MINISTERUL PENTRU
SOCIETATEA INFORMAȚIONALĂ

National Strategy on Digital Agenda for Romania

September, 2014

Table of Contents

EXECUTIVE SUMMARY

Europe 2020 – The Strategic Initiative for Europe

The National Strategy on Digital Agenda for Romania targets directly the ICT sector, aims to contribute to the economic growth and increase competitiveness in Romania, both by direct action and support of development of effective Romanian ICT and through indirect actions such as increasing efficiency and reducing public sector costs in Romania, improving private sector productivity by reducing administrative barriers in relation to the state, improving the competitiveness of the labor force in Romania and beyond.

In order to support the economic recovery of Europe, especially to ensure smart, sustainable economic growth and to promote social inclusion, the European Union has prepared the Digital Agenda for Europe 2020, with the primary objective of developing the Digital Single Market.

Some of the objectives set by the European Digital Agenda were taken and adapted to the current context of Romania, in proportion as they are relevant and aligned with the strategic vision of the Romanian ICT for 2014-2020. The purpose of this action is to ensure the alignment of the Romanian ICT development with the level recorded by the countries in the region, to establish premises of Romania's integration in terms of ICT, in the European digital single market.

Europe 2020 Targets for Romania

Europe 2020, EU's growth strategy for the next ten years, which was initially submitted in 2010, addresses the shortcomings of Europe's growth models and aims to create the conditions of an environment which is smarter, more sustainable and more inclusive. This strategy outlines 5 key common-goals parameters of where EU should be by 2020:

1. **Employment –** 75% of the 20-64 year-olds to be employed
2. **R&D** – 3% of the EU's GDP to be invested in Research & Development
3. **Climate change and energy sustainability**
4. **Education -** at least 40% of 30-34–year-olds completing third level education
5. **Fighting poverty and social exclusion** - at least 20 million fewer people in or at risk of poverty and social exclusion

These goals are seen as strongly interrelated and mutually reinforcing and were translated into national targets for each member state of the European Union. For Romania, these are depicted below.

Indicator	Target by 2020 for Romania	Current state
Employment rate (in %)	70%	63.9% (2013)
R&D in % of GDP	2%	0.49% (2012)
CO2 emission reduction targets	-19%	-50.46 (2011)
Renewable energy	24%	22.9% (2012)

Energy efficiency– reduction of energy consumption in TOE (thousand tones oil equivalent)	10toe	33.6 toe (2012)
Early school leaving in %	< 11.3%	17.3% (2013)
Tertiary education in %	26.7%	22.8% (2013)
Reduction of population at risk of poverty or social exclusion in number of persons	< 580,000	8,907,000 (2012)

Source: Eurostat, Europe 2020 Targets – all information are based on the latest available data

Tailoring the Digital Agenda for Romania

While the above environment is necessary to give context to the National Strategy on Digital Agenda for Romania, this needs to be tailored and adapted to the current national economic and social climate. The **underpinning principle** of Romania's Strategy is creating a competitive environment which encourages and attracts honest tax-paying citizens and businesses, which in turn is the paramount measure of a country's success and sustainable long-term growth.

Romania is the seventh largest country in the EU in terms of population (20.12 million) and the second largest from the group of New Member States, after Poland. Within 2001-2008, the Romanian economy expanded by an average of 5-6 percent per year, representing one of the fastest growth rates in the European Union. During 2009-2012, the GDP of Romania had an oscillating trend. A modest economic recovery is forecast with ~ 2.2% in 2014.

Nevertheless, Romania is still lagging significantly behind the majority of European countries in terms of economic development. GDP per capita recorded in purchasing power standard (PPS) was just under half of the EU 27 average in 2012 and only around 70% of the average GDP per capita of the new EU Member States.

Targeted and prioritized investments in ICT are essential in meeting the specific targets set by Digital Agenda for Europe 2014 – 2020, and in turn is the main lever for converging to the Europe 2020 strategic targets. This strong association between the strategic objectives and the specific objectives in ICT is characterized by the pervasive reach of the digital economy and the transformation properties that implementing ICT can have on several layers (legislation, innovation, procedural changes, behavioral changes etc.).

In terms of funding, as it is mentioned in the Romanian Partnership Agreement for the 2014 -2020 programming period, the investments in the field of ICT's will proceed under the umbrella of the National Strategy for Digital Agenda – the strategic policy framework for digital growth. That is why we believe it is of utmost importance for the Digital Agenda for Romania to build the foundation for coherent and convergent initiatives, that will allow Romania to have a clear roadmap for the future and a strategic vision which takes into account all the interdependencies and background factors (demographic & social context, strengths and weaknesses of the legislation framework, long-term vs. near-term goals, economic disparity etc.).

The 4 Fields of Actions for Digital Agenda for Romania 2014 - 2020

The key performance objectives of the Digital Agenda impose cumulative efforts of European countries to achieve the targets assumed by the European Commission. Romania's contribution, according to these objectives and related targets can be seen in the graph below.

Taking into consideration the 7 pillars that form the basis of the Digital Agenda for Europe 2014 – 2020, Romania has adapted them to the current context and has defined 4 major fields of action that will be pursued as Romania's vision of the ambitious program that will drive the economic growth and increased competitiveness, for covering the underpinning principle stated above in pursuit of sustainable long-term economic growth. These 4 fields of action are summarized as follows:

- **Field of action 1 - eGovernment, Interoperability, Cyber Security, Cloud Computing, Open Data, Big Data and Social Media** – increase efficiency and reduce the public sector costs in Romania by having a modern administration. Implementing and correlating the uniform vision of the fields of action 1 and 2 will generate for the period 2014-2020, an estimated impact on the Romanian economy of about 5% of GDP grow and 1% in terms of jobs.
- **Field of action 2 – ICT in Education, Health, Culture and eInclusion** – support at a sectorial level that will ensure ICT investments create a positive impact in the social context.
- **Field of action 3 - eCommerce, Research & Development and Innovation in ICT** – builds on the comparative advantages of regional Romania and supports economic growth in the private sector. The implementation of the measures of the field of action 3 will generate in the period 2014-2020 an estimated impact on the Romanian economy of approximately 3% increase at the GDP level and 2% in terms of jobs.
- **Field of action 4 – Broadband and Digital Services Infrastructure** – ensures social inclusion and enables the benefits across all other fields of actions. A full implementation of the strategic vision on ICT infrastructure in Romania will lead to total investments of around 3.5 billion Euro. Direct and indirect impact on the economy, calculated in accordance with good practice observed in other European countries who have made similar investments may be translated into GDP growth by 13%, increasing the number of jobs by 11% and reduce administration costs by 12% during 2014-2020.

ICT play an important role in improving business efficiency and extending market reach and the social impact of ICT has become significant. ICT development is a key area to improve the competitiveness of the business environment, to increase public sector efficiency and to reduce bureaucracy.

1 INTRODUCTION

1.1 ALIGNMENT TO THE DIGITAL AGENDA FOR EUROPE 2020

The National Strategy on Digital Agenda for Romania was developed in alignment with the Digital Agenda for Europe as framework of reference to define an overview on how to boost the digital economy for the 2014 – 2020 period.

This strategy is developed in alignment with all of the Government actions in terms of Information Society, including agencies from Ministry of Health, Ministry of National Education and Transport Ministry. However, due to the evolving nature of the Digital Agenda Strategy of Romania and its pervasive effect on other National Strategies and Implementation Plans, we outline the key Strategies that should be harmonized or govern the following topics:

- All strategies (including the Digital Agenda for Romania) will be reviewed after the Government Enterprise Architecture initiative that will take place in Romania according to Appendix 5 – Implementation Methodology
- Field of Action 1.2 – Cyber Security – Romania's Cyber security Strategy
- Field of Action 1.5 – Open Data – National Anticorruption Strategy 2014 – 2016
- Field of Action 2.2 – ICT in Health – Romania's Public Healthcare Strategy for 2014 – 2020
- Field of Action 3.2 – Research – Development and Innovation – National Strategy in Research, Innovation and Technological Development for 2014 -2020
- Field of Action 4 – NGN Plan

The objectives and areas of actions described in this Digital Agenda for Romania 2014-2020 impose cumulative efforts of European countries to achieve the targets, where Romania needs to maximize the impact of public policies and to look at the investment in ICT as a way to transform the Romanian economy.

Objective 2020	EU Targets	RO Targets	Current situation RO
Covered by broadband	100% by 2013	100% by 2020	90.0% (2013)
Covered by broadband above 30 Mbps	100% by 2020	80% by 2020	66.0% (2013)
Subscriptions to fixed broadband above 100 Mbps	50% by 2020	45% by 2020	25.0% (2013)
Population to buy online	50% by 2015	30% by 2020	8.0% (2013)
Population to buy online cross-border	20% by 2015	5% by 2020	1.0% (2013)
SMEs to make online sales	33% by 2015	20% by 2020	5.0% (2012)
Regular internet usage overall Among disadvantaged people	75% by 2015 60% by 2015	60% by 2020 45% by 2020	45.0% (2013) 24.0% (2012)
Population that has never used the internet	15% by 2015	30% by 2020	48.0% (2012)
Citizens using eGovernment Returning completed forms	50% by 2015 25% by 2015	35% by 2020 20% by 2020	5.0% (2013) 2.0% (2013)

The 7 Pillars of the Digital Agenda for Europe 2020

The first of the levers used by Europe 2020, so-called flagship initiatives, is the Digital Agenda for Europe 2020, which targets to reboot Europe's economy and help Europe's citizens and businesses to get the most out of digital technologies. The Digital Agenda for Europe is comprised of 7 pillars that allow meeting the set targets for 2020.

1. **Pillar I – Digital Single Market** – enables the free flow of online services and entertainment across national borders
2. **Pillar II – Interoperability & Standards** – allows seamless integration of devices, applications, data and services that need to interact across borders
3. **Pillar III – Trust & Security** – increases the trust of web users in electronic services and online transactions in order to boost consumption of ICT services
4. **Pillar IV** – **Fast and ultra-fast Internet Access** – targets investments for broadband infrastructure in order to take advantage of new technologies and services
5. **Pillar V** – **Research and Innovation** – stimulates adequate funding for increasing the competitive edge of innovation and research
6. **Pillar VI** – **Enhancing digital literacy, skills and inclusion –** bridges the digital divide for all consumers in order to benefit equally and fully from the advantages of ICT services
7. **Pillar VII** – **ICT-Enabled benefits for EU Society -** focuses on ICT's capability to reduce energy consumption, support ageing citizens' lives, revolutionizes health services and deliver better public services

Mapping the 4 action fields in Romania with the 7 pillars of Digital Agenda for Europe.

Each one of these field of actions is supported by operational objectives which will have specific targets and will be described in full in the Digital Agenda for Romania Strategy. A summary of the fields of actions, their operational objectives, their mapping with the Digital Agenda for Europe Pillars and their implications in the current context is presented below.

Field of action	Objective	Digital Agenda for Europe Pillars	Europe 2020 Target Support	DAE 2020 Target Support
1. eGovernment, Interoperability, Cyber Security, Cloud Computing, Open Data, Big Data and Social Media	1.1. Increasing the transparency of public administration acts through computerization of public services	II - Interoperability and standards I - A vibrant digital single market VI - Enhancing digital literacy, skills and inclusion	Employment rate R&D Climate change and energy sustainability Fighting poverty and social exclusion	Population to buy online Population to buy online cross-border Citizens using eGovernment Returning completed forms Key cross-border public
	1.2. Raising cyber security networks and systems	III - Trust and security		

In order to reach the goal to reform the way how the government works, shares information, engages citizens and delivers services to external and internal clients for the benefit of both government and the clients that they serve	1.3. Increasing access to digitized public services	VI - Enhancing digital literacy, skills and inclusion		services, online Public investment in ICT R&D Energy use of lighting (%)
	1.4. Efficient public administration and decrease of the costs of public administration	VII - ICT enabled benefits for EU society		
	1.5. Improving the business environment	V - Research and innovation		
	1.6. Improving governance on implementation of computerized public services	VI - Enhancing digital literacy, skills and inclusion		
2. ICT in Education, Health, Culture and eInclusion **Investing in people's knowledge and skills in order to promote development & growth**	2.1. Support for the development of ICT skills	VI - Enhancing digital literacy, skills and inclusion VII - ICT enabled benefits for EU society	Employment rate Climate change and energy sustainability Fighting poverty and social exclusion	Population to buy online Population to buy online cross-border SME's to make online sales Population that has never used the internet Citizens using eGovernment Returning completed forms
	2.2. Ensuring social inclusion for growth	IV - Fast and ultra-fast internet access		
	2.3. Training staff involved in learning and management of ICT -assisted activity	VI - Enhancing digital literacy, skills and inclusion		
	2.4. Infrastructure development of ICT sector in the areas of interest : education, health and culture	V - Research and innovation		
3. eCommerce, Research-Development and Innovation in ICT **Improve the existing framework for electronic commerce, which provides**	3.1. Support eCommerce for achieving economic growth and development at the European digital single market	I - A vibrant digital single market	Education Employment Fighting poverty and social exclusion R&D	Population to buy online Population to buy online cross-border SMEs to make online sales Key cross-border public services, online Public investment in ICT R&D Energy use of lighting
	3.2. Increasing the number of jobs in the ICT sector	VI - Enhancing digital literacy, skills and inclusion		
	3.3. Build on the comparative	I - A vibrant digital single market		

legal certainty for business and consumers alike and invest in innovation	advantages of regional Romania			(%)
4. Broadband and digital services infrastructure **Broadband has, through the ICT implications on the economy and its growth, an important role for the development of Romania, both in purely economic terms, but also in terms of improving the degree of social inclusion**	4.1. The development of broadband ICT infrastructure for complete coverage and uniform regional	IV - Fast and ultra-fast internet access	Climate change and energy sustainability Education Fighting poverty and social exclusion	Covered by broadband Covered by broadband above 30 Mbps Subscriptions to fixed broadband above 100 Mbps Regular internet usage overall Among disadvantaged people Population that has never used the internet Key cross-border public services, online
	4.2. Improving social inclusion through access to broadband ICT infrastructure	IV - Fast and ultra-fast internet access		

Whereas the strategy was developed by the Ministry for Information Society, it was established in alignment with all of the Government actions, including agencies from Ministry of Health, Ministry of National Education, Ministry of Finance and Ministry of Transportat. These cumulative efforts for convergence of short-term and long-term strategies for all the stakeholders involved in the governing act were necessary in order to align all the aspects of their respective approach and form a cohesive structure, with clear responsibilities and actions to be taken and ensuring that no real need is not covered or expressed in the National Strategy on Digital Agenda for Romania.

While providing a general framework of objectives and measurements for Romania's strategy, each field of action is insufficient by itself. Following this rationale, lines of actions have been drafted for implementation. For each line of action a detailed description of context, stakeholders and responsible actors, dependencies, actions and timelines can be found in the chapter dedicated to each Field of Action.

1.2 LINES OF ACTION SUMMARY FOR DIGITAL AGENDA FOR ROMANIA

Strategic Objectives to support the 4 fields of actions for Romanian Digital Agenda

Field of action	Lines of action	Entities responsible for implementation	Indicators
Field of action 1 – eGovernment, Interoperability, Cyber Security, Cloud Computing, Open Data, Big Data and Social Media	Define the Informational Perimeter of Public Services	Ministry for Information Society (responsible) All Ministries offering public services (support)	**eGovernment and Interoperability** % related public services Life Events brought on 4th level of online sophistication (from the 36 Life Events identified). Target: 100% by 2020 % online availability of Life Events (from the 36 Life Events Identified). Target: 100% by 2020 % of eGovernment projects completed in time (from the overall number of eGovernment projects pertaining to Life Events). Target: 60% by 2020 % of eGovernment projects for Life Events with user satisfaction above 3 (on a scale from 1 to 5 – User Satisfaction Surveys are in the responsibility of each project owner). Target: 80% by 2020 % of citizens using online services for customization / e-Participation Target: 10% by 2020 % of citizens / businesses using the online services pertaining to Life Events to obtain information. Target: 50% by 2020 % of citizens / businesses
	Implement an institutional structure meant to support the implementation of eGovernment projects	Ministry for Information Society (responsible) All Ministries offering public services (support)	
	Promote better standards	Ministry for Information Society (responsible) All Ministries offering public services	
	Identification of data registries and of relevant owners of data registries for interoperability	The Technical Economic committee Ministry for Information Society (responsible) All Ministries offering public services	
	Promote transparency and openness	Ministry for Information Society (responsible) All Ministries offering public services	
	e-Participation	Ministry for Information Society (responsible) All Ministries offering public services	
	Interoperability	Ministry for Information Society (responsible) All Ministries offering public services	

	Improve legislation	Ministry for Information Society (responsible) All Ministries offering public services	using the online services to download official forms for Life Events. Target: 50% by 2020 % of citizens / businesses using the online services pertaining to Life Events to send the official forms. Target: 25% by 2020 % of users using the online services for Life Events for complete electronic transactions. Target: 25% by 2020 % of data registries implemented pertaining to Life Events from the overall data registries of Life Events. Target: 80% by 2020 % of applications re-used within public administration. Target: 10% by 2020 % of adoption of e-identity Target: 25% by 2020 % of public officers trained. Target: 50% by 2020 % of staff costs related to IT services (from an overall budget for each entity) Target: 5% by 2020
	Consolidate institutional support and oversight	Ministry for Information Society (responsible) All Ministries offering public services	
	Promote cooperation and collaboration with public and private entities	Ministry for Information Society (responsible) All Ministries offering public services	
	Implement feedback and evaluation mechanism	Ministry for Information Society (responsible) All Ministries offering public services	
	Standardization	Ministry for Information Society (responsible) All Ministries offering public services	
	e-Identity	Ministry for Information Society (responsible) All Ministries offering public services	
	Portal	Ministry for Information Society (responsible) All Ministries offering public services	
	Focus on e-procurement	Ministry for Information Society (responsible) All Ministries offering public services	
	Implement a decommissioning model	Ministry for Information Society (responsible) All Ministries offering	

		public services	
	Improve Governance on implementation of computerized public services	Ministry for Information Society (responsible) All Ministries offering public services	
	Promote innovation	Ministry for Information Society (responsible) All Ministries offering public services	
	Establishing and operationalization of the national cyber security system	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	**Cyber Security** # of cyber-attacks / threats registered by the Government on private data Target: To be defined based on Appendix 5 Methodology Achieve a Cluster 3 rating for Maturity based on EU NIS Market Maturity Target: To be defined based on Appendix 5 Methodology IT Spending for Security Target: To be defined based on Appendix 5 Methodology # of training programs regarding cyber security Target: To be defined based on Appendix 5 Methodology
	Improve legislation	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Strengthening the partnership between public & private sector	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Data Base Consolidation of Knowledge	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Boost the Research & Development capabilities in cyber security	Operative Council for Cyber Security (COSC) (responsible)	

		All Ministries offering public services Ministry of Interior	
	Cyber Security Infrastructure	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	CERT-RO	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Implementing security standards	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Inter-institutional cooperation	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Development of public awareness programs in public administration and the private sector	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services	
	Development of educational programs	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering	

		public services	
	Training	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services	
	Concluding agreements of international cooperation for improving the response capacity in the event of major cyber attacks	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Participation in international programs and exercises in the cyber security field	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Promote the national security interests in the international cooperation formats in which Romania is a member	Operative Council for Cyber Security (COSC) (responsible) All Ministries offering public services Ministry of Interior	
	Consolidation of the Acquisition Process for the Public Institutions IT Infrastructure	Ministry for Information Society (responsible) All Ministries offering public services	**Cloud Computing, Data Management and Social Media** # of applications performed based on Governmental Cloud Target: at least 2 per county by 2020 # of applications performed based on Big Data.
	Unique Point of Contact or Single Sign on	Ministry for Information Society (responsible) All Ministries offering public services	
	Procure and bring into service a range of components and services forming	Ministry for Information Society (responsible)	

	the core infrastructure Migration of the already existent services (both those directed towards citizens and those used as internal use) of different public institutions on the new platform and the installation of new services according to governmental needs and strategies	All Ministries offering public services	Target: at least 1 per county by 2020 # of public initiatives promoted by social media. Target: at least 10 by 2020 # of companies supported related to communication by social media. Target: at least 2 per county by 2020
	Re-evaluation of the administrative capacity directly involved in the activity of management of governmental Cloud	Ministry for Information Society (responsible) All Ministries offering public services	
	Data Centers Consolidation	Ministry for Information Society (responsible) All Ministries offering public services	
	Define key principles and business framework for the communication process within the public institutions	Ministry for Information Society (responsible) All Ministries offering public services	
	Establish key coordinators and teams for the communication process – PR Communication Departments within the public institutions	Ministry for Information Society (responsible) All Ministries offering public services	
	Define the communication plan tailored for each public institution	Ministry for Information Society (responsible) All Ministries offering public services	
	Design the conversation for 1 to many, rather than use repeatedly 1 to 1, which is cheaper and quicker – one of the most useful opportunities of social media	Ministry for Information Society (responsible) All Ministries offering public services	
	Promoting public debates	Ministry for Information Society (responsible) All Ministries offering public services	

	Support for Open Government Partnership initiative, as social media is in alignment with the three principles of Open Data: Transparency, Participation and Collaboration Support for use of Big Data in public administration	Ministry for Information Society (responsible) All Ministries offering public services	
	Elaboration of a legal frame related to the free access to – FOI[1]	Ministry for Information Society (responsible) All Ministries offering public services	**Open Data** # of data sets and reports available for public use. Target: at least 1 per public body # of social projects / applications developed using open data Target: at least 1 per county by 2020
	Identification and achievement of the possibilities of combination and data processing	Ministry for Information Society (responsible) All Ministries offering public services	
	Use of relevant standards and format to be used for presentation of data	Ministry for Information Society (responsible) All Ministries offering public services	
	Improvement of the degree of presentation of civil society and its capacity to use and integrate the information generated by Open Data	The Department for Online Services and Design (responsible) All Ministries offering public services	
	Training for public servants on Open Data concepts	The Department for Online Services and Design (responsible) All Ministries offering public services	
	Identification of the possibilities of attraction of the necessary funds and concluding partnerships with possible supporters (civil society, data and information donor, investors etc.)	Ministry for Information Society (responsible) All Ministries offering public services	
	The Public Procurement Electronic	Ministry for Information	

[1] FOI – Freedom of Information

	System (SEAP) The Electronic Allocation System for Transports (SAET) Expanding the on-line submission of fiscal forms Ensuring the free on-line access to national legislation Developing electronic tools to manage subpoenas and facilitate access to information regarding legal proceedings Developing electronic tools to manage the procedures related to obtaining the Romanian citizenship Developing electronic tools to manage the procedures related to the creation of non-profit legal persons The Integrated System for Electronic Access to Justice (SIIAEJ)	Society (responsible) All Ministries offering public services	
	Determining a procedure by which the information need of public must be correlated to the publication of certain relevant data sets	Ministry for Information Society (responsible) The Department for Online Services and Design All Ministries offering public services	
	Extend the data sets present on www.data.gov.ro	Ministry for Information Society (responsible) All Ministries offering public services	
	Definition of data sets to be collected.	Ministry for Information Society (responsible) All Ministries offering public services	**Big Data** # of applications developed using Big Data databases Target: To be defined based on Appendix 5 Methodology
	Collection of data from multiple sources: • Paper document (physical environment) • Digital documents • Points of access to governmental web • Websites located on Internet	Ministry for Information Society (responsible) All Ministries offering public services	

	• Social Media • Operational systems available		
	Definition of the analysis process for the data sets collected.	Ministry for Information Society (responsible) All Ministries offering public services	
Field of action 2 – ICT in Education, Health, Culture and eInclusion	Provide equipment and relevant infrastructure in schools	Ministry of Education (responsible) Ministry for Information Society (support)	**ICT in Education** % individuals using the internet regularly. Target: 75% by 2020 % individuals from the category of those disfavored using the internet. Target: 50% by 2020 % of pupils trained with TIC skill. Target: 75% by 2020 % education facilities using OER, Web 2.0 in education. Target: 75% by 2020 % LLL resource e-learning systems Target: To be defined based on Appendix 5 Methodology # of application developed using Big Data databases Target: To be defined based on Appendix 5 Methodology
	Educate teachers on ICT technologies	Ministry of Education (responsible) Ministry for Information Society (support)	
	Provide ICT specific training courses, directly related to the improvement of the quality of the learning process and digital skills.	Ministry of Education (responsible) Ministry for Information Society (support)	
	OER implementation efforts imply, in terms of ICT: • Providing the frame and the related ICT product • Digitizing and archiving the educational content	Ministry for Information Society (responsible) Ministry of Education (support)	
	Include Web 2.0 platforms in the learning processes	Ministry for Information Society (responsible) Ministry of Education (support)	
	Stimulate students to become more involved in the learning process	Ministry for Information Society (responsible) Ministry of Education (support)	
	Encourage the Life Long Learning process	Ministry for Information Society (responsible) Ministry of Education (support)	

