form part of the definition of universal service in the EU (neither in 2007 nor today), the availability of universal service infrastructure can provide a stepping stone for the provision of broadband services, depending on the technologies.

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[2] http://www.iclg.co.uk/index.php?area=4&country_results=1&kh_publications_id=158&chapters_id=4760

3. ANCOM is responsible for issuing mobile licences and for allocating spectrum that can be used for the provision of broadband services.

3.1.2 ANCOM's regulatory strategy

ANCOM's consultation document on the "regulatory strategy for the Romanian electronic communication sector for 2007- 2010" sets out some of the key principles and initiatives envisaged by ANCOM that are relevant to the development of the broadband sector in Romania.

In its Position Paper which was subject to consultation in the beginning of 2007, ANCOM conducts a detailed analysis of the various segments in the market including fixed telephony, broadband, mobile and TV services. Specifically in relation to the broadband segment, ANCOM notes that:

- Although the penetration rate of broadband Internet access services in Romania is among the lowest levels among the EU27, annual average growth rates exceed100%.
- Unlike most of the EU27 countries, DSL access was of only minor importance in Romania in 2006 (see Figure 1), mainly due to the relatively late commercial launch of DSL services in 2005 by the incumbent, Romtelecom.

Figure 1: Broadband services by technology - Romania (September 2006)
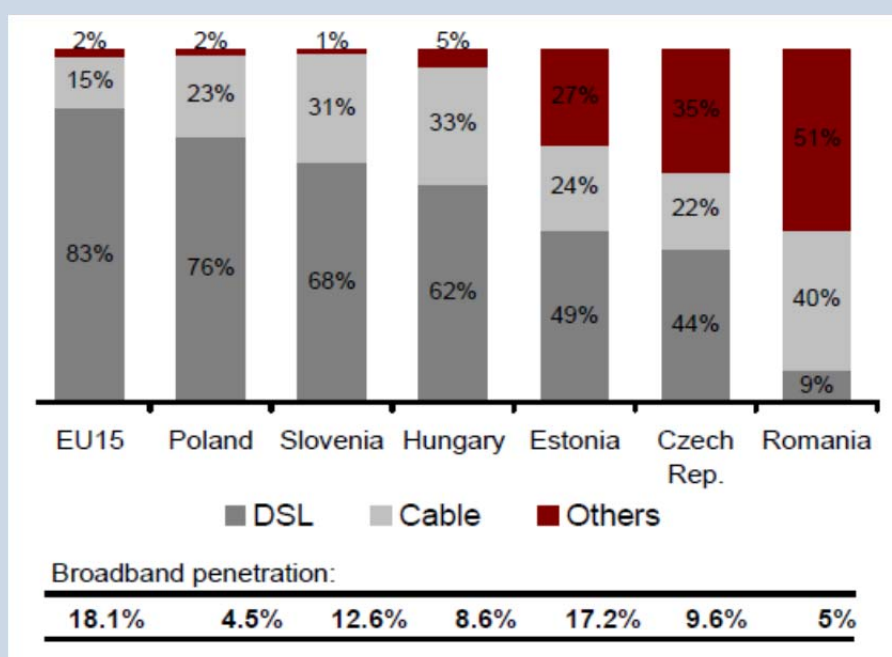
Source: ANCOM.

- The segment of dedicated Internet access connections was characterised by a large number of providers – 41% of users purchase their Internet services from 700 licensed operators, the vast majority of which are ISPs.

- The demand for broadband Internet access services would trigger an increase in the fixed penetration rate and would drive investment in the fixed electronic communications networks, whereas competition for attracting customers will be the driver of lower prices, higher quality, more diversified offers and additional value-added services.

ANCOM's market analysis revealed no major competition issues in the retail market for broadband services. However, in the corresponding wholesale markets, ANCOM noted that regulatory intervention was likely to be required to ensure the efficient provision of shared and full unbundled local loops and Bitstream services in particular. At the time of this Position Paper, unbundled local loops had not proved successful, with only 932 loops unbundled by July 2007 (unbundled local loops have not in fact proved successful subsequently, mainly due to the use of local neighbourhood networks).

ANCOM then identified a number of strategic objectives based on the identified deficiencies in the market:

- Create conditions for sustainable infrastructure-based competition while facilitating, when efficient, services-based competition;
- Promote the development of broadband Internet access services, in particular via multi-product platforms such as IP, and strive to reach the largest possible customer base;
- Create an environment where information on service availability, supply conditions and pricing is transparent, non-complex and available to all citizens;
- Avoid interference in the emergence of bundled services, as long as they do not adversely impact competition.

