DOCUMENT OF THE EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT

INFORMATION AND COMMUNICATION TECHNOLOGIES
SECTOR STRATEGY

As approved by the Board of Directors at its Meeting on 12 March 2014
INFORMATION AND COMMUNICATION TECHNOLOGIES

SECTOR STRATEGY

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<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>Adjusted KEI</td>
<td>Adjusted Knowledge Economy Index</td>
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<td>Altnets</td>
<td>Alternative networks</td>
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<td>ATC</td>
<td>Assessment of Transition Challenges</td>
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<td>B2B</td>
<td>Business to business</td>
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<tr>
<td>CA</td>
<td>Central Asia</td>
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<td>CEB</td>
<td>Central Europe and the Baltic states</td>
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<td>COOs</td>
<td>Countries of Operations</td>
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<td>DAE</td>
<td>Digital Agenda for Europe</td>
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<td>DCs</td>
<td>Data Centres</td>
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<td>EEC</td>
<td>Eastern Europe and the Caucuses</td>
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<td>EIU</td>
<td>Economist Intelligence Unit</td>
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<td>ERP</td>
<td>Enterprise Resource Programme</td>
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<td>ESIP</td>
<td>Early Stage Innovation Programme</td>
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<td>ETC</td>
<td>Early Transition Countries (includes Armenia, Azerbaijan, Belarus, Georgia, Kyrgyz Republic, Moldova, Mongolia, Tajikistan, Turkmenistan and Uzbekistan)</td>
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<td>FDI</td>
<td>Foreign Direct Investment</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GPRS</td>
<td>General Packet Radio Service, a widely-deployed wireless data service, also called 2.5G</td>
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<td>ICA</td>
<td>Industry, Commerce &amp; Agribusiness business group</td>
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<td>ICTs</td>
<td>Information and Communication Technologies</td>
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<td>IPO</td>
<td>Initial Public Offering</td>
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<td>IPR</td>
<td>Intellectual Property Rights</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>ITU</td>
<td>International Telecommunication Union</td>
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<td>KE</td>
<td>Knowledge Economy</td>
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<td>KEI</td>
<td>Knowledge Economy Index</td>
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<td>KEI</td>
<td>Knowledge Economy Initiative</td>
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<td>LTT</td>
<td>Legal Transition Team within the Office of the General Counsel</td>
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<td>MIS</td>
<td>Management Information Systems</td>
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<td>MVNO</td>
<td>Mobile Virtual Network Operators</td>
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<td>OEMs</td>
<td>Original Equipment Manufacturers</td>
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<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<tr>
<td>Region</td>
<td>All EBRD countries of operations, collectively</td>
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<td>SBIC</td>
<td>Small Business Investment Committee</td>
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<td>SEE</td>
<td>South-eastern Europe</td>
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<td>SEI</td>
<td>Sustainable Energy Initiative</td>
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<td>SEMED</td>
<td>Southern and Eastern Mediterranean</td>
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<td>SO</td>
<td>Strategic Operator</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>SPI</td>
<td>Strategic Performance Indicators</td>
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<tr>
<td>SRI</td>
<td>Sustainable Resource Initiative</td>
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<tr>
<td>Telecoms Study</td>
<td>Telecommunication Sector Review (February 2013)</td>
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<td>TC</td>
<td>Technical Cooperation</td>
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<td>TIM</td>
<td>Telecommunications, Informatics &amp; Media</td>
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<tr>
<td>VC</td>
<td>Venture Capital</td>
</tr>
<tr>
<td>VCIP</td>
<td>Venture Capital Investment Programme</td>
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<tr>
<td>WAP</td>
<td>Wireless Application Protocol, a set of protocols for connecting cellular phones and phones and other radio devices to the Internet, used in the 1990s</td>
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<td>WEF</td>
<td>World Economic Forum</td>
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EXECUTIVE SUMMARY

Furthering competition, supporting transition. In pursuing its mandate to foster transition towards open market-oriented economies and promote private and entrepreneurial initiative, EBRD invests in the infrastructure necessary to support this fundamental purpose. With individuals, businesses and governments on-line, mobile and interconnected, today, investment in information infrastructure and information and communication technologies (ICT) is as critical for transition as investment in roads and energy infrastructure. EBRD’s existing sector policy, the Telecommunications, Informatics and Media (TIM) Operations Policy was approved in 1999. Since that time until the end of 2013, over 100 projects were approved representing an EBRD investment of EUR 2.5 billion in the sector. Bank financing has been concentrated in two main categories: almost 60% was for the establishment and/or further expansion of private sector competitive fixed/mobile networks while around 30% targeted state-owned companies modernising their networks, privatising or going through an IPO. Increasing competition, a key source of transition impact, to provide better and more affordable products and services to the consumers was and still is a key driver for the Bank in the ICT sector. Additionally, the advent of the Internet, the need for faster and more secure networks, the ubiquitous presence of smartphones and tablets, and the boundless applications enabling a person to be included within a society regardless of location, have radically altered this industry and the EBRD region must keep apace of these changes or risk falling further behind.

Transition gaps remain. While good progress has been made in regulatory regimes and in promoting private sector participation in the sector, there remains work to be done. This is particularly so in the less advanced transition countries which have yet to privatize their incumbent operators and are significantly behind in investing in broadband internet development (Eastern Europe and the Caucasus (EEC) and Central Asia (CA)). Even in those medium to advanced countries (Turkey and Russia) challenges remain to ensure that these economies are able to keep up with the rapid changes. Regulatory regimes are in place, but need better alignment with best-practice and better implementation. South-east Europe (SEE) and Southern and eastern Mediterranean (SEMED) are characterized by medium to small challenges and need to increase the presence of alternative network operators to enhance competition. Even in Central Europe and the Baltics (CEB), where challenges are small, increasing the competition between alternative network operators would improve overall competition in the sector.

Availability, access and affordability. The Bank’s overall objective for the ICT sector is to promote competition and innovative ways to provide access to infrastructure (fixed line, mobile, alternative providers, etc.), which in turn will help ensure affordability. It seeks to meet these objectives by investing in information infrastructure together with the private sector and government and ensuring the correct regulatory and legal regimes are in place. In the more advanced transition countries, this will mean investing in the ICT sector at the ‘sharper’ end: faster broadband, transformational technologies. In the less advanced countries (and also still in some select more advanced countries) there is still work to be done on regulatory frameworks and privatization of incumbent operators and working with foreign and local strategic operators to enter the markets to enhance competition. In all its countries, the Bank will seek to support new entrants into the ICT markets, especially small, innovative companies.
**Economic inclusion:** Improved access to ICT can also enhance the economic opportunities of women, young labour market entrants and populations in economically lagging regions by facilitating access to instant information, reach new markets and products (including financial products) and generate social capital, particularly in countries with comparatively low penetration rates. In addition, the ICT sector holds the potential to create new employment opportunities, particularly for women. At present, only 13 percent of women who complete a computing or related degree across the EU countries go on to work directly in the ICT sector.

**Changed and continuously changing environment.** The electronic communications landscape has changed significantly and the nature and the role of ICT within a society, on a global scale, have dramatically shifted. ICT investments offer enormous development and diversification opportunities for both government and business and perform a critical role in promoting social inclusion, empowerment and human security, as well as competitiveness and industrial growth but also education and health services amongst others. This is critically important for our countries of operations (COOs) as the digital divide increases both within the EBRD region and in comparing the EBRD region globally. For enterprises, entrepreneurs and innovators to remain competitive, it is critical that they have access to ICT infrastructure. Therefore, it was important that the Bank renewed its ICT sector strategy.

**Operational Approach.** To address the remaining transition challenges, to build upon the Bank’s expertise and as ICT is a critical element of one of the four streams under the Knowledge Economy Initiative (KEI), the Bank will focus on three operational objectives in the next strategy period: (i) to promote competitive, sustainable network expansion and access to communications and information to more citizens, including through the penetration of broadband to more distant places; (ii) to assist incumbent telecoms operators and governments accelerate privatisation via pre-privatisation and privatisation financings where investment is required primarily to develop the network; and (iii) to foster the emergence of innovative and advanced ICT services, including through support for transformational technologies, with the potential for strengthening local innovation systems.

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1 Women active in the ICT sector. European Commission DG Communications Networks, Content & Technology, October 2013.
1 INTRODUCTION

1.1 Background

When the Bank embarked on its original challenge to assist the countries of Central Europe and the former Soviet Union in their transition to a market economy, one sector that served to underpin the rate of development of all the others was the communications sector. Over the ensuing years, the EBRD region has had many successes with around 80% of the countries having achieved some level of privatisation of their fixed-line operators and the establishment of more or less independent regulators. Mobile penetration far exceeds fixed-line penetration in every country as substitution has deepened its impact and some alternative network operators are also helping to drive internet penetration to respectable levels. EBRD has been at the forefront in assisting both the public and private sector in this transformation. Since the TIM Operations Policy was approved in May 1999, the Bank has been focusing on meeting the most fundamental of communication goals within the ICT sector commonly referred to as the three “A’s” of development: Availability, Accessibility and Affordability. The Bank has been an active player by providing technical assistance to governments to encourage them to adopt a clear regulatory policy with an independent regulator and liberalise their markets to promote competition, by securing financing for large scale infrastructure investment and by investing in private sector initiatives to drive competitive offerings.

Yet, while communications infrastructures have been improving within the EBRD region since 1999, the nature and role of ICT within a society, on a global scale, has dramatically shifted. ICT investments can lead to integration of isolated communities into the domestic, regional and global economy, productivity gains, efficiency and economic growth and improvements in the delivery of public services including information. ICT’s influence on the global economy is growing at an ever increasing rate. However, there is a concern of a growing digital divide within the EBRD region. Attracting entrepreneurs and businesses based on skills utilising science, mathematics, engineering and technology are critical to maintaining a growing ICT sector, which in turn is critical for narrowing the digital divide.

Within the Bank’s region, there are significant distinctions between the stage of development and sophistication of their ICT sectors. For example, the EU countries are generally more advanced and through its Digital Agenda for Europe (DAE), the EU has identified clear priority areas and key actions and performance targets, such as fast broadband coverage for all by 2020, e-commerce, e-government, internet usage, and ICT research and development investment. The DAE seeks to create a “virtuous cycle” in which ICT stimulates the economy, which can occur when “services are made available in a borderless online environment and their availability and use creates demand for faster internet. This demand for faster internet, in turn, creates investment opportunities in faster networks. When put in place and widely used, the faster networks open the way for even more innovative services”\(^2\). DAE priority areas to which the Bank can contribute include the provision of much faster internet.

The non-EU countries have a vast array of differing issues to deal with ranging from a need to privatisethe incumbent operator to promote efficient competition on all networks to having a stable and predictable regulatory regime. If fast and affordable broadband is to become the main driver of so many facets of the COOs, the divide runs the risk of becoming wider and much work is still needed.

2 PAST PERFORMANCE

2.1 The Strategic Objectives under the TIM Operations Policy

Since the policy was approved in May 1999, the EBRD has grown its ICT sector portfolio in response to sector developments and demands. The 1999 policy established the following objectives:

i. promote sustainable network expansion, increase the density of telephones and improve the quality of service – the Bank since 1999 has continued investing with different financing instruments into expansion via a technology neutral fashion of the EBRD region’s communications network on the wired and wireless components.

ii. foster emergence of innovative and advanced services crucial for overall competitiveness of businesses within the country – the advent of broadband has clearly been the phenomenon of the last few years. In the late 1990s, narrowband was de rigueur with slow data speeds, freezing up pages quite often, rendering web browsing impossible via GPRS or WAP. Broadband availability which is being offered on wired and wireless networks has changed the life for all citizens in the EBRD region and beyond. The Bank has financed several networks.

iii. assist the incumbent operator and the government to accelerate privatisation – the Bank has offered its financing within the modality of a pre-privatisation several times and there are still a few countries where the State continues to have a controlling interest in the fixed line incumbent.

iv. develop appropriate regulatory and legal frameworks – the Bank’s legal transition programme has been extremely successful in providing needed regulatory assistance to many COOs and continues to do so. An updated assessment of the electronic communication regulatory and legal frameworks in the COOs, including the four new SEMED countries, was published in 2012. Details can be found in Annex 2.

v. promote the development of the sector beyond basic telephone services, including media related, and which promote access to communications and information – the push into media has been deliberately slow given the potential reputational aspects. Activities into advertising, publishing or state of the art cinemas have had mixed results but information provision via multiple platforms remains a key lynchpin to the strategy.
2.2 Portfolio Development

Between 1999 and 2012, 101 projects in the ICT sector were approved, with aggregate commitments of EUR 2.2 billion.

Table 1 Development of the Telecoms Portfolio

![Development of the Telecom portfolio by type of investment, in EUR million](image)

Source: Datawarehouse  
Notes: Cumulative new projects, not outstanding balance, projects sorted by Signing date

There has been a significant shift in the direction of funding, highlighted by the fact that only 5% of the new deals signed between 1999 and 2012 were in the public sector. This is strong evidence of the COOs’ transition success in promoting competition in the telecoms sector. In 1998, public sector deals represented 48% of the total portfolio.
The shift from public to private sector financing has brought about a structural change in investment. Equity participations have almost doubled to 28% in the 1999 to 2012 period compared with 16% of the portfolio in the first seven years of operation.
Since 1999, the majority of EBRD financing was directed to projects in the telecoms segment, with total value of EUR 1.8 billion while media investments were almost EUR 300 million and information technology (IT) related projects of EUR 80 million.

More recently, the Bank has started to develop and enhance its technology venture capital expertise to source, execute and exit profitably technology transactions through its Venture Capital Investment Programme (VCIP). The programme, a EUR 100 million investment facility, has been structured with an external advisory committee, including three experienced VC experts, which must endorse each project prior to Bank approval. In addition an independent VC co-investor must be present and deal sizes are to be under EUR 10 million. The investment period of the VCIP is to close by the end of 2016; if successful, the Bank could seek to build upon the experience gained.
Figure 2 EBRD ICT Finance Volume 1999-2013 per subsector

In terms of volume of transactions signed by country, Poland, then Russia, Kazakhstan, Bulgaria and Romania lead the way.
IT projects are taking an increasing role in the yearly business volume as shown below:

**Table 3 IT Projects volume 1999-2012**
2.3 Policy Dialogue: Electronic Communications Regulation and Reform

The focus of the Bank’s policy dialogue in the sector has been on enhancing the investment climate for private investment, through a combination of policy and legal development work with governments (aimed at adopting pro-competitive EU reflective policies and laws), accompanied by practical support for the regulatory authorities in their efforts to implementation of new policies and laws.

More recently, as the various communications, broadcasting and information based sectors converge upon a broader knowledge-based environment, the focus has grown to cover broadcast issues, such as the switchover from analogue to digital platforms and wider ICT issues, such as the incentivisation of high-speed broadband roll-out.

Telecoms regulation is one of a number of core areas being addressed by the Bank in its Legal Transition Programme\(^3\) in liaison with other IFIs and the EU. Prerequisites to improving the quality and cost-efficiency of the telecoms sector are (i) to have national operators that work in accordance with commercially sound principles and (ii) to have a regulatory structure that underpins private-investor led competitive provision of service and capacity to implement such a structure.

**Commercialisation of Telecoms Operators:** A key objective pursued by the EBRD in its operations, especially important in the early and medium transition countries, is the commercialisation of incumbent national operators. Historically, in the Bank's COOs, the state-owned telecoms operators worked within, or as a department of, a government ministry, but have gradually moved to form new independent state entities, typically wholly Government-owned joint-stock companies or similar structures. Nevertheless, the legacy of the past means that these new entities are frequently characterised by inadequate accounting methods that under-record the true cost of capital, outdated human resources practices, deficient financial planning, programming and budgeting practices, lack of cost control, and low levels of cost recovery. The fundamental aims of reform in the public sector are to place these entities onto a commercial footing, to improve their corporate governance and to take measures to ensure long-term financial viability. This requires changes in the organisational status of the entity, better cost recovery practices, modernised staffing approaches, reform of tariff policies, accounting rules and administrative practices, and the introduction of competition.

Commercialisation of public utilities or the profit motive of private firms alone does not suffice to assure high-quality telecoms services, improvements in efficiency or an equitable sharing of gains. Regulatory reform projects undertaken by the Bank are aimed at promoting the emergence and maintenance of competition within the ICT sector and the elaboration of a modern regulatory framework likely to attract and foster private investment.