	Increasing general awareness of the phenomenon of social exclusion Raising awareness among family and friends to benefit from support in the development of eInclusion measures Facilitate communication between groups targeted for social inclusion Develop uniform digital literacy and Internet usage at the regional level Promoting the system of "learning together" Involvement of HR services within companies and public organizations: Special campaigns and trainings Promoting open database as an opportunity for informal education Provide trainings on the methodology of developing digital skills Provide materials and programs to facilitate trainers' adaptability to each community needs	Ministry for Information Society (responsible) Ministry of Education (support)	
	Improvement of the availability of the telemedicine equipment Ensuring equitable access to all citizens, especially vulnerable groups, to quality and cost effective health care through integrated delivery and remote healthcare Provision of out-patient care and emergency services in integrated and inter-operable mode	Ministry of Health (responsible) Ministry for Information Society (support)	**ICT in Health** % of data registries identified and implemented. Target: 75% by 2020 # of applications performed based on Big Data. Target: At least 10 applications # of localities and medical centers benefiting from telemedicine services. Target: At least 2 per county % of households benefiting from access to telemedicine services. Target: 40% by 2020 % of representatives trained in the field of
	Integrated Platform for all the services with easy or e-accessibility and data confidentiality Creating more patient-centric, coordinated and accountable care requires all service providers share data Monitoring and Controlling	Ministry of Health (responsible) Ministry for Information Society (support)	
	Bringing together inputs, delivery, management and organization of services related to diagnosis,	Ministry of Health (responsible)	

	treatment, care, rehabilitation and health promotion	Ministry for Information Society (support)	health. Target: 20% by 2020
	Increase the level of the information integration to facilitate compliance, monitoring and audit Cloud Services - providing lower total cost of ownership and flexibility for delivery Data portability and real time updates providing more visibility to government functioning	Ministry of Health (responsible) Ministry for Information Society (support)	
	Interoperability	Ministry of Health (responsible) Ministry for Information Society (support)	
	Analysis of a significant volume of data generated in the healthcare informatics systems which can be analyzed and used for the management of the healthcare system's resources	Ministry of Health (responsible) Ministry for Information Society (support)	
	Digitize the Romanian cultural patrimony	Ministry of Culture (responsible) Ministry for Information Society (support)	**ICT in Culture** % facilities of cultural patrimony digitalized and uploaded in European Library. Target: 25% by 2020 % of cultural facilities/libraries implementing TIC resources of biblioteconomy or similar. Target: 25% by 2020 # of application developed using Big Data databases Target: To be defined based on Appendix 5 Methodology # of digitized units of
	Achieve the minimum contribution to Europeana.eu (the European digital library)	Ministry of Culture (responsible) Ministry for Information Society (support)	
	Digitize the cultural content specific to Romanian communities	Ministry for Information Society (responsible)	
	Adjust the digital cultural content by region	Ministry of Culture (responsible) Ministry for Information Society (support)	
	Implement a modern ICT infrastructure within the public	Ministry of Culture	

	libraries	(responsible) Ministry for Information Society (support)	cultural heritage, uploaded in Europeana.eu Target: To be defined based on Appendix 5 Methodology
	Promote cultural events by means of ICT	Ministry of Culture (responsible) Ministry for Information Society (support)	
	Increasing general awareness of the phenomenon of social exclusion Raising awareness among family and friends to benefit from support in the development of eInclusion measures Facilitate communication between groups targeted for social inclusion Develop uniform digital literacy and Internet usage at the regional level Promoting the system of "learning together" Involvement of HR services within companies and public organizations: Special campaigns and trainings Promoting open database as an opportunity for informal education Provide trainings on the methodology of developing digital skills Provide materials and programs to facilitate trainers' adaptability to each community needs.	Ministry of Labor (responsible) Ministry for Information Society (support)	**eInclusion** % individuals using the internet regularly. Target: 75% by 2020 % individuals from the category of those disfavored using the internet. Target: 50% by 2020 % of individuals who have never used the internet. Target: To be defined based on Appendix 5 Methodology % of pupils trained with TIC skill. Target: 75% by 2020 % education facilities using OER, Web 2.0 in education. Target: 75% by 2020 # of application developed using Big Data databases Target: To be defined based on Appendix 5 Methodology
Field of action 3 – eCommerce, Research-Development and	Improvement of the regulatory framework for the support of the eCommerce system and the retail commerce transfer in the electronic media.	Ministry for Information Society (responsible) Ministry of Economy (support)	**ICT in eCommerce** % SMEs which receive orders online.

Innovation in ICT		Ministry of Public Finances (support) Ministry of Labor (support)	Target: 25% by 2020 % individuals who use the internet to order goods and services from other countries members of the UE. Target: 10% by 2020 % individuals who use the internet to order goods and services. Target: 30% by 2020 # of competency centers developed on a regional level. Target: 3 by 2020. # of innovative ICT products and services Target: To be defined based on Appendix 5 Methodology # of SMEs which have developed innovative products and services Target: To be defined based on Appendix 5 Methodology
	Preparation of the strategy and of the framework with respect to the copyright in Romania, for the support of the development of the commercial sector with digital content	Ministry for Information Society (responsible) Ministry of Economy (support) Ministry of Public Finances (support) Ministry of Labor (support)	
	Support from an ICT prospective of aligning the tax collection systems – ex. VAT, so that they will not represent a barrier for the e-commerce development in Romania.	Ministry for Information Society (responsible) Ministry of Economy (support) Ministry of Public Finances (support) Ministry of Labor (support)	
	Improve the access to the online services	Ministry for Information Society (responsible) Ministry of Economy (support) Ministry of Public Finances (support) Ministry of Labor (support)	
	Support for the development and implementation of the payment and online delivery systems	Ministry for Information Society (responsible) Ministry of Economy (support) Ministry of Public Finances (support) Ministry of Labor (support)	
	Preparation of a regulatory framework which would allow the resolution of the disputes caused by the online media, by means of instruments which are also available in the online media and outside the court of laws, as recommended by the	Ministry for Information Society (responsible) Ministry of Economy (support) Ministry of Public Finances	

	European Union.	(support) Ministry of Labor (support)	
	Improvement of communication and collaboration between CERT-RO, the institution which is responsible with the cybernetic security in Romania, and the *European Cybercrime Centre*, within EuroPol (center instituted in 2013, at European level).	Ministry for Information Society (responsible) Ministry of Economy (support) Ministry of Public Finances (support) Ministry of Labor (support)	
	Promotion of the competitiveness clusters and of the employees' specialization in this field especially in the excellence centers: Bucharest, Cluj, Iasi and Timisoara.	Ministry for Information Society (responsible)	**Innovation in ICT** # of innovative projects, financed and implemented in ICT. Target: 20% by 2020 % of individuals who have developed competencies, certifications by means of ICT communities developed through the improvement of the ICT innovation. Target: 5% by 2020 # of centers of ICT innovative competencies established at regional level. Target: 3 centers by 2020
	Continuous development and use of the electronic infrastructure based on ITC for the interconnection and the facilitation of the collaboration between the research teams which are spread from a geographical point of view and the separation of the resources and of the scientific knowledge is a key-method in order to accomplish this issue.	Ministry for Information Society (responsible)	
	Increase Romanian participation in international projects of Innovation, Research & Development in ICT through European programmes and resources	Ministry for Information Society (responsible)	
Field of action 4 – Broadband and Digital Services infrastructure	Implementation of the RoNET project	Ministry for Information Society (responsible)	# of active connections - Mobile Internet access Target: To be defined based on Appendix 5 Methodology # of broadband internet connections Target: To be defined based on Appendix 5 Methodology # of fixed telephony lines Target: To be defined
	Further extensions of the backhaul and backbone networks (2014 – 2020)	Ministry for Information Society (responsible)	
	Implement Monitoring Mechanisms	Ministry for Information Society (responsible)	
	Administrative and Legislative Proposals	Ministry for Information Society (responsible)	
	Encouraging Access to the Existing Passive Infrastructure	Ministry for Information Society (responsible)	

	Improving the Transparency and Coordination in the Relevant Civil Works	Ministry for Information Society (responsible)	based on Appendix 5 Methodology # of subscribers to re-broadcasting services Target: To be defined based on Appendix 5 Methodology % penetration of bundle offers per hundred inhabitants Target: To be defined based on Appendix 5 Methodology Investments in infrastructure Target: To be defined based on Appendix 5 Methodology # of households with access to internet broadband (at least 30Mbps) Target: To be defined based on Appendix 5 Methodology
	Simplifying the Authorization	Ministry for Information Society (responsible)	
	Procedures for New Developments	Ministry for Information Society (responsible)	
	Norms Regarding NGN Infrastructure for New Buildings	Ministry for Information Society (responsible)	

As a general rule, even if the indicators given above are not measured at the present moment or data for these indicators are extremely cumbersome to obtain, each entity responsible for implementing a line of action will need to ensure that proper measurements are put into place and that each strategy incorporates these key metrics, together with an estimate of their present value and the target for future enhancements. Readers of this strategy are encouraged to consult Appendix 5 – Implementation methodology for a thorough understanding of the principles and manner in which the Digital Agenda for Romania Strategy 2014 – 2020 will be implemented.

Principles for Digital Agenda in Romania – Investments should correlate with the objectives

Guiding Principles for Digital Agenda in Romania, which in turn have effect on all fields and lines of action are:

1. **Encourage and attract honest tax-paying citizens and businesses**

As stated above, this is the underpinning principle for every major initiative in Romania, from a strategic view down to operational layers. Romania needs to attract honest tax-paying citizens and business in order position Romania as a solid ground for investments and retain the advantage of highly educated

professionals. A sustainable, transparent and visible economy is the only way to ensure that Romania will bridge the gap with other EU economies and reduce as much as possible disparities in terms of living standards

Examples: All investments should be based on establishing or improving at least one of the criteria described in Annex 1 (for example, an investment should improve at least the security of a public service). All initiatives should describe tangible and quantifiable outcomes that can be measured and monitor for fulfilling this principle

2. Put the citizens and businesses at the center of any initiative

Each initiative or project should keep in mind that its final purpose is providing high-valued and quality services to their final customers – which are always (even if indirectly) the citizens and businesses in Romania.

Examples: Each entity offering a public service should firstly identify their potential target and strive to understand their needs and reasonably meet them. The customers and innovators voices should be included in a collaborative manner, so as to provide them the benefits which they can use in the real world. Entities should make it easy for their customers to find, access and use the public services

3. Use standards and reference models

For each initiative, the entity responsible for its implementation will look for industry standards or reference model that can be leveraged to provide best practices, lessons learned and to ensure a smooth transition to a proven model.

Examples: The order of decisions for investment in information systems is: Buy, Customize, Build. This means that generally, an entity will first look for already existing solutions that satisfy the needs of their customers, even if that implies a transformational project for that entity. This will drive down the complexity of the environment, the costs for development and the time to deployment.

4. Formulate legislation to support the initiatives

This document acknowledges that there may exist some gaps in legislation pertaining to the use, operation or maintenance of information systems. It is of utmost importance to create the correct climate for change in ITC and these needs to start from the legislative framework which should clearly define the boundaries and the cascading effects of this charter to all the underlying functions.

Examples: Where gaps are found between the current legislation and what needs to be achieved, the entities are responsible for proposing new legislation and monitoring its implementation in a timely manner

5. Protect security and privacy

Ensuring a trusting environment for public services is crucial for a fast adoption of these in an online environment. A small security flaw in one service can have a detrimental effect on the perceived benefits of all others services and special care should be taken so that no data loss or breach is incurred.

Examples: All investments will take all the appropriate measures for ensuring security for services, data, and processes. Security should cover all aspects of a service (financial security, operational security, transactional security). Security should not compromise usability of a service (for example entities should not impose a non-standard way for authentication, registration, authorization; entities should not issue a different token / card than the one marked as standard by the Romanian Government)

6. Encourage transparency and openness

What, how and where the state provides public services (irrespective of their online form) should be fundamental questions and guidelines for each entity in the Romanian Government. The citizens (private or enterprises) should be able to find the answers quickly, in an accessible manner.

Examples: Where not in conflict with any explicit mention in the law, public entities should make their data publicly available. This will ensure better quality for the service quality and also reduce the costs associated with data quality. This action will enable individuals

and businesses to use data in ways most helpful to them including developing applications relevant to their own needs and interests and such increase innovation. All internal and external processes should be transparent to the customers

7. Drive continuous improvement

Processes and systems should be constantly evaluated and improved in light of their efficiency, effectiveness and flexibility. This principle should be applied foremost on new investments, which are first-of-a-kind for the Romanian Government, to safeguard against initial significant investments that bring only reduced added value. Additionally, this should be applied in a continual manner to all running initiatives.

Examples: A monitoring, feedback and improvement mechanism will be put in place for the satisfaction and overall quality of a system by each entity investing in public services. Entities should make the most out of the available information – start small and aim for perfection

8. Aim for sustainable initiatives

Complementing the above principle, all investments in ICT sector need to be sustainable – that means self-funding themselves or with a solid Return on Investment plan for the Government, even if not financially. This principle will ensure that all initiatives in Romania are prioritized with respect to their costs (initial and recurrent for the entire lifespan of the initiative) and will not bring significant burden to the budget without clear results, in detriment to other planned or strategic investments which can yield additional benefits.

Examples: Entities should secure funding for the investment for a period up to 5 years for all recurrent costs of that investment objective (including initial investment, maintenance, upgrades etc.). For all decentralized initiatives, a centralized system needs to be put in place – ensuring uniformity and efficiency for processes, data and technology

9. Facilitate innovation

In order to create technological innovation and growth which can make possible significant enhancements in the way Romania delivers its services, a competitive and equal chances environment should be in the center of all Romanian initiatives.

Examples: Technology is an enabler for minimizing disparity meaning that having access to the right technology at the right time is an enabler for reducing inequity for all major perspectives of a citizen. With proper technology in place, the current environment can be monitored and evaluated, leading to improvements in areas found inadequate. Consecutively, the right services can be identified and delivered through the use of technology.

10. Maximize initial investment

All investments need to make sure they achieve their full potential.

Examples: Entities should break down barriers of adoption by incentivizing the use of the service (for example reducing the time needed to interact with that public service and/or reducing fees). Entities should put in place a mechanism for evaluating and improving the rate of adoption.

From a tactical perspective, based on consultation with the stakeholders in Romania (both in terms of citizens / private business as well as public sector representatives), the following table summarizes the main issues underlying the need for change.

Issue	Rationale	Field of Action to Support
Sustainable Public Finances And Taxation System	Romania low tax compliance represents a major challenge and the sustainability and adequacy of	Field of action 1 Field of action 4

Issue	Rationale	Field of Action to Support
	the pension system is at medium risk in the long-term	
Better Public Administration	Poor administrative capacity is a core concern for Romania which contributes to the low absorption of EU funds. The governance and quality of public administration should therefore be strengthened Labor Market, Youth Unemployment & Poverty Romania should enhance the quality of active labor market policies, employment information availability, enhance social program efficiency to reduce the risk of poverty	Field of action 1 Field of action 2 Field of action 4
Implementation Of The Precautionary Programme	Romania negotiated with the European Commission and the IMF a precautionary economic adjustment programme in 2011	Field of action 1 Field of action 3
Health Sector Reform	There are major inequalities in the Romanian health sector mainly due to the inefficient use of resources and poor management	Field of action 2
Business Environment	The Romanian authorities should ensure a coherent eGovernment and undertake efforts to ease access to finance and to reduce the administrative burden on SME's	Field of action 1 Field of action 3 Field of action 4
Education Reform	Romania faces a major challenge in raising the quality of its education and training system. Romania should build up its administrative capacity and align education to labor market requirements	Field of action 1 Field of action 2
Energy And Transport	Romania has a low degree of competition and efficiency in the energy and transport industries. Government needs to ensure transparency in agency function.	Field of action 1 Field of action 4

Romania has embarked on an ambitious project of aligning itself to the latest trends in eGovernment and introducing the most advanced electronic systems in providing public services to its citizens. Romania's

Doing Business (DB) ranking indicates significant scope of improvement in creating conductive business environment. ICT play an important role in improving business efficiency and extending market reach and the social impact of ICT has become significant. ICT development is a key area to improve the competitiveness of the business environment, to increase public sector efficiency and to reduce bureaucracy.

Economic impact of ICT represents 5% of European GDP and in Romania the percent was 4.1% in 2011, value decreased versus 2010. In the ICT sector in 2011, the investments was around 3 billion RON, significantly lower than in other countries with a total number of employees of 128.000 in the field of ITC. The goal for 2020 is to reach 250.000 employees for Romania. While in recent years the ICT sector has observed a slowdown in terms of development and employment, this figure takes into account the average growth of ICT employment in Romania (7% year on year growth) before the economic downturn and projects it for the 2014 – 2020 period as a target for future investments. Major contributions have already been made in order to improve the growth of the ICT employment by the Romanian Government (for example the state aid scheme for creating a minimum number of jobs).

ICT contributed to GDP growth in all economies, but productivity was increased mainly within the developed economies and based on the below indicators Romania needs to improve the overall growth in employment.

	EU15	USA	Bulgaria	Czech Rep	Hungary	Poland	Romania	Russia	Slovakia	Slovenia
GDP growth	2.42	3.52	0.51	2.27	3.64	4.81	0.79	1.12	4.1	4.1
ICT capital contribution	0.46	0.82	0.45	0.73	0.71	0.55	0.22	0.09	0.55	0.54
ICT sector contribution to TFP	0.27	0.44	0	0.13	0.58	0.14	0	0	0.09	
Total ICT contribution	0.73	1.26	0.45	0.86	1.29	0.69	0.22	0.09	0.64	0.54
ICT contribution as %age of GDP growth	30%	36%	88%	38%	35%	14%	28%	8%	16%	13%
Growth in GDP per person employed	1.13	2.21	1.91	2.8	3.25	4.45	3.55	1.66	4.76	3.75
ICT capital contribution	0.41	0.74	0.49	0.75	0.71	0.58	0.26	0.13	0.57	0.54
ICT sector contribution to TFP	0.27	0.44	0	0.13	0.58	0.14	0	0	0.09	0
Total ICT contribution	0.68	1.18	0.49	0.88	1.29	0.72	0.26	0.13	0.66	0.54
ICT contribution as %age	60%	53%	26%	31%	40%	16%	7%	8%	14%	14%
Growth in persons employed										
Overall growth in employment	1.28	1.28	-1.37	-0.52	0.38	0.34	-2.67	-0.53	-0.63	0.34
ICT contribution	0.05	0.08	-0.04	-0.02	0.00	-0.03	-0.04	-0.04	-0.02	0.00
ICT contribution as %age	3.9%	6.2%	2.9%	3.8%	0.0%	-8.6%	1.5%	7.5%	3.2%	0.0%

Source: The Impact of ICT on Growth in Transition Economies, Marcin Piatkowski, Warsaw 2004;

More information pertaining to detailed indicators of Romanian economy can be found in Appendix 1 – Romanian Indicators.

Roadmap for the Digital Agenda in Romania

Taking into account all the factors and the principles listed above, we have developed the following implementation roadmap. It contains a short description of our next steps, and a division of our lines of action for the next years.

The Digital Agenda – Roadmap for the implementation of strategic initiatives

	Strategic Initiatives (2014 – 2016)	Enabler Initiatives (2015 – 2018)	Operational Initiatives (2016 – 2020)
1 Field of Action I eGovernment, Interoperability, Cyber Security, Cloud Computing, Open Data, Big Data and Social Media	Define the life events services Define the National Interoperability Framework Implement the governance structures for ICT Establish the National Cyber Security System Establish key principles for Social Media Define Governmental Cloud Capacity	Prepare E-Identity Build sustainable initiatives Boost R&D in cyber security Data Center Consolidation Support for Open Government and Big Data	Promote and implement better standards Promote and implement transparency and openness Unique Portal Promote public debates Common infrastructure
2 Field of Action II ICT in Education, Health, Culture and eInclusion	Provide the frame for OER Ensure equitable access to cost-effective healthcare Modernize culture Contribute to Europeana Develop uniform digital literacy	Encourage Life Long Learning Web 2.0 platforms in the learning process Improve availability of telemedicine equipment Develop specific cultural content Raise awareness on digital literacy	Stimulate students to get involved Educate on ICT Technologies Patient-centric service model Monitoring & evaluation of healthcare Digitize the Romanian cultural patrimony Involve public and private entities for social inclusion
3 Field of Action III eCommerce Research – Development and Innovation in ICT	Improve regulatory framework Strategy for copyright law Promote competitiveness clusters	Support from ICT to reduce barriers for e-commerce Support for the development of payment and delivery systems Development and use of infrastructure for collaboration Support innovative start-ups	Improve access to online services Resolve disputes and improve communication Increase involvement in R&D projects
4 Field of Action IV Broadband and Digital Services infrastructures	Improve regulatory framework Encourage access to passive infrastructure	RONET project Simplify procedures	Implement monitoring mechanisms Transparency and coordination for civil works Increase involvement in R&D projects

Full coverage activities: Improve legislation and promote innovation

1.3 NEED OF INVESTMENT

A full implementation of the strategic vision for ICT sector in Romania that will meet the specified targets for Romania will require a total investment of 3.5 billion Euro. Direct and indirect impact on the economy, calculated in accordance with good practice observed in other European countries who have made similar investments may be translated into GDP growth by 13%, increasing the number of jobs by 11% and reduce administration costs by 12% during 2014-2020.

The Romanian and European Union objectives through the Digital Agenda are ambitious and involve partnership and participation of all actors in the sector, whether it's leading ICT sector representatives, representatives of financial institutions or international organizations supportive.

From a methodological perspective, the investment requirements were assessed for each line of action through comparison with similar investments for the same objective done by other countries and adjusting them to take into account the specific Romanian social-economic context. The estimated impact for each Field of Actions was derived from statistical analysis of historical data in countries which implemented similar projects or impact assessments published by European Commission / World Bank.

The assessed investment calculation for each line of investment was performed based on the following:

- Values estimated at the level of the European Union for the implementation of the Digital Agenda and presented within the analysis of the impact of the proposed measures
- Values generated from studies published by the JRC – Joint Research Centre, European Commission
- Values published for investments which are comparable identified at the level of other countries – it refers to investments with the same perimeter, performed under comparable conditions
- Values resulted from the statistical analysis performed based on the figures recorded in countries which finalized similar investments
- Similar investment rates

These values were adjusted afterwards with relevant indicators for Romania:

- The number of inhabitants – ex. Total estimated investments for the computerization of the public services were estimated at a total level for the European Union; Romania's rate was estimated based on the average cost per inhabitant, the population of Romania and the country's level of development
- The Gross Domestic Product – the estimated investments for Romania were adjusted at the total economy value expressed through the Gross Domestic Product

Also, the calculations performed both for the estimation of the future investments which will be performed by Romania within the Digital Agenda strategy, as well as for the estimation of the impact upon the economy, were performed starting from and considering the methodology published by the European Commission for the performance of such calculations.

The table below depicts the necessary investment for each field of action in order to meet the specific targets for the Digital Agenda for Europe 2014 – 2020.

Operational Program	Need for Investment (EURO)	%
eGovernment and Interoperability	247,487,375 EUR	6,2%
Cloud Computing and Social Media	70,187,239 EUR	1,8%

ICT In Education	207,365,877 EUR	5,2%
ICT in Health	119,166,509 EUR	3%
ICT in Culture	37,500,000 EUR	0,9%
eCommerce	171,489,313 EUR	4,3%
Research-Development and Innovation in ICT	10,564,304 EUR	0,3%
Broadband	3,100,000,000 EUR	78,2%
Total	**3,963,760,617 EUR**	**100%**

Additionally, in order to bridge the significant gap of investments required between the Operational Programs 2014-2020 and the necessary budget for achieving the target indicators, public entities should make sure that complementary funding mechanisms are used, such as: World Bank and BERD funding, Public Private Partnerships, self-funded investments, national budget etc. Below you can find a mapping of fields of actions and available structural funds.