These objectives were applicable to all segments identified, including the broadband segment. ANCOM then identified a set of regulatory principles to define its anticipated activities in the various segments including: transparency, proportionality, opportunity, mandatory decisions (i.e. decisions that are binding on the service providers concerned), technological neutrality, predictability and necessity. For the broadband market, the application of these principles has resulted in recommendations to:

- Maintain the obligation to provide access to the local loop on the incumbent (taking account of technological evolution);
- Investigate the requirement of introducing Bitstream services; and
- Maintain obligations on the provision of ancillary services such as collocation.

In 2007, ANCOM then developed its forecast for the evolution of Romania's broadband segment, shown in Figure 2.

Figure 2: ANCOM forecast for broadband services (2007)
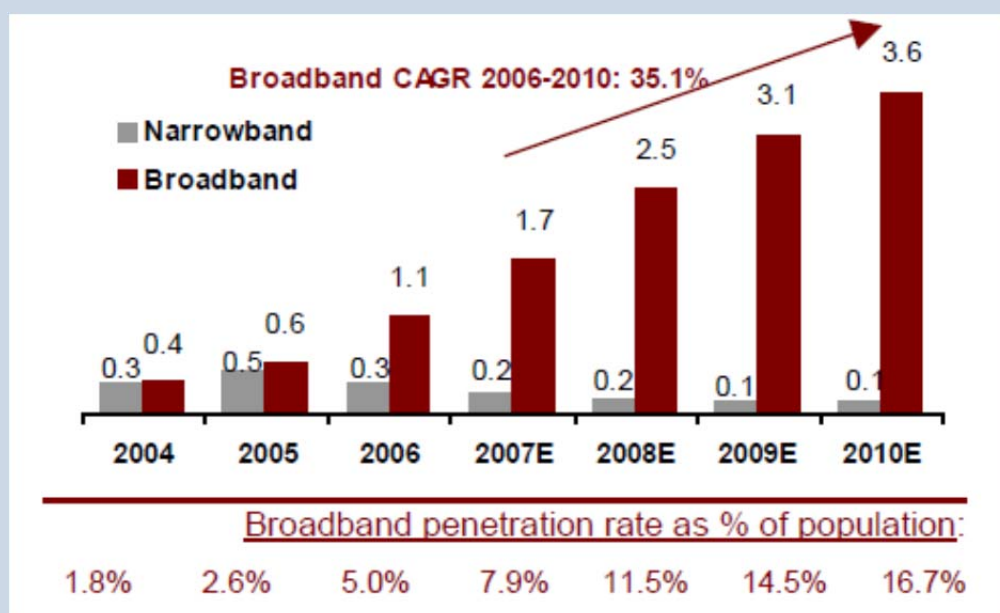
Source: ANCOM.

3.1.3 Assessment of ANCOM's defined strategy

The consultation process on ANCOM's Position Paper was a major milestone in the evolution of the Romanian communications market because, for the first time, the national regulator articulated a view on the evolution of the market, both past and future, and developed an associated regulatory strategy. This process not only provided clarity to the industry, but also helped manage expectations as to the anticipated degree and direction of regulatory intervention

On its assessment of the broadband market, ANCOM put most emphasis on the development of service competition through the development of existing (local loop) and new (Bitstream) access products. Its emphasis was therefore on optimising the use of existing legacy infrastructure, while taking account of technological evolution.

This is not unexpected, given the principles laid out in the EU Directives, but two observations need to be made in the context of this case study:

1. Access products like ULL and Bitstream are not likely to be successful in markets where alternative higher-speed infrastructure exists, as in Romania – i.e., neighbourhood networks routinely offer symmetrical broadband services with speeds up to 100 Mbps in competition with asymmetrical DSL services offering much lower upload and download speeds. Unbundled access is therefore still not successful in Romania today, with less than 1,000 local loops unbundled.

2. A focus on the development of service competition (as a supplement to infrastructure-based competition) is largely designed to enhance competition where infrastructure already exists, and has limited value for generating new investment in areas where infrastructure and services are lacking.

3.2   ANCOM's universal service strategy

3.2.1   Description of approach

When Romania signed up to the Acquis during its accession to the EU, some of the main challenges it faced in becoming fully compliant with the obligations of the Acquis lay in the obligations on universal service, as set out in Directive 2002/22/EC. In line with the Directive, universal service in Romania is defined as follows in the Telecommunications Act:

> "All reasonable requests for connection at a fixed location to the public telephone network and for access to publicly available telephone services at a fixed location are met by at least one undertaking. The connection provided shall be capable of allowing end-users to make and receive local, national and international telephone calls, facsimile communications and data communications, at data rates that are sufficient to permit functional Internet access, taking into account prevailing technologies used by the majority of subscribers and technological feasibility."