**Development of Regulatory Structures and Capacity:** Experience demonstrates that the performance of the ICT sector improves immensely when there is effective competition

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\(^3\) See the Legal Transition Programme Action Plan 2013-2015
between several privately-owned players. However, telecoms has hitherto long been considered as a public-service, the provision of which could only be ensured if entrusted into the hands of a state-owned monopolist. Transforming the sector into a dynamic multi-operator environment is quite challenging. Apart from the obvious need to change mentalities and remove exclusive rights from the incumbent operator, one also needs to elaborate rules that will facilitate the entry of new competitors into the market, provide new investors with the necessary safeguards of transparency, objectivity and clarity and permit competition to emerge and thrive.

Obliging and ensuring the incumbent to interconnect on fair and reasonable terms with competitors that threaten or encroach on a monopoly is a difficult task. The problem can only be addressed by adopting and fully implementing a set of rules designed to force the incumbent to provide new entrants with transparent, objective and non-discriminatory access to its network, as well as enabling better access to radio frequency spectrum, and by creating strong and efficient institutions that will oversee the market and ensure effective implementation of these rules. Such steps will promote value-based spectrum management processes and open access wholesale capacity as a means of creating lowest cost infrastructure and at the same time competition at the retail level.

In 2012, the Bank completed an updated assessment of the Electronic Communications sector across the region, including SEMED. Annex 2 provides details of the Study, but identifies 4 broad groupings of COOs: Group A countries which display a higher overall legal/regulatory risks; Group B countries which are increasing harmonisation with EU member states, thereby reducing the overall regulatory risk; Group C countries have varying, but declining levels of overall legal/regulatory risks; and Group D countries which have reduced overall legal/regulatory risk significantly by largely adopting best practice.
The reality of the sector across the COOs is that the various sub-markets (fixed, mobile, internet, broadcasting, etc.) are converging (if not already converged in some countries), providing significant opportunities for government, business and consumers to deliver and benefit from the modern economy. Providing a clear, coherent and joined-up legal and regulatory basis for such a converged environment should be a priority of government, particularly so given the communications sector’s critical role in underpinning and facilitating modern and diversified economies. Additionally, modernising spectrum management and introduction of infrastructure sharing (e.g., masts, fibres, etc.) will improve investment efficiency and lower unit costs, with such modernisation of spectrum management ensuring optimal economic, rather than political, exploitation of spectrum. Further regulatory action is also necessary on consumer issues and internet matters, e.g., domain names, data protection, internet freedom, cyber-crime, etc.

Belarus, Kosovo and Uzbekistan were not included in the study.

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Table 4 Groupings of EBRD countries by legal / regulatory risks

<table>
<thead>
<tr>
<th>Low Risk</th>
<th>High Risk</th>
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<tr>
<td>GROUP B</td>
<td>GROUP A</td>
</tr>
<tr>
<td>Albania</td>
<td>Armenia</td>
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<tr>
<td>Bosnia-Herzegovina</td>
<td>Azerbaijan</td>
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<td>Croatia</td>
<td>Georgia</td>
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<tr>
<td>FYR Macedonia</td>
<td>Kazakhstan</td>
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<td>Montenegro</td>
<td>Kyrgyz Republic</td>
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<td>Serbia</td>
<td>Moldova</td>
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<td>Turkey</td>
<td>Russia</td>
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<td>Tajikistan</td>
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<td>Turkmenistan</td>
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<td>Ukraine</td>
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<td></td>
<td>Mongolia</td>
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<td>GROUP D</td>
<td>GROUP C</td>
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<td>Bulgaria</td>
<td>Egypt</td>
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<td>Estonia</td>
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<td>Hungary</td>
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<td>Poland</td>
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<td>Romania</td>
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<td>Slovak Republic</td>
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<td>Slovenia</td>
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</table>

High Harmonisation | Low harmonisation

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4 Belarus, Kosovo and Uzbekistan were not included in the study.
2.4 Evaluation Results and Lessons Learned

The Bank continues to postevaluate a representative sample of its ICT projects and to draw out the lessons learned. Projects are evaluated to assess their performance in terms of transition impact and additionality, project business performance (sound banking principles), profit contribution and overall success rating. Lessons learned are disseminated within the Bank, and where appropriate, to other IFIs. The Evaluation Department undertook a special study: Telecommunication Sector Review (January 2013) which has been taken into account in preparing this strategy. The key thematic lessons learned include:

- **Relative weakness of alternative operators in the Bank’s COOs.** Though alternative operators can be energetic, they often lack economies of scale. As the Bank’s projects in Serbia and Moldova demonstrate, actions to consolidate alternative operators can bring about economies of scale and thereby stimulate competition and have strong transition impact. However, attention should be paid to avoid strengthening the positions of operators already dominant in other markets (such as cable television), while supporting their broadband expansion.

- **The Bank’s role in privatisation.** There are still large telecoms companies directly or indirectly owned by the state (even in some advanced transition countries). The EBRD may still play a role in accelerating or enabling privatisation as strategic investors still prefer to co-invest in this sensitive sector alongside institutions providing additional political comfort, such as the Bank.

- **Impact of rapid evolution in the sector on the Bank’s expectations.** Most COOs, like Albania, historically had low fixed telephony penetration rates. However, after the privatisation of the incumbent (Albtelecom), the expected rise in fixed telephony connections did not materialise, as demand for fixed telephony was replaced by demand for mobile telephony. Correspondingly, the desired fall in employees per fixed line (set as a transition impact benchmark) became difficult to achieve.

Some of the key considerations from the study which have helped in formulating the Bank’s operational response over the next strategy period include:

- **Expansion of broadband penetration – the main direction in telecoms sector development.** As demonstrated during the Polkomtel privatisation and other recent projects, the main development in telecoms over the next few years will be the growth of high speed broadband access (including 4G), using wireline or wireless technologies. For rural and remote areas, penetration will be increased by using various distinctive funding schemes, such as minimum subsidy auctions, and market arrangements, such as municipal open access. The Bank will consider new opportunities for financing broadband infrastructure with both operators and local authorities, particularly those which strengthen alternative operators (through consolidation, for example). The Bank will examine how lessons from successful EU-backed state-aid to facilitate municipal or rural broadband roll-out (e.g., Poland, Slovak Republic) could be applied in other COOs.

- **Financing network development in low population density regions.** As the Tele2 experience in Russia demonstrates, in large countries, regional operations outside the capital can be successful if they can keep their costs low enough to take account of the low population densities and low incomes in those regions. To do so, telecoms operators
might need to use terrestrial or satellite wireless technologies instead of wireline ones. Such Bank projects would benefit regional development and could have strong transition impact and additionality.

- **Participation in major privatisations.** There are still several large telecoms companies in the Bank’s COOs which are state-owned and which might be (further) privatised in the future. The Bank might play an important role in guiding partner countries and individual clients through privatisation, including ensuring effectiveness of the regulator, and providing co-financing to strategic investors.

## 3 CURRENT STATE OF THE ICT SECTOR IN THE BANK’S COOs

The sector includes ICT infrastructure (networks or data centres), ICT production (IT systems, software) and ICT services (IT services, Internet firms, select media-related segments, mobile virtual network operators (MVNOs)). By investing in the sector, the Bank can support those sectors of the economy which have large potential to advance the innovation agenda in all of its COOs.

Figures demonstrate that ICTs contribute to about half of productivity growth and represented over 5% of 2008 GDP world-wide. ICTs are also key enablers of “green growth” in all sectors of the economy, ranging from process improvements (industrial automation), product-specific improvements (embedded ICTs for energy-efficient vehicles), entire systems (ICTs for smarter transport management) and company improvement (ecommerce). The digital transformation of every economic sector has been accompanied by a net creation of jobs: for every job that is eliminated, 2.6 new ones are created\(^5\). Part of the digital transformation is the continued integration into, and reliance upon the internet for, market-based activities. As noted in the declaration of the Deauville G8 summit: the internet is “a driver of innovation, improves efficiency and thus contributes to growth and employment”. Both the OECD ICT Top Priorities report issued in 2012 and the EU’s Digital Agenda for Europe (DAE), identify investment in broadband as a delivery mechanism as the top priority in the sector, enabling so much more than just a voice call or a data transfer. The Bank has de facto followed that goal given the many investments made to propagate broadband in a technology neutral fashion.

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\(^5\) eG8 Forum press release, 30 May 2011, see http://www.eg8forum.com
Figure 4 OECD ICT Top Priorities OUTLOOK 2012

1. Broadband
2. ICT skills and employment
3. Government online
4. Security of information systems and networks
5. Research and development (R&D) programmes
6. Technology diffusion to business
7. Electronic settlement/payment
8. Digital content

Source: OECD Information Technology Outlook 2012

Also, as seen by a study conducted by the International Telecommunication Union (ITU), mobile telephony surpassed fixed line telephony around 2001-2002 and has never looked back. The ease of pricing of mobile telephony and the lack of investment to be made by the customer upfront, the explosion of pre-paid subscribers, the advent of new technologies, miniaturizations, better battery lives, the incredible leap into the forefront of ecommerce via the application platforms, the affordability of computers, the blurring of tablets as an office tool rendering legacy tools such as computers almost obsolete, the incredible ways in which the internet connects merchants/customers such as farmers checking weather reports and market pricing and the ease of internet connectivity lead to the chart below. Fixed lines will slowly disappear while all will reside on mobile devices spurred by ever increasing broadband usage, putting enormous strain on existing networks.

Figure 5 Global ICT Developments 2001-2013
Through the privatisation of state-owned operators, the ensuing corporate entities have generally retained control over their assets and cash flows allowing them access to international financial markets. A condition to most privatisations in the telecoms sector has been the required presence of a Strategic Operator (SO), bringing additional operating experience, management training and wider service offerings in order to improve not only the companies’ operational efficiencies but also the business experience for the customer. Unfortunately, the current financial crisis has forced many of these SOs to curtail their investment plans, shed many operations in the EBRD region and de facto limit the benefits such SOs bring to the market. Currently, 17 out of the 34 countries in the EBRD region can be said to be privatised, meaning the state retains a less than 50% ownership of the operator.

Figure 6 Regional Overview of State Ownership in Fixed line Operators

To increase the rate of fixed line development is a costly and time-consuming process, whether privately or publicly owned. Hence, the introduction of mobile technologies has become the preferred method to quickly and economically expand communications in areas where fixed cables or fibre is limited or non-existent. Due to the advancement in wireless technology leading to tablets and the smartphone phenomenon, mobile infrastructure no longer handles only voice traffic but also high volumes of data. This has resulted in a regional evolution similar to other emerging markets where wireless methods have become the dominant means as to how communications are delivered. Some of the COOs are already
looking beyond the need of just access and availability but also the requirement for quality capacity building.

Broadband, shorthand for “broad bandwidth”, is a very fast, high-capacity, “always-on” connection using fixed and wireless technologies to transfer a vast amount of information to and from digital, electronic devices like mobile phones, tablets, computers and laptops, cameras, and TVs but also white goods such as refrigerators. In the business environment, broadband connectivity is used to integrate local offices, workgroups and processes or a community of related businesses and institutions to provide innovative ways in delivering services. To receive the vast level of required digital data over these networks, many fixed line networks need to be upgraded or digitalised including those of regional phone companies and TV and radio broadcasting authorities or companies.

To effectively use the internet and its various applications in the Bank’s COOs, there is a significant need for the development and operation of data centres (DCs) and managed services. It is no longer feasible or cost effective to run a DC in Amsterdam to service heavy data volume traffic in the EBRD region; therefore, DCs are being contemplated in many countries and the Bank is actively pursuing various such investments.

Capacity requirements will be increasing at a faster rate than the Region will be able to accommodate without accelerating the development of infrastructure. The demand is being driven by internet and broadband opportunities and usage. There is an ever increasing need for ICT infrastructure development, including DCs, call centres and network innovations. These factors present a fundamental challenge and critical role for the Bank in assisting in the development of a knowledge economy in the Region that is robust enough to compete effectively in an ever expanding global economy.

A case in point in select COOs demonstrating the substitution effect is shown in the next two graphs with select countries showing a creeping substitution effect.

**Table 5 Fixed Line Penetration from 2007 to 2011 (Source ITU)**
Table 6 Mobile Penetration from 2007 to 2011 (Source ITU)

<table>
<thead>
<tr>
<th>Year</th>
<th>Bulgaria</th>
<th>Croatia</th>
<th>Estonia</th>
<th>Hungary</th>
<th>Kazakhstan</th>
<th>Lithuania</th>
<th>Poland</th>
<th>Romania</th>
<th>Russia</th>
<th>Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2011</td>
<td>200.00</td>
<td>180.00</td>
<td>160.00</td>
<td>140.00</td>
<td>120.00</td>
<td>100.00</td>
<td>80.00</td>
<td>60.00</td>
<td>40.00</td>
<td>20.00</td>
</tr>
</tbody>
</table>

Penetration per 100 population

4 TRANSITION CHALLENGES

Please refer to Annex 1 for the full text of the country-by-country Assessment of Transition Challenges. Below is a short summary of the main remaining challenges for each of the sub-regions.

Central Europe and the Baltics

The CEB region is characterized by negligible to small remaining transition challenges. Most of the telecommunications incumbents have already been privatised (Telekom Slovenia being the exception) and most countries have at least three mobile operators with customers enjoying the benefits of competition. There is still a room for alternative network operators to provide stronger competition in the fixed segment of the telecommunications sector. The telecommunications regulatory frameworks have already generally been aligned with the EU framework. The enforcement of the intellectual property rights could be further improved as, for example, the software piracy rates still remain above the EU average, although significantly below the rates in the other EBRD sub-regions.

South Eastern Europe

The SEE region is characterized by small to medium remaining transition challenges. A few privatisations of major telecommunications assets have yet to occur (Telekom Serbia notably bought out the 49% owned by STET of Italy and OTE of Greece recently creating a 100% state-owned incumbent). Most countries have at least three mobile operators with good competitive tariffs offered to customers. There still remains a need for alternative network operators to provide stronger competition in the fixed segment of the telecommunications sector. There is also a room for further alignment of the telecommunications regulatory frameworks with best practices. Effective protection of intellectual property rights remains a challenge as reflected in still relatively high software piracy rates, significantly above the rates for the CEB region.
Eastern Europe and the Caucasus

The EEC region is characterized by medium to large remaining transition challenges. Strategic telecommunications operators have not yet entered the fixed segment of the market (except Vimpelcom in Armenia) and the state continues to control most incumbent operators. Most countries have at least three mobile operators with good competitive tariffs offered to customers. The presence of alternative network operators remains low and the broadband internet infrastructure needs to be further developed. The telecommunications regulatory regime needs further development. Effective protection of intellectual property rights remains a challenge as reflected in still very high software piracy rates.

Turkey

The remaining transition challenges in Turkey are rated medium in market structure and small in market supporting institutions. Turkey has privatised the telecommunications incumbent Turk Telekom, although the state continues to hold a significant minority stake. There are three mobile operators in the country, although Turkcell controls a relatively large market share. Alternative network operators are active in the market and the incumbent’s market share has been decreasing, although from a very high level. The telecommunications regulatory framework is relatively developed, although there is a potential for further implementation. Effective protection of intellectual property rights remains a challenge as reflected in still relatively high software piracy rates.

Russia

The remaining transition challenges in Russia are rated medium in both market structure and market supporting institutions. The telecommunications incumbent Rostelecom continues to be controlled by the state. There are three large operators and a few smaller entities in the competitive mobile segment. A few alternative network operators are active in the market. There are still significant challenges in terms of aligning the regulatory framework with best practices. Effective protection of intellectual property rights remains a challenge as reflected in high software piracy rates.

Central Asia

The Central Asia region is characterized by medium to mainly large remaining transition challenges (with significant differences within the region). The incumbent telecommunications operators are yet to be privatised. There are at least three mobile operators in each country. The presence of alternative network operators remains low and the broadband internet infrastructure needs to be further developed. The telecommunications regulatory regime also needs further development. Effective protection of intellectual property rights continues to be a challenge.

Southern and Eastern Mediterranean (SEMED)

The SEMED region is characterized by small to medium remaining transition challenges. Some of the incumbents have already been privatised. There are at least three mobile operators in each country. However, the presence of alternative network operators remains low. The telecommunications regulatory regime should be further aligned with best practices. Both the reliability and development of the regulatory framework constitute an important competitiveness and investment factor and the meaningful implementation of an EU-
reflective regulatory framework remains a critical factor for investment decision-making for the region. Intellectual property protection also needs to be further supported as indicated by the relatively high software piracy rates.

5 OPERATIONAL APPROACH

5.1 Sector Objectives

The EBRD’s objectives for this sector strategy are built on the progress made to-date and reflect the developments in technology which continue to be a driving force for change and innovation in available services, network platforms and market structure within the ICT sector. It is a fact that this sector is a very fast evolving one and our Region has witnessed many instances where technology leaps occurred given the newness of investments compared to the existing legacy networks prevalent in Western Europe. This means the Bank has been very active in ensuring that the right combination of project, technology, sponsor, and regulatory/government environment is in place. EBRD has been and still needs to be ready to seize such opportunities where and when they appear and this strategy articulates how these opportunities may map into the broader strategic challenges facing the Region.