Operational Program	Competitiveness	Human Capital	Administration	CEF	EAFRD
eGovernment and Interoperability	X		X	x	
Cloud Computing and Social Media	X		X	x	
ICT In Education	X	X			
ICT in Health	X				
ICT in Culture	X				
e-Inclusion	X	X			
eCommerce	X				
Research-Development and Innovation In ICT	X				
Broadband	X			x	X

2 FIELD OF ACTION I - EGOVERNMENT, INTEROPERABILITY, CYBER SECURITY, CLOUD COMPUTING, OPEN DATA, BIG DATA AND SOCIAL MEDIA

2.1 EGOVERNMENT AND INTEROPERABILITY

2.1.1 Introduction

Preamble

The combination of the use of advanced ICT, especially the Internet, and the support of new ways of thinking, acting and working in public administration, together with the enhanced provision of information and interactive services accessible over different channels, is the foundation of eGovernment. In the last years there has been a visible progress within all European Union countries in terms of the general framework for the eGovernment Strategy which has as a starting point best practices and methodology. The strategy and mission of the public administration in Romania has been created in accordance with the Digital Agenda for Europe 2020 and will use the resources, proven experience that can be found in the framework for electronic public administration used by the EU states.

eGovernment 2.0 Definition

The fundamental principle for which Romania needs to implement eGovernment 2.0 is foremost related to the citizens' cultural and behavioral transformations, with added benefits coming from the social aspects of the interaction between the Government and its users (e-services, e-democracy, e-participation, e-management etc.). To fulfill its full potential, it is important not to limit the scope of this initiative to a restrictive definition of delivering transactional public services over the Internet, but mainly, eGovernment should mean "the transformational approach enabled by the use of information technology to offer better public services by the government, while engaging its citizens and supporting government operations".

2.1.2 European context

The ranking resulted from the survey conducted by United Nations (eGovernment Development 2012 Survey) reflects the supremacy of European countries in defining and implementing efficient strategies in this area.

Regional and Economic Groupings	Index value	Online Service Component	Telecomm. infrastructure component	Human Capital Component
Africa	0.2780	0.2567	0.1094	0.5034
Americas	0.5403	0.4648	0.3602	0.7958
Asia	0.4992	0.4880	0.2818	0.7278
Europe	0.7188	0.6189	0.6460	0.8916
Oceania	0.4240	0.2754	0.2211	0.7754
World	0.4882	0.4328	0.3245	0.7173

Source: EGovernment Development Survey 2012, conducted by United Nations

The general development of economic, social and cultural life in European countries, combined with the new requirements from the European Union and the new technologies from ICT will allow the countries to experiment similar moves towards eGovernment and identify the challenges on how to adapt the policy in order to achieve the goals.

The governments of developed countries in the world decided to adopt the paradigm of eGovernment services focused on the need of citizens.

Good practices in the field have proved in time that a solid implementation of eGovernment must be regarded completely from the following perspectives:

1. Public services and connection between them
2. eGovernment platforms and interfaces
3. Local and central, public and private structures involved in such process and in the collaboration between them
4. Work procedures for the development of eGovernment solutions and for the management of subsequent eGovernment activity
5. Electronic centralized system of authentication of users and unique identification of the users prepared so as to incorporate all needs of electronic identification resulted from the implementation of online public services

Increasing the efficiency and transparency of the public administration and improving the business environment represents short term strategic priorities aimed at contributing to the effective approach of the major obstacles regarding the economic growth and employment.

eGovernment Approach in Romania

Public services and their efficiency are considered to have a significant impact on the economic and social condition across the country. The main direction is to use eGovernment projects to modernize Government Agencies and Local Governments offering services for citizens and businesses, in an integrated, transparent and secure manner. The current Programme for Government is the expression of an outlook on Romania's future and will be in alignment with the long term development strategy.

The intention is to create a modern public administration, become more proactive, increase internal efficiency, achieve a greater transparency, reduce the operational expenses, interact with citizens and develop new sources of growth.

The Strategy for eGovernment in Romania as outlined in this document is to focus on the services that provide elements to Life Events and bring them on the 4th level of sophistication. Prioritizing the government services pertaining to the Life Events will bring a significant improvement in the way the citizens and business perceive the Government, as refining those services will alleviate much of the burden from the way in which they interact with public bodies. Also, we consider that this approach can have synergize with other eGovernment strategies in Romania.

2.1.3 National context

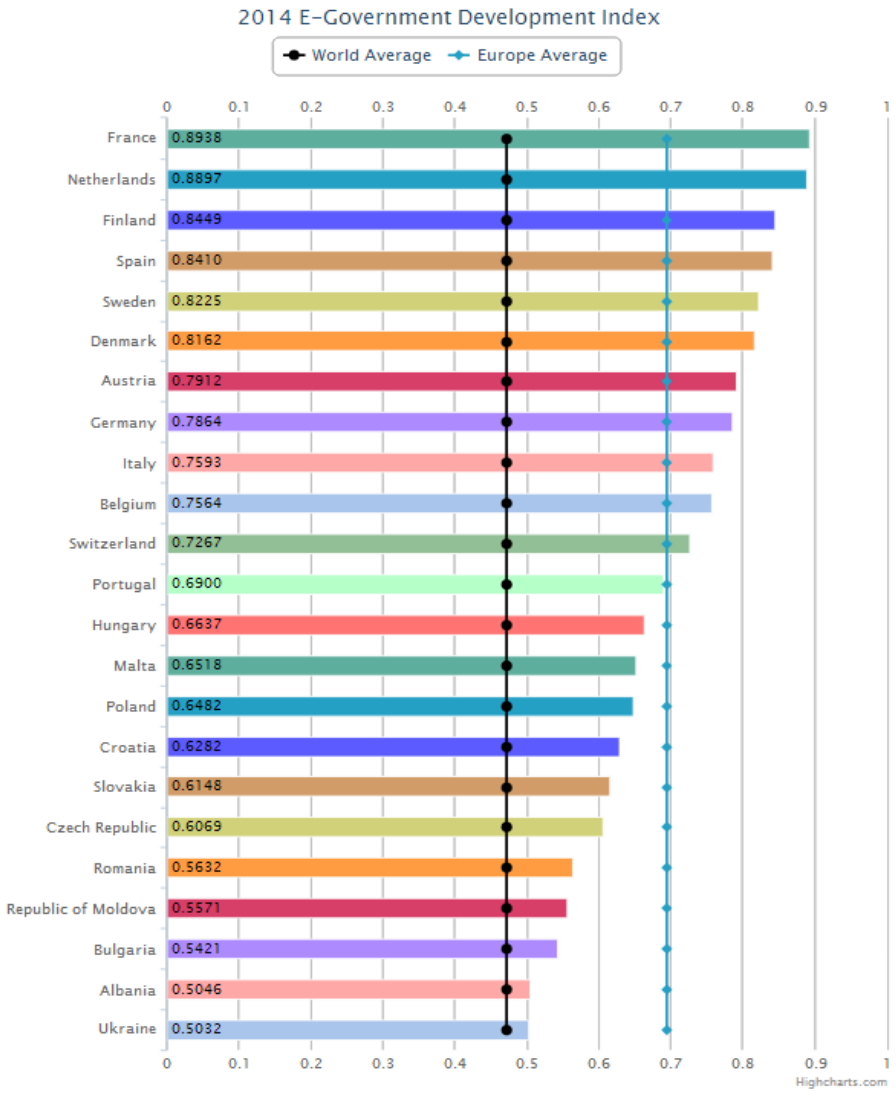
In 2013, according to the European Commission Digital Agenda Scoreboard 2014, Romania has scored only 5% regarding the use of eGovernment services by the citizens. The target that Romania has assumed to reach is 35% until the end of 2020.

Romanian indicators pertaining to eGovernment

Currently, the EGDI index (eGovernment Development Index) granted to Romania by the United Nations, during the latest study on eGovernment (0. 5632) is under the average value granted in Eastern Europe (0.6333). This index is calculated as an accumulation of three factors:

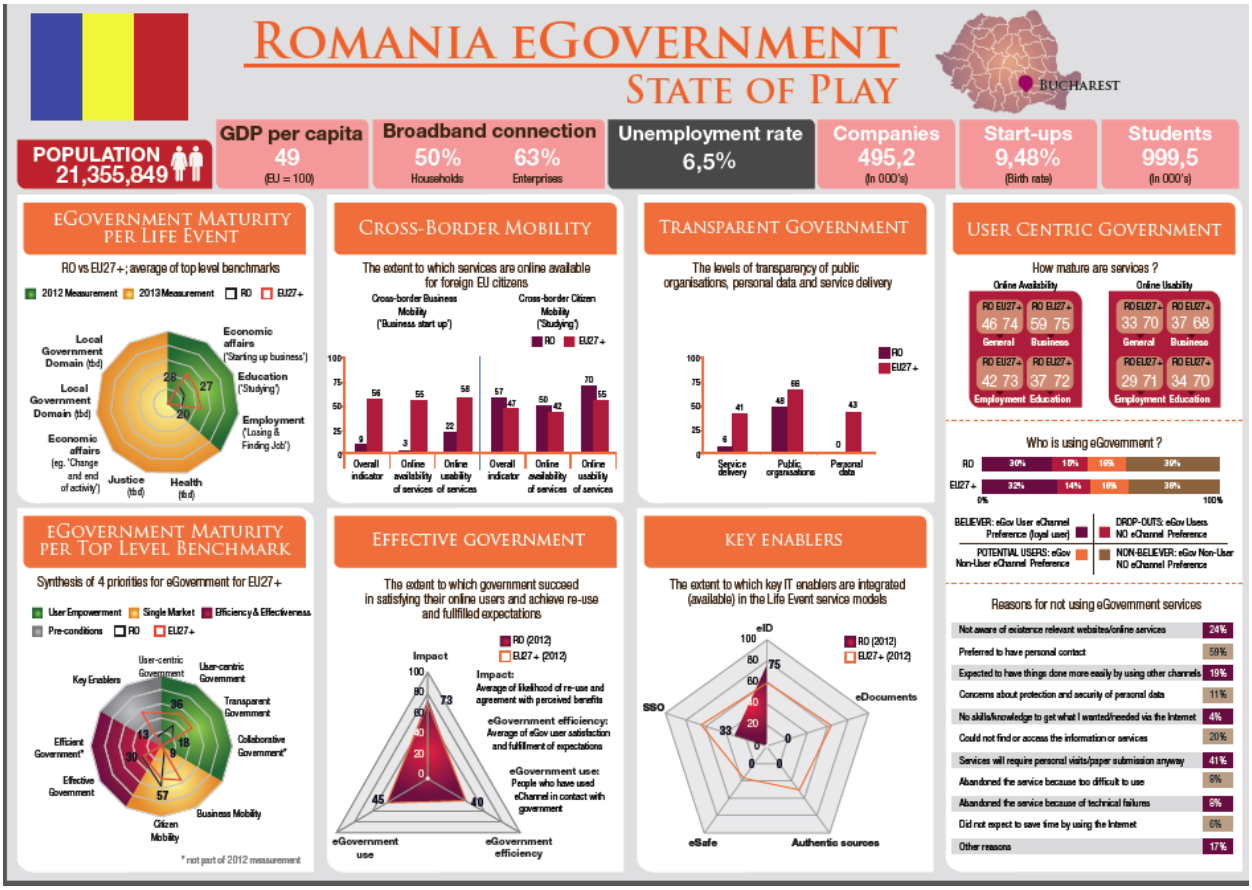
- **online services** (estimated in terms of the % of use of online services depending on the 4 degrees of sophistication),
- **telecom infrastructure** (calculated depending on % of internet users, % of subscribers of fixed telephony, % subscribers of mobile telephony, % internet subscribers in fixed line and % broadband subscribers)
- **the index of human capital** (generated depending on the education level noticed on adults and % of school enrolments).

Sursa: EGovernment Survey 2014, United Nations



Current status:

- In Europe, the average usage of eGovernment in European Union countries taken together is around 40% of EU population
- In Romania, the % of citizens who have used eGovernment services in 2013 has reached 5%, with an assumed target of 35% to reach until the end of 2020.



Source: http://ec.europa.eu/digital-agenda/en/scoreboard/romania

2.1.4 Strategic Lines of Development

Romania's strategic pursuits for eGovernment and Interoperability

In pursuing the desired outcomes for Romania outlined by the Digital Agenda for Europe and in order to achieve the national targets referenced above, Romania needs to concentrate on 3 key aspects of the governing act from a technological perspective, hereby referred to as Strategic Lines of Development, which will enable a full transformation of how the public interacts with the public services in Romania:

- **Romania needs to provide better public services through the use of eGovernment 2.0**. While there have many major steps in Romania in the later years in Romania (from access perspective as well as implementing major information systems), the majority of initiatives faced challenges in terms of adoption, quality, legislation and uniformity. Concentrating on new or improved public services, but with a coherent model in place for ensuring greater impact in the social-economic

context, together with restructuring the rationale behind providing those public services will lead to beneficial results in every layer of the society.

- **Public entities need to increase the adoption of eGovernment Services**. Without proper adoption of public services in their computerized form, the impact of the Digital Agenda will be reduced.
- **Public entities need to optimize the use of technology for effective government operations**. As technology is an enabler for reducing financial and administrative overheads and maximizing Romania's needs to look into the ways in which to reduce unnecessary burdens.

Lines of Actions for addressing the Strategic Lines of Development

Below is a comprehensive list of action points that need to be followed and executed in meet the desired outcomes for the Digital Agenda for Romania and as a broader scope, support Romania's targets for Europe 2020.

Lines of Development	Lines of Actions	Rationale
Provide better public services through the use of eGovernment 2.0	Define the Informational Perimeter of Public Services (Strategic)	Romania will focus firstly on implementing the services derived from "life events" as these are the services which have the greatest impact in the interaction with eGovernment. Romania will use the toolset offered by this methodology to asses and improve its current offer of e-services following the steps: • Define "life-events" activities in Romanian social and economic landscape : divide the process related to each "life event" into specific activities • Discover the current situation, identifying for each activity : o the public services involved and their availability in the online environment; o TIC systems that provide the services and their interoperability degree. Identify the socio-economic needs regarding the further development of on-line public services and prioritize accordingly their implementation using the customer-centric approach defined by this methodology.

		The main actor of this initiative will be the new public institutional structure that will be created to coordinate and supervise the development of eGovernment in Romania (please see appendix 5 – Guiding Principles).
	Implement an institutional structure meant to support the implementation of eGovernment projects (Strategic)	In order to implement the eGovernment system as a program (a set of projects which target a common final goal), it has to be instituted a centrally coordinated facility, meant to include obligatorily a transformation flow, which on its turn facilitates, supports and promotes the active involvement of citizens in preparing online public services and promotion by implementation of online collaborative systems and participative online services. Also, the experience of some countries more developed show that decentralized implementation by local representatives is not effective in time, considering that they do not assume entirely the responsibilities. Their role should be turned into a satellite role – part of implementation, of facilitator. The two new formed public bodies (Digital Agenda Agency and Technical Economic Committee) will be the main actors of this initiative. They will oversee all Romanian implementations pertaining to the Digital Agenda in Romania and will support the implementation of eGovernment project that are in line with the Guiding Principles and Public Services Criteria.
	Promote better standards (Operational)	By using the open standards, the information administrated by the systems is available into stable, public, vendor-independent formats that make it accessible to a large audience over a long period of time. Consequently, the information of public interest – statistics, laws, research results etc. – will not depend on a specific software product and it may be accessed by any computer literate citizen that will be able to disseminate it to the rest of the society All public bodies will adhere to this Line Action.
	Identification of data registries	The most practical option for actual

	and of relevant owners of data registries for interoperability (Operational)	identification of actions related to interoperability of informational systems used in the public administration is the conducting of a feasibility study with direct identification of both the entire informational ecosystem implemented on the level of public administration, of data registries involved and of related owners of data registries and by marking the relations and dependencies between the related informational flows. All the public bodies will adhere to this Line Action. The responsible public body for centralizing the data will be the Technical Economic Committee.
	Promote transparency and openness (Operational)	Use of open source and open standards and providing access open to the application already purchased and susceptible to be implemented on the level of public administration All public bodies will adhere to this Line Action.
	e-Participation (Enabler)	The Ministry for Information Society will develop an electronic channel allowing citizens and businesses to suggest potential new eGovernment services and to track progress of their suggestions. Also, all public bodies that provide services pertaining to Life events will use this channel for improving their services. Additionally, in order to leverage new technologies and to ease the burden of paying for online services, ghiseul.ro will become a one stop shop for paying for public services, with multiple channels for delivery (for example: paying online by card, SMS pay, m-Wallet, etc.) All public bodies will adhere to this Line Action.
	Interoperability (Strategic – defining the interoperability framework Operational – adopting & implementing the interoperability framework)	When new eGovernment services are being developed, these will, where appropriate, be designed to support cross organizational data sharing opportunities and to facilitate interoperability. Main actions: • The creation of the National Interoperability strategy and review

		implementation • National implementation of the legislative package on the review of ICT standards • Develop the necessary measures to promote research projects on standardization activities in the field of interoperability • Participate in the pilot program started by the EU to develop interoperability at the EU level All public bodies will adhere to this Line Action.
	Improve legislation (Strategic)	All Public Bodies will analyze existing legislation, regulations, and service procedures in the work and processes to determine provisions that could promote the use of electronic channels. All public bodies will adhere to this Line Action.
Increase the adoption of eGovernment services	Consolidate institutional support and oversight (Strategic)	Implement the Technical – Economical Committee and the Digital Agenda Agency The responsible for this Line Action is the Minister for Information Society.
	Promote cooperation and collaboration with public and private entities (Operational)	The newly formed Technical – Economical Committee will act as the technical mediator between public and private entities.
	Implement feedback and evaluation mechanism (Operational)	Opportunities for users to provide feedback should be integrated into the design of new electronic systems to facilitate suggestions from those that use the systems with a view to ensuring continuous improvement. This feedback could be through the system itself or through links with social media where appropriate. All public bodies will adhere to this Line Action
	Standardization (Operational)	Participation in working groups of the EC on the harmonization of standards and achieve the set of rules National implementation of the rules of

		standardization **Current Status:** • Lack/ absence of common standards • Current standards do not reflect current market All public bodies will adhere to this Line Action
	e-Identity (Enabler)	Electronic Identity Management is a complex technological and social innovation. The switch to electronic communication between public institutions and citizens or businesses requires new forms of identification and authentication using a personal signature. In order to simplify the access to eGovernment services it is necessary either a single sign on mechanism allowing the users, once authenticated, to use the services to which they are entitled or a unique element of identification, known by all suppliers of eGovernment services. This identification element may consist in an electronic identity stored on the electronic identity card as in the case of other states, members of European Union. In order to achieve this, it is necessary a coordinated involvement of several institutions, including the institutions directly involved in issues related to data security. All public bodies will adhere to this Line Action
	Portal (Operational)	Implementation of the web portals goes through stages; starting from an interface to citizens and SMEs containing a catalogue of information and then providing access to the most important and interactive eGovernment services and then providing single access point to all services Services for citizens, businesses, public officials and visitors of the portal can be organized and follow a series of "life events". Design and implement customer-centric portals instead of service provider-centric

		ones. Current Status: Low % of Citizens are using web portals to submit forms and a smaller number of % of enterprises are interacting online with public authorities Romania's e-governance portal being average among its peers has areas for improvement toward providing digital governance experience in the below areas: ○ Site completeness ○ Maturity of Integrated Web Services ○ One Stop Portal Approach ○ Multi lingual site ○ Forms / Process / Descriptions ○ Promotes Collaborative Platform ○ Helpdesk availability Romania offers provider-centric on-line services, usually via the web sites / portals of the provider state entity; the current eGovernment portal structures the access to these sites Romania has a separate payment portal which allows citizens to make payments for selected services (https://www.ghiseul.ro/ghiseul/public) All public bodies will adhere to this Line Action
[e-Gov SID3] Optimize the use of technology within the government operations	Focus on e-procurement (Operational)	According to the strategic plan of development of an Electronic System of Public Procurements – SEAP, at the end of 2014, the objective is reaching the below results: • Increase of the degree of using SEAP in the procurements by electronic means from 20% - 40% in 2013, up to 60% for the year 2014 • Promoting

		administrative/legislative measures with role of support in development of current activity, of optimization of the conditions of operation and increase of efficiency of internal management related to strategic development of e-auction (which involves the implementation of new functionalities brought by SEAP All public bodies will adhere to this Line Action
	Implement a decommissioning model (Enabler)	A decommission model will be implemented to safe guard against spending public funds for systems which do not have an impact on. As such, the Minister for Information Society will oversee the implementation of a decommissioning model for which: - All investments will need to calculate and secure the necessary budget for 5 years (coming from mixed financing sources) - After 5 years a clear decision will be made regarding decommissioning that investment objective or securing additional funds for incremental periods of 3 years This model will apply to all the systems pertaining to Life Events but its feasibility will be assessed in order to use it on all the eGovernment systems. All public bodies will adhere to this Line Action
	Improve Governance on implementation of computerized public services (Strategic)	This action line will consist of 2 major initiatives: 1. MSI will implement and actively support the Government Enterprise Architecture in Romania 2. The newly formed Technical Economic Committee will oversee all IT implementation to be in line with the Digital Agenda Strategy and guidelines coming from the Government Enterprise Architecture approach More information can be found in Appendix

		4. All public bodies will adhere to this Line Action
	Promote innovation (Strategic)	Part of Romania's strategy for the Digital Agenda will be to give access to the public to open data and actively invest in innovation of eGovernment Services, by receiving feedback and ideas from citizens and businesses. All public bodies will adhere to this Line Action

2.2 CYBER SECURITY – INFORMATION SYSTEMS AND NETWORKS SECURITY

2.2.1 Introduction

Preamble

Trust and security in public services is national priority for the Romanian government and is the underlying requirement for electronic infrastructure of data networks, electronic services and communications.

The occurrence of cyber incidents is mainly determined by human or procedural reasons. Thus, some of the incidents were identified as the main cause of the lack of consistent security policies to protect data that is collected, handled, processed and stored by computer networks..

Cyber Security Definition

Cyber Security is defined as "the state of normality that results after provisioning proactive and reactive measures that ensure confidentiality, integrity, availability, authenticity and non-repudiation of electronic information, of private and public resources and services in the cybernetic environment. These reactive and proactive measures can include policies, concepts, standards, security guides, risk management, training and awareness activities, implementation of technical solution to project the cybernetic infrastructure, identity management, outcome management." [2]

2.2.2 European context

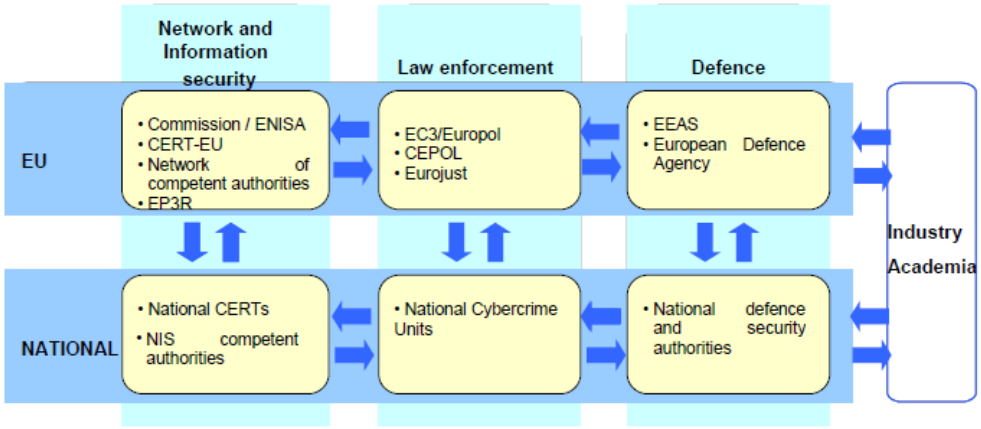
At EU level, the European Commission is funding several projects to protect critical infrastructure information via the CIIP initiative, for border security and resilience of critical information and communications infrastructure by stimulating and supporting the development of national and multinational capabilities in this area. At the beginning of 2013, published a proposal on European Cyber Security Strategy was published, for a directive concerning measures to ensure a high common level of network and information security across the Union.

A new Cyber Security Strategy was developed by the European Commission which comprises internal market, justice and home affairs and foreign policy angles of the cyberspace issues. The Strategy is accompanied by the technical legislative proposal by the European Commission's Directorate General Connect to strengthen the security of information systems in the EU and is comprised of 4 major priorities:

[2] http://www.cert-ro.eu/files/doc/StrategiaDeSecuritateCiberneticaARomaniei.pdf

- Freedom and openness
- The laws, norms and EU's core values apply as much in the cyberspace as in the physical world:
- Developing cyber security capacity building
- Fostering international cooperation in cyberspace issues

To respond to EU cyber strategy, to address cyber security in a comprehensive manner, the activity should be spread over three sub-key pillars - NIS network and information security – law enforcement – defense, sub-pillars that already operate in various institutions in Romania horizontally and vertically as in the following scheme:



Source: European Commission Strategy http://ec.europa.eu/digital-agenda/en/news/eu-cybersecurity-plan-protect-open-internet-and-online-freedom-and-opportunity-cyber-security

In its Pillar III "Security and Trust", the Digital Agenda for Europe defines a series of cyber security initiatives at European level to ensure cyber security incident response capabilities and the protection of personal data.