In most EU countries, the implementation of the Universal Service Directive involved a designation of (typically) the fixed incumbent as the universal service provider and, in the majority of cases, no funding of the net costs associated with such obligation is provided[3]. In Romania, this was not a reasonable option, given the low starting point of fixed telephony penetration and the correspondingly high investments needed to ensure full universal access.

During the period 2004-2008, ANCOM therefore launched its 'Telecentres' initiative alongside local governments and operators. Telecentres are small telecommunication outlets from which members of the public can gain access to telephone, facsimile and Internet services. Between 2004 and 2008, ANCOM held seven auctions in 633 localities in rural areas without access or only poor access to public telephony services and seven operators were designated universal service providers across all these localities.

The Romanian Government then set the goal of ensuring full compliance with the Universal Service Directive by 31 December 2012. To achieve this goal, and mindful of the market structure and its obligation to uphold technological neutrality, ANCOM developed a policy in which mobile technologies were also considered for the provision of universal service (at a fixed location) across the Romanian territory. ANCOM decided that so-called "homezone" products provided by mobile operators could be considered as access services at a fixed location with functionality and prices in line with the universal service definition. With mobile networks covering close to 100% of the Romanian territory, this approach neatly addressed the problem of the limited reach of fixed networks, although it presented other challenges, particularly in the area of providing functional access to the Internet.

In addition to the involvement of mobile networks, ANCOM developed a series of initiatives for funding customer premises with equipment for fixed devices connected via mobile network technology. These initiatives included the further development of infrastructure in more remote areas through partnerships with operators. This infrastructure investment was to be supported by a universal service fund administered by ANCOM using funds collected from the communications industry through a levy on net

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[3] Although this is generally true, Italy and France provide notable exceptions.

revenues. During the period 2004-2010, ANCOM spent around US$ 15.4 million on universal service subsidies, mostly on Telecentres.

3.2.2 Assessment of ANCOM's universal service strategy

Universal access to basic telecommunication services is essential to ensure equal opportunities in economic growth and the creation of jobs, as recognised by, among others, the Lisbon Agenda[4]. Romania's market structure always presented a challenge to Romania's policy-makers in ensuring full compliance with the Universal Service Directive, and the chosen approach (particularly the consideration of mobile technologies to provide fixed services) ensures that the most efficient and lowest-cost technologies are used. While broadband is not currently included in Romania's definition of universal service, but these efforts are highly relevant to this study, as universal service provides a stepping stone on infrastructure development for broadband services. Once full compliance is achieved, Romania will be in a stronger position to have universal access to broadband services as well, depending on the technologies used to provide these basic services.

3.3 Initiatives on spectrum use

3.3.1 Description of initiatives

One of the main means of providing additional coverage of broadband-enabled networks is the issuance of new licences and spectrum in relevant frequency bands for the provision of mobile services. In Romania, some key spectrum initiatives include:

- WiMAX – for example, Airspan Networks recently announced the completion of one of the largest IEEE 802.16e-2005 networks in Europe, with 1500 base-stations.
- Lower-frequency CDMA licences have been awarded – these are particularly cost-effective for the provision of coverage in remote areas
- Early liberalisation of 900 MHz and 1800 MHz use for 3G services has allowed rapid increase of mobile network coverage;
- Four 3G High-Speed Downlink Packet Access (HSDPA) licences have been awarded.

3.3.2 Assessment on spectrum initiatives

With limited fixed infrastructure, mobile technologies are an essential part of any strategy to stimulate the use and availability of broadband. In the opinion of the Author, Romania's licensing strategy should ensure a mix of spectrum is made available to provide high-speed broadband in higher frequency bands (mainly used to provide capacity in cities) and lower frequency spectrum to provide coverage and basic broadband services in rural areas.

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[4] Followed by the targets and strategy set out in the Digital Agenda for Europe (Europe 2020).

4 MCSI's strategy for the sector 2009-2015

4.1.1 Main elements of the strategy

In 2009, the Government issued Decision no. 444/2009 on the Government Strategy for the development of broadband electronic communications in Romania for the period 2009-2015. This strategy aimed to provide wide access to information technologies for the whole of society by creating conditions for developing a competitive market and to provide public support in disadvantaged areas, to promote Romania as an important region for e-business services and to encourage the development of relevant content for Romanian users.