EBRD activities and investments in this sector aim to make an important contribution to the transition process through promoting private sector activity within a regulated environment and enhancing a country’s ability to develop its knowledge economy. Recognising the operating principles of the EBRD (transition impact, additionality and sound banking principles), the Bank will pursue the following objectives through careful project selection and transaction structuring:

- promote sustainable network expansion, increase the density of communication devices and improve the quality of service-neutral technological platforms, wired and wireless (through traditional operators and MVNOs), and promote access to communications and information to more citizens furthering the competitive landscape, including through the penetration of broadband to more distant places while also enhancing economic inclusion by fostering network deployment geared at creating economic opportunities for women, youth and residents of less developed regions;

- assist the incumbent operator and the government to accelerate (further) privatisation via pre-privatisation and privatisation financings where investment is required primarily to develop the network. This provides an opportunity to influence the future development of the company, and possibly the sector, through restructuring and regulation, and provides a strong demonstration effect;

- foster emergence of innovative and advanced ICT services, including through support for transformational technologies, with the potential for strengthening the local innovation system through creating or reinforcing linkages within the system and/or supporting development of skills transferrable to other stakeholders within the innovation system.

The relative focus on these objectives will require a differentiated approach across the EBRD region, depending on the remaining transition challenges and the stage of the development of
the knowledge economy and the ICT sector of any particular country. The sector’s regulatory and legal reform challenges are described in section 5.3

**Central Europe and the Baltics:**

- Strengthen competition in provision of fixed line and data services
- Increase the use of modern innovative technologies, ecommerce
- Transfer and dispersion of innovation-related skills and R&D

**South Eastern Europe:**

- Transfer and dispersion of innovation-related skills and R&D
- Introduction or enhancement of infrastructure sharing (e.g., masts, fibres, etc.)
- Improvement of coverage and quality of broadband infrastructure

**Eastern Europe and the Caucasus:**

- Introduction and strengthening of competition and improvements in service quality
- Improvement in coverage and quality of broadband infrastructure
- Introduction or enhancement of infrastructure sharing (e.g., masts, fibres, etc.)

**Turkey:**

- Improvement of broadband coverage and access in rural areas
- Transfer and dispersion of innovation-related skills and R&D
- Introduction or enhancement of infrastructure sharing (e.g., masts, fibres, etc.)

**Russia:**

- Improvement in coverage and quality of broadband infrastructure
- Strengthening of competition through privatisation of state-controlled regional fixed line incumbents
- Increase the use of innovative technologies (including IT) as well as transfer and dispersion of innovation-related skills and R&D
- Introduction or enhancement of infrastructure sharing (e.g., masts, fibres, etc.)

**Central Asia:**

- Introduction and strengthening of competition through privatisation of state-controlled incumbents
- Improvement in coverage and quality of infrastructure, in particular broadband
- Introduction or enhancement of infrastructure sharing (e.g., masts, fibres, etc.)

**Southern and Eastern Mediterranean:**

- Improvement in coverage and quality of broadband infrastructure
- Increase the use of innovative technologies (including IT) as well as transfer and dispersion of innovation-related skills and R&D
• Privatisation of state-controlled regional fixed line incumbents
• Introduction or enhancement of infrastructure sharing (e.g. masts, fibres, etc.)

5.2 Investment Priorities and Delivery Mechanisms

While continuing to invest in ICT infrastructure, greater focus needs to shift to projects with the potential to support the development of the knowledge economy through demonstrating new innovative activities and/or supporting transfer of skills, at the same time continuing to support a stronger competitive environment. These may include ICT services and support for companies focused on bringing to the market new innovative ICTs.

Investing in ICT infrastructure, the Bank will primarily support the establishment and development of private sector electronic communications operators through equity and debt financing. The Bank can be highly additional in mobilising private sector financing, particularly in the cellular and fixed line market segments, but also in value-added and information services such as cable TV, satellite communication services, publishing and other media tools, and internet. In the value-added and services segments, opportunities may arise in any of the Bank’s COOs but are likely to be focussed in the more advanced countries where sound regulatory frameworks exist. The Bank will critically evaluate its additionality taking into account the transition stage in the sector of the individual country, the nature of the project, and the regulatory environment.

The Bank will continue to assist in the transformation of incumbent national telecoms operators into commercially-oriented, privatised companies. The approach will include pre-privatisation financing through debt and quasi-equity, privatisation participation and post-privatisation financing, including equity, underwriting and syndicated loans. Technical cooperation assistance will be given, in collaboration with EU and other IFI partners, through institutional development programmes targeted on sector policy and legal reform and establishment of an independent regulatory regime which are reflective of international best practice. Support will be targeted at those countries where the government has demonstrated the greatest commitment to implementing reforms as part of pre-privatisation preparation and liberalising agenda. In addition, the beneficiary countries will be asked to establish a policy of progressive regulatory reform and market liberalisation in order to secure the Bank’s financial support.

The Bank will promote small companies and new entrants to the market that are often better at innovating and developing new products. Evidence suggests that, in emerging markets, larger and incumbent firms tend to innovate through imitation; small firms and new entrants are often the birthplace of new technologies. However, the EBRD Region struggles to support small innovators, who have difficulties accessing finance and in some countries face significant bureaucratic/regulatory/administrative hurdles which make it difficult for them to operate efficiently. Therefore, it is essential that EBRD continues to focus on the SMEs across all sectors, which supports the creation of tools such as VCIP.

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6 Diversifying Russia: Harnessing regional diversity. EBRD 2012, pg. 68.
5.2.1 ICT Infrastructure

Access to information infrastructure throughout the EBRD region is fundamental. The Bank will continue to invest in and encourage the roll-out of regional networks, encouraging communication and broadband access to the widest population, whether deployed over fixed or mobile (including MVNOs) or satellite access. Mobile broadband, combined with the fast decreasing costs of Internet-enabled devices such as smartphones, tablets, and netbooks using networks that are being upgraded in the Region to offer 3G and soon 4G, is democratizing Internet access. There will also be a focus on regional network consolidation of all network types to provide operating scale to allow for the development of the widest range of affordable services that can be delivered on any type of network and improve competition while also potentially enhancing economic inclusion. The Bank invests in combination services – fixed voice, video, internet and mobile voice (known to consumers as triple or quad plays) and in the development of new regional networks. Some investments will be capital intensive, such as private mobile radio or public access mobile radio networks, which are networks providing services to closed user group. Others may be national platforms delivered via satellite or data storage network centres. Increasingly, networks will be software applications driven in a virtual capacity. Applications might include acting as financial clearing houses and processing centres, electronic exchanges of digital payment transactions, software driven security networks for tracking moveable assets and increasing the accuracy of locating calls over mobile networks for emergency response systems.

At the same time, the public media sector in the EBRD region has to undergo a critical shift from broadcasting TV signals in an analogue standard to a digital one. This process should free up spectrum that can then be used for further development of high-speed mobile broadband services, thus further improving the information infrastructure in the country. Assisting with their Digital Switch Over (DSO) is being explored with Moldova, Georgia, Romania and Serbia. Work with the EU to assist those COOs struggling to meet the digitalisation deadlines will be critical (as will potential TC support for the authorities in adopting the policy, legal and regulatory measures necessary to achieve implementation of the new digital standard).

5.2.2 ICT Services

In addition to such direct investment in networks, the Bank will also look to widen its investment opportunities to projects in the ICT services sub-sectors that further enhance or build upon the essential ICT infrastructure and/or have significant potential for strong demonstration effects and skills transfers. Such projects may positively affect the ability of the local economy to innovate, thus advancing the development of the knowledge economy, and may include the support for IT service providers (including data centres), IT equipment and systems producers, communication equipment and systems producers, software publishers, content providers, some media-related segments, and Internet firms (e.g. ecommerce firms).

The EBRD region has a clear comparative advantage in the software side versus the hardware elements such as microchip manufacturing. For example, the Bank has worked successfully with companies like Asseco (a large Polish-based ICT player operating regionally) and ITG (a Russian IT service provider) or Prognoz (a Russian business intelligence company).
In more advanced transition countries, the basic ICT physical infrastructure may already be present, and in order to push the ICT sector and knowledge economy forward, the focus will shift to a higher rung of a well-functioning ICT service industry, which is essential to enable delivery upon the infrastructure including: customer care (including billing pre- and post-sale), hardware/software and applications support and advanced technical training programmes for higher-end technical support like network and server management for business process outsourcing, etc. In less advanced economies, ICT services might apply to more basic elements such as marketing or pure sales as the infrastructure itself is being improved or developed.

Data Centres (DCs, for more detail see Annex 3) are the fundamental building blocks for ICT services and the Bank will seek to promote and invest in the development of DCs throughout the EBRD region, where appropriate. DCs are becoming an increasingly important component of the global IT infrastructure. The demand for specialist provision of DCs is increasing driven by a number of factors such as (1) increased data creation, usage and sharing, including cloud computing (where the computational and storage resources of the infrastructure is not housed within one’s personal computer), (2) increasing globalisation, (3) the need for enterprises to ensure disaster recovery and business continuity, and (4) increasing regulatory requirements such as environmental and data protection.

Demand is also driven by the increasing cost and sophistication associated with the provision of reliable, secure and cost effective DC services. Outsourcing to specialist providers is therefore increasingly attractive to both larger enterprises, for which internal data centre provision is no longer a core asset or skill, as well as small and medium sized enterprises which are less able to afford the significant upfront outlay and annual running costs associated with housing its own DC provision, preferring instead to convert this capital outlay into an annual rental charge. Such costs are only likely to increase given the growing price and volume of power consumption, (which can account for between 40% - 60% of operating costs for a DC), and the requirements for both the physical security of the DC and the security of the data itself through software such as firewalls. In addition, DCs are becoming increasingly sophisticated and expensive to build and manage. Environmental concerns, for example, can affect all aspects from building design, IT usage and IT efficiency to recycling, site related issues and access to reliable and renewable energy. Specialist DC providers have the necessary skill sets and can realise available economies of scale to manage environmental and other cost factors more successfully.

The need also crosses all sector boundaries, coming not only from telecoms companies, internet service providers (ISPs) and managed service providers, but also from financial services, industry, media, system integrators (who wish to add managed services to their portfolio of services), governments and retailers, among others. DC services include not only secure data storage, but also remote hosting of applications, cloud computing, disaster recovery and business continuity. Specialist DCs are often carrier neutral ensuring redundancy for connectivity and encouraging choice of carrier, competitive quality and pricing for customers. There is a clear lack of DC strategic investors in our Region, which means that most DC provision is either (1) carrier dependent e.g. telcos (Rostelecom, Kazakhtelecom), altnets (GTS, Linx), or mobile providers (e.g. Megafon) or (2) entrepreneurial small scale e.g. Nexus, 3DC, or IXcellerate.
The Bank will also look to support selected projects involving emerging transformational technologies as such projects may provide a particularly strong demonstration effect of a new innovative activity, lead to the development of new types of transferable skills and create new linkages within the local innovation system. This may in turn positively affect the ability of the local economy to innovate, thus advancing the development of the knowledge economy.

The emergence of the transformational technologies cannot be identified and correlated to either a country or a region in our COOs. On the contrary, there is an element of ad hoc emergence predicated upon the coming-together of assets such as entrepreneurial spirit, and the ability to “think outside-the-box” and re-invent even the simplest of product or service in order for more consumers to enjoy the latter in a more expeditious manner and at lower costs. The advent of the Internet has enabled people to reach millions of potential clients almost instantaneously at exceptionally low expense. Miniaturisation leading to more affordable handsets and the presence of a mobile network, even in the most remote areas of our planet, being the conduit to transmit large amounts of data reliably and fast, have enabled companies to, for example, deploy mobile banking in ways never thought of before. Work between the ICT, equity funds and financial institutions teams has already begun, given mobile payments continue to grow as an emerging transactional platform in developing markets.

Early investments into emerging technologies in areas such as nanotechnology or nanomaterials also provide solutions for much-needed current problems such as reaching longer battery lives, etc. These investments require specialised training, wider scientific community interaction and tend to be projects with long development cycles and high risk of operational success, which means a careful approach will be used to slowly develop in-house expertise resulting in positive investment decisions. With the growth of Near Field Communications (NFC) and other short-range connectivity technologies, machine-to-machine (M2M) technologies are widely considered to be a strategic option for operators who are seeking new revenue growth opportunities. As new uses are discovered, the M2M network build-up will support a massive range of platforms and application layers, ranging from smart metering to security functions. It is expected that the installed base of the Internet of Things (IoT) will be approximately 212 billion “things” by 2020. This is mainly due to intelligent systems installed in our most primitive devices which collect data leading to further developments of smart cities, cars and houses. Our enhanced connectivity infrastructure and a society thriving in becoming an increasingly connected culture are two critical components leading to such an explosion in the number of IoT.

In general, computing platforms having undergone a massive re-invention going from large mainframes to desktops to laptops to tablets and now smartphones, combined with access to the internet at speeds enabling streaming of large volumes of data, have facilitated and will further facilitate many transformational activities. Three very recent smartphone capabilities when taken together will precipitate transformational endeavours: contextual interacting (one can interact with many including the latter’s environment and data), mobile intelligence

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7 Internet of Things (IoT) 2013 to 2020 Market Analysis: Billions of Things, Trillions of Dollars, IDC

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(more and more powerful tools at the fingertips available anywhere anytime), and engagement (user experience delivered in an easy and helpful manner)\(^8\).

5.3 Policy Dialogue: Electronic Communications Regulation and Reform

The Telecomms Study (described in more detail in Section 2.4) found that there is a need for a shift in the focus of technical cooperation projects, while recognising that the Bank’s TC projects for regulatory and legal strengthening are generally well regarded by the industry practitioners. Market participants commented that the staff of regulators and judges in commercial courts would benefit from a better acquaintance with practical solutions to day-to-day regulatory problems applied elsewhere, especially in respect of strengthening the enforcement of regulation. Accordingly the Bank should continue to support the staff of regulators and judges, with a focus more on the effective monitoring of compliance and enforcement of regulations, than on new legislation. Options here include more time on the ground for advisors, assisting with monitoring of compliance and enforcement, closer cooperation with similar initiatives with the EU and other IFIs in this area, or possibly, more efficiently, ‘regional advisors’, responsible for multiple countries.

The Bank will look for opportunities to assist the policy-making and regulatory authorities through policy dialogue and technical cooperation in its COOs and where appropriate/available, through closer cooperation and alignment with similar EU initiatives. While much of the work has been completed in CEB, there remain challenges in the other regions:

**South Eastern Europe:**
- Competition strengthening:
  - Liberalisation in certain markets/countries, particularly in the fixed and broadband internet markets
- Strengthening of independence and enforcement of regulation
- Modernise spectrum management
- Regulatory action on consumer issues and internet matters, e.g., data protection, internet freedom, cyber-crime, etc.

**Eastern Europe and the Caucasus:**
- Introduction and strengthening of competition:
  - Fixed market: Enhanced liberalisation
  - Liberalisation of the broadband market
- Strengthening of independence of decision-making, capacity of regulatory and policy-making institutions and enforcement of regulation
- Modernise spectrum management
- Regulatory action on consumer issues and internet matters, e.g., data protection, internet freedom, cyber-crime, etc.

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Turkey:
- Transparency and enforcement of regulation:
  - Further liberalisation of local telephony markets
- Regulatory action on consumer issues and internet matters, e.g., data protection, internet freedom, cyber-crime, etc.

Russia:
- Strengthening of competition:
  - Strengthening the regulator’s independence of decision-making
- Modernise spectrum management
- Regulatory action on consumer issues and internet matters, e.g., data protection, internet freedom, cyber-crime, etc.

Central Asia:
- Introduction and strengthening of competition:
  - Liberalisation of fixed line markets
  - Adoption of competitive safeguards which underpin competitive provision of services
- Strengthening of independence of decision-making, capacity of regulatory and policy-making institutions, transparency and enforcement of regulation
- Modernise spectrum management
- Regulatory action on consumer issues and internet matters, e.g., data protection, internet freedom, cyber-crime, etc.

Southern and Eastern Mediterranean:
- Strengthening of independence of decision-making, capacity of regulatory and policy-making institutions, transparency and enforcement of regulation
- Modernise spectrum management
- Regulatory action on consumer issues and internet matters, e.g. domain names, data protection, internet freedom, cyber-crime, etc.

In addition, as value added services can often drive innovation, the Bank will examine how TC assistance can support the entry of such service offerings into the market.