In this context, the responsibility of the national cyber infrastructure protection, whose compromise would undermine national security or prejudice the Romanian state, is equal to all institutions and companies that own such facilities, primarily the state institutions constituting the Cyber Security Operations Council in accordance with the Cyber Security Strategy of Romania.

In order to achieve a strengthened network and information security policy, cooperation is needed between EU governments, public institutions and private companies to improve the exchange of information and to ensure that security issues will be effectively addressed and solved. ENISA will provide the exchange and collaboration. A real-time response to threats is required, implementing and improving the CERT network in Europe, including the European institutions. At the national level it is necessary to develop the operational capabilities of CERT-RO as required by law, to monitor and implement the principles provided by EC, as well as to draft amendments for improving business expertise of CERT-RO.

In fighting against cyber-attacks on the information systems, Member States must amend the existing criminal law on attacks against information systems. The main purpose is to provide greater authority to the European legislation on cybercrime. The initiative will improve the security of citizens and businesses, and it is expected to have a positive effect on companies, as information systems repair costs are very high. At the national level, it will provide points of contact for complaints and information gathering on

cyber security incidents either in an automated manner or secured through direct communication as appropriate. It will also identify, analyze and classify security incidents in the cyber infrastructure, as per the area of competence. CERT-RO will develop proposals to amend the legislative framework to foster the development of cyber security infrastructure that provides public utility functionality or information society services. It will also continue to develop the partnership with ENISA on combating cyber incidents and to establish task forces to work jointly at EU level in order to increase the speed of response to attacks.

To achieve a European platform on cybercrime, Europol in cooperation with the European Commission has called for the integration of all relevant EU platforms in only one. The platform should serve as a center for collecting and storing information about cyber-attacks. It will be the major element in the European Centre CyberCrime. At the national level it will be carried out the analysis and optimization of existing security platforms, eventually merging and consolidating their national platform and access to Europol and staff training in fighting against cybercrime. The implementation, monitoring and interconnection between the European and national platforms will be achieved.

In order to intensify the fight against cybercrime at international and European level it will be enhanced the cooperation between EU Member States in the fight against cyber-attacks. In this respect, in the EU we will need to create a European forum for discussion between the national government to integrate risk management, and to create a public-private partnership. Regarding the transatlantic cooperation it is necessary to improve the EU-US relations for the application of the European Commission's cyber security plan and to have an ongoing dialogue and exchange of information with the U.S.

In this matter, at national level, we will consider implementing processes of security risk management in the public administration. At the same time, we will aim at enhancing consultations with similar bodies in the EU and U.S., and at exchanging specialists with the U.S. and other EU countries for 1-2 years, hiring these specialists and their active involvement when they return home.

2.2.3 National context

Cyber Security Approach in Romania

Risks of cyber incidents occurrence are caused by human or procedural reasons. Thus, some of the incidents were identified as the main cause of the lack of consistent security policies to protect data that are taken, handled, processed and stored by computer networks.

A positive development in the field of cyber security is the setting up of CERT -RO (http://www.cert-ro.eu), which is the national contact point for similar structures and is responsible for the development and distribution of public policies to prevent and fight against incidents taking place in the national cyber infrastructure.

Also, Romania's cyber security strategy adopted by Decision no. 271/2013 sets out the objectives, principles and main directions of action for understanding, preventing and deterring threats, vulnerabilities and cyber security risks and promotes Romania's interests, values and national objectives in cyberspace. The strategy and action plan aim at setting targets for cyber security and lines of action for the coming years. The Romanian approach is aligned to the guidelines proposed by the European Commission in the Digital Agenda and its Pillar III - Trust and Security – as well as to the progress of other European Union Member States.

The topic "Network Information Security" is a real priority of both the European Commission and national structures. Raising cybersecurity awareness, issues such as viruses and malware, how to use passwords, social engineering - blogging, how to use your computer at home, how to use "social media", how to work

outside the office, send and receive emails, use fax machines and all types of data structures is one of the high priorities of the national structures with responsibilities in the field.

The National Cyber Security System (NSCC) is the general framework for cooperation that brings together public authorities and institutions with responsibilities and capabilities in the field, in order to coordinate national actions for cyberspace security, including the cooperation with academia and business trade associations and nongovernmental organizations-NGOs.

The National Center for Response to Cyber Security Incidents - CERT-RO is a structure of expertise and research and development in the cyber infrastructure protection, under the coordination of the Ministry for Information Society, which has the capacity to prevent, analyze, identify and respond to cyber security incidents of information systems.

Developing cooperation between the public and private sectors in order to ensure cyber security represents a priority for action at the national level, given that cyberspace include cyber infrastructure owned and managed by both the State and private entities.

Currently, institutions within the National Cyber Security System creates, at the level of public institutions, the technical and operational framework in order to ensure interoperability between computer security components in order to protect the cyber infrastructure within the public and increase the availability and level of confidence in the specialized public services provided to citizens, businesses and government.

Romanian Indicators pertaining to Cyber Security

According to a Eurostat survey on ICT[3] usage by individuals and households:

- 45% of the Romanian users use the Internet at least once a week
- 52% of the Romanian users are at least fairly confident in buying online or online banking
- 33% of Romanian users are concerned about misuse of the their personal information online
- 37% of Romanian users are concerned about security related aspects of online payments.

2.2.4 Strategic Lines of Development

Strategic Lines of Development for Cyber Security in Romania

Strategic Lines of Development	Lines of Actions	Description
Establishing the necessary conceptual and organizational framework for cyber security	Establishing and operationalization of the national cyber security system (Strategic)	Setting up the platform for cooperation and harmonization of the existing CERT capabilities at national level that should capitalize the tools, will work to strengthen expertise in cyber risk, by fostering synergies between different action plans on cyber security (military and civil, public-private, government, non-government); Responsible: Operative Council for Cyber Security (COSC)

[3] http://ec.europa.eu/public_opinion/archives/ebs/ebs_404_en.pdf

	Improve legislation (Enabler)	Completing and harmonizing the national legislation, including the establishment and enforcement of minimum national security requirements in cyber infrastructure Responsible: Operative Council for Cyber Security (COSC)
	Strengthening the partnership between public & private sector (Operational)	Developing cooperation between the public and private sectors, including by fostering the exchange of information on threats, vulnerabilities, risks, and those related to cyber incidents and attacks Responsible: Operative Council for Cyber Security (COSC)
Developing national capacities for risk management in cyber security and cyber incident response under a national program	Construction of Data Base with relevant information (Operational)	Consolidating, at the level of the competent authorities, the potential for knowledge, prevention and counteracting of threats and minimizing risks related to the use of cyberspace Responsible: Operative Council for Cyber Security (COSC)
	Boost the Research & Development capabilities in cyber security (Enabler)	Fostering national R & D capabilities and innovation in cyber security Responsible: Operative Council for Cyber Security (COSC)
	Cyber Security Infrastructure (Enabler)	Increasing the resilience of cyber infrastructure Responsible: Operative Council for Cyber Security (COSC)
	CERT-RO (Strategic)	Developing CERT entities, in both public sector and private sector Responsible: Operative Council for Cyber Security (COSC)
	Implementing security standards (Strategic)	Increase cyber security by reducing vulnerabilities and implement minimum procedural and security standards for cyber public and private infrastructures Responsible: Operative Council for

		Cyber Security (COSC)
	Inter-institutional cooperation (Operational)	Coordination of inter-institutional response in case of cyber security incidents Responsible: Operative Council for Cyber Security (COSC)
Promoting and consolidating the security culture in cyber field	Development of public awareness programs in public administration and the private sector (Operational)	Development of public awareness programs related with threats, vulnerabilities and risks of using cyberspace Responsible: Operative Council for Cyber Security (COSC)
	Development of educational programs (Enabler)	Educational programs in the forms of compulsory education on the safe use of the Internet and computing equipment Responsible: Operative Council for Cyber Security (COSC)
	Training (Operational)	Appropriate training to people working in cyber security and promoting widespread professional certifications in the field Responsible: Operative Council for Cyber Security (COSC)
Developing international cooperation in the field of cyber security	Concluding agreements of international cooperation for improving the response capacity in the event of major cyber attacks (Strategic)	Responsible: Operative Council for Cyber Security (COSC)
	Participation in international programs and exercises in the cyber security field (Operational)	Responsible: Operative Council for Cyber Security (COSC)
	Promote the national security interests in the international cooperation formats in which Romania is a member (Enabler)	Responsible: Operative Council for Cyber Security (COSC)

2.3 CLOUD COMPUTING

2.3.1 Introduction

Preamble

Cloud Computing is offering several potential benefits to public bodies, including scalability, elasticity, high performance, resilience and security together with cost efficiency. Understanding and managing risks related to the adoption and integration of cloud computing capabilities into public bodies is a key challenge. Effectively managing the security and resilience issues related to cloud computing capabilities is prompting many public bodies to innovate, and some cases to rethink, their processes for assessing risk and making informed decisions related to this new service delivering model.

Currently, a range of issues faced by public authorities in terms of managing the infrastructure of informational systems entails a careful analysis of the organization strategy. Among these, some of the more important issues are:

- IT infrastructures existing on the level of different governmental organizations have problems of scalability, effectiveness of costs, and are often not updated to the current standards
- Updating technical skills for the staff serving applications in different governmental organizations becomes a less efficient process due to heterogeneous and / or old technology, not complying with standards, insulation of IT infrastructure and people in different institutions, etc.
- Heterogeneous security solutions which reflect in greater security risk
- Granular purchase of hardware and software solutions does not provide transparency on governmental level.

Cloud Computing can address all these issues by:

- Enabling rapid and cost-effective procurement of information systems / services for all state agencies
- Eliminating the duplication of effort
- Reducing risk management costs

Cloud Computing Definition

Cloud computing relies on sharing of resources to achieve coherence and economies of scale, over a network. At the foundation of cloud computing is the broader concept of converged infrastructure and shared services.

2.3.2 European context

On European level, intense activities are carried out for the standardization of concepts related with Cloud Technologies. In the communication submitted by the European Commission "Unleashing the Potential of Cloud Computing in Europe", one provides the first definitions and European strategies in this field. Based on the materials published by European Commission, Cloud Computing is understood as being a capacity of storing, processing and accessing data encountered on remote calculation systems. In this model, the users may assign calculation resources almost unlimited for which they need major capital investments.

The adoption in private sector of Cloud technologies within the European Union exceeds 64%, however the organizations are still circumspect in implementing them. The general inclination is to use hybrid patterns of Cloud and testing non-critical services.

The adoption of Cloud technologies in the public sector is not very different from private one. The main issues followed in the public sector are the reduction of costs and the increase of the quality of services supplied by Cloud platforms.

Having such major benefits, noticed or estimated, the European Commission proposed the Cloud technologies for economic development and reduction of negative impact on environment of economic activities. Thus, in order to stimulate the development of Cloud 3 major actions may be undertaken:

- Standardization of the series of data and informational applications
- Adjusting the terms and conditions for contracts
- Determining a partnership for European Cloud which supports innovation and development in the public sector

2.3.3 National context

Cloud Computing Approach in Romania

Cloud computing has several advantages which also Romanian Government and public authorities can benefit from. Therefore, we have looked to the couple of European countries who already adopted cloud computing in the public sector or are planning to do so. As a conclusion, the dominant cloud computing deployment model in those countries is a so-called G-Cloud (Governmental Cloud), a private or community cloud especially designed for national governmental use.

The Governmental Cloud has a double role. The first issue refers to the relation of governments with citizens in the eGovernment context. But there is also a secondary issue, equally important, related to determining a technical work frame for the interoperability of governmental organizations. The concept of governmental Cloud approaches both issues combining a particular concept of a hybrid Cloud with an area of public Cloud for citizens and an area of private Cloud for interoperability.

In the context of eGovernment and creation of an interoperability frame in the space of public services the governmental Cloud is a versatile infrastructure of support which presents certain indisputable technological advantages such as:

- Lower operation costs
- Necessary optimized of human resources
- flexible infrastructure adjusted to changes in the context of a faster launch of eGovernment services

2.3.4 Strategic Lines of Development

Strategic Lines of Development for Cloud Computing in Romania

Strategic Lines of Development	Lines of Actions	Description
Creation of a safe and scalable IT infrastructure, common to all organizations of public sector	Consolidation of the Acquisition Process for the Public Institutions IT Infrastructure (Enabler)	The pattern changes the manner by which IT products, infrastructure and services are purchased, managed and used independently by the organizations of public institutions, by using common elements of infrastructure which reduce

		significantly the costs and complexity of interoperation of eGovernment services. Similarly, the pattern of infrastructure proposed allows the use by all public institutions of common elements of IT infrastructure such as the courier services, the collaboration platforms, the data connections, the security platforms (on the level of data centers). Responsible: Ministry for Information Society. All public bodies will adhere to this Line of Action
Application of PCU pattern – Unique Point of Contact in the activity with the citizen	Unique Point of Contact or Single Sign on (Enabler)	The use of Cloud Computing technology may support as well the achievement of more general targets, afferent to eGovernment activities as well as the successful implementation of the unique point of contact with the citizen and may implicitly improve the interoperability level of IT public systems. It shall also entail the reduction of duplication of databases existent in the public institutions, of web portals used in the interaction with citizens, and of related complex services used by such institutions as support services. Responsible: Ministry for Information Society. All public bodies will adhere to this Line of Action
Application of the pattern of central virtual store of IT resources for the organization of public sector	Procure and bring into service a range of components and services forming the core infrastructure (Enabler) Migration of the already existent services (both those directed towards citizens and those used as internal use) of different public institutions on the new platform and the installation of new services according to governmental needs and strategies (Operational)	The application of virtual store will have the role of supplying the IT components necessary to public institutions in order to allow them to carry out the activity without repeating the processes of procurements and installation. This approach address the issue of decentralization (insulation) of systems and benefits of all advantages offered by a Cloud centralized infrastructure Responsible: Ministry for Information Society. All public bodies will adhere to this Line of Action

Re-evaluation of the administrative capacity directly involved in the activity of management of Governmental Cloud	(Strategic)	The changes of the governmental IT infrastructure, registered upon the implementation of governmental Cloud lead inevitably to the reorganization of administrative capacity which supports the governmental TIC activity. In this respect, an evaluation of administrative capacity will take place in order to be adjusted to the new requirements of governmental Cloud infrastructure Responsible: Ministry for Information Society. All public bodies will adhere to this Line of Action
Reduction of number of data centers in the public institutions and consolidation of infrastructure	Data Centers Consolidation (Enabler)	Currently, the data centers are encountered within all governmental institutions. The result of the action of reducing the number or the size of data centers will be the centralization within a sole data center with a high level of availability, security, redundancy for protection in case of disasters, protection to data loss, etc. IT services which may be supplied by third parties – in outsourcing business model – must be first identified, and then planned for migration to the cloud All services which are provided from the data centers in progress of being consolidated will be submitted to analysis to check which of them must be: • either migrated as such • merge with other systems already centralized • re-designed • or decommissioned Responsible: Ministry for Information Society. All public bodies will adhere to this Line of Action

The main benefits are reduction of costs, improvement of services, and much faster process of deployment of the new services:

- A pattern which allows the reduction of costs durably for IT services in the public sector, including hardware, software and operations
- Reduction of costs for the migration of services towards new platforms
- Reduction of the number of applications and services (redundant) in the public sector
- Reduction of the time and cost for procurement of new services
- Shifting IT investments to more efficient computing platforms
- Ability to use shared applications for common Government functions (ERP, HR, SCM, GIS etc.)
- Promoting the use of Green IT by reducing the overall energy and real estate footprint of government data centers
- Cost savings by providing common services, utilities, and facilities to multiple public institutions who had previously enacted these operations independently
- The attention can be focused on development, deployment and management of cloud-based infrastructures and services (IaaS, PaaS, SaaS) over large-scale, distributed, heterogeneous, dynamic computing and storage environments
- The IT infrastructure within the cloud that is faster, more secure, and continually refreshed with the latest application versions and updates
- Agencies can consolidate servers, departments can consolidate data centers and move to one email system, and even across different departments services like payroll applications, can be shared
- Improved services for citizens by reducing the time by which a governmental service is rendered
- Reduction of carbon emissions by optimizing the use of the resources of data center, decommissioning of redundant services and purchase of "green" systems with regards to energy consumption
- Increase of security on the level of data center by implementation of up-to-date, standard and proved security solutions. Data will be much less prone to loss because the data backup processes within a cloud environment will render the data much safer.

2.4 SOCIAL MEDIA

2.4.1 Introduction

Preamble

We have seen how the social media environment has evolved over the past years, from a communication channel between citizens to a business marketing tool.

Social media, together with the wider internet have become useful business tools in other countries, currently helping governments to be part of the conversation. They have understood that they cannot isolate themselves and that they can provide better services when consulting with and involving the citizen.

Social Media Definition

Social Media are defined as specific Web 2.0 communication tools which enables people to interact, generate and share content using the online environment. These social platforms can be seen in several forms:

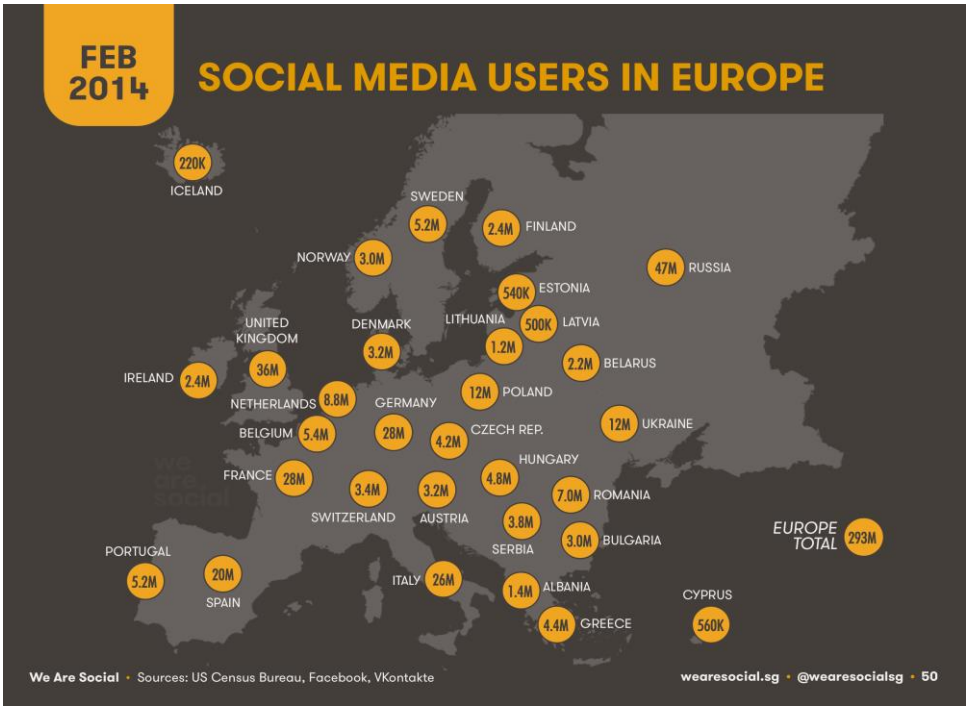
- **Social news:** dedicated websites where the user can read about different topics, give feedback by voting or commenting on the articles.
- **Social networks**: platforms that allow the user to connect and interact with other people, based on mutual interests and experiences, and also to publish and recommend content based on personal/public accounts.
- **Blogs/Forums**: platforms that are owned by people, communities or businesses of any kind which deliver general or personalized content. The difference between them and a website is that blogs & forums are generally build on free platforms or unique domains and can allow a more direct interaction with the target audience. Their users and beneficiaries can comment or add articles within these platforms.
- **Social bookmarking:** websites that allow the user to publish, recommend and comment any kind of content. Bu using the "bookmark" function, the user can find and bookmark sites and information of interest that can be accessed from anywhere and also, they can be shared with other users.
- **Photo/video sharing:** websites where the user is given the possibility to create, upload, publish, share and receive feedback on photo and video content.

Social media are one of the most famous and used instruments for creating online communities, based on shared values and interests. These virtual communities can create, use and share high volume of data and information, can conduct to creating and developing new social trends and can determine their present and future evolution.

2.4.2 European context

Analyzing the European context, at the beginning of 2014 we know that there are 293 million social media users, of which 193 million accessing social media through mobile devices[4]. Otherwise said, 40% of the total European population is represented by active social network users.

[4] Global Web Index, Q2, 2014 (https://www.globalwebindex.net/) via wearesocial.net



A recent study conducted by TNS Digital Life states that 42% use social media at least once a week, while 27% use social media every day, or almost every day. These percentages give us an idea of how many people one could reach using social media.

There are notable differences in the geographical use of social networking and social media technologies amongst EU Member States; the biggest users of social media are UK, Germany, France, Italy and Spain. However, there is also a generational split as younger people use the Internet less outside social networking sites in all Member States, while older people who use social networking sites are practically

the same as the percentage of Internet users. The generational split has two main components: 15-39 and over 40. These differences have a major impact on the effective deployment and uptake of social networking and social media by business and public sector organizations.

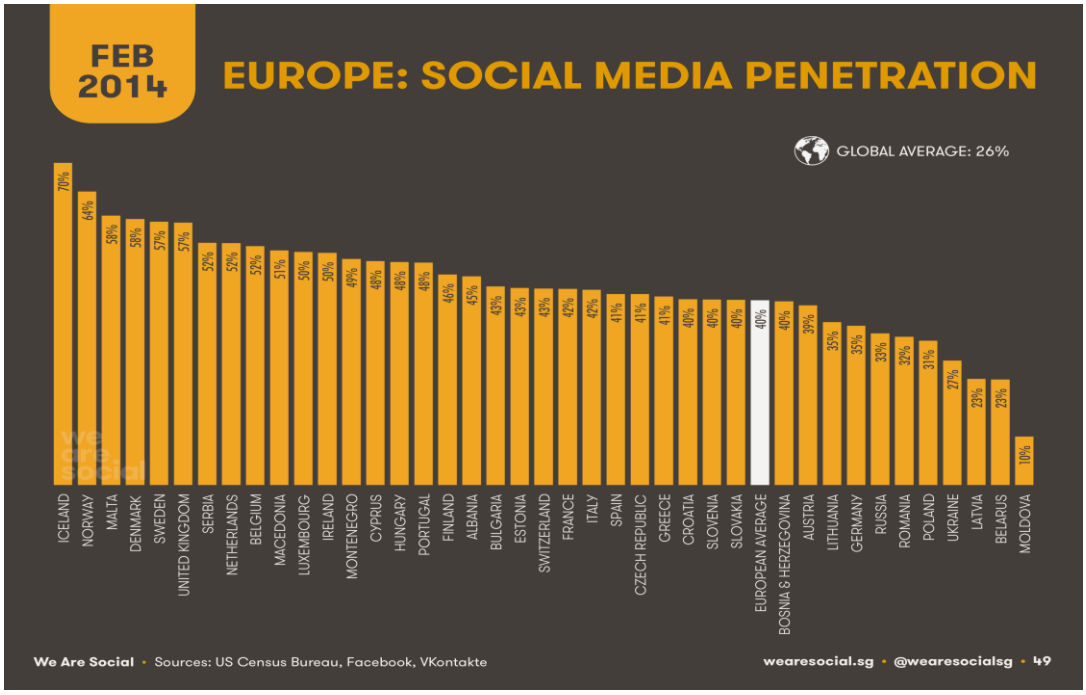
Romania's intention is to use their good example and drive innovation further in our country, by tailoring and implementing the good practices used so far, in this field of action. Through this field of action, Romania needs to pursue a revaluing of the current communication process of public entities in Romania, by modernizing communication channels. The context of this approach is favorable in Romania, as recent statistics (published by Quintly.com), has placed Romania in top 10 countries worldwide of increase in number of users for online media platforms (4.78% users every 4 weeks).