The strategy addressed seven key areas of concern relating to broadband availability and use:

- Internet/broadband-related constraints:
  1. Low Personal Computer (PC) penetration;
  2. A number of areas with limited broadband access;
  3. Scarce and non-attractive broadband content (in Romanian);
  4. High broadband costs in rural areas; and
  5. Limited perception of the value of Internet adoption and use.
- Country constraints:
  6. Low levels of knowledge of Information Technologies in rural areas; and
  7. Reductions in IT expenses (in particular by SMEs) to facilitate productivity improvements.

These seven areas formed the starting point for the strategy document or Decision. This Decision is structured in 5 main sections:

Section 1: Defining the concept of broadband electronic communications and presenting the envisaged benefits of the development of broadband communication services

The MCSI strategy identified the major benefit associated with increased availability of broadband (defined as connectivity of 1 Mbps or above) as the inclusion of end-users, particularly in rural areas, within the Information and Knowledge Society. Digital inclusion itself brings benefits including economic growth in key sectors such as tourism and commerce, in particular for SMEs (Small- and Medium-sized Enterprises). MCSI emphasised the importance of the ICT sector through education (eLearning), access to goods and services, social and economic integration, efficiency improvements (e.g., teleworking, streamlining of administrative processes), and rural participation in the digital economy. MCSI estimated that 40-50% of growth in productivity in Romania over the previous ten years had been due to the ICT sector.

Section 2: Analysis of the current situation in Romania

The situation in Romania at the start of the MCSI strategy initiative showed low Internet and broadband penetration, but high growth from this low base (as already identified in the ANCOM strategy). The MCSI strategy defines various principles and goals to boost broadband penetration levels.

Section 3: Defining general principles and strategic goals

Based on its analysis of the market, MCSI identified the following general objectives of the strategy:

- Increasing broadband penetration of households to 40% in 2010 and 80% in 2015;

- Increasing access to electronic communications to 100% of the population by 2015.

MCSI identified a mix of supply and demand-related areas of activity that would allow these targets to be met, including:
- stimulating use of broadband services for SMEs;
- increasing penetration of electronic communications for disadvantaged areas; and
- improving supply of online services for government institutions and the business community (content and applications, consumer education etc.).

The main focus of MCSI was to ensure access to broadband from a fixed location, although connections could also be provided over mobile technologies. We have found no data on whether this strategy included any environmental or green policy angles.

Section 4: Drafting the action plan

The government then set up a working group[5] to monitor the implementation of projects related to the development of the broadband electronic communications infrastructure. The make-up of this working group reflected the need for co-ordination of efforts across the various government institutes that were involved in the strategy to ensure its success and to ensure efficient use of resources. After this working group was established, it developed and published incentives for local government authorities to support infrastructure projects, to pilot projects that implement new broadband technologies in areas with low penetration of ICT infrastructure, and to define specific needs for disadvantaged communities that can be met through ICT applications.

Section 5: Identifying all necessary measures and financing options

In its strategy, MCSI set out initiatives with an estimated funding requirement of $US 1.7 billion or EUR 1.25 billion, providing some insight into the ambition levels of the strategy. Since then, the following main initiatives have been deployed:

- **"Project for the development of broadband" (2011-2015)**: This project was set up to finance the building of broadband network infrastructure in areas of Romania where inhabitants are deprived of access to broadband services. This program covers 3,648 villages in Romania, with a combined population of around one million people. Funding estimates amount to around $US 112 million or EUR 84 million ($US 92 million from EU Funds and $US 20 million from the national budget). The project is under preparation, and a feasibility study is due to be completed later this year. Approval from the European Commission is likely to be obtained by the end of 2013, while tenders for the construction and operation of new networks will be completed in 2014-2015.

- **The "Knowledge-based economy"**: This is an extensive PPP program designed to ensure access to ICT and improve Digital Literacy in 'Knowledge-Disadvantaged Communities'. Its objectives

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[5] Comprising representatives of the Ministry of Communications and Information Society the Ministry of Education, Research and Innovation, the Ministry of National Defence, the Ministry of Public Finances, the Ministry of Economy, the Ministry of Small and Medium Enterprises, of Commerce and of the Business Environment, the Ministry of Transport and Infrastructure, the Ministry of Regional Development and Housing, the Ministry of Labour, Family and Social Protection, the Ministry of Agriculture, Forests and Rural Development, the Ministry of Health and the National Authority for Management and Regulation in Communications.

include offering access to modern ICTs and training citizens in using computers. This program has been deployed in 260 communities where town halls, public libraries and schools have been connected to broadband networks. In addition, 520 specialists have been deployed to provide training and support in making use of these new infrastructures and technologies.