5.4 Other Bank Initiatives

As information systems is one of four operational streams under the Bank’s knowledge economy initiative, ensuring that the Bank has an up-to-date and relevant ICT sector strategy is critical. This strategy has been developed with the Bank’s desire to assist countries in developing their knowledge economies, and their ICT infrastructure in particular, firmly in the foreground.

There is also potential to work with the Energy Efficiency and Climate Change (E2C2) group on cross-over projects. From energy efficiency audits conducted to-date, many clients are also interested in enhancements to ICT as they relate to the operation of their businesses.
Indeed, many clients who wish to grow to the next level and access the capital markets, find that they are required to first overhaul their MIS and IT systems in order to meet the governance and reporting standards required.

Similarly, ICT have a significant potential to contribute to the Strategic Gender Initiative (SGI) by allowing women (and groups that may be otherwise excluded) access to information previously not accessible and lowering transaction costs, the ability to trade and conduct business in a gender neutral environment, and provide greater access to equal opportunities in the workplace.

5.5 Key Partners

The Bank will intersect with, and work alongside other IFIs to maximise the complementarity of each institution’s comparative advantage and differentiated approach.

5.5.1 European Union

Europe 2020 is the EU’s growth strategy for the coming decade and has three mutually reinforcing priorities: smart, sustainable and inclusive economy. The first of seven flagship initiatives under Europe 2020 is the DAE which aims to reboot Europe's economy and help Europe's citizens and businesses to get the most out of digital technologies. Launched in May 2010, the DAE contains 101 actions, grouped around seven priority areas. The review published on 18 December 2012 identifies 7 key areas for further efforts to stimulate the conditions to create growth and jobs in Europe. The most likely points of intersection with EBRD activities revolve around stable broadband regulatory environments and investment in broadband infrastructure.

1. Create a new and stable broadband regulatory environment.
2. New public digital service infrastructures through Connecting Europe Facility loans
3. Launch Grand Coalition on Digital Skills and Jobs
4. Propose EU cyber-security strategy and Directive
5. Update EU's Copyright Framework
6. Accelerate cloud computing through public sector buying power
7. Launch new electronics industrial strategy – an "Airbus of Chips"

The Bank works closely with DG Connect in relation to its electronic communication regulatory work, which seeks to encourage all COOs to adopt regimes based on EU best practice and it will seek to enhance this cooperation through regular dialogue and sharing of planned activities and priorities. Representatives of DG Connect attended the Bank’s launch of the 2012 Electronic Communications Regulation Assessment launch. In November 2013, EBRD was invited as a key speaker to the Southern Mediterranean dialogue on Electronic Communications and the Information Society co-hosted by DG Connect and involving both ICT ministries and telecommunications regulators from the EU and SEMED countries, as an integrated part of the EU’s policy approach in the region and which resulted in a joint statement. The Bank will continue to work with all of the relevant DGs and EU delegation offices in country and will seek to enhance this cooperation.
5.5.2 European Investment Bank

Under EIB’s Corporate Operational Plan Objective “Knowledge Economy”, the ICT sector represents an important contribution to the Europe 2020 Strategy for jobs and growth. As part of the Digital Agenda objectives, the Commission has outlined three primary perspectives in support of ICT: the development of ICT and particularly broadband infrastructures in the EU; the innovative application and diffusion of ICT across sectors and government as an innovation enabling technology; and the research and development in ICT and application of ICT to create a low carbon economy. The EIB financing pursues these objectives in its operations.

The EIB already provides some EUR 3 billion each year to finance economically viable ICT projects. The following table summarises the instruments available for further supporting EU objectives in the field of ICT.

<table>
<thead>
<tr>
<th>EU2020 Initiatives</th>
<th>EIB support and instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Speed Broadband Networks (&gt;30 Mbps)</td>
<td>- Much of the EIB contribution in this area is through direct lending to private initiatives primarily of mobile and fixed high speed broadband network projects. High levels of revenue and other risks in a project’s early operating stages can be addressed by appropriate risk sharing instruments and credit enhancements</td>
</tr>
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<td>- Combined funding based on Structural Funds, in particular projects concerning “white” areas eligible for state aid</td>
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<td>- In high speed broadband network investments</td>
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<td>- In terms of further financing of high speed broadband network in collaboration with the Commission, EIB is asked to participate to the Connecting Europe Facility.</td>
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<tr>
<td>ICT R&amp;D, service and application across industries</td>
<td>- R&amp;D and innovative pilot plants for ICT undertaken by private and public operators.</td>
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<td></td>
<td>- Support to projects involving key enabling technologies (KETs) in the ICT domain, in particular in the upstream supplying sectors (e.g. nanoelectronics, photonics)</td>
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<td>- Projects concerning ICT application for instance in energy grids, environmental information systems, systems for transport and mobility and healthcare systems.</td>
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</table>
5.5.3 World Bank Group

The World Bank (WB) group adopted a new ICT Strategy in July 2011 which applies across the group, including the IBRD and the IFC. IFC has provided US$ 3.8 billion since 2001 for 199 private ICT sector projects.

There is also the Partnership on Measuring ICT for Development, a multi-stakeholder initiative providing quality ICT data and indicators which includes the World Bank, OECD and the ITU and various UN agencies.

The WB’s ICT department, GICT (Global Information and Communication Technologies), is one of the few joint departments in the Group. GICT includes four separate but related units: two IFC units that cover investment in private enterprises and two IBRD (International Bank for Reconstruction and Development) units that cover investments and relationships at the governmental level as well as technical assistance and research. The two IFC investment units are: (1) the telecommunications and media group that includes new investments in telecommunications and media industries; and (2) the technology and portfolio group that includes new investments in the IT industry as well as the monitoring of portfolio projects.

The ICT strategy is aimed at investing in ICT as a way to stimulate sustainable economic growth, increase productivity, improve public services, promote transparency and good governance, enhance social inclusion, and ultimately reduce poverty. Three themes govern the WB’s ICT sector strategy: (1) Transform stream: making development more open and accountable and improving service delivery, (2) Innovate stream: developing competitive IT-based service industries and fostering ICT innovation across the economy, and (3) Connect stream: scaling up affordable access to broadband.

**IFC ICT Investment Strategy – Telecoms / Media / Technology:** IFC’s telecom and media strategy is aimed at investments that: (a) extend access for basic voice and data communications services to un-served or under-served areas, primarily through mobile and fixed-line services; (b) support advanced telephony such as broadband infrastructure and convergent technologies; (c) promote market liberalization and deregulation through support for the privatization of incumbent operators; (d) encourage and support competition and customer choice by working with alternative operators, networks and technologies; and (e) support the manufacturing of telecom equipment. The IFC telecom and media unit covers investments in cellular and wireline services, broadband and cable TV infrastructure, satellite, and broadcasting. For telecoms and media projects, IFC’s investment size range is US$ 5 million - US$ 150 million. IFC’s technology unit covers all areas of IT including locally-based systems integrators and software developers that serve local or international customers, companies that promote offshore software development and business process outsourcing, and enterprises that focus on the design and manufacture IT components and products. Within this sector, IFC’s special area of interest is the promotion of e-government and e-commerce (m-banking, etc.). IFC emphasises mid- to late-stage equity and mezzanine investments, but also provides debt financing for later-stage technology companies. For its technology investments, IFC’s investment size range is US$ 2 million - US$ 10 million.

*InfoDev,* a global trust fund program which provides a forum for joint action amongst bilateral and multilateral donors and for global sharing of information on ICT for development is administered under the auspices of the WB. EBRD has recently collaborated with *infoDev,* in March 2013 in its search for a commercial manager of an Angel Co-
Investment Fund. The Bank maintains good links with the IFC ICT team, infoDev, and the WB telecoms legal reform team.

5.5.4 Asian Development Bank

The ADB has an ICT strategy: Toward e-development in Asia and the Pacific, approved in 1998 (only published in 2003). It also identifies ICT opportunities in key sectors including governance and agriculture, etc. It does not have a specific sector team, but it is viewed as a cross-cutting component of all investments. From 2000 to 2011, ADB’s ICT-supported 372 projects (including loans, technical assistance projects, grants and one private sector investment) amounting to US$ 13.22 billion (although to be noted that this is not restricted to the ICT components, but the entire investment).

5.6 TC Requirements

The Bank’s legal transition programme has significantly supported efforts in the ICT sector and this will continue in the new strategy period. Work on the regulatory frameworks for data transfer and broadband expansion, in order to promote competition and market-based tariffs, will still be needed ranging from (1) systematic policy, legal, regulatory and institutional support for policymakers and regulators, concentrating on building and enhancing competition mainly through elimination of barriers to investment (programmatic training, engagement and follow-on practical implementation support) such as in Armenia, Georgia, Kyrgyz Republic, Mongolia, and SEMED; (2) ad-hoc policy, legal, regulatory and institutional support projects designed and implemented to support specific banking deals (e.g. tariffing or infrastructure access support to accompany a specific investment in a rural broadband project, or, support for digital broadcasting switchover (DSO) planning); (3) support to policymakers and regulators with respect to new areas of sector development, developments mostly driven by technology and economics, e.g. 4th generation mobile, infrastructure sharing (as part of the follow-on practical implementation support deriving from systematic support to the regulator that may be provided by the EBRD; and to (4) support for ICT/knowledge economy-related aspects, e.g. intellectual property rights, broader innovation business climate. This element in addition to ad-hoc TC requirements for studies such as the ones performed in Morocco, Tunisia and Serbia will range between EUR 2 million to EUR 4 million.

5.7 Resource requirements

Following the substantial rebuilding of the ICT team in 2011-2012, it is anticipated that this new sector strategy will not require any new additional resources.

5.8 Operational performance indicators

To measure the progress in the ICT sector in its COOs, the Bank has identified five key indicators that will be monitored and tracked. Improvement in these indicators should reflect a reduction in the remaining transition gaps, as such improvements would result from a wider, regionally dispersed access to ICT infrastructure that is affordable for more people:

- Regional expansion and deepening of ICT markets outside top tier urban environments which increase competition in the market;
• Promotion of equality of access to mass-scale broadband, independent of delivery mechanism be wired or wireless;

• One or two projects per year to have a cross-sector impact or an economic inclusion or SRI element;

• Number of Mobile Subscribers platform/technology agnostic; and,

• Number of Fixed Data Subscribers (XDSL, FTTX).

These metrics will be measured and reported on for each country of operations by the end of 2014 and they will be measured again at the conclusion of the strategy period.

5.9 Review

Given the nature of the ICT sector and the speed at which changes occur, this strategy will be reviewed regularly to ensure its continued relevance for the sector and the changing environment and market conditions. It is proposed the full strategy will be reviewed within three years.
## Annex 1 Assessment of Transition Challenges

### ASSESSMENT OF TRANSITION CHALLENGES 2013

#### ICT

<table>
<thead>
<tr>
<th>Region</th>
<th>ATC 2013: Telecomms</th>
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<tr>
<td></td>
<td>MS 2013</td>
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<td>Central Europe and Baltics</td>
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<td>Croatia</td>
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<td>South Eastern Europe</td>
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<td>Albania</td>
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<td>Bosnia and Herzegovina</td>
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<td>Bulgaria</td>
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<td>FyR Macedonia</td>
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<td>Serbia</td>
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<td>Turkey</td>
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<td>Eastern Europe and Caucasus</td>
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<td>Armenia</td>
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<td>Azerbaijan</td>
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<td>Kyrgyz Republic</td>
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<td>Uzbekistan</td>
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<td>Southern and Eastern Mediterranean Region</td>
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<td>Egypt</td>
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<td>Jordan</td>
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<td>Morocco</td>
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<td>Tunisia</td>
<td>Medium</td>
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**Methodological/Historical changes:**

- Green shading implies an upgrade.
- Red shading implies a downgrade.

MS: Market Structure
MI: Market Institutions
Albania

ICT

Market structure: Medium

Market institutions: Medium

Key challenges: (i) further developing the telecommunications infrastructure (broadband internet); (ii) increasing competition in the fixed-line segment; (iii) further strengthening independence and capacity to regulate of the telecommunications regulator; and (iv) completing the alignment of the regulatory framework with that of the EU.

The telecommunications sector is regulated by the Albanian Authority of Electronic and Postal Communications (AKEP). Although the legal framework for telecommunications is close to that of the EU (the EU 2003 regulatory framework), further progress is needed especially in the implementation of competitive safeguards. There has been some political interference in the regulation of the sector (e.g. in spectrum management). The process of digitalisation of national broadcasting networks is nascent in Albania, presently driven by the Government which is preparing the DSO strategy.

Although the market is liberalised, competition is not very strong in the fixed line segment, with the incumbent Albtelecom (privatised in 2007) dominating over the fixed-line and internet markets. Mobile telephony market is more developed and competitive, improving even further with the entry of the fourth mobile network operator, Plus, in late 2010 and with mobile number portability introduced in 2011. Mobile penetration has already surpassed the EU level. The market is still highly underserved in the broadband internet segment as indicated by a large pent-up demand, high prices and low accessibility (there is a large gap between the total internet and broadband internet penetrations). Broadband internet penetration is still very low even in the SEE context.

Armenia

ICT

Market structure: Medium

Market institutions: Medium

Key challenges: (i) continuing to develop the telecommunications infrastructure (broadband internet); (ii) further developing the regulatory framework (implementing competitive safeguards); and (iii) strengthening the independence of the regulator.

The telecommunications sector is regulated by the Public Service Regulatory Commission (PSRC), a multi-sector regulatory body, which is not yet fully independent. There are still significant challenges in terms of aligning the regulatory framework with best practices (e.g. implementing local loop unbundling). In July 2013, PSRC approved the regulation for mobile number portability which should further strengthen competition in the sector (the regulation was drafted with EBRD support).
Although the telecommunications sector was liberalised at the end of 2007 and VOIP telephony licenses have been granted to several operators, the fixed-line incumbent Armentel (owned by VimpelCom) still holds a de facto monopoly on the fixed market. In the mobile segment, there is competition between three operators, Armentel, Vivacell (owned by MTS of Russia) and Orange (France Telecom Group). Mobile penetration has already increased to over 100 per cent. Internet market is relatively competitive but relatively underdeveloped, with local Internet Service Providers (ISPs) complaining about the high cost and poor quality of connections offered by Armentel. However, during the recent year two other major companies, namely Ucom and a major Russian operator Rostelekom, started to build new generation fiber-optic networks in Armenia providing internet access and fixed telephony services.

**Azerbaijan**

**ICT**

Market structure: *Large*

Market institutions: *Large*

*Key challenges:* (i) continuing to develop the telecommunications infrastructure (broadband internet); (ii) developing the regulatory framework (e.g. establishing an independent regulator and implementing competitive safeguards); (iii) privatising the fixed line incumbent Aztelekom.

Although there have been plans to proceed with reforms, the telecom sector continues to be dominated by the Ministry of Communications and Information Technologies (MCIT), whose triple role as a regulator (through a regulatory department within the Ministry), policy-maker and key shareholder in most telecommunications enterprises (including the fixed-line incumbent Aztelekom) has had a negative impact on the performance of the sector. The regulatory framework is generally under-developed.

The fixed segment is dominated by two state-owned incumbents Aztelekom and Baktelekom (in the capital city Baku). Even though a number of companies hold licenses for fixed telephony, competition is very limited. The mobile market is better developed (with 3 major mobile operators, Azercell, Bakcell and Azerfon), but still lags behind the region. Mobile phone and broadband internet penetration levels have been increasing significantly, although they remain at relatively low levels. Azercell was fully privatised in February 2008, and a CDMA license (450MHz frequency) was issued to Catel in February 2006, which however mainly provides fixed wireless services. Internet services development has been hindered by the lack of local loop development and legislation that would determine the legal status of Internet-related businesses.

**Belarus**

**ICT**

Market structure: *Medium*

Market institutions: *Large*
Key challenges: (i) further developing the regulatory framework (e.g. establishing an independent regulator and implementing competitive safeguards); (ii) privatising the fixed line incumbent Beltelecom and the mobile operators MTS and BelCel.

The state continues to have a strong involvement in the telecommunications sector. The Ministry of Communications and Informatization is the telecommunications regulator as well as policy-maker and key shareholder. The regulatory environment is generally far from best practices (e.g. in terms of developing competitive safeguards or tariff rebalancing). The government has taken steps to develop an independent regulator and improve the regulatory environment, however it remains to be seen what will be the final structure and whether true independence will be established.