Top 10 Countries With Highest User Growth

1 MONTH | 3 MONTH | 6 MONTH | 1 YEAR

	Country	Users	Change	+/-%
	World	971,426,940	-4,368,880	-0.45 %
1.	Brazil	65,657,820	+1,669,280	+2.61 %
2.	Philippines	30,214,140	+399,860	+1.34 %
3.	Vietnam	10,965,880	+383,040	+3.62 %
4.	Turkey	32,260,920	+371,000	+1.16 %
5.	Poland	10,164,260	+318,660	+3.24 %
6.	Romania	5,591,660	+255,280	+4.78 %
7.	Algeria	4,302,460	+238,580	+5.87 %
8.	Egypt	12,481,580	+237,880	+1.94 %
9.	Peru	9,956,500	+190,380	+1.95 %
10.	Iraq	2,702,680	+162,960	+6.42 %

Source:https://www.quintly.com/blog/2013/02/facebook-country-stats-february-2013-top-10-countries-lose-users/



2.4.3 National context

Social Media Approach in Romania

According to Global Web Index via wearesocial.org, in February, 2014 there were 7 mil. social media users across Romania. Based on a study published by Eurostat in December 2012, 73% of Romanians are using the internet to read newspapers online. Posting messages on social media occupies with 48% the second place in the classification of the motivation for using the internet, followed by searching for tourist services, creation of a website and internet banking, the last reason being claimed only by 8% of users. However, the most common activities in online environment remain the sending/receiving emails and searching for information about goods and services.

Public institutions in Romania (Ministries, Municipalities) need to involve the citizen, as their primary customer, in their work, their decisions, research and implementation. The citizen should be considered the main source for feedback and solution improvement, because he is the main beneficiary of their services. Social media and e-petitions are able to increase citizen involvement into the government decisions (acts). This will ensure that policy is developed in consultation with citizens.

Currently, the Romanian public institutions have low social media representation. Most of those institutions have developed a one way type of communication, reporting information, but not giving the possibility of real time comments and feedback.

2.4.4 Strategic Lines of Development

Strategic Lines of Development for Social Media in Romania

Strategic Lines of Development	Lines of Actions	Description
Modernization of Communication Structures, Communication Channel & Indicators	Define key principles and business framework for the communication process within the public institutions (Strategic) Establish key coordinators and teams for the communication process – PR Communication Departments within the public institutions (Strategic) Define the communication plan tailored for each public institution (Enabler) Design the conversation for 1 to many, rather than use repeatedly 1 to 1, which is cheaper and quicker – one of the most useful opportunities of social media (Operational)	**Structure:** • Single web portal with access to all public institutions websites and public services. • Public institutions websites with real time feedback option implemented. **Communication:** • Smart use of social media channels: define the user profile, engage and empower him in conversations. • Use of reverse communication mechanisms: proactive notifications and keeping the citizen in the loop **Indicators:** • Number of people connected to public institutions through social media channels. • Number of public initiatives

		promoted through social media. • Number of ideas, projects validated through relevant conversations facilitated through social media. Responsible: Ministry for Information Society. All public bodies will adhere to this Line of Action
Support of use of Social Media for promoting governmental initiatives	Promoting public debates (Operational)	Making data available for the citizens and increase their involvement to participate in public debates for the impact programs. The citizen may have needs that public institutions can't respond, but which can be solved by initiatives of other citizens. Citizen life improvement, administration cost reduction by promoting open data sets or relevant conversations facilitated through social media Responsible: Ministry for Information Society. All public bodies will adhere to this Line of Action
Support, sponsorship and empowerment of the citizen for social media communication	Support for Open Government Partnership initiative, as social media is in alignment with the three principles of Open Data: Transparency, Participation and Collaboration (Enabler) Support for use of Big Data in public administration (Operational)	**Indicators:** Number of public initiatives promoted through social media Number of ideas, projects validated through relevant conversations facilitated through social media. Responsible: Ministry for Information Society. All public bodies will adhere to this Line of Action

To embed social media as a mainstream channel used routinely to engage with citizens, business and internally within the government will help the Government and public institutions to:

- Enable the citizens as business partners in creating a better society by:
    - communicating with the citizens in the places they already are, using the channels that they already use
    - generating relevant conversations, consulting and engaging them in the decision-making process
    - becoming more transparent and accountable

- Promoting the information initiatives of SME's related to the potential of social media for business development and promotion by:
    - Helping SME's to generate higher income by extending the activities in the entire EU on a fraction of traditional cost
    - Assuring equal access to information will increase the surviving rate of SME's which, in the absence of financial resources for advertising and communication, have higher risks of becoming insolvent
    - Enabling the SME's to: manage company and brand reputation, to build brand awareness and improve brand perception, to get closer to the customer, to learn what they need and to respond in a timely manner, to consult and debate
    - Involvement in the Digital Sunrise Europe initiative.

2.5 OPEN DATA

2.5.1 Introduction

Preamble

Openness is a concept common to open source, open government and open data. It is both a philosophy of action and a profession of faith, a practice and a goal. But its application to the field of public data is not obvious. Open Government Data can be used to help the public better understand what the government does and how will it performs, and to hold it accountable for wrongdoing or unachieved result. Also, open data is a contributing factor to innovation in the private sector. As such, where not in conflict with any explicit mention in the law, public entities should make their data publicly available.

The concept of "Open Data" involves making available to public freely data accessible, reusable and re-sharable. Open Data is applied in fields such as scientific environment and governmental environment.

Open Data relies on 3 principles:

1. Transparency- the data is published by the directly competent institutions and it has to be easy to understand, amend, reuse and mainly in a standard format in order to allow easy integration in other informational or analysis systems
2. Participation – the data may also be obtained from public demands therefore the citizen-administration interaction is provided in order to serve their needs
3. Collaboration – open data will provide opportunities to work together (improvement of service, generation of data sets) with natural persons, as well as the groups in the public sector, non-profit, university and private in order to answer the needs of community

Open Data Definition

Open data means that data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control. The final goals of the open data movement are similar to those of other "Open" movements such as open source, open hardware, open content, and open access.

2.5.2 European Context

The European Commission work in the area of open data is focusing on generating value through re-use of a specific type of data – public sector information, sometimes also referred to as government data.

They are supporting open data for 4 reasons:

- Public data has significant potential for re-use in new products and services
- Addressing social challenges – having more data openly available will help us discover new and innovative solutions;
- Achieving efficiency gains through sharing data inside and between public administrations;
- Fostering participation of citizens in political and social life and increasing transparency of government

In accordance with the Digital Agenda for Europe, the Member States can contribute to making open data a reality through the rapid adoption, transposition and implementation of the revised Directive on the re-use of public sector information. This will create the conditions for economic activity based on open data, and will stimulate cross-border applications.

Open Data place among governmental projects worldwide

Commitment Activity Focus Area	Number of projects
eGovernment	199
Open Data	190
Citizen Engagement	131
Access to Information/ Freedom of Information	93
Budgets & Financial Planning	79
Sub-national Governance	57
Public Servants/Civil Service	50
Anti-Corruption	34
Procurement	29
Capacity Building/ Training	28

Source: Global Integrity, July 2012

In any case, the national particularities are essential to take into account when someone wants to build up a working Open Government Action Plan.

2.5.3 National context

Until now, a total of 64 Governments from all around the globe are part of Open Government Partnership (OGP) or the Partnership for an Open Governance (PGD). Governments joining OGP in different phases are committing to open government across four key areas:

- fiscal and budget transparency
- freedom of information
- asset disclosures for public officials
- citizen engagement [5]

[5] *http://www.opengovpartnership.org/*

In April 2012, the Romanian Government has strengthened its commitment and, with the approval of the Memorandum on participation in the OGP, has taken on the 2012-2014 National Action Plan for the implementation of commitments.

The Government's goal was to fulfill the open government principles – promoting the governmental transparency, using new technologies to increase efficiency and to fight corruption, and increasing the civil participation in the public life. Thus, the main measures of the National Action Plan 2012-2014 has been included the following areas: Increasing the public access to open data; improving the delivery of public services in electronic format (eGovernment); increasing the citizen participation in the decision-making process.

The OGP National Action Plan reflects the priorities of the Romanian Government with regard to promoting good governance. The short and medium-term measures planned to be effected express Romania's determination to implement the OGP commitments, with a special note being given to the following challenges:

- improving public services
- increasing public integrity
- more effectively managing public resources

2.5.4 Strategic Lines of development

Open Data Approach in Romania

Openness and transparency are the key words on how the Government can be transformed. A significant and most marking benefit politically speaking is that of significant improvement of transparency and Strategic Lines of Development supervision of administrative act. The Open Data impact on the perception of citizen related to the corruption of the system of public administration is major due to the free, direct and complete access concerning public activity and the offer of instruments of direct supervision of the performance of the activity of public administration. Freeing up public data and putting it in people's hands can help them have more of a say in the reform of public services.

Concepts	Lines of Action	Comments
Open data – making available to public freely accessible data, reusable and re-sharable.	Elaboration of a legal frame related to the free access to open data – FOI[6] (Strategic)	Public open data refers to data generated or collected by public authorities, which are made available to the citizens to re-use and re-distribute free of charge and in an accessible format. The benefits of Open Data proved to be closed to the applicability of using the information, than its availability. Thus, the simple collection of data and presentation of it was not enough, the added value to which the citizens answered was related to data processing and presentation of structured information in order to
	Identification and achievement of the possibilities of combination and data processing (Operational)	
	Definition and use of relevant standards and format to be used for presentation of data (for example: open standards) (Strategic)	
	Improvement of the degree of presentation of civil society and its capacity to use and integrate the	

[6] FOI – Freedom of Information

	information generated by Open Data (Enabler)	support both them and the civil society, in taking certain decisions. Other benefits: • Improvement of transparency and supervision of administrative act. • Improvement of the interaction with citizen and attraction of its involvement in the improvement of the performance of public administration and quality of public service. Increase the performance of internal products of data management, which generates a high efficiency and a lower cost. Responsible: All public bodies will adhere to this Line Action Responsible for definition of standards and data sets: The Department for Online Services and Design Responsible for training curricula: The Department for Online Services and Design
	Training for public servants on Open Data concepts (Enabler)	
	Identification of the possibilities of attraction of the necessary funds and concluding partnerships with possible supporters (civil society, data and information donor, investors etc.) (Operational)	
Standardization of procedures	Determining a procedure by which the information need of public must be correlated to the publication of certain relevant data sets (Enabler)	The public institutions are required to uniform the format of publication of open data and the form selected should be adjusted to the public preferences. Responsible: The Department for Online Services and Design
Open data supplied by public institutions should be concentrated within a unique platform on national level	Extend the data sets present on www.data.gov.ro (Strategic)	In order to facilitate public access, the existent data was centralised in a list and a permanent supervision system was put in place in order to secure the observance of norms related to open data. The next major step is stimulating the public authorities to upload more data sets and update them frequently.. The institutions must insure the at least one quarter of data sets published on the common platform has a high value. Responsible: The Department for Online Services and Design

2.6 BIG DATA

2.6.1 Introduction

Preamble

Big Data is a concept which refers to an informational initiative which solves the issue related to processing high amounts of data within a limited interval.

By high amount of data one understands an interval included between dozens of Terabytes and several Petabytes of information. An additional challenge is the fact that the data sets proposed for analysis have a high dynamic, forming a set of data “in movement” which changes permanently, several times in real time. The third challenge is related to the format in which such information is encountered and may be approached, varying between structured, semi-structured formats and non-structured formats.

The Big Data systems may provide information both to governmental organisations and to citizens from different sources which may be identified as follows:

- Paper document (physical environment)
- Digital documents
- Points of access to governmental web
- Websites located on Internet
- Social Media
- Operational systems available

The information provided by Big Data systems does not include personal information or information restricted by mechanisms of control and confidentiality.

Big Data Definition

Big Data is the term for a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools or traditional data processing applications. There's nothing new about the notion of big data, which has been around since at least 2001. Big Data is related with the information owned by your private organization or public institution obtained and processed through new techniques to produce value in the best way possible.

2.6.2 European context

Data creation is occurring at an unexpected record rate. Market research analysts believes that organizations that are best able to make real time business decisions using Big Data solutions will thrive, while those that are unable to embrace and make use of this shift will increasingly find themselves at a competitive disadvantage in the market and face potential failure.

Big data, a general term for the massive amount of digital data being collected from all sorts of sources, is too large, raw, or unstructured for analysis through conventional relational database techniques. Many white papers, journal articles, and business reports have proposed ways governments can use big data to help them serve their citizens and overcome national challenges (such as rising health care costs, job creation, natural disasters and nationals security).

At the European level, the improvement of the analytics and data processing, especially Big Data, will allow to:

- transform Europe's service industries by generating a wide range of innovative information products and services;
- increase the productivity of all sectors of the economy through improved business intelligence;
- more adequately address many of the challenges that face our societies;
- improve research and speed up innovation;

- achieve cost reductions through more personalized services;
- increase efficiency in the public sector
- get insights from data that can prevent or deter fraud and abuse

Currently, the European Technology Platform for Software and Services NESSI, together with partners from the FP7 project Big, has drafted a Strategic Research and Innovation Agenda (SRIA) on Big Data Value for Europe. The objective of the SRIA is to describe the main research challenges and needs for advancing Big Data Value in Europe in the next 5 to 10 years.

2.6.3 National context

Big data analytics can improve efficiency and effectiveness across the broad range of government responsibilities, by improving existing processes and operations and enabling completely new ones. After a high level analysis, we discovered that health and human services organizations face constant pressure to collect more revenue, reduce operational costs per case, ensure eligible citizens receive benefits, lower claims adjudication time, improve collections and maintain program integrity. An important direction will be in the area of tax organizations which are having a high pressure on collecting more revenue, in reducing operational costs and improve collections.

2.6.4 Strategic Lines of Development

Big Data Approach in Romania

Concepts	Lines of Action	Comments
Big Data - refers to an informational initiative which solves the issue related to processing high amounts of data (an interval included between dozens of Terabytes and several Petabytes of information), within a limited interval.	Definition of data sets to be collected. (Strategic)	Challenges: • that the data sets suggested for analysis have a high dynamic, forming a set of data "in movement" which changes permanently, several times in real time. • The format in which such information is encountered and may be approached, varies between semi-structured formats and non-structured formats. Responsible: All public bodies will adhere to this Line of Action
	Collection of data from multiple sources: • Paper document (physical environment) • Digital documents • Points of access to governmental web • Websites located on Internet • Social Media • Operational systems available (Operational)	
	• Definition of the analysis process for the data sets collected. (Strategic)	
Use the Big Data concepts in order to optimize, reduce costs or bring value added services	Example of fields where Big Data project have proven feasible: - Health (statistical analysis of cases,	The Government is increasingly dependant on large variety of programs and services, which

	telemedicine, etc.) - Culture - eCommerce - Security (Enabler)	produce and require massive amounts of data, often unstructured and increasingly in real-time The benefits of leveraging Big Data concepts include: - Reduced overpayments - Better fraud and abuse - Improve efficiency - Improved program integrity and preservation of limited budgets for eligible citizens

3 FIELD OF ACTION II – ICT IN EDUCATION, HEALTH, CULTURE AND EINCLUSION

3.1 ICT IN EDUCATION

3.1.1 Introduction

Preamble

The education landscape is experiencing radical change which is redesign of the existing infrastructure of future learning environments. Technology is a high spend consideration for most schools yet smarter spending on the right equipment and infrastructure ensures that learners are engaged and motivated and that every pupil reaches their potential.

In recent years, ICT skills have become essential in the learning process, once with the development of technology and thus of e-learning products. Romania is part of the group of countries where ICT subjects are transversal, specific skills being developed and included into the teaching process of other subjects, thus the assessment not being conducted directly.

ICT Education Definition

ICT is a framework of technologies designed for many purposes. Specifically for the education domain, it can enhance communication, creation and information management through all its components: computers, the Internet, broadcasting technologies and telephony. The benefits are translated into improvement in efficiency and effectiveness of education at all levels and in both formal and non-formal settings.

3.1.2 European context

An advanced digital society requires that most citizens can regularly access the Internet and benefit from the opportunities if offers. For this reason, the European Union has set up the ambitious objective, by 2015, of having at least 75% of the citizens and 60% of people in disadvantaged groups using the Internet on a regular basis, and of reducing the percentage of population that has never used it to below 15%.

A forerunner factor of using computers and the Internet in the learning process is the pupil access to these technologies. Besides the horizontal measures of improvement in the number of broadband connections, development of digital infrastructure and increase of digital inclusion, the best practices show as appropriate the direct intervention in education, an acceleration factor of digitalization through the role of children within the family. Thus, measures such as the provision of equipment and relevant infrastructure in schools and ICT specific training courses are directly related to the improvement of the quality of the learning process and digital skills.

3.1.3 National context

ICT in Education Approach in Romania

The ICT instruments supporting the learning process are the most representative in the support of development pursuant to the completion of classes and for continuous training of citizens, as well as for facilitating digital inclusion. Such instruments provide flexibility to the learning and specialization process in time, entailing a new specialization when the economy of a country

provides other possibilities and development of entrepreneurial sense related to the professional evolution of individual. Such approach is perfectly aligned to the strategy of economic development based on *smart specialization* which involves an approach of economic development and innovation in accordance with the specificity of area and competition advantage which may be developed.

Based on the priorities set forth by the European Commission and undertaken by Romania, the instructions to be followed related to ICT in education may be organized in 3 categories, in conformity to the specificity of learning process:

1. Education by curricular activity based on ICT

This kind of education relies mainly on OER resources and Web 2.0 on learning and evaluation based on projects and e-Portfolio of results of the pupil or student, on creation of original digital content and interaction.

On national level, a similar exercise was performed for the development on the level of ICT in education of disfavored communities from Romania, identified and supervised within the project *Knowledge Economy* Romania.

2. Education by extracurricular activity based on ICT

The resources used within this project are the TIC technologies for the support of extracurricular networking activities (creation camps, experience exchange, visits of international study and e-Holiday project).

3. Continuous professional training - Life Long Learning with the help of ICT

The objective of continuous professional training consists in providing knowledge and skills necessary to adult individuals so they may have the perspective of a work place and to develop an individual professional career. In this respect, special attention must be paid to forming a politics in the field, based on national consensus obtained pursuant to social dialogue.

The analysis of the PISA (Program for International Student Assessment) results in the national context highlights the need of improvement of the teaching methods, as well as the curriculum, particularly in terms of development of specific skills such as interpretation, application and reflection on information in different contexts. According to PISA 2009 in Romania, students coming from schools located in urban areas (with population between 100,000 and 1 million inhabitants) manage to achieve performance, on average, by almost one level of competency higher than students in rural.

Romanian Indicators pertaining to ICT in Education

Based on the Eurostat data for 2015, only 1,6% of Romanian adults (25-64 years) continue to engage in education and professional training processes, with a slightly higher participation of female individuals, compared to 26 % in Iceland, 32% in Denmark, 11% in the Czech Republic and 4.5% in Poland. Moreover, Romania still has much to recover compared to the EU average of 8.9% and the Euro Area average of 8.2%.

As regards the implementation of e-Learning solutions in universities, in 2010 more than half of the universities (58%) had e-Learning solutions, and in the years that followed other 9 universities have implemented such platforms by means of POSCCE and POSDRU financing.

3.1.4

3.1.5 Strategic Lines of Development

Strategic Lines of Development for ICT in Education in Romania

Strategic Lines of Development	Lines of Actions	Description
Providing ICT infrastructure in schools	Provide equipment and relevant infrastructure in schools (Operational)	Providing schools with ICT equipment and systems will primarily impact students' level of digital literacy, which will exert an indirect influence on the quality of future human resources. If the investment plan will focus on a balance between rural and urban areas, in the long term the quality of education will improve and the phenomenon of the digital division will blur, leading to social inclusion of the disadvantaged areas. The existence of an ICT network in each school will also allow a better management of educational materials and facilitate students' access to information. Additionally, the implementation of an ICT infrastructure, complemented by the installation of educational software (for teaching, testing) will encourage the ICT-assisted teaching and will impose an objective evaluation of pupils' performances. Responsible: Ministry of Education with support from Ministry for Information Society
Developing pupils', students', and teachers' digital competencies	Educate teachers on ICT technologies (Enabler)	Due to the fast pace of updating the IT systems, in order to ensure appropriate education to students, teachers themselves should be trained on a regular basis on updates of the ICT-assisted educational sector Responsible: Ministry of Education with support from Ministry for Information Society
	Provide ICT specific training courses, directly related to the improvement of the quality of the learning process	Through the thorough preparation of teachers, pupils and students will gain a competitive advantage that

	and digital skills. (Operational)	will be useful when engaging, facilitating their entry into the work environment. Responsible: Ministry of Education with support from Ministry for Information Society
Using ICT (OER and Web 2.0) in the learning process and in the Life Long Learning process – LLL	OER implementation efforts imply, in terms of ICT: • Providing the frame and the related ICT product • Digitizing and archiving the educational content (Strategic)	The current technological opportunities provide access to resources such as OER - Open Educational Resources. This type of resources can be used without license and include content such as: lessons, educational content, educational evaluation and research OER is both an open source of digital content, as well as an opportunity to develop digital interaction with the pupil / university students by creating, storing and sharing original content generated by them within OER. Responsible: Ministry of Education with support from Ministry for Information Society
	Include Web 2.0 platforms in the learning processes (Enabler)	For a more flexible learning process, a key objective of the European Union is the implementation of ICT technologies type Web 2.0 across all member countries. This activity requires a flexible education system within which ICT skills act as core competences. Web 2.0 platforms are currently used for professional development as well as for enhancing training within the classroom. By using Web 2.0 tools pupils and students can prepare both complex inter/trans-disciplinary curriculum projects and extracurricular projects to develop social and entrepreneurial skills. Social media sites can be used for documentation on innovative concepts such as "classrooms in the mirror" or distribution of the latest

		Web 2.0 applications for schools. Responsible: Ministry of Education with support from Ministry for Information Society
	Stimulate students to become more involved in the learning process (Operational)	Due to the novelty represented by the technological factor, students will be stimulated to become more involved in the learning process, which, over time, will have a positive impact on their school performance, with potential to reduce the dropout rate. Interactive visual materials and additional sources of information provided by the Internet will increase student engagement. Using ICT will also allow the adaptation of learning subjects according to students' skills, supporting personalized and individualized learning. Responsible: Ministry of Education with support from Ministry for Information Society
	Encourage the Life Long Learning process (Enabler)	Regarding lifelong learning, online learning platforms and the existing materials in digital format will encourage the distance learning, allowing adults of any age to gain knowledge in a particular field. Responsible: Ministry of Education with support from Ministry for Information Society

3.2 ICT IN HEALTH

3.2.1 Introduction

Preamble

Technology is providing ever more ways of storing and processing medical data. The increasing processing power of portable devices in particular has led to the development and linking together of services that would have been hard to imagine only a few years back. ICT use in healthcare is wide now and plays a

strategic role in the delivery of better and efficient healthcare services. ICT in healthcare can increase quality and safety of patient care.

The European society is characterized by high costs for its health system and a shrinking work force due to health reasons and an aging population. These aspects put an enormous pressure on the economy and the social system. Personal lifestyle and environmental impact factors are the most significant risk factors influencing health status.

ICT eHealth Definition

eHealth is a relatively recent term for healthcare practice supported by electronic processes and communication. In the last years, the focus of e-health investments was on e-health services.

3.2.2 European context

The e-Health strategies of EU and EEA countries are not always labeled as such. Some countries may indeed publish a policy document which refers to the ICT strategy in the healthcare sector. Other countries such as France and Germany have enshrined the central e-Health activities in legislation governing the healthcare sector. In Germany, the relevant law is the law on the modernization of healthcare; in France the introduction of an electronic medical record is included in a law concerning social security.

The European Commission presented a 2014-2020 multiannual action program in healthcare. This program addresses the need to support Member States in their efforts to improve citizens' health and to ensure the sustainability of healthcare systems according to the European Strategy 2020.

For 2014-2020, after identifying current problems, the following objectives have been developed in terms of the development of the e-health sector:

- Strengthening and diversifying the unique integrated health information system
- Upgrading and consolidation of nomenclatures (classification of diseases groupings etc.) and ensuring the inter-operability between systems at national and European level
- Monitoring and assessing the health of the population
- Increasing preventive activities in relation to the curative ones
- Expansion and diversification of emergency medical services
- Implementing e-Health solutions that facilitate disease prevention methods

3.2.3 National context

ICT in Health Approach in Romania

The healthcare sector has always been a continuous challenge for many countries in Europe and it still is a complex and sensitive topic to be addressed in any part of the world. During the past two decades, Romania has gone through a period of rapid and major changes in every sector, including health.

At present, Romania's healthcare system is still dominated by the public healthcare system, being funded by a combination of employer and employee contributions to the National Health Insurance Fund (NHIF) and of direct allocations from the state budget.

Romania currently has a unique integrated system (SIUI), a solution designed to better manage the Unique National Fund of Health Insurance by on-line collection and real-time processing of all medical information of the insured patients.