- **The "Biblionet program" (2009-2014):** this program was launched to facilitate free access to information for Romanian citizens by fostering the development of a modern public library system. As part of this program, 795 public libraries were equipped with 3,318 computers with public access to broadband services.

4.1.2   Assessment of Romania's broadband strategy

Romania's broadband strategy provides a good example of the challenges facing policy-makers in countries where fixed network infrastructure is less developed. In such countries, The Romanian approach shows how these challenges can be addressed, i.e. by creating a broad government-led collaboration supported by the private sector through PPPs and funded through a mixture of public and private investment, including direct EU funding. The combination of strategic vision (articulated by the Government), operational knowledge (provided by the operators) and financial support (from the EU) provides a replicable model for policy-makers elsewhere.
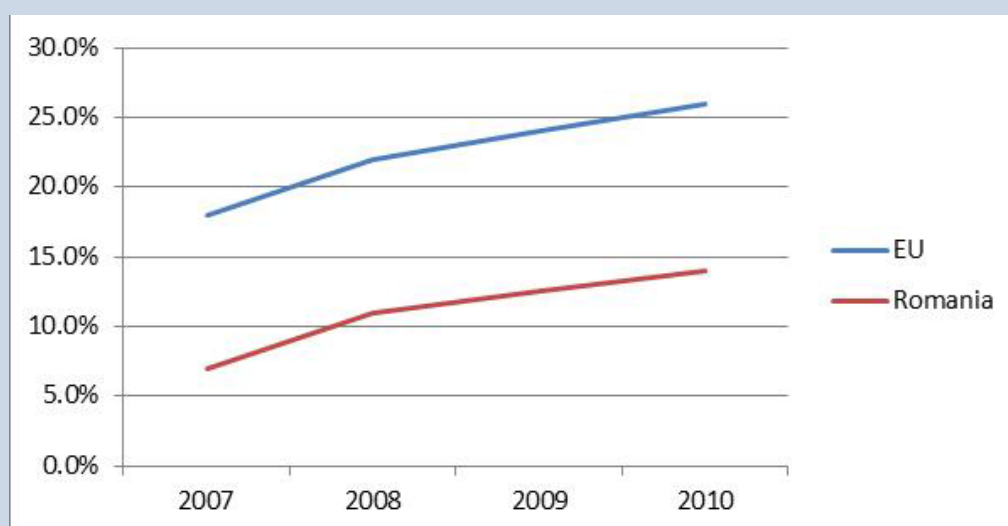
5   Evolution of the Romanian broadband market

5.1.1   Key Statistics

The Romanian fixed broadband market has continued to grow rapidly from a base of around 2 million connections in 2007 to 3 million in 2010 and around 3.1 million connections in mid-2011, an increase of around 50% over a period of three and a half years.

This is impressive growth; however, starting from a lower starting position, the relative gap with the EU has not changed, as can be seen in Figure 3. This is at least partly due to the financial crisis, which hit Romania particularly hard due to its reliance on international investments to support economic growth. At the same time, broadband markets in many EU countries are now maturing, with growth rates declining, which should make it easier for countries with lower penetration rates to start closing the gap.
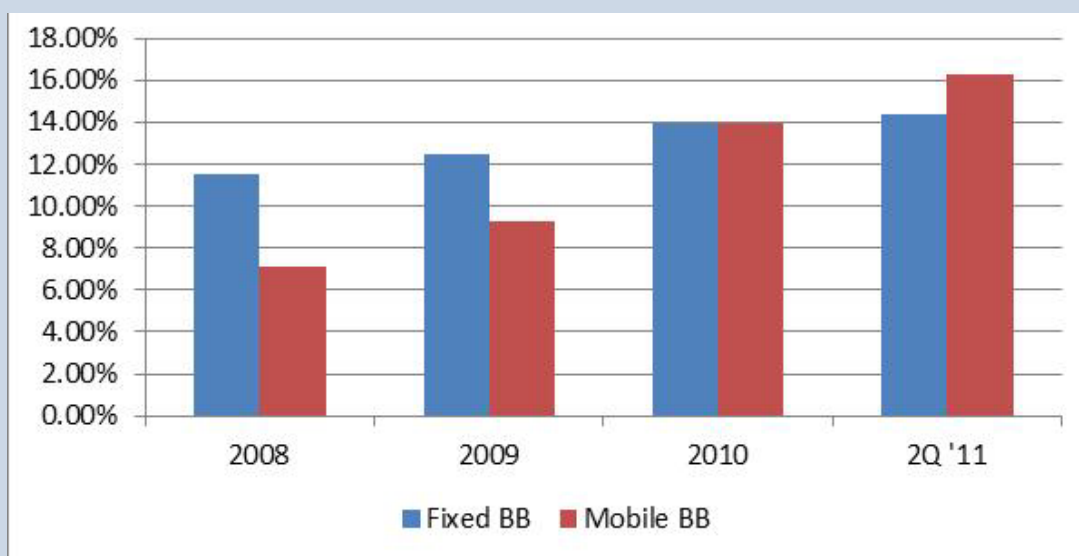
Figure 3: Romania vs. EU 27 broadband penetration rate per 100 capita

Source: Eurostat.