In the fixed line segment, the state controlled fixed-line incumbent Beltelecom retains its monopoly over the provision of basic voice services (national and international long distance) and the fixed network infrastructure. In the fixed-line internet market there is some competition from the cable-TV and a few alternative operators but Beltelecom still dominates and has a monopoly over international connections. ISPs are able to provide internet access through Wi-Fi technology from January 2009. In the mobile segment, there are four operators, BeST, BelCel, MTS and MDC. 3G mobile services are available in the market and 4G/LTE services availability is being prepared. Two of the mobile operators have been privatised to foreign investors, but the largest company, MTS Belarus, remains majority state-owned (efforts to privatise the state’s 51 per cent stake have not been successful due to a high asking price). Interconnection between the mobile operators is controlled by Beltelecom. Both fixed and mobile broadband internet penetration is high compared with other countries in the EEC region, although still below Western European markets.

Bosnia and Herzegovina

ICT

Market structure: Medium

Market institutions: Medium

Key challenges: (i) strengthening of the regulatory framework and the regulator’s capacity to regulate; (ii) privatising the fixed line incumbents HT Mostar and BH Telecom; and (iii) continuing to develop the telecommunications infrastructure (broadband internet).

The telecommunications sector is regulated by the Communications Regulatory Agency (RAK). Implementation of modern regulation is lagging behind, especially in areas such as the authorisation regime, universal access provisions or market access. The market has been fully liberalized in January 2006. Both mobile and fixed number portability have now been implemented (mobile number portability was introduced in 2013). The process of digitalisation of national broadcasting networks is nascent, with the country’s present broadcasting infrastructure owned by three separate companies operating in different parts of BiH.

The telecommunications market continues to be dominated by the three ethnically-based fixed line operators (all of them state-controlled, two of them by Bosnia and Herzegovina, one by Serbia), which also operate mobile networks – all of the latter offer near-national
coverage. Republika Srpska sold the incumbent to Telekom Srbije, but plans for the privatisation of the Federation telecom companies, HT Mostar and BH Telecom have been delayed further. In February 2011, the authorities in the Federation indefinitely postponed the privatisation of the latter. In the mobile segment, the three major operators are affiliated with the fixed-line incumbents. They have been designated as possessing significant market power. Internet services are available through both the incumbents and alternative (cable) operators. Broadband internet penetration is still low, well below the EU average, but growing strongly, also thanks to a strong uptake of mobile broadband. There have been significant consolidation efforts in the cable TV segment which has started investing in the provision of advanced services such as broadband internet and telephony, thus putting strong competitive pressure on the fixed line incumbent operators.

Bulgaria

ICT

Market structure: Small

Market institutions: Small

**Key challenges:** (i) continuing to develop the telecommunications infrastructure (broadband internet); and (ii) increasing competition in the fixed line segment.

The telecommunications sector is regulated by the Communications Regulation Commission (CRC), an independent regulatory body. The relevant legislation is in line with the EU requirements. However, implementation has not been fully completed yet (e.g. tariff rebalancing needs to be completed).

In the fixed line segment, the incumbent Vivacom continues to dominate the market, although several alternative operators have been licensed. The continued construction of alternative infrastructure is likely to lead to the breakdown of the incumbent's last-mile monopoly. The mobile segment is highly competitive with three operators, Mobilitel, Globul and Vivacom, and mobile penetration of more than 140%. While historically high interconnection prices have been declining, there is still room for further adjustments to bring them in line with European standards. Broadband penetration has grown substantially over the past few years, but it is still significantly below the European average. Alternative broadband providers based on Wimax technology are also making headway, especially in the main cities, and are expected to further expand coverage.

Croatia

ICT

Market structure: Small

Market institutions: Small

**Key challenges:** (i) further developing the telecommunications infrastructure (broadband internet); and (ii) increasing competition in the fixed line segment.
The telecommunications sector is regulated by the Croatian Post and Electronic Communications Agency (HAKOM), an independent regulator with adequate capacity to regulate. The regulatory framework is aligned with that of the EU (the EU 2009 regulatory framework). Fixed and mobile number portability have been introduced. Analogue broadcasting switch-off has already been completed, freeing up spectrum for mobile broadband services.

Although the market has been fully liberalised, the fixed-line incumbent Hrvatski Telekom (T-HT, controlled by Deutsche Telekom) still retains a major share of the market. However, there are a number of alternative fixed line operators and competition is likely to further intensify. In the mobile segment, there are three network operators, Hrvatski Telekom (controlled by the fixed line incumbent), VIPnet and Tele2. Broadband penetration, including mobile broadband penetration, is increasing steadily. Cable TV segment, potentially a platform to increase competition in the broadband and telephony segments, is still relatively fragmented, especially in the regions.

**Egypt**

**ICT**

Market structure: *Medium*

Market institutions: *Medium*

*Key challenges:* (i) privatising the fixed-line incumbent and facilitating competition in the fixed-line segment, (ii) further developing the regulatory framework (e.g. in terms of the implementation of competitive safeguards and tariff rebalancing), (iii) ensuring full regulatory independence, and (iv) improving intellectual property rights protection.

Based on legislation adopted in 2003, the telecommunications sector is regulated by the National Telecommunications Regulatory Authority (NTRA), with financing separated from the state budget. However, there have been doubts about the de facto full independence of the regulatory process that may still be influenced by the policymaker, the Ministry for Communications and Information Technology (MCIT). Intellectual Property rights protection remains very weak.

The fixed-line segment is dominated by the state-controlled incumbent Telecom Egypt which enjoys a monopoly over the network. The extent of the incumbent’s control over the network has been evidenced by the ability of the state to almost completely block the country’s access to the internet during the recent political crisis. Fixed line penetration is relatively low at about 15 per cent. Broadband internet penetration is very low and the internet take-up by businesses is very slow. Local internet content market has not yet developed.

In the mobile segment, there is competition between three operators, Vodafone Egypt, MobiNil and Etisalat. The sector has been influenced by the entry of major foreign strategic investors but the state still retains a large minority stake (through the fixed-line incumbent Telecom Egypt) in the second largest operator Vodafone Egypt. Mobile penetration has been rising rapidly, reaching about 75 per cent in 2010. In 2013, Telecom Egypt and Etisalat signed a memorandum of understanding to launch an integrated license which should allow Telecom Egypt to start offering mobile services.
Estonia

ICT

Market structure: Small

Market institutions: Negligible

Key challenges: (i) further increasing competition in the fixed line segment.

The telecommunications market is regulated by the Estonian Competition Authority (ECA) and the Estonian Surveillance Authority (ETSA). The regulatory framework is well developed. Estonia also benefits from a developed e-government infrastructure.

There is competition in both the fixed and mobile segments of the market. Although the fixed line incumbent Elion (controlled by TeliaSonera) continues to be the main player with a large market share on the broadband market, competition from cable operators is gradually increasing. Further increase in competition may come from further increase in the use of local loop unbundling and wholesale broadband access. Mobile market is highly penetrated, with competition between four operators, EMT, Elisa, Tele2 and Bravocom. Next generation mobile services (LTE) are already available in the country. Both fixed and mobile broadband penetrations are close to the EU average level.

FYR Macedonia

ICT

Market structure: Small

Market institutions: Small

Key challenges: (i) further developing the telecommunications infrastructure (broadband internet); (ii) further modernising the regulatory framework (aligning it with the EU 2009 regulatory framework); (iii) completing the privatisation of the fixed line incumbent Makedonski Telecom; and (iv) further increasing competition in the fixed line segment.

The telecommunications sector is regulated by Agency for Electronic Communications (AEC), an independent regulatory body. The regulatory framework is relatively well developed, close to the EU framework (the EU 2003 regulatory framework). Competitive safeguards have been implemented, including local loop unbundling and both fixed and mobile number portability. Further improvements could be achieved in tariff rebalancing or rules for granting rights of way.

Although alternative operators have been able to compete since January 2005, competition only started in February 2007 due to a delay in implementing the new regulatory framework. The incumbent Makedonski Telekom, controlled by Magyar Telecom (which in turn is controlled by Deutsche Telekom), continues to dominate the fixed line market, although there is competition coming mainly from mobile and cable operators and the market share of the incumbent has been declining (the share of the alternative operators in the fixed telephony market has reached about 20 per cent). The state continues to be a minority shareholder in the
fixed line incumbent (it also holds a golden share). Mobile market is well-developed, with three competing operators, T-Mobile (controlled by Makedonski Telekom), VIP (controlled by Telekom Austria) and ONE (controlled by Telekom Slovenije), although the uptake of mobile broadband has been relatively slow. The first MVNO (Mobile Virtual Network Operator), WTI Macedonia, started operations in 2010. The broadband internet penetration is still relatively low (especially the mobile broadband internet penetration). The analogue switch-off process was completed in 2013, thus freeing up spectrum for advanced wireless data services.

Georgia

ICT

Market structure: Medium

Market institutions: Small

Key challenges: further developing the telecommunications infrastructure (broadband internet); and (ii) ensuring that the regulator has sufficient enforcement powers.

The telecommunications sector is regulated by the Georgian National Communications Commission (GNCC), which is subject to comprehensive rules on independence and transparency. The regulatory framework is already relatively well developed, largely aligned with the EU requirements (the EU 2003 regulatory framework), although there are still remaining challenges (e.g. ensuring that the regulator has sufficient powers to enforce market access requirements or in the area of universal service regulation). Both fixed and mobile portability were implemented in 2011. The process of digital switch-over has been launched and is expected to be completed by 2014.

In the fixed line segment, the incumbent SilkNet (formerly United Telecom of Georgia, sold by the government to a Kazakh-Georgian consortium in 2006) still controls a large market share, with competition coming from alternative operators Akhali Kselebi, Akhteli and Telecom Georgia. In the mobile segment, there is competition between three operators, Magti, Geocell and Mobitel (Beeline), although interconnection settlements are skewed towards Geocell and Mobitel due to the previous government’s inactivity. There are no mobile virtual network operators (MVNOs). The state does not have any outstanding ownership stakes in the fixed and mobile operators. Mobile network coverage is provided to virtually the whole of Georgia, and mobile communication systems have become increasingly important, as the fixed-line networks are outdated in many places. Internet uptake is improving but suffers from inadequate networks and investment into improvement of the network. Fixed broadband penetration is also improving, particularly in the few larger cities, but is still very low. This is partly compensated for by a relatively high mobile broadband penetration.

Hungary

ICT

Market structure: Small
Market institutions: **Negligible**

**Key challenges:** (i) further developing the telecommunications infrastructure (broadband internet); and (ii) further increasing competition in the fixed line segment.

The telecommunications sector is regulated by the National Media and Communication Authority (NMHH). The regulatory framework in Hungary is well developed, generally aligned with the EU requirements. A number of bitstream, shared access and local loop unbundling agreements are in place (although the use of the latter is rare). Fixed-line number portability has facilitated a relatively high number of transfers since its introduction in 2004. The analogue switch-off process has been delayed and is likely to be completed by 2014. In 2010 the government imposed temporary higher taxes on the telecommunications operators.

Magyar Telecom (controlled by Deutsche Telekom) still controls a major share of the fixed-line market, but the competition has been intense at the local level. The other significant players in the fixed line segment include Invitel, UPC and DIGI. In the mobile segment, competition between three foreign owned operators, Magyar Telekom, Telenor and Vodafone, is intense, and moving to value-added services. The fourth mobile license was awarded to a consortium of state owned companies in 2012, raising questions about the future involvement of the state in the sector. Internet penetration rates are increasing and the broadband market is growing remarkably fast. Hungary has a relatively well developed IT sector, with major international players operating in the country and with a significant hardware manufacturing capacities. The use of services such as e-commerce and e-government is increasing.

**Jordan**

**ICT**

Market structure: **Small**

Market institutions: **Medium**

**Key challenges:** (i) further improving the regulatory framework, including further implementation of competitive safeguards facilitating access to the incumbent’s network and strengthening the independence of the regulator; (ii) further developing data-ready telecommunications infrastructure (broadband internet); (iii) ensuring effective protection of intellectual property rights; and (iv) ensuring alignment of education curricula with business needs.

The telecommunications sector is regulated by the Telecommunications Regulatory Commission (TRC). Concerns about regulatory independence emerged during the unrest in the region. Certain important competitive safeguards, such as number portability, still need to be implemented. Although the software piracy rate of over 50 per cent is lower than in other SEMED or SEE countries, intellectual property rights protection should be further improved. Availability of skills for the ICT sector (alignment of the available skills with the business needs) also seems to be a challenge, despite the fact that the country has one of the highest literacy rates in the region and ranks higher than other countries of the SEMED region in the World Bank’s Knowledge Index.
The ICT sector plays an important role in the economy, accounting for about 12 per cent of GDP. The fixed-line incumbent, Jordan Telecom (controlled by France Telecom) lost its guaranteed monopoly in 2005 and faces competition mainly from major mobile network and WiMAX operators. Furthermore, an alternative fixed-line license has been awarded to Batelco Jordan. Advanced service offerings such as Internet Protocol TV (IPTV), Voice over Internet Protocol (VoIP) and mobile commerce are available in the country. In the mobile segment, there is competition between three major operators, Zain Jordan, Jordan Telecom (branded as Orange) and Umniah (owned by Batelco). Zain and Orange have already been rolling-out 3G services and Umniah is expected to follow soon. The mobile virtual network operator FRiENDi Mobile recently started operations in the country, thus further increasing the competitive pressure in the mobile segment, but certain competitive safeguards such as number portability are yet to be implemented. Overall, the mobile segment is subject to ad-hoc government tax intervention; in July 2013, the government increased the special tax imposed on mobile phones from 8% to 16%, and the tax imposed on mobile subscriptions from 12% to 24% in an attempt to reduce its fiscal deficit.

Internet penetration has reached about 40 per cent, i.e. a level similar to other SEMED countries and slightly below the average for the SEE region. Although Jordan Telecom remains the major provider of broadband internet, it faces increasing competition from mobile operators offering 3G services. Fixed line broadband penetration is still low, however mobile broadband access is improving rapidly, indicating the importance of the mobile-fixed substitution in the SEMED region.

Kazakhstan

ICT

Market structure: Medium

Market institutions: Medium

Key challenges: (i) privatising the fixed line incumbent Kazakhtelecom (KTC); (ii) increasing competition in the fixed line segment; (iii) further developing the telecommunications infrastructure (broadband internet in the regions); (iv) ensuring the independence of the telecommunication regulator; and (v) further developing the regulatory framework (especially implementing and enforcing competitive safeguards).

The Ministry of Transport and Communications is formally responsible both for policy and regulation in the telecommunications sector, though decision making and regulation is somewhat fragmented amongst other actors in the sector. Thus, the regulator is not independent. There are significant challenges in terms of aligning the regulatory framework with best practices (especially implementation and enforcing competitive safeguards such as number portability, local loop unbundling, duct access or completing tariff rebalancing).

The government still holds a 51 per cent stake in the fixed line incumbent KTC which still dominates the fixed-line market (it controls about 80 per cent of the market). The main competition in the fixed line segment comes from other state-controlled companies, Transtelecom and Kaztranscom but also private operators Beeline (Vimpelcom). In the mobile segment, there is competition between the leading players K-Cell, KaR-Tel, Altel and Tele2. KTC sold its 49% stake in K-Cell in February 2012 to TeliaSonera, the 51% owner,
and in December 2012 there was a listing of K-Cell. The Internet is one of the fastest growing segments of the telecoms market, with broadband penetration increasing significantly above other countries of Central Asia. Regional disparities in terms of broadband penetration however remain significant.

**Kosovo**

**ICT**

Market structure: Medium

Market institutions: Medium

*Key challenges: (i) developing modern telecommunications infrastructure (broadband internet); (ii) privatising the fixed line incumbent PTK; and (iii) further improving the implementation and enforcement of a modern regulatory framework (including competitive safeguards such as number portability, local loop unbundling or wholesale broadband access).*

The liberalisation of the telecommunications market was completed in 2008. A new Law on Telecommunications, aligned with the EU 2009 framework, was adopted in 2012. The telecommunications sector is regulated by the Regulatory Authority of Electronic and Postal Communications. Most of the standard competitive safeguards (such as number portability, local loop unbundling or wholesale broadband access) still need to be implemented and enforced.

In the fixed line segment, there is competition between the state owned incumbent Post and Telecommunications Kosovo (PTK, whose privatisation has been going through very lengthy negotiations and is yet to be closed), IPKO Telecommunications (controlled by Telekom Slovenije) and to some extent also the locally owned operator KONET. Fixed-line penetration is very low. In the mobile segment, there is a competition between two mobile network operators (PTK and IPKO Telecommunications) and two mobile virtual network operators (MVNOs). 3G or 4G services are not yet available in the country. Mobile penetration is also significantly below the SEE average. The broadband penetration is still very low.