By June 2013, besides SIUI, Romania has implemented the following IT systems specific to healthcare sector:

- System of classification by groups of diagnoses (Diagnosis Related Groups – DRG's)
- Electronic Prescription System (EP)
- Electronic Health Insurance Card (EHIC) System - currently being implemented
- System of management of patients' electronic medical records – in tender phase

In Romania, telemedicine has become a great interest in the past nine years, the first center developed in this respect being located in Targu Mures. Telemedicine stands for the electronic transfer of the medical data (ex. High definition images, sounds, life video transmissions, recordings related to the patient) from one place to another, at a certain distance. This transfer of medical data might use different types of technologies, including – but not being limited only to the technologies which are listed below – regular telephone lines, Internet, Intranet and satellites. Telemedicine is used by the suppliers in a more and more increased number of medical specialties which include the dermatology, oncology, radiology, surgery, cardiology and psychiatry.

Currently Romania has not a clearly appointed authority to coordinate the national e-Health policy and to be a technical partner of the European Commission for common targets, as, for example, e-Health interoperability. The Ministry of Health is the only institution connecting together all health related activities of the country.

Romanian Indicators pertaining to ICT in Health

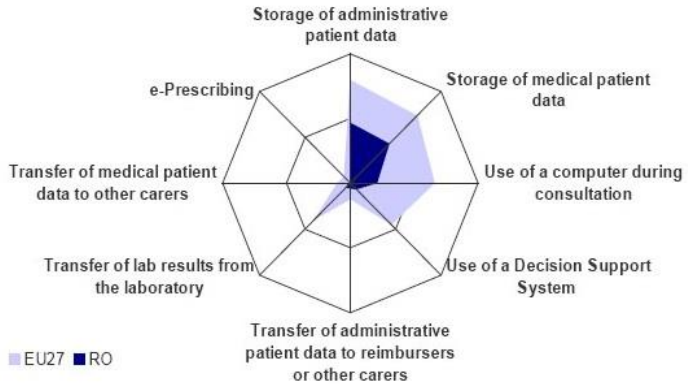
In terms of Infrastructure, 97% of the Romanian GP practices use a computer during a patient consultation and 65% of them use the computer to electronic storage of individual medical patient data.[7]

Romania displays its best eHealth performance in the area of patient data storage and the use of a computer for consultation purposes. Half of Romanian practices register administrative patient data and about one-third of GP practices store at least one type of medical electronic patient data. The electronic transfer of individual patient data has not yet arrived on the agenda of Romanian GPs. Only 6% of Romanian GP practices exchange medical data with other careers and only around 2% of the practices transfer administrative patient data to reimburse via networked connections. The exchange of medical data via networked connections is equally little established: only 2% of the GP practices participating in the survey reported having exchanged medical data with other care providers while 4% received results from laboratories this way.

As of 2010 all public hospitals (427) and all family doctors (over 11500) have a minimal IT endowment. A survey conducted in 2008 showed that 411 public hospitals subordinated to the Ministry of Health had an average of around 8 hospital beds per computer, half of them used in clinical and pre-clinical fields.

eHealth use by GPs in Romania

Source:
http://www.ehealth- indicators.eu



[7] Digital Agenda Scoreboard 2014

for Romania, CE

3.2.4 Strategic Lines of Development

Strategic Lines of Development for ICT in Health in Romania

Strategic Lines of Development	Lines of Actions	Description
Increase of the level of inter-hospital cooperation based on the ICT tools – telemedicine – especially in the field of emergency medicine and of specialty medicine	Improvement of the availability of the telemedicine equipment (Enabler) Ensuring equitable access to all citizens, especially vulnerable groups, to quality and cost effective health care through integrated delivery and remote healthcare (Strategic) Provision of out-patient care and emergency services in integrated and inter-operable mode (Operational)	Telemedicine represents the electronic transfer of medical data (e.g. high picture definition, sounds, live video transmissions, records, all related to patients) from one place to another, at great distance. This medical data transfer can use various technologies, including - but not limited to the following listing - regular phone lines, Internet, Intranet and satellites. Telemedicine is used by providers in an increasing number of specialties including dermatology, oncology, radiology, surgery, cardiology and psychiatry. Improving the availability of the telemedicine equipment will facilitate access to quality medicine among elders and people, especially where distance is a critical factor. ICT-assisted medicine will improve elders' quality of life, providing permanent assistance, helping them to acquire a certain independence and ensuring social inclusion for those located in remote areas. Responsible: Ministry of Health with support from Ministry for Information Society
Patient-Centric Healthcare	Integrated Platform for all the services with easy or e-accessibility and data confidentiality (Strategic) Creating more patient-centric, coordinated and accountable care requires all service providers share data (Enabler)	• Healthy life expectancy at birth remains lower than the EU27 Member States (57.1 as compared to 62.2 years in the EU) • Unmet medical needs of the entire population of Romania is 11.1% in 2011 (compared with 0.4% in Norway and Austria and 7% in Bulgaria)

	Monitoring and Controlling (Operational)	• European Consumer Health Index (EHCI), which consistently places Romania on the last positions in Europe (position 33 of 34 for EHCI 2013) , recording a significant decrease from 600 points in 2006 to 475 points in 2013. For comparison, the Netherlands scored 870 points, the highest in 2013
Collaboration across government agencies	Bringing together inputs, delivery, management and organization of services related to diagnosis, treatment, care, rehabilitation and health promotion (Enabler)	• Restrictive view to citizen information hampering welfare services • Population coverage by social health insurance system has decreased from 95.9 % in 2010 to 85.3 % in 2012 • Absence of integrated citizen view and lack of planning leading to large differences in health care access by income stature
Operational Efficiency and Performance Management	Increase the level of the information integration to facilitate compliance, monitoring and audit (Operational) Cloud Services - providing lower total cost of ownership and flexibility for delivery (Strategic) Data portability and real time updates providing more visibility to government functioning (Strategic)	• According to WB report 2011, healthcare expenditure in Romania is low: slightly above 5% percent of GDP, compared to an average in Europe of 6.5% and an average in UE of 8.7%. • Physicians at all levels of care are not used efficiently and to maximum effect • Low hospital staff productivity and lack of transparency and accountability • Lack of accurate data on citizens leading to ineffective campaign

		managements, program planning and monitoring
Standardization in compliance with the EU Directives of all the medical acts for supporting the medical system's interoperability	Interoperability (Enabler) Optimizing use of practitioner and hospital staff, at the same time focusing on retention and motivation of workforce (Strategic)	Benefits: • remove duplication of data within the system • increase the efficiency of the medical and administrative staff • remove redundant data of the system • improve the process of healthcare delivery • avoid errors The patient will not face conflicting information, because all those involved in his treatment will access the same accurate information, updated in real time. From the administrative point of view, a more efficient control of resources may be exerted, decreasing the risk of fraud and preventing inappropriate medication (electronic prescription). Responsible: Ministry of Health with support from Ministry for Information Society
Effective management of information generated by the IT system	Analysis of a significant volume of data generated in the healthcare informatics systems which can be analyzed and used for the management of the healthcare system's resources (Enabler)	Using Big Data to manage the information generated by the IT system will help increase transparency and flexibility of the medical system. The analysis of the data collected in the system could establish the level of demand and any potential seasonal factors, which will facilitate the adjustment of production / imports of drugs and the allocation of resources to hospitals or other relevant institutions. Accessing the personal information of all insured patients, some of their demographic characteristics will be deducted, that will facilitate the patients grouping into categories with similar features and customized services. Knowing the availability of medical centers will facilitate better allocation of patients, avoiding overcrowding of medical units. Responsible: Ministry of Health with

		support from Ministry for Information Society

3.3 ICT IN CULTURE

3.3.1 Introduction

Preamble

According to the 'European Competitiveness Report 2010', the cultural and creative industries represents one of Europe's most dynamic sectors, accounting for 3.3% of EU GDP and 3% of employment. Beyond this significant contribution to GDP, the cultural and creative sectors represent a driver for significant changes in lifestyle and progress, including the development of modern skills, adaptation of teaching and learning and intergenerational and intercultural dialogue.

Digital technologies keep transforming radically our approach on creativity and culture. They not only change the way we access and preserve the cultural assets, but they also provide unique tools to inspire us to create and communicate more effectively. ICT has become an important means of enriching the 'creative capital' growth and the ability of competing globally.

This is why the digital content is one of the major policy areas within the Digital Agenda for Europe (DAE). This policy aims to strengthen Europe's cultural creativity, continue the development of the internal market for digital content, preserve our cultural resources and make them more accessible for all the citizens.

3.3.2 European context

The objectives of the European Union structured within the Digital Agenda and the digital targets assumed for 2020 involve measures directly connected to the preservation and the promotion of the European patrimony. Out of these we can mention the following:

EU Goals
Supporting the effort of digitization of all European cultural content and providing a platform for aggregating digitized cultural resources with an easy and single access point to information related to the cultural heritage, but, also to education, leisure, etc.
Materialization and digitalization of cultural heritage (libraries, physical archives and audiovisual works, museums) to facilitate access to the European level and to ensure its preservation over time
Development of the Europeana.eu – the European digital library – in close collaboration with all the involved institutions (with the precise target of making 30 million objects available by 2015)

Over the last 10 years, the European Commission and Member States have invested millions of Euros to support cultural heritage institutions (museums, archives and libraries), to digitize their collections and upload them on the Internet. This investment has led to an unprecedented period of technical research and development in the European cultural heritage sector, when all the organizations, no matter the scale, have developed different models and methodologies for Digitization.

The European Digital Library is the maximum interest focus point of the ITC strategy in the field of culture and stands for a unique access point towards millions of books, paintings, movies, and museum objects

and archiving documents which were digitalized within the entire Europe. Also, it represents a source of information derived from the European cultural and scientific institutions, a promoter support of the cultural inheritance, by means of knowledge transfer, innovation and technology, a platform for the exchange of knowledge between the librarians, museum curators, archivists and representatives of the creational cultural industries and a way to stimulate the creative economy and to promote the cultural tourism. Making the collections held by Europe's libraries, archives, museums and audiovisual archives available online is a win-win for culture, economic growth and individual fulfillment.

3.3.3 National context

ICT in Culture Approach in Romania

Based on the objectives of the European Union, Romania has set the following digital targets for 2020:

Romania Goals
Development of the digital archives of Romania and contribution to the further development of Europeana.eu (with the precise target of exposing within Europeana ~750.000 digital items until 2015)
Promoting the creation of original digital content, specific to the communities in Romania
Better interaction between the library and the citizen through ICT resources

In Romania, same as in all the EU Member States, online accessibility of Europe's cultural heritage needs requires the right conditions for proceeding with digitization, online accessibility and preservation of cultural content. This all requires close collaboration between Member States and cultural institutions, and also between these cultural institutions and other stakeholders.

Stakeholders	Responsibilities
The European Commission	• Monitors progress towards the implementation of the Commission's Recommendations • Facilitates the exchange of information and good practices of MS policies and strategies
Europeana Foundation	• Runs the Europeana.eu portal and coordinates the network of contributing cultural institutions, currently around 2,200
Romania as EU's Member State • Ministry of Culture (responsible) • Ministry for Information Society (support)	• Provides most of the funding for digitization and implement decisions taken jointly at European level • Contribute to the development of Europeana.eu
Romanian Cultural institutions	• Drive the creation of Europeana.eu and provide digitized content

On national level, the eCulture project within the „Knowledge based Economy" programme, 255 Romanian disadvantaged communities had the opportunity to create and store in the Europeana.eu library original cultural material which represent their community at European level.

There are several ongoing initiatives following the Europe 2020 strategy, for a better interaction between the library and the citizen, as follows:

- **E-Accessibility in Public Libraries Provides a Portal to New Worlds for People with Disabilities**

The European Commission has made E-Accessibility a central policy priority of the Digital Agenda for Europe, to ensure that all people—regardless of age or disability—are able to access ICT equally. With more than 80 000 visually impaired people living in Romania, the Iasi County Public Library approached the "Biblionet" Romania programme (including voice recognition software and other specialized Internet functions and capabilities such as email, search engines, online music, chat, and radio broadcasts.) with the goal of becoming a specially designated public library branch providing visually-impaired persons with access to technology to help them reach their personal and professional goals.

- **Public Libraries Provide a Path to Employment**

The Europe 2020 strategy to create smart, sustainable growth across the European Union aims to secure employment for three-quarters of citizens between the ages of 20 and 64 by 2020. With unemployment hovering around 7% in Romania, public libraries are an invaluable resource to job seekers.

- **Internet Access in Public Libraries Supports Agriculture, Romania's Primary Job Sector**

Public libraries are actively helping the 70% of citizens in rural areas of Romania that are employed in the agriculture sector that accounts for up to 12% of national GDP. In 2012, more than 41 000 farmers filed online applications for agricultural subsidies at public libraries in Romania, directly resulting in more than US $63 million in subsidies from the Ministry of Agriculture to individuals.

- **Public Libraries Support Improved Digital Literacy**

Since it began in 2009, the "Biblionet" Romania programme has provided E-Skills training to more than 1.300 participants, especially hard-to-reach citizens like the elderly, retirees, adults, students, and the unemployed. More than 1.8 million Romanians currently use public libraries, and 1 million have expressed interest in participating in free ICT courses.

- **Public Libraries Break Down Barriers to eInclusion**

Just **19**% of disadvantaged people in Romania are regular Internet users, compared to 51% across the EU. eInclusion efforts in Romania seek to break down marginalizing barriers like age, income, and geography, and directly support the European 2010 initiative on eInclusion and the EU 2020 Growth Strategy. By enabling everyone to have access to ICT, the benefits of digital technology like eGovernment, eHealth, and e-Employment services can be extended to all.

- **Public Libraries Connect Older Adults to New Skills and Communities**

To ensure that older people can fully engage in a digital society, the EU has outlined key policy initiatives in the 2020 Growth Strategy and i2020 that support better access to information and communications technology (ICT) for the elderly. By 2020, 17 per cent of the population of Romania will be age 65 or older, demonstrating a growing demand for health information, government resources, and social connections. This is why, beginning with 2009, public libraries in Romania have introduced **more than 17,000 older adults** to a range of ICT skills, including email, browsing the Internet, online banking and commerce, and social media.

National Indicators pertaining to ICT in Culture

In order to estimate the necessary ICT investment in culture, one considered the estimations published on European Union level concerning the digitalization of digital content. With respect to the situation and targets undertaken by Romania, the estimated value of ICT investment in Culture amounts to 37,5 million Euro (out of which 15 mil. Euro from ERDF).

By implementing and correlating the uniform vision of the first 2 fields of action specified within DAE 2020, the estimated impact on the Romanian economy would be of 5% growth in terms of GDP and 1% growth in terms of jobs.

Computer access is currently available in around 65%-70% of public libraries in Romania, and our country will run policies in order to improve the percentage of cultural facilities/libraries implementing TIC resources of biblioteconomy or similar.

According to The Official Journal of the European Union, currently Romania contributes to Europeana.eu with 35.852 cultural items, while the indicative target for 2015 is about 789.000 cultural. Romania will have to digitalize approximately 1000 cultural works/day in order to achieve the precise target.

Making the collections held by Europe's libraries, archives, museums and audiovisual archives available online is a win-win for culture, economic growth and individual fulfillment. By combining policy, research and innovation, the DAE actions aim at making our cultural heritage a driver for innovation and creativity and to enable the wider diffusion of European culture and values worldwide.

3.3.4 Strategic Lines of Development

Strategic Lines of Development for ICT in Culture in Romania

Strategic Lines of Development	Lines of Actions	Description
Development of Digital Archives of Romania Cultural Patrimony	Digitize the Romanian cultural patrimony (Operational)	The main advantage resulting from the action of digitization of the cultural patrimony of Romania is represented by the preservation of national cultural works. By designing all representative cultural creations in a wide digital universe, within an electronic consistent format, will provide access of future generations to the artistic creations from the past By facilitating the access to these digital registries, including heritage items, citizens' awareness of the Romanian cultural inheritance could increase. Responsible: Ministry of Culture with support from Ministry for Information Society
	Achieve the minimum contribution to Europeana.eu (Strategic)	Once this digital portfolio of national cultural elements is performed, it may be included in the European digital library, thus increasing the visibility of the country, influencing the perceptions of foreigners and determining them to visit Romania. Responsible: Ministry of Culture with support from Ministry for Information Society
Promoting the creation of original digital content, specific to the communities from Romania	Digitize the cultural content specific to Romanian communities (Enabler)	The digitization of the cultural content specific to Romanian communities will have a major impact on the degree of the citizens' awareness on national sights and

		national and international tourism. On long term, such an action can have a significant impact on the perpetuation of Romanian traditions, educating the youth – the segment of population most active on internet, and with very low preoccupation for traditional occupations – and increasing their interest in traditional practices. Responsible: Ministry of Culture with support from Ministry for Information Society
	Adjust the digital cultural content by region (Enabler)	The adjustment of digital cultural content by region will contribute to the individualization of regions, promoting rural tourism and social inclusion of individuals located in regions difficult to access, by educating them indirectly and develop their digital skills. Responsible: Ministry of Culture with support from Ministry for Information Society
Better interaction between citizens and the digital cultural content	Implement a modern ICT infrastructure within the public libraries (Strategic)	Implementation of a modern ICT infrastructure within the public libraries will stimulate interactivity, will reduce time associated with the process of borrowing a book, saving time for citizens and reducing costs for public libraries. In the library, the readers will have internet access to search for references or additional information about a certain subject. Those benefits will increase the satisfaction of individuals and will facilitate their access to information, determining them to use more often the library's services. Responsible: Ministry of Culture with support from Ministry for Information Society
	Promote cultural events by means of ICT (Operational)	Cultural Passport to explore Romania and unlock the treasures stored in buildings, landmarks and communities. App/widget which proposes to its users one cultural event per day, based on smart usage of user's personal profile and her/his current location.

		Responsible: Ministry of Culture with support from Ministry for Information Society

3.4 EINCLUSION

3.4.1 Introduction

Preamble

Social inclusion is a multidimensional set of measures and actions in the field of Social Welfare, employment, education, health, information and communications, mobility, security, justice and culture, designed to combat social exclusion based on criteria such as poverty, geographical location, disability and so on.

Digital division affects a significant percentage of the world population. There is a clear need for adequate ICT infrastructure, easy and affordable Internet usage, generalized ability and easier access to useful information. Many countries are facing a shortage of e-Skills and all types of ICT skills are in high demand in close connection with eInclusion objectives.

eInclusion Definition

eInclusion is a social movement which aims to end the digital divide, a term used to describe the fact that the world can be divided into people who do and people who do not have access to modern technology or lack the necessary digital skills.

3.4.2 European context

Social inclusion and fight against poverty are part of the European Union's objectives in terms of economic growth and employment. It proposes formal and informal education for citizens to develop digital literacy in all levels of education. [8]

According to the European Digital Agenda, ICT represent a very important tool for improving the process of social inclusion because it gives people means of finding a new job, provides information on rights and obligations of individuals, facilitates professional development and, at the same time, offers a way to general and uniform improve the ICT skills throughout the country. This entire process is known as eInclusion.

Ability to access ICT networks does not involve people capacities to use the Internet and ICT equipment or tools. The differences are due to:

- Low-income communities
- Regional discrepancies: the poverty rate in rural areas is much higher compared to the urban
- Social and physical disabilities

[8] http://ec.europa.eu/information_society/activities/einclusion/docs/gdansk_roadmap.pdf

3.4.3 National context

eInclusion Approach in Romania

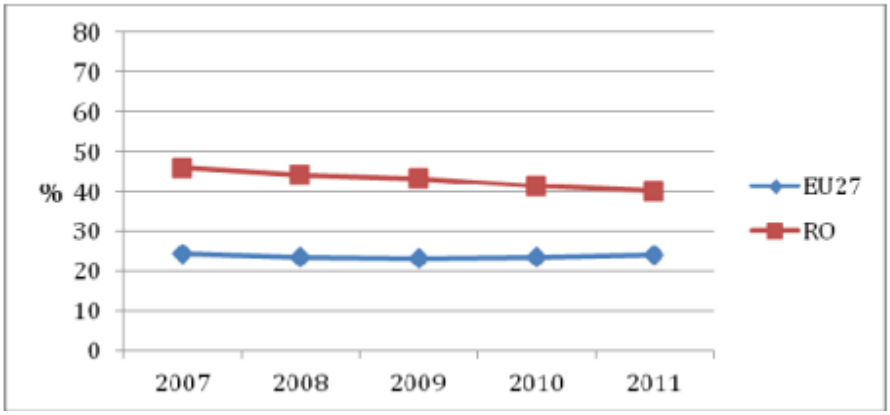
Besides the infrastructure in terms of ICT, social inclusion represents a very important issue of national interest. Broadly speaking, in Romania we have all the 3 previously mentioned categories as groups of disadvantaged communities that might face difficulties in adapting to the modern requirements of today's society, thus requiring assistance to improve the level of social inclusion.

In Romania, a representative project in the field of eInclusion was the "Access to Information and Communication Technology (ICT) and improvement of digital skills". This project aimed to provide access to ICT services by providing physical and connectivity equipment, as well as to permit people with basic digital skills to use them[9]. Overall, 255 communities across Romania, namely 1.8 million people living within this communities had the opportunity to be part of a new knowledge-based economy, through a successful implementation of local electronic networks. These are informational networks serving as knowledge centres, which are still providing information and services to local authorities, schools, public libraries, citizens and small enterprises.

National Indicators pertaining to eInclusion

In 2011[10] , 40.3% of the Romanian population was facing the risk poverty or social exclusion, being a significantly higher value than the European average (24.1%). To a total of 8.63 million people at risk of poverty or social exclusion in 2011, 4.74 million people were facing the risk of poverty.

% of Romanian Population facing poverty and social exclusion



Source: http://www.fonduri-ue.ro/res/filepicker_users/cd25a597fd-62/2012-2020/Dezbateri%20parteneriale/Rezultatele%20analizei%20documentare/03.06.2013/7.Social%20inclusion_23%20mai.pdf

In 2012, the rate of absolute poverty[11] in urban environment was of 2.4%, whereas that of rural environment was of 7.4%[12]

[9] http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/0,,contentMDK:21948518~menuPK:64282137~pagePK:41367~piPK:279616~theSitePK:40941,00.html

[10] http://www.fonduri-ue.ro/res/filepicker_users/cd25a597fd-62/2012-2020/Dezbateri%20parteneriale/Rezultatele%20analizei%20documentare/03.06.2013/7.Social%20inclusion_23%20mai.pdf

[11] The rate of absolute poverty represents the share of individuals from households with consumption expenses per adult lower than the poverty limit of overall population

[12] http://www.worldvision.ro/_downloads/allgemein/Raport_Bunastarea_copilului_din_mediul_rural.pdf

In what concerns individuals with disabilities in Romania, their number reached in 2012 about 690,000, out of which 8.8% are children and 91.2% adults. Romania's Counties that register the highest share of people with disabilities are Salaj, Valcea and Vrancea with 6.77%, 6.62% and respectively 5.77%, compared to the national average of 3.61%. On the opposite side, Dolj, Covasna and Ilfov register the lowest percentage of people with disabilities relative to county population: 2.26%, 2.12% and 2.09%. In the first quarter of 2012, only 27,000 people with disabilities were employed, representing less than 4% of all the people with disabilities in Romania.

Although the tendency of increase of the number of individuals using internet to search for information and support of educational process is obvious, the percentages registered in Romania in 2010[13] are almost half opposite to the average of UE27 (17% comparatively to 32%).

Degree of using computer, depending on residence

Number of individuals, aged between 16-74 years using the computer, depending on residence						
Residence	**Year**					**Variation 2007 2011**
	2007	**2008**	**2009**	**2010**	**2011**	
Total	6,847,343	6,719,591	7,464,651	8,325,674	8,401,940	23%
Urban	5,264,183	5,065,288	5,428,420	6,054,078	6,007,059	14%
Rural	1,583,160	1,654,303	2,036,231	2,271,596	2,394,881	51%

Source: INSSE, 2012

As you can see, when it comes to differences in using ICT, there is a clear trend towards uniformity between the two areas of residence, due to reduction of prices of computers in recent years, migration of population from rural areas to urban and increase of awareness of benefits offered by ICT among rural youth.