Figure 4 shows some of the key indicators for the Romanian market from 2008 to 2011. It is clear that in 2011, a relatively small proportion of the population had access to broadband Internet. The number of broadband users accessing services over mobile networks shows the highest growth (growth of around 130% between 2008 and 2Q 2011) and mobile has now overtaken fixed as a technology to access the Internet on a broadband-enabled device, demonstrating the importance of mobile technologies to bridge the digital divide in Romania.

Figure 4: Romania key broadband indicators - broadband[6] penetration rate per 100 capita

Source: ITU, Incyte Research

5.1.2   Meeting the Broadband Targets

Using a household figure of 7.3 million (source: National Institute of Statistics of Romania), the target set by MCSI of reaching 40% broadband penetration of households in 2010 appears to have been met. It is difficult to assess the extent to which the broadband strategy was responsible for this growth, because detailed data on the impact of the various initiatives are not readily publicly available. However, it would appear in the opinion of the Author that the positive initiatives by MCSI and the transparency on regulatory intervention provided by ANCOM has created a more beneficial investment climate for the market to flourish. The focus for broadband policy should now shift to achieving the more ambitious MCSI target of doubling the fixed broadband penetration rate to 80% by 2015. This may prove a difficult target to achieve, because as many as half of all households (around 50% in 2010) do not have access to personal computers, so broadband development may hit a ceiling unless demand-side stimulation is given more emphasis in broadband policies and action plans.

5.1.3   The Romanian broadband market today

Unlike most EU markets, where the incumbent dominates the provision of broadband services, the supply of broadband in Romania is much more diverse with a large number of cable operators (including RDS and UPC) and 'neighbourhood networks' providing services to consumers. Neighbourhood networks are a particularly interesting phenomenon - these are private enterprises which stepped into the market when demand for broadband services was nascent and the incumbent Romtelecom had not yet launched its

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[6] Mobile active prepaid and postpaid connections; technologies included: EDGE, CDMA, EVDO, 3G, 3G+.

DSL service. They are low-cost operations with small customer bases, typically deploying aerial fibre to connect homes in the neighbourhood. Often, aerial fibre is deployed in areas where duct-based network roll-out is mandatory. There are now discussions about forcing these operators to put their networks underground, which would have the benefit of removing the fibres from view in many urban areas. The downside of course would be that this would raise the cost of providing services over these networks and limit the affordability of services provided. However, to date operators have not been forced to put their networks underground on a large scale and Romanians therefore enjoy access to relatively cheap broadband infrastructure in many urban areas. Due to the fibre networks deployed by neighbourhood networks these connections also have very high speeds - only 2% of the connections in Romania are below 2 Mbps, 53% of connections have speeds between 2-30 Mbps, 29% have speeds between 30-100 Mbps and 16% of connections have speeds of at least 100 Mbps (Source: ANCOM).

The following figure illustrates current Romtelecom broadband tariffs versus those of the UK's British Telecom (BT), as a comparison of the differences in price levels with a more advanced EU market.