**Kyrgyz Republic**

**ICT**

Market structure: *Large*

Market institutions: *Medium*

*Key challenges: (i) further developing the telecommunications infrastructure (broadband internet); (ii) further increasing competition in the fixed line segment; (iii) privatising the fixed line incumbent Kyrgyztelecom; (iv) completing the privatisation of the mobile operator MegaCom; and (v) further developing the regulatory framework (e.g. ensuring the independence and sufficient capacity of the regulator and implementing competitive safeguards).*
The telecommunications sector is regulated by the State Communications Agency (SCA) which is partially independent. The regulatory framework is relatively under-developed and sufficient competitive safeguards are missing (e.g. there is no number portability). The regulatory capacity of the regulator is limited.

In the fixed line segment, the majority state owned fixed-line incumbent Kyrgyztelecom still dominates the market, although alternative operators have been licensed. The attempt to privatise the incumbent in February 2010 was annulled following the political and social turmoil in 2010, two attempts were unsuccessful in 2012 as no bids had been received and recently the Government has proposed to exclude the company from privatisation plan 2012-2014. Private operators are active in the mobile and Internet markets, heavily investing in the relevant infrastructure. Although there are seven mobile network operators in the mobile market, the two biggest operators, MegaCom (controlled by MegaFon) and SkyMobile (controlled by VimpelCom) dominate the market. MegaCom was partially nationalised after the April 2010 events and the state continues to hold a significant minority stake in the operator. Although the country has one of the largest numbers of Internet users per capita in Central Asia, Internet access is concentrated in urban areas and broadband Internet penetration is very limited in rural areas.

Latvia

ICT

Market structure: Small

Market institutions: Negligible

Key challenges: (i) selling the remaining government owned shares in the fixed line incumbent Lattelecom and the mobile operator LMT; and (ii) further increasing competition in the fixed line segment.

The telecommunications sector is regulated by the Public Utilities Commission (PUC), a multi-sector regulatory body. The regulatory framework is already well developed in Latvia, although there are remaining challenges such as the need to implement tariff rebalancing.

In the fixed line segment, the state-controlled incumbent Lattelecom continues to dominate the market, despite the liberalisation of the market in 2003 and the presence of a number of alternative operators. The latter have complained about the high installation charges levied by the incumbent. Also, Lattelecom owns the cable ducts and cost of access for other operators to these ducts is considered high, forcing them to use aerial cables. This might restrict their market access in the future as municipal authorities are becoming reluctant to see a proliferation of aerial cables. In the mobile segment, there is a strong competition between three operators, LMT, Tele2 and Bite. The state still keeps its stake in the leading mobile operator, LMT. The Internet market is dominated by Lattelecom, but alternative operators provide competition. Broadband Internet penetration is expected to continue growing strongly, also as a result of the EU funds for rural broadband deployment.
Lithuania

**ICT**

Market structure: *Small*

Market institutions: *Negligible*

*Key challenges:* (i) further increasing competition in the fixed line segment.

The telecommunications sector is regulated by the Communications Regulatory Authority. The regulatory framework is already well developed, aligned with the EU requirements.

In the fixed line segment, the incumbent Lietuvos Telekomas (TEO) has managed to maintain a significant market share despite fixed-line market liberalisation. In the mobile segment, there is competition between Bite, Ommitel, Tele2 and a number of mobile virtual network operators (MVNOs). The largest player in the broadband Internet market is the incumbent TEO. Internet access via mobile telephony is the fastest growing form of internet uptake. Although the broadband internet penetration is still below the EU average, the average speed is relatively high due to a very good coverage of fibre networks.

Moldova

**ICT**

Market structure: *Medium*

Market institutions: *Medium*

*Key challenges:* (i) further increasing competition in the fixed line segment; (ii) privatising the fixed line incumbent; (iii) further developing the regulatory framework; and (iv) further developing the telecommunications infrastructure (broadband internet).

The telecommunications regulator is independent and has sufficient investigation and decision power, but the sanctions it may impose are limited. The regulatory framework still needs to be further developed, e.g. in terms of tariff rebalancing. In 2013, conditions for competition have improved thanks to the implementation of mobile number portability.

Although the market was liberalised as part of the WTO requirements in 2004 and a number of alternative operators have commenced operations, the state owned fixed line incumbent Moldtelecom continues to dominate the market. Efforts to privatise the incumbent have failed repeatedly. Mobile penetration rates are growing rapidly, although from a relatively lower level. Mobile services are offered by Moldcell, Orange, Eventis and Unite (controlled by the state-owned incumbent Moldtelecom), with an additional one in Transdnistria (IDC). Both dial-up and broadband Internet services are available, although broadband penetration rate is still low. Moldtelecom is the dominant broadband provider.
Mongolia

ICT

Market structure: Large

Market institutions: Medium

Key challenges: (i) privatising the fixed line incumbent Mongolia Telecom; (ii) further developing the regulatory framework; and (iii) further developing the telecommunications infrastructure (broadband internet, mainly outside larger urban areas).

The telecommunications sector is regulated by the Communications Regulatory Commission of Mongolia (CRC). The regulatory framework is still relatively far from best practices (e.g. in terms of the implementation of competitive safeguards such as local loop unbundling or number portability). To address the challenge of low access, a universal access fund was established with a transparent system to bid for the government subsidies to establish telecom networks in rural areas.

The fixed-line incumbent, Mongolia Telecom, continues to be majority state-owned (with a significant minority stake of Korea Telecom) but it is included in the list of state-owned companies that the government intends to privatise. The incumbent faces competition mainly from mobile operators. In the mobile segment, there is competition between four operators, MobiCom, Skytel, Unitel and G Mobile. Three of the operators are offering 3G services. The maturing mobile segment has recently seen explosive growth and reduction of the market share of the dominant MobiCom from some 90 per cent few years ago to about 50 per cent in 2009. Internet penetration is strong in urban centres, but the rural sector is also catching up. Both fixed and mobile broadband penetration rates, however, are still very low and some areas are not yet connected to the Internet. The penetration of e-commerce services has been increasing.

Montenegro

ICT

Market structure: Small

Market institutions: Medium

Key challenges: (i) further increasing competition in the fixed line segment; (ii) further developing the telecommunications infrastructure (broadband internet); and (iii) further modernising the regulatory framework (aligning it with the EU 2009 regulatory framework).

The telecommunications sector is regulated by the Agency for Electronic Communications and Postal Affairs (EKIP). Its independence could be further improved. The regulatory framework is close to the EU framework (the EU 2009 regualtory framework) but there are still gaps in the practical implementation. The Digital Switchover strategy was adopted in 2008 and the public broadcaster, RTVCG, has been supported by the EU in the on-going digitalisation process. In 2012, the date of the analogue switch-off was postponed till 2015.
The incumbent, T-Crnogorski Telekom, has been privatised (it is now controlled by Magyar Telekom) and the government has no stake in it, but it continues to dominate the fixed-line market. A number of licenses were awarded in 2007 to encourage fixed-line market competition and development of the cable TV market. The mobile segment is relatively well developed, with competition between three operators, Telenor, MTEL and Crnogorski Telekom. Mobile penetration is very high, partly compensating for a declining fixed line penetration. 3G and HSDPA services were launched in 2007, enabling the launch of new mobile broadband services. 4G/LTE service trials have already begun. Broadband internet is available through a variety of platforms, including WiMAX, and the penetration levels have improved significantly (although they are still significantly below the levels typical in Western Europe or the CEB region).

**Morocco**

**ICT**

Market structure: *Small*

Market institutions: *Medium*

*Key challenges: (i) ensuring full regulatory independence of the telecommunications regulator; (ii) further developing the telecommunications infrastructure (broadband internet); (iii) improving intellectual property rights; and (iv) developing high skilled human capital.*

The telecommunications sector is regulated by the Agence Nationale de Réglementation des Télécommunications (ANRT), which does not appear to be fully independent. Its board is chaired by the prime minister and seems to have a limited ability to impose sanctions. Further improvements are needed to align the implementation of the regulatory environment with the standards typical for the EU countries (e.g. the authorisation regime). Number portability has already been implemented. Weak intellectual property rights protection and lack of highly skilled human capital appear to be obstacles to the development of the knowledge economy. The analogue to digital switchover is expected to be completed by 2015.

There is competition in all the main segments of the telecommunications market: there are three main players in the fixed-line and mobile segments, and a number of internet services providers. However, the fixed-line incumbent, Maroc Telecom (MT), has a strong position in all segments. MT controls the biggest mobile operator, with over 50 per cent market share. It has been partially privatised, with the state retaining a minority stake (however, the current owner Vivendi has initiated a sale process for its stake to be sold to Etisalat of the UAE). Broadband internet penetration is still very low. On the other hand, Morocco has a well developed off-shoring industry, mainly providing services for French corporate customers. The government has been investing in a number of technology parks.
Poland

ICT

Market structure: Small

Market institutions: Negligible

Key challenges: (i) further developing the telecommunications infrastructure (broadband internet), including the efficiency of the infrastructure; and (ii) further increasing competition in the fixed line segment.

The telecommunications sector is regulated by the Office of Electronic Communications (UKE). The regulatory framework is well developed, generally aligned with the EU requirements. The main competitive safeguards have been implemented, although the use of local loop unbundling has remained relatively rare and access to the incumbent’s backbone network is still restricted.

In the fixed line segment, the privatised incumbent, Telekomunikacja Polska (TP), competes with alternative operators in the local, long-distance and international call segments, but still controls a major share of the market. Increasing consolidation of the alternative operators is creating a stronger challenge for the incumbent. In the mobile segment, there is intense competition between four leading operators, Orange, Polkomtel (privatised in 2011), T-Mobile and Play, a number of smaller players and a number of MVNOs. Fixed broadband internet penetration remains significantly below the EU average, but it should increase as the incumbent TP was forced by the regulator to open its network to rivals and finalise a number of local loop unbundling and bit stream access agreements with alternative operators. Mobile broadband is relatively more developed, with a penetration level close to the EU average. New technologies, such as LTE, are expected to further improve broadband internet uptake in the future. While carrier-neutral data centres started emerging recently, collocation and hosting space in relation to the country’s population is still lower compared to Western European standards. The use of e-commerce is increasing but from a relatively low base.

Romania

ICT

Market structure: Small

Market institutions: Small

Key challenges: (i) completing the privatisation of the fixed line incumbent Romtelecom; (ii) further developing the telecommunications infrastructure (broadband internet); and (iii) ensuring the independence of the telecommunications regulator.

The telecommunications sector is regulated by the National Authority for Management and Regulation in Communications (ANCOM) and partly also the Ministry of Communications and Information Society which controls a significant minority stake in the fixed line incumbent. Although the regulatory framework is already relatively well developed, the independence of the regulator has been questioned by the EC.
In the fixed line segment, the incumbent Romtelecom (controlled by the Greek group OTE) still controls a large share of the market, but faces increasing infrastructure competition from alternative operators with significant market shares. The state still has a significant minority stake (46%) in the incumbent. In the mobile segment, there is competition between four mobile network operators, Orange, Vodafone, Cosmote and RCS&RDS. Demand for broadband services has been increasing, although the current broadband penetration is still significantly below the EU average. 4G/LTE services have already been launched in Romania, thus further improving conditions for the development of broadband internet availability. The use of services such as e-commerce and e-government remains relatively low.

Russia

ICT

Market structure: Medium

Market institutions: Medium

Key challenges: (i) ensuring the independence of the telecommunication regulator; (ii) further developing the regulatory framework (e.g. implementing and enforcing competitive safeguards); (iii) privatising the fixed line incumbent Rostelecom; (iv) increasing competition in the fixed line segment; and (v) further developing the telecommunications infrastructure (broadband internet in the regions).

The telecommunications sector is regulated by the Ministry of Communications which is not independent. Although Russia’s long-distance market was fully liberalised in January 2006, there are still significant challenges in terms of aligning the regulatory framework with best practices (e.g. implementing competitive safeguards such as number portability or local loop unbundling). As part of the WTO negotiations, Russia has committed to eliminating the current restrictions on foreign investment in the telecommunications sector (to be implemented within four years after accession) and to implementing the WTO’s Basic Telecommunications Agreement. The process of rolling out the next generation mobile network (LTE / 4G) has recently raised significant concerns about the transparency of the regulatory process in the country.

In the fixed line segment, the state-controlled incumbent Rostelecom still controls a major market share. It controls the majority of long-distance/international and local calls. In 2013, the government included Rostelecom in the list of state-owned companies to be privatised by 2018. Effective competition in the local fixed-line market has been hampered by the lack of an effective network access regulatory regime, with alternative operators consequently deploying alternative access network infrastructure. Another state-controlled operator, TTK (owned by Russian Railways), has strengthened its position in the market through acquisitions and a consolidation of its regional subsidiaries in 2013. The leading players in the highly competitive mobile segment are MTS, Vimpelcom and Megafon. The fixed line incumbent Rostelecom is also increasingly focusing on the mobile segment. Further competition comes from Tele2, although its position in the market had been negatively impacted after it failed to secure access to the 4G/LTE spectrum in a tender. In April 2013, Tele2 was sold to the state-owned bank VTB, thus further increasing the state’s involvement in the telecommunications sector in Russia. VTB recently agreed on a 60:40 joint venture with
Rostelecom’s mobile operations. Mobile penetration is already high (although the apparent very high SIM card penetration is partly due to the popularity of multiple SIM card ownership and the predominance of pre-paid services), including the average penetration in the regions. The Russian broadband internet market is well developed in Moscow and St. Petersburg, but not yet in the rural areas. A number of players employ a variety of technologies. However, consolidation has already started. The process of analogue switch-off and transition toward digital terrestrial TV varies by regions and should be completed by 2015.

**Serbia**

**ICT**

Market structure: *Medium*

Market institutions: *Medium*

*Key challenges:* (i) privatising the fixed line incumbent Telekom Srbija; (ii) further increasing competition in the fixed line segment; (iii) further developing the telecommunications infrastructure (broadband internet); and (iv) further modernising the regulatory framework (aligning it with the EU 2009 regulatory framework).

The telecommunications sector is regulated by the Republic Agency for Electronic Communications (*RATEL*). The regulatory framework is aligned with the EU 2003 regulatory framework. Implementation of competitive safeguards is lagging behind (e.g. local loop unbundling is at an early stage and fixed number portability is yet to be introduced). The digital switchover process is still at a relatively early stage (in 2013, the digital switch-off date was postponed to 2015). In 2012, the fixed-line telecommunications market was finally fully liberalised.

The fixed line segment is dominated by the incumbent Telekom Srbija which continues to be fully state owned. The government has tried to privatise the incumbent but without success. The main competitors are cable and mobile operators. Telenor was awarded the second fixed line license in 2010. In the mobile segment, there is competition between three operators, Telekom Srbija, Telenor and VIP mobile, but mobile broadband is still at a relatively early stage. There are no mobile virtual network operators (*MVNOs*).

**Slovak Republic**

**ICT**

Market structure: *Small*

Market institutions: *Small*

*Key challenges:* (i) completing the privatisation of the fixed line incumbent Slovak Telekom; (ii) further increasing competition in the fixed line segment; and (iii) further developing the telecommunications infrastructure (broadband internet).
The telecommunications sector is regulated by the Telecommunication Office of the Slovak Republic (TUSR). The regulatory framework is already relatively well developed, generally aligned with the EU requirements; although some implementation challenges remain (e.g. local loop unbundling has not yet been used extensively).

The fixed-line market has been liberalised since 2003, but the incumbent Slovak Telekom (controlled by Deutsche Telekom) retains its dominant market position and the competition has been undermined by network connection issues (the first local loop unbundling agreement was signed as late as in 2009). The state continues to hold a significant minority stake in the incumbent (49%) which the government intends to privatise. In the mobile segment, there is competition between three operators, T-Mobile, Orange and Telefonica O2. A number of alternative operators have entered the market for internet access provision. Broadband internet market has seen high growth in recent years.

Slovenia

ICT

Market structure: Small

Market institutions: Negligible

Key challenges: (i) privatising the fixed line incumbent Telekom Slovenije and the leading mobile operator Mobitel.

The telecommunications sector is regulated by the Post and Electronic Communications Agency (APEK). The regulatory framework is already relatively well developed, generally aligned with the EU requirements.