3.4.4 Strategic Lines of Development

Strategic Lines of Development for eInclusion in Romania

Strategic Lines of Development	Lines of Actions	Description
Ensuring eInclusion by developing digital literacy - e-skills	Increasing general awareness of the phenomenon of social exclusion (Strategic) Raising awareness among family and friends to benefit from support in the development of eInclusion measures (Enabler) Facilitate communication between	eInclusion can be achieved in two ways: providing access to ICT equipment and networks and providing ICT and skill development trainings. According to the best practices, there are three crucial issues in the development of eInclusion initiatives: 1. Ensuring the public nature of ICT space: ICT should be public to ensure uniform access for the

[13] Eurostat, Raport BMI - Romania Telecommunication, 2011

	groups targeted for social inclusion (Enabler) Develop uniform digital literacy and Internet usage at the regional level (Strategic) Promoting the system of "learning together" (Operational) Involvement of HR services within companies and public organizations: Special campaigns and trainings (Operational) Promoting opening the learning databases as an opportunity for informal education (Enabler) Provide trainings on the methodology of developing digital skills (Strategic) Provide materials and programs to facilitate trainers' adaptability to each community needs (Operational)	disadvantaged communities, especially in terms of income 2. Promoting ICT communities that have a social mission, such as promoting social issues and aiming at social inclusion and eInclusion 3. Ensuring the necessary infrastructure for the development of ICT skills: it should focus on providing Internet access and delivering trainings for acquiring ICT skills in most areas, so as to assure lasting and uniform regional develop Responsible: Ministry of Education with support from Ministry for Information Society

4 FIELD OF ACTION III - ECOMMERCE, RESEARCH-DEVELOPMENT AND INNOVATION IN ICT

4.1 ECOMMERCE

4.1.1 Introduction

Preamble

The online services play a more and more important role in the everyday life of the European Union citizens. These services contribute, among others, to the minimization of the time spent for the filling in and the consultation of the paperwork and to the increase of the online activity (reading newspapers, verifying the bank accounts and performing electronic payments, sending e-mails, searching for information, communicating by means of the social networks, etc.). The electronic commerce continues to increase significantly, even in the context of the actual economic crisis. In 2013, 30% of people living in Europe use eCommerce service.

eCommerce Definition

eCommerce (Electronic Commerce or EC) is the buying and selling of goods and services on the Internet, especially the World Wide Web. Electronic Commerce or eCommerce is currently a catalyst for other technologies, such as: electronic funds transfer, supply chain management, internet marketing, social media, electronic data interchange. For online retail selling, the term e-tailing is sometimes used.

4.1.2 European context

Online Internet penetration and purchasing still differ in the various parts of Europe, according to the maturity of the market, the level of trust, the availability of offers, the penetration of reliable payment options, reliable and affordable delivery, Internet-usage and penetration, and consequently, the number of e-shoppers.

European B2C eCommerce is developing extremely well. In 2010 Europe overtook the USA, the biggest market in the world until then. The total Gross Domestic Product (GDP) of Europe in 2012 is estimated to have reached around 16 trillion Euro, of which the GDP of the EU28 was just over 80%. eCommerce Europe estimates the share of the European Internet economy at 3.5%, a percentage that is set to double by 2016 and to triple by 2020.

The development of the electronic commerce will generate concrete benefits for the **consumers**, in the sense of price reduction and increase of the products and goods offer and quality, due to the cross-border exchanges and to the possibility to compare the offers more easily.

The current communication of the European Commission identifies five main obstacles in the way of creating a unique digital market, and defines an action plan for their removal:

1. Insufficient regulatory framework established with respect to the offer of online services, regulatory and cross-border.
2. Lack of information of the online services operators and lack of protection of the internet users.
3. Non-adequate payment and delivery services: purchasing an item over the internet should be a flexible process, facilitated through e-commerce.
4. Too numerous abuses and litigations which are difficult to be solved.

5. Insufficient implementation of the high speed communication networks and of the advanced technological solutions.

An important factor which is known and tackled at European Union level is the lack of trust in online payment systems and their security[14]. Approximately 35% of internet users avoid using online commerce channels due to this factor. Also, the financial costs related to the micro-payments are considered to be excessive by the SME's, having a significant impact upon the profitability of the business model in online.

Consequently, Romania indicates a very strong tendency to finalize online transactions by means of cash payment, upon delivery (70% of the online transactions performed in 2010 were finalized in this manner).

4.1.3 National context

eCommerce Approach in Romania

The Eastern European region, led by Russia, has shown an impressive 32.6% growth, reaching a turnover of 13.4 bil Euro and a 4% market share. In this context, as well Romania is one of the top 5 countries in percentage growth in 2012.

TOP 5 EMERGING COUNTRIES IN PERCENTAGE GROWTH IN 2012

	Country	e-Sales 2012
1	Turkey	75%
2	Greece	61%
3	Ukraine	41%
4	Hungary	35%
5	Romania	33%

Source: Ecommerce Europe, 2013: e-sales of goods and services

National Indicators pertaining to eCommerce

According to the data provided by Digital Agenda Scoreboard 2014 for Romania, only 8 % of population aged between 16-74 years has used the internet in 2012 for the acquisition of goods and services for personal use in Romania.

However, the overall trend registered a small increase; this increase started in 2006, when only 1% of the population used the internet for the performance of online shopping, followed by a fluctuant evolution during the following years. Until 2008 the value of the index increased to 4%, only to register a decrease in 2009, when the effects of the crisis were felt more severely, going down to 2%. Afterwards, an improvement was recorded in 2011, with 6 % of use.

[14] Eurostat Household Survey, 2009

In Bucharest, 14% of population aged between 16-74 years used the internet for online shopping in 2011, recording a significant increase as compared to the value of 7% recorded in 2009 and to the valued of 8% recorded in 2010.[15]

Regarding the eCommerce use by the business environment, in 2013 only 9% of SMEs and 13% of large enterprises in Romania have sold or bought services online.

4.1.4 Strategic Lines of Development

Strategic Lines of Development for eCommerce in Romania

Strategic Lines of Development	Lines of Action	Comments
Developing a regulatory framework with respect to the e-commerce cross-border offer	Improvement of the regulatory framework for the support of the e-commerce system and the retail commerce transfer in the electronic media. (Strategic) Responsible: Ministry for Information Society	The main informatics risks and threats can be classified based on several criteria. So, a first criterion highlights the risks and the threats related to the following: • Data integrity – intended alteration of the stored data or of the data transmitted inside the electronic commerce systems. • Data availability –intended blockage of the data flows transmitted inside the electronic commerce systems. • Data authenticity – intended modification of the stored data or of the data transmitted inside the electronic commerce systems. • Data confidentiality –accessing personal data stored or transmitted inside the electronic commerce systems. All the risks and threats mentioned above represent critical situations which can affect in a first instance citizen trust in the utilization of the electronic commerce systems.
	Preparation of the strategy and of the framework with respect to the copyright in Romania, for the support of the development of the commercial sector with digital content (Strategic) Responsible: Ministry for Information Society	
	Support from an ICT prospective of aligning the tax collection systems – ex. VAT, so that they will not represent a barrier for the e-commerce development in Romania. (Enabler) Responsible: Ministry for Information Society	
Increasing the level of information of the online services operators and of the e-commerce users	Improve the access to the online services (Operational) Responsible: Ministry for Information Society	An important barrier for the development of the e-commerce is represented by the absence of information of the online service operators and internet. Thus, the online services operators can benefit from important and relevant information by means of utilization and access offering to

[15] Eurostat - Individuals making purchases over the internet, 2013; Eurostat - Individuals purchasing over the internet by regions, 2012

		platforms such as Enterprise Network Europe, and the internet users may be protected through access to Consumer Protection Cooperation network systems (by assuring the protection of personal data, by promoting the specialized web sites for the comparison of the products provided online and by the development of *Trustmarks*).
Support for the development and implementation of the payment and online delivery systems	Responsible: Ministry for Informatio Society (Enabler)	The global tendencies regarding e-commerce and the development of the related payment technologies refer to the following: • m-Commerce – The number of telephones ("smartphone") in Romania amounts 2.5 million and will reach up to 7.5 million in 2015 based on current global trends. Smartphones provide instant internet access, the consumers wanting in this context, real-time transactions • m-wallet – represents the transformation of the mobile telephone in a virtual wallet which might contain: bank cards, which can be used both in the online / mobile commerce, as well as in the traders' locations which are equipped with POS, discount coupons, identity cards etc. • NFC – communication technology with short range (0-7 cm) which provides the opportunity to transform the mobile telephone in: bank card, subscription or traveling ticket, ticket or prescription for a cultural or sports event, physical access card (access in the office building, in the hotel room or in a rented car) or digital access (access in certain secured networks) etc.; In Romania there are five banks which already accept NFC cards, approximately 2,100 POSs compatible with the NFC terminals (out of more than 215,000 POSs installed at traders)

Easy resolution of abuses and litigations specific for the e-commerce	Preparation of a regulatory framework which would allow the resolution of the disputes caused by the online media, by means of instruments which are also available in the online media and outside the court of laws, as recommended by the European Union. (Operational) Responsible: Ministry for Information Society	The incidence of abuses with respect to the online commerce is significant, and the manner of their solution is slow and difficult, still taking place in the classic regime with intervention from the court of law.
	Improvement of communication and collaboration between CERT-RO, the institution which is responsible with the cybernetic security in Romania, and the *European Cybercrime Centre*, within EuroPol (center instituted in 2013, at European level). (Operational) Responsible: Ministry for Information Society	

4.2 RESEARCH – DEVELOPMENT AND INNOVATION IN ICT

4.2.1 Introduction

Preamble

The intelligent specialization process is necessary to involve the complete involvement of the interested parties and to encourage innovation and experiment, based on the advantages, on the competitiveness benefits and on the Excellency potential of each and every sector.

There is no progress in ICT without innovation. And innovation is driven by smart people and smart ideas, solving everyday problems. We intend to pay more attention to everyday problems and create a better framework for generating better solutions.

4.2.2 European context

As part of the UE cohesion policy for the 2014 – 2020 period, the European Commission proposes as an **intelligent specialization**[16] **to become a preliminary condition** („ex ante conditionality") for the support of investments within the two key-objectives:

- Consolidation of research, technical development and innovation (the Research & Innovation target)
- Enhancement of access to ICT and of it being used in a qualitative manner (ICT target)

The entire innovative potential of the UE regions must be mobilized so that it will reach the objective of intelligence growth, proposed by Europe 2020. Innovation is important for all the regions: the more advanced regions must maintain their current position and the less developed regions should reduce the distance that separates them from the more advanced ones[17].

[16] Strategii de cercetare si inovare pentru specializarea inteligenta - POLITICA DE COEZIUNE 2014-2020

[17] R. Wintjes, H. Hollanders, „The regional impact of technological change in 2020".

The knowledge and innovation capacity of the regions depends of several factors – entrepreneurial culture, competencies of the man power, education and formation institutions, services for innovation support, mechanisms for technology transfer, infrastructure for ICT innovation, mobility of the researchers, business incubators, new financing sources and local creative potential. Good governing is also essential. The performance in the field of innovation varies widely inside the UE, as indicated by the regional index with respect to the performance in the field of innovation, as a composite indicator of many of those factors.

4.2.3 National context

Research - Development and Innovation Approach in Romania

Investment in research, development and innovation in ICT and application of accomplished results through said investment are key factors to improve competitiveness of our companies and Public Institutions.
At Romanian level, the development of the smart specialization strategy – intelligent specialization – represents a prerequisite for the preparation and for the accessing exercise of European funds for the period 2014-2020. In this context, Romania must perform a regional analysis of the innovative potential, to place itself in this context, to develop the specific intelligent specialization vision and to set its development priorities by the end of June 2013.

According to analysis of the regional context18, developed by the Ministry of Research, and to the Romania's innovative potential, four areas of development were identified:

- Agriculture and biotechnology
- Information and communication technology
- Energy and Environment
- Technological and engineering sciences (especially the automotive industry)

National Indicators pertaining to Research - Development and Innovation

From the total of the overall turnover accomplished in 2011 at the level of the Romania's enterprises, 4.1% is achieved by the ICT sector, value which decreased by 1% as compared to the one achieved in 2010. Within the ITC sector, 47.2% of the overall turnover recorded in 2011 is generated by the Telecommunication sub-sector, 24.8% by the Software and IT services sub-sector, and the rest of 28.0% is assigned to the Hardware sub-sector.

At the beginning of 2011, in Romania, 14,595 of SMEs activated in the ITC field, representing approximately 3% of the total of SMEs registered and active in Romania in the same period of time. Out of this number, approximately 15% (2,156 companies) recorded technological innovation in the period 2006-2008.

In 2011, 128,000 employees were active in the ITC field, which stands for approximately 3% of the overall man power. The increased investments in the wide range connections and infrastructure, as well as in the e-commerce investments connected to the ITC products and services innovation will have as direct implication the increase of the number of available working places, both in the ITC sector as well as in other sectors of economy as a result of outsourcing.

According to the study developed for Romania, ITC indicated the highest development in the Bucharest - Ilfov regions, in the North-Western and Western regions, with excellence centers developed around the big academic centers: Bucharest, Cluj, Iasi and Timisoara.

[18] JASPERS, Analysis and Evidence Base of the R&D&I Market in Romania, Martie 2013

Out of the net investment performed in Romania19 in the past few years, approximately 10% come from the state budget and from other local budgets, the majority of the amounts (between 60-70%) being supported by the own funding resources of the private sector. In the ICT sector, in 2011, investments were performed in the amount of 3 bil. RON, which is approximately 8% of the turnover of the sector for this period.

4.2.4 Strategic Lines of Development

Strategic Lines of Development for Research - Development and Innovation in Romania

The strategies of intelligent specialization may assure a more efficient use of the public funds and can stimulate the private investments. They can help the regions to concentrate resources upon a few essential priorities, more than to spread, less intense, the investments within all the fields and sectors of activity.

In the case of the Romanian Digital Agenda the main lines of action are related to the promotion of Promotion of innovative clusters and of the competitiveness poles for regional growth, to increase the efficiency of public investment in the **Innovation, Research & Development** in ICT; encourage the research of the infrastructure development at regional level and expand the Romanian participation in **Innovation, Research & Development** in ICT.

Strategic Lines of Development	Lines of action	Description / Comments
Promotion of innovative clusters and competitiveness poles for regional growth	Promotion of the competitiveness clusters and of the employees' specialization in this field especially in the excellence centers: Bucharest, Cluj, Iasi and Timisoara. (Strategic) Responsible: Ministry for Information Society	**Clusters** – geographical concentrations of small enterprises, usually SME's, which interact with one another and also with clients and suppliers, and which usually have in common a fund of specialized man power, financial services and for the enterprises, facilities in the field of innovation and formation – they are an important element in the strategies of intelligence specialization. They provide a favorable environment which stimulates the competitiveness and the innovation. The support for the cluster's development must be concentrated upon the fields with a comparable advantage. Alternatively, virtual clusters can also be considered for investments. A virtual cluster is a concentration of SMEs distributed geographically, but grouped together by common interest through means of technology.

[19] Institutul National de Statistica – Romania in cifre 2012: http://www.insse.ro/cms/files/publicatii/Romania%20in%20cifre_%202012.pdf

		The poles for the regional competitiveness – support for the sustainable regional development based on knowledge. The scope of the competitiveness poles is the increase of the competitiveness promoting capacity, entrepreneurial formation, and innovation, technological transfer as a regional sustainable development policy by means of interconnecting the technologies, the know-how and the persons.
Encourage the research of the infrastructure development at regional level	Continuous development and use of the electronic infrastructure based on ITC for the interconnection and the facilitation of the collaboration between the research teams which are spread from a geographical point of view and the separation of the resources and of the scientific knowledge is a key-method in order to accomplish this issue. (Enabler) Responsible: Ministry for Information Society	The research infrastructure is very important for the systems which are based on knowledge. A tridimensional approach is needed in order to help the regions to fulfil their full potential: • Development of the research and of the ITC infrastructure al global level, based on the existent regional scientific research • Establishment of research facilities networks for the countries which have a less intensive use of research and the development of facilities for the regional partners • Promotion of the competency transfer between partners and the support of a solid regulatory framework with respect to the copyright issues
Expanding the participation to the Innovation, Research & Development projects in ICT within the international initiatives	Increase Romanian participation in international projects of Innovation, Research & Development in ICT through European programmes and resources. (Operational) Responsible: Ministry for Information Society	Some challenges of the society determine that there is a need for a major approach, coordinated at the EU level in order to find and to implement effective solutions for the ITC promotion. The innovating union includes several partnerships for innovation which will deal with specific challenges through providing means of putting into common resources and to reunite all the main actors, as well as the political instruments, at EU and national level, in order to fulfil common objectives. The regional policy will continue to approach these challenges integrating the involved partnerships and putting it into application and identifying a

		sustainable model for the project's financing.
Funding of innovative start-ups in Romania	Increase the Romanian Government contribution in supporting innovative ICT start-ups. (Enabler) Responsible: Ministry for Information Society	We propose a tiered investment strategy from the Government in ICT start-ups that can bring significant value in technology, creating a productive ground for innovation in Romania: - Tier 1 – Small investments in new technologies with market potential which are not yet proven to bring significant added value / return on investment - Tier 2 – Medium investments in new technologies / start-ups which have a proven market potential and have demonstrated the return on investment - Tier 3 – Large investments for technology innovation in proven models that have received funding from multiple credible sources Any project can apply for funding and the criteria for qualification in each tier will be defined by the Ministry for Information Society.

5 FIELD OF ACTION IV - BROADBAND AND DIGITAL SERVICES INFRASTRUCTURE

5.1.1 Introduction

Preamble

The analysis made at the European Union level show that Europe must intensify efforts to stimulate the development of new generation broadband access. A study on the socio-economic impact of broadband infrastructure shows that without intervention, by 2020, 94% of households will be covered with connection at speeds of above 30 Mbps and only 50% could be covered with connections at speeds of over 100 Mbps with a penetration rate of 26%, significantly lower than the one specified in the Digital Agenda for Europe.

Measures to be assumed at national level

In this context, the European Commission has undertaken the following measures to be assumed at national level:

- First, the Commission shall endeavor to ensure a predictable and consistent regulatory framework that encourages competition while providing incentives to investors.
- Secondly, the Commission proposes measures to encourage demand, particularly the demand for broadband services.
- Thirdly, the Commission adopts various measures within the Radio Spectrum Policy in an effort to provide sufficient spectrum for future mobile broadband, recognizing the increasing use of mobile and wireless Internet.
- Fourthly, the Commission adopts initiatives to ensure that in the European Union ther are available sufficient funds for development in areas that are underserved. If in densely populated areas ("black") operators are ready to invest and the market will deliver with no aid, in the ' gray' and 'white' areas it is necessary the aid of the public authorities. To this end, the structural funds and public financing within the revised Guidelines on State aid for Broadband will contribute to achieve the objectives.

5.1.2 European context

The Digital Agenda sets ambitious coverage and speed targets and requires Member States to take measures, including legal provisions, to facilitate broadband investment.

The rolling out of high-speed fixed and wireless electronic communications networks across the Union requires substantial investments a significant portion of which is represented by the cost of civil engineering works. A major part of these costs can be attributed to inefficiencies in the rollout process related to the use of existing passive infrastructure (such as ducts, conduits, manholes, cabinets, poles, masts, antenna installations, towers and other supporting constructions), bottlenecks related to co-ordination of civil works, burdensome administrative permit granting procedures, and bottlenecks concerning in-building deployment of networks.

The 2012 Spring Council has asked for steps to be taken at EU level to achieve costs savings in the deployment of high-speed broadband networks, as part of the efforts to complete the Digital Single Market by 2015.

A significant fraction of this untapped potential can be found at the level of network infrastructures: different regulatory approaches to network roll-out increase the cost of access to national markets, prevent the exploitation of economies of scale at services and equipment level and hinder the development of innovative services which could emerge on very high-speed networks running in a seamless fashion across borders. While the deployment of access networks often involves provisions and procedures administered at local level, such measures, including local secondary legislation may indirectly affect the freedom to provide services and justify Union intervention. Furthermore, based on Article 114 of the TFEU, the Union has previously legislated, in order to foster local network infrastructure deployment, through unbundling of the local loop.

The Union cannot afford to leave citizens and businesses outside the footprint of such infrastructures and has subscribed to ambitious broadband targets of the Digital Agenda for Europe: by 2013, basic broadband for all Europeans, and by 2020, (i) access to speeds of above 30 Mbps for all Europeans, and (ii) subscription of internet connection above 100 Mbps for 50% or more of European households. These goals will only be achieved if the infrastructure deployment costs are lowered across the EU.

5.1.3 National context

Primary Objective

New Generation Networks strategy has as its objective the availability of a group of highly advanced, state-of-the-art telecommunications networks, assuring nationwide coverage. For this purpose, the construction of fiber-optic networks will be promoted, with national coverage and a wide spread of distribution points, as close as possible to the end user and with appropriate levels of symmetry and interactivity, to guarantee a greater two-way transmission of information. Nevertheless, given the advances developments of the wireless communications sector in Romania, we envisage that these networks will be integrated and thus complement existing wireless infrastructure constructed according to New Generation Wireless technology (e.g. LTE), allowing for mobility, and extending the levels of access coverage.

Thus the primary objective of the National Plan for the Development of NGN Infrastructure is the definition and planning of political and administrative measures that can stimulate the development of the next generation broadband infrastructure and, respectively, the penetration of high speed access services in Romania up to the level assumed under the Digital Agenda for Europe for 2020.

Specific objectives

- **Sizing**: the identification of the volume of investments necessary in the development of the next generation access infrastructure for the purpose of the attainment of the objectives related to the development of the access services assumed under the Digital Agenda for Europe
- **Delimiting**: identification of the geographical areas where the current rate of investments in broadband next generation access infrastructure impose the taking of certain public intervention measures (rural areas, areas with a low density of the population, etc)

- **Financing**: identification of investment models compliant with good practices and European recommendations with respect to the financing of the development of next generation electronic communications infrastructure.
- **Stimulating**: stimulating the investment in the next generation access infrastructure in Romania through the identification of the measures to cut costs and increase the efficiency of its development.

Broadband infrastructure coverage in Romania

The coverage by fixed broadband infrastructure of the population and households situated in localities with at least one Internet access services provider has reached 96%, while the total number of fixed broadband access lines reached 3.54 million in January 2013. Romania is, thus, on the ninth place as far as the number of lines in EU is concerned.

Indicator	Status
Mobile Internet access	7.1 M active connections (2012)
Broadband internet connections	10.6M connections (2012)
Number of fixed telephony lines	4.43M (2012)
Subscribers to re-broadcasting services	6.03 M (2012)
Penetration of bundle offers per hundred inhabitants	37.5% (2012)
Investments in infrastructure	537M € (2012)

Source: *ANCOM – Market of services of electronic communications, 2012*

Broadband services penetration in Romania

According to ANCOM's biannual reports, the demand for broadband Internet services recorded a genuine boom starting from 2006 – with respect to both fixed and mobile technologies.

According to the Digital Agenda Scoreboard 2014 for Romania, in 2013 there was a national spread of broadband connections of 56%. Romania also provides a broadband Internet coverage for 90% of total population, and 78% coverage for rural area.

Investment in "white" spots

In the underserved ("white") areas, as there were defined in Broadband Guidelines, where the inherent profitability of investment in broadband infrastructure is low, neither ex ante regulation nor demand-side measures will be sufficient to enable the supply of broadband service. In the situation currently presented, the efforts from alternative instruments (including demand stimulation and ex ante regulation) did not solve the problems related to the lack of supply of broadband on the targeted areas.

In support of the sub-measure "Investments regarding the broadband infrastructure in the rural area" within the National Rural Development Program, ANCOM carried out, in the period November 2012 – January 2013, a program for consulting the operators with respect to the existence of infrastructure and the intention to invest in a total number of 12,487 localities from the rural environment.

Further to centralization, the following useful results were obtained in the development of the **national broadband next generation infrastructure**:

- In 2.307 localities *(18.47%)*, there are no communications networks of broadband local loop.
- In 6.064 localities *(48.56%)* there are no broadband backhaul communications networks.
- In 3.666 localities *(29.35%)* no broadband communications services are provided.
- In 210 localities there are private operators intending to develop broadband networks in the next 3 years. Supporting documents were presented in only 5 of the 210 cases.

As such, a number of 783 localities were selected (declared eligible) to be included in a state-aided development of backhaul infrastructure: **the RONET project**. These localities were grouped in 7 well-balanced areas - from economic/investment perspective - that were put out for Design-Build-Operate concessions (public tender).