Figure 5: Romania-UK broadband price comparison

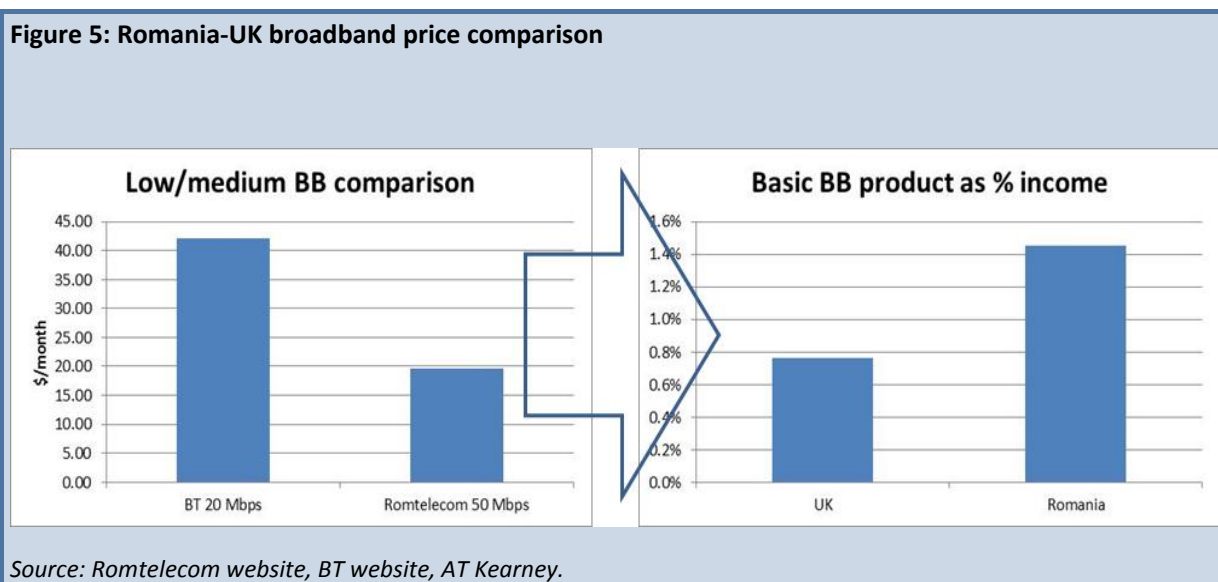*Source: Romtelecom website, BT website, AT Kearney.*

Figure 5 shows tariffs (including fixed line rental) for a relatively low-speed broadband product. The tariffs presented are for BT's Winterdeal (20 Mbps) and Romtelecom's ClickNet Play (50 Mbps). Although the features vary, it is clear that the Romtelecom tariff is substantially below BT's, partly as a function of the competitive pressure in the Romanian market and partly as a reflection of the differences in income levels between the UK and Romania. However, expressed as a percentage of nominal UK GDP per capita, the BT 'Winter deal' amounts to 0.8%, whereas the ClickNet Play product (a better product in terms of download speed) amounts to 1.5% of Romanian nominal GDP per capita. There are clear differences in affordability that will contribute to differences in broadband penetration between these two countries, despite the low tariff levels in Romania. So affordability in Romania is lower, while lower tariffs result in lower Average Revenue Per User (ARPU) and thus in a less attractive investment proposition for operators.

In addition, income levels in Romania are skewed towards urban areas, with average income per household 36% higher in urban areas than those in rural areas. This creates the second challenge for the

ClickNet Play product (which is not an entry-level product) representing an estimated 3.1% of income per capita in urban areas and 4.3% in rural areas, after removing the tariff for the fixed line rental. Both these estimates are within Target 2 of the Broadband Targets 2015 (tariffs for entry-level broadband services to present less than 5% of average monthly income), but it shows the relative purchasing power of urban areas and their greater attractiveness as a target market from a demand-side perspective.

The costs per fixed broadband connection are significantly higher in urban areas than in rural areas, largely due to higher economies of density and scale. With a substantial part of the Romanian population living in rural areas, this is another factor to overcome in the stimulation of broadband across the country.

6   Observations

This case study has highlighted some important elements of a successful strategy to promote the availability of broadband infrastructure and services, as well as highlighting areas, which, as elsewhere, require further effort.

"Fail to plan, plan to fail"

One of the positive aspects of the Romanian experience is that a Government strategy for the communications sector (by MCSI), and a strategy for the regulation of the sector (by ANCOM), were developed relatively soon after market liberalisation. This provided transparency in objectives, targets and supporting strategies, and ensured that the goals were supported by a broad group of interested stakeholders and institutions.

It is recommended, however, that a sectoral strategy like the one defined by MCSI is defined prior to the development of a regulatory strategy for the sector. This is because the regulatory strategy is one of the executional strands that flows from the sector strategy and this allows the national regulator to define trade-offs between, for example, stimulating investment and the development of competition, in the context of the overall sectoral strategy. In Romania, the strategy of the regulator was not followed up until after 2010, when the period on which the original strategy was based (2007-2010) was over.

Transparency in regulatory intervention

ANCOM has made considerable efforts to ensure clarity and predictability in the regulatory regime in Romania. This in turn should provide support for more ambitious business plans of operators, as there is greater predictability relating to one of the key drivers of growth in the market. In addition, ANCOM set up a program to comply with the Universal Service Directive, which has extended the availability of ICT infrastructure to areas where infrastructure was previously lacking. In taking these actions, the regulator set the scene for accelerated investments in broadband infrastructure. However, given that the primary mandate of the regulator is to ensure the development of competition, investment incentives should also be developed at the governmental level, as was indeed the case in Romania.