The fixed-line sector is still dominated by the state-controlled incumbent Telekom Slovenije, which is now designated for privatisation. Competition from alternative operators / cable TV providers, such as Telemach, has been increasing. In the mobile segment, there is competition between four operators, Mobitel (the mobile arm of Telekom Slovenije), Si.mobil, Tsmobil and T2, and a number of mobile virtual network operators (MVNOs). The mobile segment is still dominated by Mobitel, whose share has however been declining over time. Slovenia’s high Internet penetration is on par with Western European countries. 4G/LTE services have already been launched in Slovenia, thus further improving the conditions for improved access to broadband internet. DSL and cable broadband services are widely available, with SiOL, the internet arm of Telekom Slovenije, the most significant player in the market, facing competition from ISPs and cable operators.
Tajikistan

ICT

Market structure: Large

Market institutions: Large

Key challenges: (i) privatising the fixed line incumbent Tajiktelecom; (ii) developing the telecommunications infrastructure (broadband internet); (iii) ensuring independence of the telecommunications regulator; and (iv) further developing the regulatory framework (e.g. in terms of the implementation of competitive safeguards such as number portability, access to the incumbents network etc.).

The telecoms regulator is part of the Ministry of Transport and Communication, and there has been much political manoeuvring about which entity will exercise responsibility for approval of tariffs. The regulatory framework is generally under-developed (e.g. in terms of the implementation of competitive safeguards such as number portability or access to the incumbent’s network).

The incumbent fixed-line operator, Tajiktelecom, continues to be owned by the State and it still has a monopoly in fixed-line services. Although fixed line penetration remains very low due to geographical factors, there has been an impressive growth in mobile penetration. The main competitors in the mobile segment are Babilon-Mobile, Tcell (ultimately controlled by TeliaSonera), Beeline Tajikistan (controlled by VimpelCom) and Megafon Tajikistan. 3G networks, and to some extent also 4G/LTE services, are available. However, internet penetration is still very low.

Tunisia

ICT

Market structure: Medium

Market institutions: Medium

Key challenges: (i) completing the privatisation of the fixed-line incumbent and re-privatizing the recently frozen stakes in network operators; (ii) continuing to develop the telecommunications infrastructure (broadband internet); (iii) ensuring the independence and strengthening capacity of the telecommunications regulator; and (iv) improving the protection of intellectual property rights.

The telecommunications sector is regulated by the Instance Nationale des Télécommunications (NTI) and the Ministry of Communication and Technologies. Regulatory responsibilities are distributed between these two bodies, thus raising concerns about sufficient independence of the regulatory process. The NTI’s capacity to regulate also needs to be improved further. Intellectual property protection needs to be further supported as indicated by the relatively high software piracy rate (over 70 per cent).
The incumbent, Tunisie Telecom (TT), maintains a dominant position in the fixed line segment, but a second fixed-line license has been awarded to Orange. Although the government privatised a 35 per cent stake in 2006 (stake sold to the UAE’s Dubai Holdings who recently announced intentions to sell it), TT remains majority state controlled and an IPO has recently been cancelled. In the mobile segment, there is competition between three main players, TT, Tunisiana (controlled by Ooredoo, formerly known as Qatar Telecom) and Orange. Following the events from 2011, some of the assets in the telecom sector, including stakes in the operators Tunisiana and Orange Telecom, were frozen by the interim government due to the owners’ links to the previous regime. In 2013, the Tunisian government sold a 15 per cent stake in Tunisiana to Ooredoo (thus increasing the latter’s stake to 90 per cent and reducing the state’s stake to 10 per cent). There is competition between a number of private and public internet service providers (ISPs), one of them controlled by TT. Fixed broadband internet penetration has been increasing rapidly, reaching close to 5 per cent in 2010, i.e. a level below the average for the transition region of close to 10 per cent, but significantly higher than in Egypt and Morocco.

Turkey

ICT

Market structure: Medium

Market institutions: Small

Key challenges: (i) completing the privatisation of the fixed line incumbent Turk Telekom; (ii) further developing the telecommunications infrastructure (broadband internet in regional areas); and (iii) further modernising the regulatory framework (aligning it with the EU 2009 regulatory framework).

The telecommunications sector is regulated by the Information and Communications Technologies Authority (ICTA), an administratively and financially independent national regulatory authority. The regulatory framework is relatively developed, being close to the EU 2003 EU regulatory framework, although there is a potential for further implementation (e.g. tenders for the designation of universal service providers or procedures for the implementation of rights of way). The digitalisation process is still at relatively early stages.

In the fixed line segment, the incumbent Turk Telekom continues to be dominant due to the reach of its copper-based network. It still maintains a dominant position in the broadband internet market, although its market share has been consistently decreasing since 2006 and there are a large number of competing ISPs. In the mobile segment, there is a competition between three operators, Turkcell, Vodafone and Avea, although the mobile services penetration is still below the EU level. Turkcell continues to control a market share of over 50 per cent, despite the availability of mobile number portability. There are no mobile virtual network operators (MVNOs) in the market. The state continues to hold a 30 per cent stake and a golden share in the incumbent, as well as an indirect minority stake in the mobile operator Avea. Mobile broadband is growing strongly and takes an increasing share of the broadband market. The number of internet users has increased significantly, although the overall penetration remains relatively low, with important regional disparities. Broadband penetration is expected to further increase as a result of the planned expansion of Turk
Telekom’s network infrastructure in the more remote regions of Turkey (partly financed by the EBRD).

**Turkmenistan**

**ICT**

Market structure: *Large*

Market institutions: *Large*

*Key challenges:* (i) privatising the fixed line and mobile incumbents; (ii) liberalising the market, establishing an independent regulator and adopting modern regulatory framework; and (iii) further developing the telecommunications infrastructure (broadband internet in regional areas).

Unlike the other Central Asian countries, Turkmenistan has made only very limited efforts to liberalise its telecoms market. The Ministry of Communications plays the role of both the regulator and policy maker and controls a number of state enterprises in the post and telecommunications sectors. The state-owned incumbent Turkmen Telecom has been the primary provider of public telephone, email and Internet services. In 2000 it was granted a monopoly over data services, thus seriously stifling growth of the Internet sector. Even though Internet cafes were starting to open again in Ashgabat in mid-2006, Internet access is still restricted and controlled. In the mobile segment, Altyn Asyr (formerly a subsidiary of Turkmen Telecom) competed with MTS Turkmenistan, owned by the Russian telecommunications group MTS. In December 2010 the authorities suspended the license of MTS Turkmenistan, thus leaving the then state owned Altyn Asyr as the only active mobile operator in the country. In 2012, MTS was allowed to resume operations in the country. In April 2013 Altyn Asyr was privatised but without any publicly announced open tender.

**Ukraine**

**ICT**

Market structure: *Medium*

Market institutions: *Medium*

*Key challenges:* (i) ensuring independence of the telecommunications regulator; (ii) further modernising the regulatory framework (implementing competitive safeguards); (iii) increasing competition in the fixed line segment; and (iv) further developing the telecommunications infrastructure (broadband internet).

The telecommunications sector is regulated by the National Commission for the State Regulation of Communications and Informatization (NCCIR). The regulator is not fully independent. Competitive safeguards such as number portability or local loop unbundling have not been fully implemented. A 3G license has been awarded to the incumbent Ukrtelecom without a proper call for tender. Mobile number portability is expected to be launched by the end of 2013.
In the fixed line segment, the incumbent Ukrtelecom still dominates the market. Since the market was liberalised a number of alternative operators started offering fixed-line services but with a focus predominantly on the higher-value business segment. In 2011, Ukrtelecom was finally privatised to a private equity group Epic, the only bidder in a privatisation tender with very restrictive terms. In 2013, Ukrtelecom was then sold to Rinat Akhmetov (SCM). However, competition is intensifying, particularly in light of the network expansions by a number of wireless local loop (WLL) operators. In the mobile segment, there is competition between three leading operators, MTS, Kyivstar and Astelit. The penetration level above 100 per cent and price wars have left smaller mobile players struggling. Both fixed and mobile broadband internet penetrations are still relatively low. The Ukrtelecom’s near monopoly over the local loop and backbone network will continue to hinder market development, but broadband uptake is beginning to increase – also due to the availability of alternative fibre-optic infrastructure.

Uzbekistan

ICT

Market structure: Large

Market institutions: Large

Key challenges: (i) privatising the fixed line incumbent Uzbektelecom; (ii) liberalising the market, establishing an independent regulator and adopting modern regulatory framework; and (iii) further developing the telecommunications infrastructure (broadband internet in regional areas).

The telecoms regulator, Communications and Information Agency (ACI), is not independent. The fixed line incumbent Uzbektelecom continues to be state-controlled. Active competition is provided by a number of fixed and Internet service providers plus five mobile companies, but the incumbent dominates the fixed-line market. The mobile market is more competitive and dynamic than the fixed market, and the three GSM players are owned by experienced international operators (MTS and VimpelCom and TeliaSonera). Mobile penetration over the last few years has been growing very quickly. However, the authorities have recently suspended the license of MTS on the grounds of deteriorated quality of the services and tax evasion. Broadband internet penetration is still low. The government failed to open the market to competition and to give up attempts to control the Internet.
Annex 2 Electronic Communications Sector Assessment Summary

ELECTRONIC COMMUNICATIONS SECTOR ASSESSMENT SUMMARY
SUB-REGIONAL OVERVIEW AND GAP ASSESSMENT

1. Regional overview – Group A - Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan and Ukraine plus Mongolia,

The 11 countries which encompass the bulk of the former Soviet Union (Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan and Ukraine) plus Mongolia, have a total population of around 280 million (2010), with Russia the largest (142 million) and Mongolia the smallest (2.7 million).

The telecommunications market in Russia generates over 70 per cent of the total telecommunications revenues of the group, which totalled around €39 billion in 2011. The region’s markets differ by size, maturity, availability and quality of services. The conditions for investors are influenced not only by the geographical conditions and economic development, but also by the relatively slow pace of liberalisation and regulatory development, compared with the EU. Penetration of telecommunications services is low by EU standards, and in the cases of Kyrgyz Republic, Mongolia, Tajikistan and Turkmenistan, very low.

Mobile services play a far greater role in the region’s markets than in the EU. In the Group A region, there are now 5.4 mobile phone subscriptions for every one fixed-line, compared with 3.2 in the EU. In Mongolia, Tajikistan and Kyrgyz Republic, where fixed networks are the least developed, there are around 10 mobile phones for every fixed-line.

- Fixed-line penetration averages 25 per 100 population for the region, compared to an average EU penetration of 40/100 population. All countries are below the EU average, with Kyrgyz Republic and Turkmenistan having around one quarter of the EU average and Tajikistan and Mongolia less than one fifth.
- Mobile subscriber penetration in the region is 135/100 and exceeds the EU rate of 127. Russia maintains the highest rates at around 181/100 population and Kazakhstan (151/100 population) also has higher levels than the EU. The remaining countries are below the EU average, with Tajikistan and Turkmenistan the lowest at less than half the average for the EU.
- Broadband services are still at a relatively early stage, with an average penetration of total broadband subscriptions (fixed plus mobile) below 20/100 population compared with the EU level of 71/100 population. Armenia, Azerbaijan, Georgia and Russia have led the way, with total broadband penetration levels above 20/100 population. In Kyrgyz Republic and Turkmenistan, broadband penetration remains below 1/100 population.

All countries now have legally liberalised markets. Armenia, Azerbaijan, Georgia, Moldova and Ukraine are now actively working towards alignment with the EU regulatory framework.

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9. The main mobile operators in the region generally charge very low retail on-net call tariffs, using high off-net call tariffs to compensate. This leads most customers to subscribe to two or three networks, which greatly increases the quoted penetration figures.
In all countries of the region fixed-line services are still dominated by incumbents, while mobile services are fiercely competitive, with at least three mobile operators in each country (except Turkmenistan).

Broadband communications are showing the greatest growth potential in those markets that are becoming generally more competitive. All countries now have 3G mobile services. Commercial 4G/LTE services are reported to have been launched in Armenia, Kyrgyz Republic, Moldova and Russia.

Legal/Regulatory Issues – Group A

The main areas where best practice remains to be implemented to reduce the overall legal/regulatory risk are:

- **The legal frameworks** in a number of Group A countries require better provision for independent decision-making for sector regulatory agencies in terms of structure, source and sustainability of funding and decision-making procedures. The legal frameworks for licensing need to introduce general authorization regimes (removing the need for specific types of licence) and remove the need for a regulatory decision before market entry becomes possible (unless genuinely scarce resources are involved). The legal frameworks of many Group A countries also need to better ensure a more internationally consistent methodology is used for market analysis and determination of operators with significant market power, and follow-up with appropriate and proportionate market-based remedies to provide normally expected competitive safeguards. In general, the legal frameworks for spectrum management, universal service, consumer protection and numbering administration need further modernising to better incorporate up-to-date best practice. Georgia and Moldova are notably closer to best practice in these areas, ranking first and second in the Group A countries, while significant revision of sector and related legal frameworks is required in Azerbaijan, Kazakhstan, Kyrgyz Republic, Tajikistan and Turkmenistan to better ensure alignment with best practice.

- **The movement of sector organisation and governance** more towards best practice requires the creation of improved regulatory structures in Azerbaijan, Kazakhstan, Kyrgyz Republic, Russia, Tajikistan and Turkmenistan. Legal and regulatory risk would also likely improve if state shareholdings in sector operators were reduced in all countries (except Armenia, Georgia and Ukraine where full privatisation has already been achieved). In general in Group A countries, regulatory capacity needs strengthening to deal with more dynamic and increasingly competitive markets, and regulatory procedures need to become more transparent and predictable. Among the Group A countries, Armenia, Georgia, Moldova and Ukraine have achieved higher levels of implementation of best practice in sector organisation and governance, whilst significant changes will be necessary in Kyrgyz Republic and Turkmenistan to bring those countries closer to the higher ranked members of the group.

- **Market conditions for wired services operators generally** appear least promising in the Group A countries, with significantly greater levels of legal/regulatory risk when compared with countries that have done more to implement best practice. Georgia appears to have the easiest market entry conditions and implemented the most competitive safeguards. Notably, the remaining countries still lack number portability in fixed services. All the Group A countries (apart from Georgia and Moldova) maintain some form of fixed licensing requirement and have yet to move to the more progressive
general authorisation scheme seen in more advanced regulatory environments (such as the EU member or candidate countries), with some still requiring separate types of licences and permission from the regulator to enter wired markets. Additionally, access to public and private rights of way could be improved in all Group A countries, while interconnection and infrastructure access regulation has yet to match best practice, with better enforcement necessary in most countries to remove discrimination and to make use of modern cost models to set interconnection and access charges. The remaining barriers to access caused by ineffective wholesale markets in infrastructure appear to contribute significantly to lower than expected broadband penetration. Fixed line retail charges remain unbalanced in all Group A countries except Armenia.

- **Market conditions for wireless services.** Growth and competition remain strong in mobile markets, filling the gap caused by generally low fixed network coverage. To ensure this growth continues, and capacity matches demand, the transition to more a market-led spectrum management regime needs to be accelerated. Recent moves in Russia that have made significant new spectrum available to meet the growth of broadband are notable in this respect. In the other Group A countries, provision needs to be made for spectrum re-farming and trading, national roaming and for virtual mobile operators to enter the market (Russia alone amongst Group A countries has MVNOs). Increased flexibility as to the uses allowed for spectrum is also a key aspect of modern regulatory practice. However, in the Group A countries, spectrum usage is understood to be technologically neutral only in Armenia, Mongolia and Tajikistan. While making available further spectrum for exploitation by wireless services through the analogue to digital broadcasting switchover process is a key regulatory task, the switch off of analogue broadcasting appears to be being left to the last possible date (June 2015) in many Group A countries, thereby delaying valuable spectrum redeployment for broadband expansion, which is especially important in rural areas.

- **Fees and taxation.** Special taxes are imposed on operators or consumers in Georgia, Kazakhstan, Moldova, Tajikistan, Turkmenistan and Ukraine, arguably reducing the incentive to invest and reinvest. Where there is a legacy system for subsidising low-priced basic services from operators’ universal service contributions (for example in Kazakhstan) or (in some Group A countries) an informal requirement that the incumbent operator provide certain universal services without specific reimbursement, this should be replaced with an incentive-based funding system to support co-operative investment in broadband infrastructure into rural areas. In Armenia, Azerbaijan, Kazakhstan, Russia, Tajikistan and Turkmenistan the regulatory function is still directly reliant on state budget funds. The introduction of a system of sector-funded administrative fees would likely reduce the overall regulatory risk. In all cases, the overall transparency and predictability of operators’ fees and taxes needs to be improved.

- **Information society progress.** Azerbaijan and Ukraine appear to have already implemented the main safeguards for ease of internet service provision, electronic documents and signatures, personal data protection, liberalised domain name registration and protection against cybercrime. The other Group A countries need to complete the implementation of these information society safeguards to give the required confidence to investors. This is particularly the case in Mongolia and Turkmenistan.