Address both the supply and demand side

The failure of communications markets to provide broadband services in rural areas is often referred to as a 'market failure'. However, in a perfectly competitive market, services would not to be delivered, if the marginal costs to provide them exceed the expected marginal revenues. So a lack of supply in these circumstances may be a sign of a rational, efficient market, not necessarily of market failure. A situation in which there is a persistent lack of broadband supply can instead be interpreted as a failure of policy.

It is clear that there are tremendous benefits to consumers of having access to ICT infrastructure. Those citizens who do not enjoy such access are put at a considerable disadvantage in terms of their access to jobs, services, information and applications. From a policy perspective, it is vital to provide incentives to broaden the geographical reach of broadband infrastructure. Broadband infrastructure is necessary, but not sufficient, to drive the knowledge economy. It is just as important to address the demand side of the equation by stimulating availability and affordability of customer premises' equipment such as computers and to develop Internet Literacy through training and education. It is on the demand side that the Romanian experience demonstrates some deficiencies. The development of Telecentres has been a success, and has helped to fund broadband network roll-out, but demand-side initiatives in other

countries have been more creative and produced a greater boost to broadband usage than has so far been witnessed in Romania.

Technological neutrality

It is in the interest of suppliers and consumers to ensure that broadband infrastructure is provided through a mix of efficient technologies that allow for the lowest-cost technology to be used for specific circumstances. Spectrum policy needs to be tailored to ensure operators are provided with the appropriate tools to make this happen. This approach formed a key plank of the Romanian universal service strategy and it should be a core element of any successful strategy in countries with limited fixed infrastructure. In more developed markets, there is often a temptation to rely on the (often outdated) fixed technologies used by the incumbent. However, in markets with low fixed network penetration, this approach is unlikely to meet the broadband challenge.

Develop specific policies for zones with specific supply and demand conditions

In Romania, there are essentially three main geo-zones, each with different challenges for the development of broadband infrastructure and services:

- **Major cities** – here consumers typically have a choice between the fixed incumbent, a cable operator and a neighbourhood network for their broadband needs and there are typically at least three high-capacity mobile networks available. In these areas, the main concern for policy-makers is to ensure competition develops fairly. In the case of Romania, there may be discussions about the development of areal cable networks in areas where this is not permitted.
- **Towns** – here, consumers typically have a choice between the incumbent operator, a cable operator and again the mobile operators for services.
- **Remote villages** – in these areas, fixed infrastructure exists sparingly, but not all homes are passed and for a large proportion of the population, mobile networks provide the only coverage (often 2G, but not 3G). It is in these areas that, depending on the definition of the broadband service targeted, additional infrastructure may need to be developed, and mobile technologies may provide the best solution.

A detailed understanding of the various supply and demand conditions is vital to any successful broadband strategy. Such an analysis must be conducted at a more detailed level than described above, by districts or constituencies. The secret of many successful broadband strategies is that they are defined nationally, but executed locally; taking into account local needs and conditions.

Define funding needs

Most ambitious broadband strategies succeed or fail depending on the willingness and ability to provide significant amounts of funding to stimulate both the supply and the demand side of the equation. If funding requirements are large relative to the size of the communications sector, then such funding should be made available from general taxation sources or targeted EU and European Investment Bank (EIB) funds.

In Romania, funding gaps are likely to be large. It should be noted that those consumers that do have access to broadband services (over 40% of households) experience very high download speeds Partly as a

consequence of the neighbourhood network phenomenon, Romania ranks among the fastest Internet countries in the world for real speeds, according to a recent Akamai report[7]. Given this background, Romania should be in a good position to meet the *Digital Agenda for Europe* target of 50% of households at 100 Mbps by 2020. The real challenge will be to meet the target of 30 Mbps for all households by that same date.

The next and greatest challenge for Romanian policy-makers is to define a new broadband strategy, based on the above principles, that identifies ways of making these Digital Agenda targets happen. A good first step would be to quantify the gap between the targets and what the market is likely to provide, with detailed analysis on an area-by-area basis. This gap may be closed by judicious supply-side incentives such as can be handled within the industry through Universal Service Fund and by demand-side stimulation backed by Government initiatives, but ultimately the scale of the challenge will almost certainly need large-scale external funding. This is true in Romania, but equally so in any market that starts from a position of low fixed network penetration.

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[7] http://www.akamai.com/dl/akamai/soti_slides_q3_2011.pdf