2. **Regional overview – Group B -** Albania, Bosnia-Herzegovina, Croatia, FYR Macedonia, Montenegro, Serbia and Turkey
The seven countries of the south east Europe/western Balkans grouping (Albania, Bosnia-Herzegovina, Croatia, FYR Macedonia, Montenegro, Serbia and Turkey) have a total population of around 95 million (2011), with Turkey the largest (74 million) and Montenegro the smallest (0.6 million). Apart from Croatia and Serbia, penetration of telecommunications services is low by EU standards, and in the case of Albania, very low.

Fixed-line penetration averages 23/100 population for the Group B countries, compared to an average EU penetration of 40/100 population. Fixed-line penetration reaches the EU average in Serbia and Croatia, but the remaining countries are below the EU average, with Albania having a rate of less than one third of the EU.

Average mobile subscriber penetration in the region is 97/100 compared with the EU rate of 127. Montenegro and Albania have the highest rates at around 185/100 population, Serbia also has higher levels than the EU (140/100 population). The remaining countries are below the EU average, with Bosnia-Herzegovina the lowest at 83/100.

Broadband services are still at an early stage, with penetration levels of total broadband subscriptions (fixed plus mobile) in all countries well below the EU level of 71/100 population. Croatia and Montenegro have the highest at around 27/100, Albania the lowest at around 6/100 population.

Mobile communications has been the main competitive growth market, with three licensed mobile operators in each country (except Albania with four).

Broadband communications are showing the greatest growth potential in markets that are becoming generally more competitive.

Legal/Regulatory Issues – Group B

The main areas where best practice remains to be implemented to reduce the overall legal/regulatory risk are:

- **The legal framework** in most Group B countries has been significantly overhauled in recent years to incorporate best practices, through adopting the EU 2009 framework (Croatia) or the EU 2003 framework (Albania, FYR Macedonia, Montenegro, Serbia and Turkey). Notably, Bosnia and Herzegovina has, so far, only implemented the EU 1998 framework. Consumer protection provisions in particular need strengthening in most Group B countries to the level now adopted by Croatia from the EU 2009 framework.

- **Sector organisation and governance**. Apart from Croatia and Montenegro, there is still some state ownership in main operators in the Group B countries. Although all countries have structural separation of policy, ownership and regulatory functions, further improvements to the financial or operational independence of the sector regulator are needed generally to improve the independence of regulatory decision making.

- **Market conditions for wired services** are moving towards best practice for Group B countries, with only Bosnia and Herzegovina yet to implement a general authorisation scheme with simple notification for market entry. Fixed number portability has been implemented, except in Albania and Serbia. Fixed-line retail tariff rebalancing has yet to be achieved in any Group B country. Rights of way into public and private property do not appear strong enough in the Group B countries. With respect to measuring the competitiveness of markets, all countries use the EU best practice for market definition, analysis and determination of significant market power. However, the remaining competitive market safeguards need to be enforced/re-enforced, in particular through
stronger infrastructure access and sharing provisions and cost oriented wholesale charging based on modern cost models.

- **Market conditions for wireless services** with best practice are increasing in Group B countries, with evident strong competition and growth in mobile markets. Mobile number portability is fully implemented in all Group B countries, except Bosnia and Herzegovina. National roaming is present in all countries, and although the regulatory enablers for virtual mobile operators to enter the market are generally in place, MVNOs exist only in Albania and Montenegro. The switch off of analogue broadcasting is being left to 2015 in Albania, FYR Macedonia, Serbia and Turkey, delaying valuable spectrum redeployment for broadband expansion, especially in rural areas.

- **Fees and taxation.** A special tax is imposed in Turkey and operators also have to pay a contribution to a universal service fund. In other countries, the fees paid are generally low, although the level of transparency and predictability of operators’ required payments needs to be improved to give better confidence that operators only pay the true administrative costs of the regulatory function.

- **Information society progress.** Good progress has been made in Group B countries in implementing the required information society safeguards. Bosnia and Herzegovina still needs to implement adequate cybercrime protections, Albania and FYR Macedonia have not yet liberalised domain name registration.

3. **Regional overview – Group C - Egypt, Jordan, Morocco and Tunisia**

The four countries of Grouping C (Egypt, Jordan, Morocco and Tunisia) have a total population of nearly 130 million (2010), with Egypt the largest (81 million) and Jordan the smallest (6 million).

Penetration of telecommunications services is low by EU standards:

- Average fixed-line penetration is around 11/100 population in Egypt, Morocco and Tunisia, and only 7/100 population in Jordan (the EU average is 40/100 population).
- Mobile subscriber penetration is 105/100 population, with Egypt the lowest at 99 and Jordan the highest at 120 (the EU average is 127/100 population).
- Broadband services are still at an early stage, with the average levels of penetration of fixed and mobile broadband connections only one tenth of the average EU levels.

During the last eight years, all four countries have passed legislation that allows the full liberalisation of the sector, most recently in Tunisia in 2009. This means that there is a legal basis for new entrants in all markets, but in practice, the countries still have dominant fixed network incumbent operators, all of which have some remaining state interest.

Mobile communications is the main competitive growth market, with three licensed mobile operators in each country, operating with a mixture of state and foreign ownership.

Broadband communications are still at an early stage, but show the greatest growth and promise. Voice revenues have already stagnated.

**Key legal and regulatory issues – Grouping C**

All countries have a significant gap with the EU, where on average, broadband subscriptions and penetration are significantly higher and the overall demand is being satisfied by broadband.
The legal frameworks in Group C countries are currently under active modification, using the EU legal and regulatory framework to provide the general direction towards best practice. Notably, amongst all Group C countries, there is a need to better provide the key competitive and market entry benefits that a general authorisation framework provides (as understood from the EU framework). While this cannot happen immediately, there should be provision for the transition from individual licensing to a general authorisation framework in order to simplify market entry and reduce legal risk. Other areas where more legal clarity is generally required are market analysis, to ensure that the regulator has clear powers including enforcement of market remedies, consumer protection and universal service.

**Sector organisation and governance.** There remains some form of state ownership in all Group C countries. Although all four countries have defined separate policy, ownership and regulatory functions, the strengthening of independence of the regulatory decision-making is needed generally to reduce overall legal/regulatory risk.

**Market conditions for wired services** continue to improve in Group C countries although, notably, none have yet completed the transition to a general authorisation regime. Fixed number portability and fixed line retail tariff rebalancing has been implemented only in Morocco. Rights of way into public and private property should be strengthened generally, and the remaining competitive market safeguards need to be enforced, in particular infrastructure sharing and cost oriented wholesale charging based on modern cost models. Fixed-line retail tariff rebalancing has so far only been completed in Morocco.

**Market conditions for wireless services.** Growth in mobile markets has been strong in Group C countries and market regulation is moving towards best practice. Mobile number portability has been implemented in Egypt and Morocco. The transition to more a market-led spectrum management regime needs to be accelerated to meet the growth of broadband. Spectrum authorisations are already technologically neutral and national roaming is in place (except in Tunisia), although provision needs to be made for spectrum re-farming and trading and for virtual mobile operators to enter the markets. Plans for the switch off of analogue broadcasting need to be finalised in order to provide valuable spectrum for broadband expansion, especially in rural areas.

**Fees and taxation.** Special taxes are imposed in Egypt and Jordan. The situation is particularly complex in Jordan, where the overall burden on mobile operators includes revenue sharing and special taxes. Morocco and Tunisia use development fund contributions from the sector to finance infrastructure expansion.

**Information society progress.** Good progress has been made in Group C countries in implementing some information society safeguards and best practices. Egypt and Tunisia still need to implement adequate cybercrime protections and Jordan has not yet liberalised domain name registration. Adequate data protection provisions appear in place in the Group C countries, except in Egypt.

4. **Regional overview – Group D - Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia**

The nine countries of this regional grouping (Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia) have a total population of nearly 92 million
(2010), with Poland the largest (38 million) and Estonia the smallest (1.3 million). The average Group D Penetration rates of fixed, mobile and broadband communications are lower than the EU27 averages.

Fixed-line penetration is highest in Slovenia at 46/100 population and lowest in Lithuania, Poland and Slovak Republic at only around 22/100 population (Group D average is 25.2/100 and the EU27 average is 40/100 population).

Mobile subscriber penetration is highest in Latvia at 157/100 population and lowest in Slovenia at 105/100 population. (Group D average is 120/100 population and the EU27 average is 127/100population).

Fixed broadband penetration is highest in Estonia at 27/100 population and lowest in Romania at 15/100 population. The Group D average is 17.8/100 population and the EU27 average is 27.7/100 population.

Mobile broadband penetration approaches the EU27 average in Estonia and Poland (at over 40/100 population) while Bulgaria, Hungary and Romania have mobile broadband penetration rates below 20/100 population.

Each EU country is required to transpose the 2009 European Regulatory Framework (as described in Section 2 of this report) into its own legislation and to implement the framework. In the Group D countries the 2009 framework has been adopted in Bulgaria, Estonia, Hungary, Latvia, Lithuania, Romania and Slovak Republic. In Poland and Slovenia the 2003 regulatory framework has been implemented and the adoption of the 2009 framework will take place during 2012.

5. The European Union policy framework

The EU has adopted the Digital Agenda for Europe\textsuperscript{10} as part of the overall Europe 2020 strategy “… for smart, sustainable and inclusive growth. The Digital Agenda proposes 101 specific policy actions across 7 domains: digital single market; interoperability and standards; trust and security; fast and ultra-fast internet access; research and innovation; digital literacy, skills and inclusion; and ICT-enabled benefits for EU society.”

There are several key performance targets that are relevant to the penetration of electronic communications services, and the progress against these targets has been reported most recently in May 2012 report. The EU case study included in section 4 of this report summarises the main features of the progress that are most relevant to the effectiveness of the electronic communications market in the Group D countries.

6. Implementation of the EU regulatory framework

The following tables summarise the progress of each Group D country in implementing measures to increase market competitiveness. More details are given in the country-by-country summaries included in this section.

All the normally expected market entry conditions are in place, except that in Bulgaria and Latvia the retail tariffs for basic fixed-line services have not yet been fully rebalanced. In these two countries, the rental charge for a basic fixed-line is around €5 per month, the lowest in the EU. This creates a market entry barrier to competitors in the fixed-line market.

\textsuperscript{10} Available at http://ec.europa.eu/information_society/digital-agenda/index_en.htm.
National mobile roaming has only been mandated in Slovenia. In the remaining countries, the market for mobile call origination and access has been found to already be competitive.

In all countries except Slovenia, the number of the incumbent fixed operator’s unbundled local loops is less than 5 per cent of the total number of the incumbent’s copper loops. In all countries except Hungary and Poland, the number of the incumbent’s wholesale broadband access lines is less than 5 per cent of the incumbent’s total broadband access lines.

In all countries, legislation on provision of information society services, electronic contracts and electronic signatures, protection of personal data and measures against cybercrime is generally aligned with the EU acquis.
DATA CENTRES

Data centres form a critical element and the backbone of the modern IT ecosystem. A data centre is a large space that is typically 500-1,000,000 square feet and houses computers, racks, switches, cables, cooling, and power. They are used to run applications, provide storage, and connect networks together. Companies in need of data centre capacity can be facing a complex and costly project.

The costs of developing data centres are tens of millions of dollars depending on the size, location, and reliability. Location is often a key with companies needing data centre space located as close to critical partners as possible, financial services companies needing space near a stock exchange is a good example, and sometimes that space is too costly or unavailable. In addition, the need for reliable cost effective power is frequently becoming one of the biggest challenges facing companies and the data centre providers takes these and other problems away.

According to JP Morgan forecasts, the global data centre market has reached USD 12 billion in 2011 and is expected to post a 15-20% CAGR in the next 5 years. In Russia in 2011, according to J’Son & Partners, the market of data centre has been relatively nascent and stood at ca USD 320 million. It is expected to more than double to USD 650 million in the best case and increase by half to USD 480 million in the down case scenario, translating into a CAGR of 16% and 9% respectively.

Cloud computing, one of the newest developments in the IT industry, is emerging today as a new driver of the global IT growth and significant costs saving opportunities provided by clouds explain their increasing popularity globally. The definition of cloud computing per RootAxcess.com is a type of computing that relies on sharing computing resources over the Internet. The term is generally used for anything that delivers a way to increase capacity or add capabilities at need be without having to invest in new infrastructure, training, or licensing. This IT model encompasses any subscription based, pay-as-you-grow service that extends an IT department’s existing capabilities. Three distinct characteristics differentiate cloud from traditional hosting. First, cloud is typically sold on demand, rather than an upfront investment. Second, it is elastic, with the ability to be scaled up or down based on need. Third, cloud is generally fully managed by the provider, with the end consumer needing only a computer and Internet access. Cloud can be private, public, or hybrid. Public cloud sells services to anyone on the Internet. Private cloud is proprietary network or data center that supplies hosted services to a limited number of people. Hybrid cloud is a combination of both public and private solutions. Regardless of the type of cloud solution, the overriding characteristic of cloud computing is to provide easy, scalable access to computing resources and IT services.

According to IBM, by the end of 2012, 80% of Fortune 1000 companies will be using or planning to use cloud based services, while according to IDC, a global research and technology consultancy firm, about 65% of all new IT product launches will be sold as services based on the cloud concepts. In Russia, for example, the market for cloud service is
expected to increase from only USD 5 million in 2009 to more than USD 160 million p.a. by 2014, growing with a CAGR in excess of 100%, according IDC estimates.

IT operations are a crucial aspect of most organizational operations around the world. One of the main concerns is business continuity; companies rely on their information systems to run their operations. If a system becomes unavailable, company operations may be impaired or stopped completely. It is necessary to provide a reliable infrastructure for IT operations, in order to minimize any chance of disruption. Information security is also a concern, and for this reason a data centre has to offer a secure environment which minimizes the chances of a security breach. A data centre must therefore keep high standards for assuring the integrity and functionality of its hosted computer environment. This is accomplished through redundancy of both fiber optic cables and power, which includes emergency backup power generation.

The Telecommunications Industry Association is a trade association accredited by ANSI (American National Standards Institute). In 2005, it published ANSI/TIA-942, Telecommunications Infrastructure Standard for Data centres, which defined four levels (called tiers) of data centres in a thorough, quantifiable manner. TIA-942 was amended in 2008 and again in 2010. TIA-942: Data centre Standards Overview describes the requirements for the data centre infrastructure. The simplest is a Tier 1 data centre, which is basically a server room, following basic guidelines for the installation of computer systems. The most stringent level is a Tier 4 data centre, which is designed to host mission critical computer systems, with fully redundant subsystems and compartmentalized security zones controlled by biometric access controls methods. Another consideration is the placement of the data centre in a subterranean context, for data security as well as environmental considerations such as cooling requirements.

The German Datacenter star audit program uses an auditing process to certify 5 levels of "gratification" that affect Data centre criticality.

Independent from the ANSI/TIA-942 standard, the Uptime Institute, a think tank and professional-services organization based in Santa Fe, New Mexico, has defined its own four levels. The levels describe the availability of data from the hardware at a location. The higher the tier, the greater the availability. The levels are:

<table>
<thead>
<tr>
<th>Tier Level</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single non-redundant distribution path serving the IT equipment</td>
</tr>
<tr>
<td></td>
<td>Non-redundant capacity components</td>
</tr>
<tr>
<td></td>
<td>Basic site infrastructure with expected availability of 99.671%</td>
</tr>
<tr>
<td>2</td>
<td>Meets or exceeds all Tier 1 requirements</td>
</tr>
<tr>
<td></td>
<td>Redundant site infrastructure capacity components with expected availability of 99.741%</td>
</tr>
<tr>
<td>3</td>
<td>Meets or exceeds all Tier 1 and Tier 2 requirements</td>
</tr>
<tr>
<td></td>
<td>Multiple independent distribution paths serving the IT equipment</td>
</tr>
<tr>
<td></td>
<td>All IT equipment must be dual-powered and fully compatible with the topology of a site's architecture</td>
</tr>
</tbody>
</table>
|            | Concurrently maintainable site infrastructure with expected availability of...
99.982%

- Meets or exceeds all Tier 1, Tier 2 and Tier 3 requirements
- All cooling equipment is independently dual-powered, including chillers and heating, ventilating and air-conditioning (HVAC) systems
- Fault-tolerant site infrastructure with electrical power storage and distribution facilities with expected availability of 99.995%

The difference between 99.671%, 99.741%, 99.982%, and 99.995%, while seemingly nominal, could be significant depending on the application.

Whilst no down-time is ideal, the tier system allows the below durations for services to be unavailable within one year (525,600 minutes):

- Tier 1 (99.671%) status would allow 1729.224 minutes
- Tier 2 (99.741%) status would allow 1361.304 minutes
- Tier 3 (99.982%) status would allow 94.608 minutes
- Tier 4 (99.995%) status would allow 26.28 minutes