Broadband support for meeting the National Strategy on Digital Agenda for Romania

The broadband communications are enabling, and thus facilitating, the development of a wide array of IT&C services, increasing at the same time productivity and competitiveness and thus driving GDP growth; it is accepted worldwide that IT&C determined 40-50% productivity increase in the last 10 years, several studies showing a strong correlation between the broadband penetration and GDP per capita[i] (R^2=0.5419). The positive repercussions of extending broadband access to the less developed regions of a country have been the subject of many international studies. As it has been shown through these studies, the main anticipated long term benefits for the affected areas through the implementation of this project are the following:

- Alleviation of social exclusion in geographically isolated groups of population.
- Boost in regional business activity due to the capacity:
  - to access a greater customer base,
  - for enterprises to provide new services, and
  - to access information relevant for the business in a more timely manner and less costly.
- Improvement in the quality of life because of:
  - the simplification of the transaction processes with the state and the enterprises, and
  - time-savings in transport
- The development of tele-medicine with direct repercussions in the reduction of the necessity for dispersed building infrastructures for medical care, the prevention of deaths, the savings of the relevant cost in the insurance system and the reduction in transport costs and of the cost of management of emergency situations.
- The development of distance-learning and the promotion of life-long education: broadband communications will contribute to the implementation of the new learning methods, increasing thus the teaching quality and accessibility
- eGovernment: broadband will facilitate the interaction between government and citizens/companies, leading to the increase of public administration efficiency and accessibility
- eEconomy: broadband communications contribute to the e-business development, having as a result cutting costs and increase of companies' competitiveness

By ensuring equitable provision of coverage and access to broadband communications across Romania, the measure helps achieving greater cohesion and contributes to the formation of the single market for ICT services.

5.1.4 Strategic Lines of Development

Broadband and digital services infrastructure approach in Romania

In the attainment of the proposed objectives, 4 action directions were identified:

- Encouraging access to the existing passive infrastructure;
- Improving the transparency and coordination in the relevant civil works;
- Simplifying the authorization procedures for the new network developments;
- Norms regarding the NGN infrastructure for new buildings.

The estimated costs of rolling-out NGN infrastructure in Romania to a level that can support the objectives of the National Strategy on Digital Agenda for Romania are estimated to reach up to a level between 1.3 to 3.5 bil. Euro, depending on the technology of choice. These costs are going to be covered only partially by private investments.

Strategic Lines of Development	Lines of Action	Comments
Deployment of Next Generation Backhaul and Backbone Infrastructure	Implementation of the RoNET project (Enabler) Responsible: Ministry for Information Society	Although the competition on the electronic communication market increased considerably, this is concentrated in the urban areas; many rural areas are white areas, with no broadband coverage. Following the consultation process with electronic communications providers, no operator expressed intentions to extend in the next three years their broadband networks in existing white areas. As such, population living in white areas will remain uncovered - not even basic broadband access - unless public intervention will be used.
	Further extensions of the backhaul and backbone networks (2014 – 2020) (Enabler) Responsible: Ministry for Information Society	During the 2014 – 2020 budgetary exercise further developments of the national NGN backbone and backhaul coverage will be enabled by the government either by launching new state-aid programs or by taking additional measures that will encourage private investment in NGN Broadband infrastructure.
	Implement Monitoring Mechanisms (Operational) Responsible: Ministry for Information Society	The providers of the New Generation Networks within the future state-aided Broadband developments will be obliged to publish access-related information (inter alia, technical specification, terms and conditions) for interested parties and to provide open access to all electronic communication operators. Compliance with the obligations will be supervised by the

Strategic Lines of Development	Lines of Action	Comments
		MCIS-PIU based on quarterly reports submitted by the respective companies. **Monitoring of the NGN broadband networks construction** For all state-aid NGN developments the developers will have to submit MCIS-PIU progress reports regarding implementation status. During NGN network constructions, teams of auditors of appropriate expertise (Information & Communication Technology technicians/engineers, economists, accountants, etc.) shall be appointed by MCIS-PIU to audit the physical and financial scope of the specific projects. **Monitoring of the network management, maintenance and operation** NGN network operators will submit MCIS-PIU periodical reports regarding specific KPIs related to network management: major operation failures, security incidents, operations & maintenance. **Financial monitoring and Claw-back mechanisms** The Entrustment Act will mandatory include provisions concerning the effective modality to calculate the level of compensation, taking into consideration the amount of the expenses necessary in order to provide the public service and all the revenues generated by the newly created backhaul infrastructure.
	Administrative and Legislative Proposals. (Strategic)	• Amendment of Law No. 50/1991 regarding the authorization of construction works, so that the construction of electronic communications networks, of infrastructure elements and of supporting infrastructure for electronic communications networks should be governed by a distinct, coherent and simplified chapter in this law.

Strategic Lines of Development	Lines of Action	Comments
		• The elaboration as fast as possible of the Technical Norms for Infrastructure Law No. 154/2012, so that the said law could be put into application. • The amendment/repeal of the provisions contained in Government Decision No. 490/2011 regarding the supplement of the General Town Planning Regulation, as approved under Government Decision No. 525/1996, published in The Official Gazette of Romania No. 361/24.05.2011, so that it could allow the construction of aerial and over-ground networks. The establishment within each county of a single office to manage the entire authorization process for electronic communications networks, from the receipt of applications and related documents (the lease agreement and the architectural plan of the construction) until the release of the permits. • The elimination of any tariffs requested by local authorities in addition to the tariff for the exercise of the access right. • The establishment at a national level of a database regarding public properties, in view of favoring the identification of future sites for networks and elements of the electronic communications networks. • The simplification of the authorization procedure for the construction of electronic communications networks and related infrastructure.
Further stimulate Private Investments in the NGN Infrastructure	Encouraging Access to the Existing Passive Infrastructure. (Strategic) Responsible: Ministry for Information Society	• Improving the operators' access to the existing associated infrastructure allows the reduction by 30-60% of NGN development costs; • Granting access to infrastructure by utilities

Strategic Lines of Development	Lines of Action	Comments
		companies; • Improving transparency regarding the inventory of existing infrastructure.
	Improving the Transparency and Coordination in the Relevant Civil Works. (Operational)	• Developing a system to inform the operators with regard to the civil works planned by local authorities • The systematic possibility to mount pipes and related infrastructure together with the performance of public works
	Simplifying the Authorization Procedures for New Developments. (Enabler)	• Increasing transparency and coordination between the public authorities involved in the granting of permits; • Establishing a point of information with regard to such permits; • Defining a maximum time limit for granting/declining.
	Norms Regarding NGN Infrastructure for New Buildings (Enabler)	• 30-60% of the costs can be saved in case of the new buildings prepared for access to NGN infrastructure; • Defining requirements and including such requirements in the permit granting criteria; • Ensuring undiscriminating access to the terminal segments of NGN.

APPENDIX 1 – SOCIAL ECONOMIC CONTEXT

ITC indicators Specific to Romanian Economy

Indicators	2011	2012
Number of enterprises	14595	15726
Average number of employees (thousands individuals)	128,0	131,2
Turnover of enterprises (mil. lei)	40113,3	37254, 2
Staff costs (mil. lei)	6671,1	7065,1
Gross added value (mil. lei)	14320,3	15418,2
Gross operation excess (mil. lei)	5235,6	8353,1
Investments performed (mil. lei)	3016,3	2983,0
Share of turnover of enterprises in the TIC field of the overall turnover of enterprises with economic activity (%)	4.1%	3.6%
Share of turnover of enterprises with main activity of editing software products and service activities in information technology overall the turnover of enterprises with TIC main activity (%)	24.8%	30.5%
Share of the turnover of enterprises with main activity of telecommunication overall the turnover of enterprises with TIC main activity (%)	47.2%	49.8%
Turnover of the activity of editing software products and service activities in technology of information (mil. lei)	9959,5	11361,1
Share of turnover of enterprises with main activity of editing software products and service activities in information technology overall the turnover of economic activity (%)	1.0%	1.1%

Source: http://www.insse.ro/cms/files/publicatii/Societatea%20informationala%202014.pdf

Active SME's ITC' in Romania

At the beginning of the year 2011, in Romania 14.595 of SMEs were activating in the TIC field, representing around 3% of the overall number of SMEs registered and active in Romania during the same period. From this number, around 15% (2.156 companies) registered a technological innovation during the period 2006-2008.

Innovation and Research

In 2012, Romania has spent £ 2.8727 billion for research-development. Research and development expenses represented 0.49% of GDP, with 0.01 percentage points more than in 2011. At the end of 2012, 42674 employees were conducting their activities in the R&D sector, roughly the same number registered in late 2011.

Employees in ICT

In 2012, 131.200 of employees were active in the field of TIC, around 3% of the overall workforce. The increased investments in broadband connections and infrastructure, as well as the investments in innovation of TIC products and services type e-commerce will have as direct implication the increase of the number of available jobs, both in TIC sector, and in other sectors of economy pursuant to externalities.

eCommerce

Based on the data supplied by Eurostat, the percentage of population aged between 16-74 years who used the internet in 2013 to purchase personal goods and services in Romania was of only 8%, increasing the value registered in 2012 of 5%. Overall, in this field it is noticed a slow increase, started in 2006, when only 1% of population was using the internet for purchases, followed by a fluctuating evolution during the following years. Until 2008 the value of index increased to 4%, only to decrease in 2009, when the effects of crisis were experienced the most, to the value of 2%. Subsequently, it followed a restoration up to the value of 6% in 2011. In capital, the percentage of those aged between 16-74 years and who used the internet for shopping in 2011 was of 14%, registering a significant increase opposite to the value of 7% registered in 2009 and that of 8% in 2010.20
Regarding the private sector, in 2013 9% of SMEs sold goods and services online. Large enterprises had in 2013 a percentage of 13% in selling goods and services online, compared with 10% in 2012.

Broadband connections and infrastructure of digital services in Romania

During the period 30.06.2010 – 30.06.2012 Romania registered a constant increase of the overall number of broadband internet connections on fixed points. If in June 2010 the value of such index was of 2,93 million, within 2 years, until June 2012, the overall number of broadband internet connections on fixed points increased to 3,42 million.

Digital Agenda Scoreboard 2014 upon Romania is showing for the year 2013 a 90% fixed broadband coverage of total population and a 78% rural fixed broadband coverage. The NGA broadband coverage reached 66%, with 55% of population shared subscriptions with at least 30 Mbps and 25% of subscriptions were with at least 100 Mbps. The Mobile broadband take-up is 41% in total subscriptions per 100 people. The 4G mobile broadband coverage is as a 25% of total population.

Digital Division between urban and rural, Romania

	Urban	Rural
Population	55,1%	44,9%
Fixed internet access on household level	54,0%	16,00%
Broadband indicators		

[20] Eurostat - Individuals making purchases over the internet, 2013; Eurostat - Individuals purchasing over the internet by regions, 2012

Penetration rate on every 100 inhabitants	26,1%	8,8%
Broadband internet connections on fixed points (% of overall number of connections)	*76,9%*	*23,1%*
>144kbps<2mbps	1,2%	0,5%
>=2mbps<10mbps	15,4%	5,6%
>=10mbps<30mbps	27,9%	1,4%
>=30mbps<100mbps	16,8%	0,4%
>=100mbps	15,6%	15,2%

Source: ANCOM – Market of services of electronic communications, 2012

Digital Inclusion and Access

In 2013, 45% of the population was using the Internet regularly (at least once a week), significantly below the EU average of 72%. Internet users on a daily basis has reached in 2013 a 32% score.

Furthermore, a huge 42% of the population has still never used the Internet, more than double the rate for the EU average of 20%. With regard to disadvantaged people, the rate was 24%, 30% points below the EU average of 54%.

Between June, 2010 – June, 2012 Romania registered a constant increase of the overall number of broadband internet connections on fixed points. If in June 2010 the value of such index was of 2,93 million, within 2 years, until June 2012, the overall number of broadband internet connections on fixed points increased to 3,42 million. In what concerns the broadband cover per environments of residence, in June 2012 it was registered a penetration rate on 100 inhabitants in urban environment of 26, 12%, by only 1, 19% more than in the same period of the year 2011. In the rural environment, the same index registered a more significant increase, from 6, 98% in 2011 to 8, 82% in June 2012.

The improvement of penetrations of broadband connections on rural level involves in most of cases significant investments for reaching the far points/dwellings geographically speaking. The rural fixed broadband coverage scored in 2013 a 78%. This form of digital divide has been and will be for several years included on digital agenda of development of Romania, leading indirectly to percentage increases stronger from one year to another of the rate of penetration rural environment, comparatively to the evolutions registered in the urban environment.

In what concerns the report between the households with access to internet and those with access to broadband connection it may be noticed in Romania a reduction of the gap in the years. Whereas in 2006 out of 14% households with access to internet only 5% had broadband connection, in 2013, 56% of households benefit from broadband connection.

In 2013, the coverage of fast broadband, of minimum 30 Mbps was of 55% and the minimum of 100 Mbps is reached by 25% of total households.

Access to Internet in Romania

	2009	2010	2011	2012	2013
Inhabitants with access to internet (%)	38%	42%	47%	54%	58%
Access to internet from home (%)	28%	31%	36%	N/A	46%
Access to internet from workplace (%)	10%	11%	12%	N/A	14%
Access to internet from institutions of education (%)	6%	6%	7%	N/A	7%
Access to internet from other places (%)	3%	2%	3%	N/A	3%

Source: Eurostat, 2013[21]

Socio-demographic profile of internet users in Romania

- In 2013, just over half of the Romanian households (52.9%) have Internet access at home, the majority (73.2%) located in the urban area.
- In 2013, the Internet connection was most widespread among households located in the region Bucharest-Ilfov (72.5% of households had Internet access at home), followed by the regions West and North West (58.3% and 56.9%), Southeast (51.2%) and Central (49.5%). The lowest share of households with Internet connection is in the North East (45.7%) and South Muntenia (47.2%)
- The main segments of Internet users opposite to their occupational status are those of skilled/unskilled workers (20%), pupils/students (19%) and engineers, physicians, architects, professors and economists (15%). The proportions are almost identical in case of users using fixed connections, whereas the Internet users using mobile connections come significantly as well from the category of contractors, free-lancers, managers or administrators (13%)
- Most of internet users come, without significant differences between those using fixed or mobile connections, from the households formed of 3 - 4 individuals (59%), with a higher share of those with three members

Mobile broadband penetration has increased but it is still at insufficient quotas and fixed high-speed Internet remains still a privilege of big cities. In 2012, third generation mobile broadband (HSPA) was available to 96.2% of Romanian population (96.3% in the EU). Meanwhile, 4th generation (LTE) was available only for 23.6% of population, compared with the EU average of 26.2%. The take-up rate of mobile broadband reached 41% in June 2013, being still below the EU average of 54.5%.

Public Services of eGovernment

In 2013, 5% of citizens in Romania made use of the internet for eGovernment services. Out of these, 2% of users returned to the Government authorities filled forms.

On the level of enterprises, 63% of Romanian enterprises are using the Internet up to the 3rd degree of sophistication – transactional eGovernment services for interaction with public authorities (which is below the EU27 average of 87%) and almost 20% are submitting offers through SEAP.

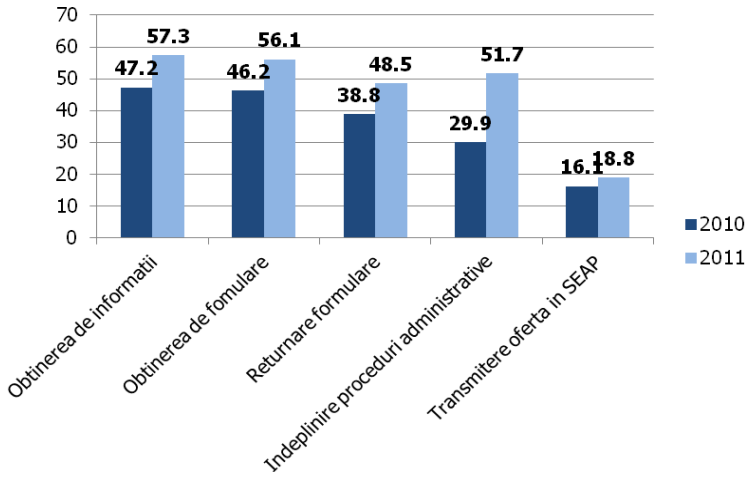
[21] http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/main_tables

Indicators of efficiency of governing act, Romania

	2011		2012	
	RO	EU27	RO	EU27
Efficiency of governing (1-100)	48.00	82.00	-	-
Administrative modernization**, out of which:**				
Use of e-governing services by citizens (%)	11%	49%	31%	-
Time necessary to incorporate a new company (days)	3.00	7.00	-	-
Cost necessary to incorporate a new company (EUR)	100.00	400.00	-	-
Hours necessary for conformity to the norms of tax return, out of which:				
Income tax	-	-	42.00	
Labor tax	-	-	120.00	
Consumption tax	-	-	60.00	
	2011		2012	
	RO	EU27	RO	EU27
Bribe (1-very common - 7 – never happens)	4.00	5.10	3.70	5.00
Defalcation of public funds (1-very common - 7 – never happens)	2.80	4.40	2.50	4.20

Source: European Commission, 2011 – 2012[22]

Share of Enterprises interacting online with public administration per stages (%), Romania



Source: INS, Informational society, 2013[23]

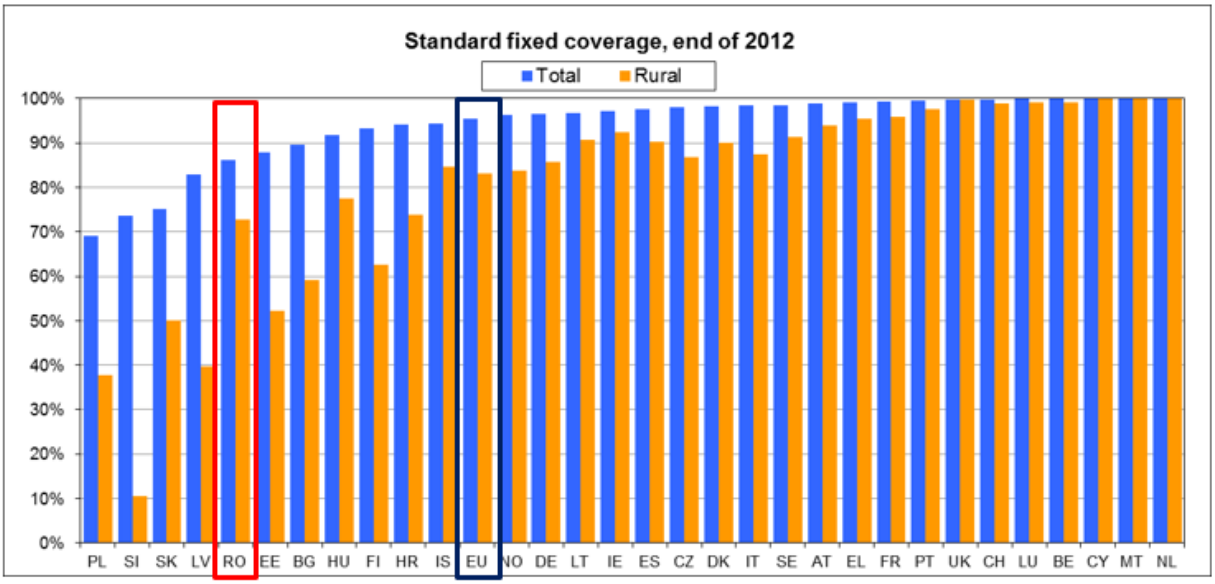
[22] http://ec.europa.eu/europe2020/making-it-happen/key-areas/index_en.htm

APPENDIX 2 – SOCIAL ECONOMIC INDICATORS

Relevant indicators taken from The Digital Agenda Scoreboard – 2013 show Romania's position compared to EU standards.

Standard fixed broadband* availability

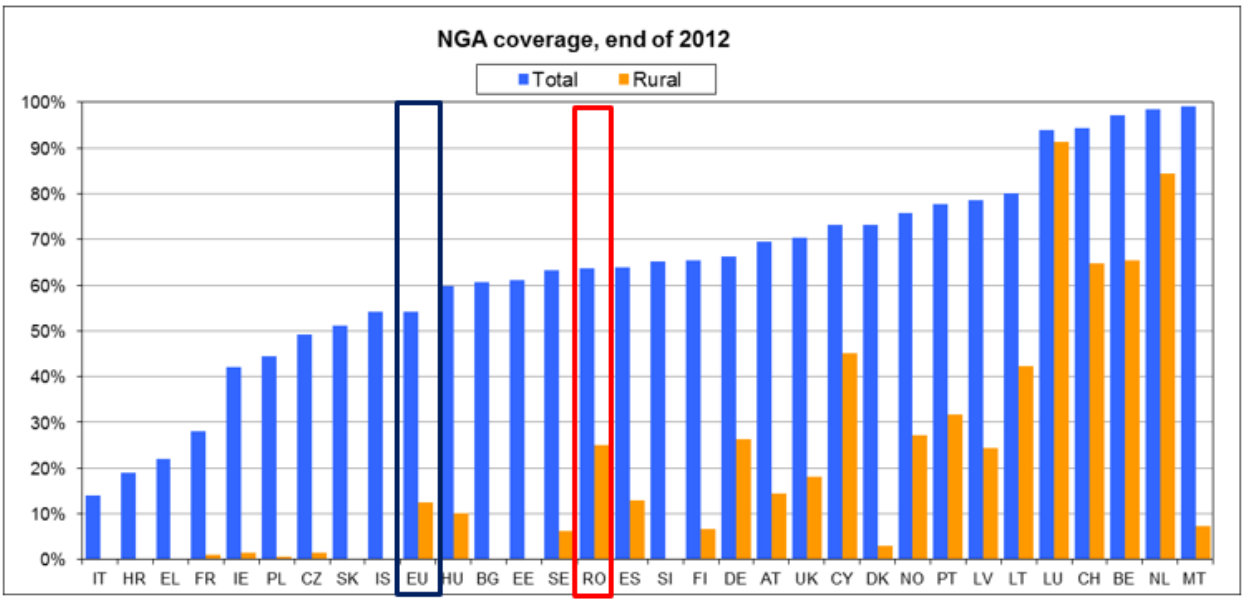
adding wireless, EU coverage is 99.97%



*xDSL, Cable, FTTP and WiMax; Source: Point Topic

NGA* availability (54% of EU homes)

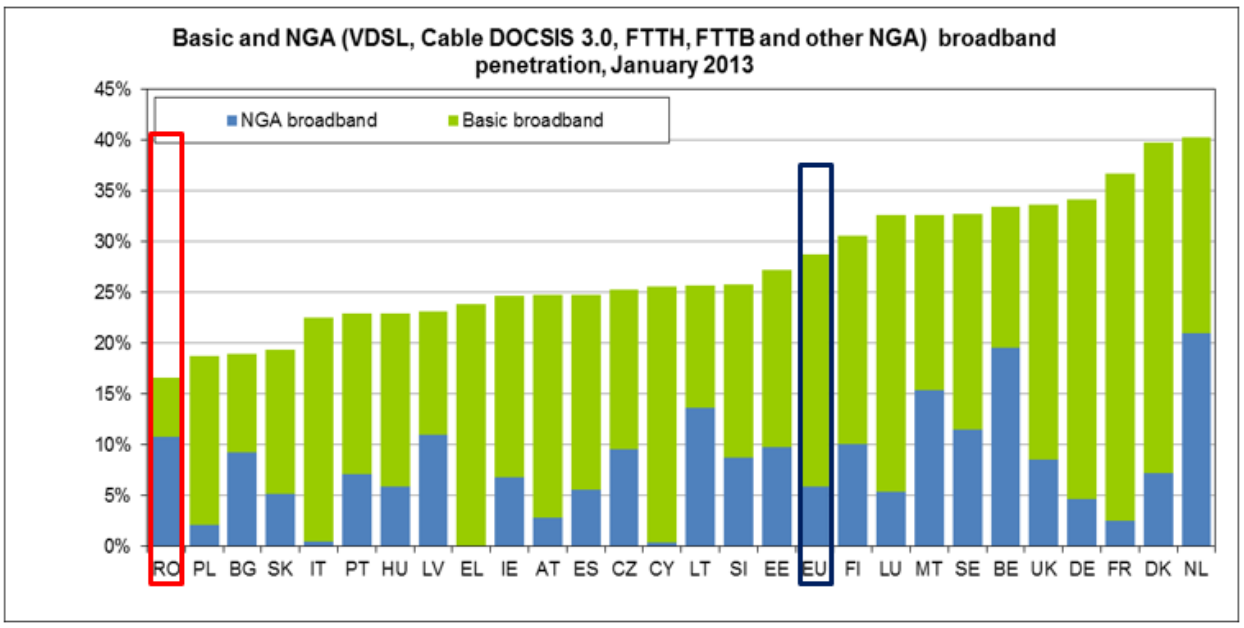
But only 12% of EU rural areas are covered



* Next Generation Access (NGA): VDSL, Cable Docsis 3.0 and FTTP; Source: Point Topic

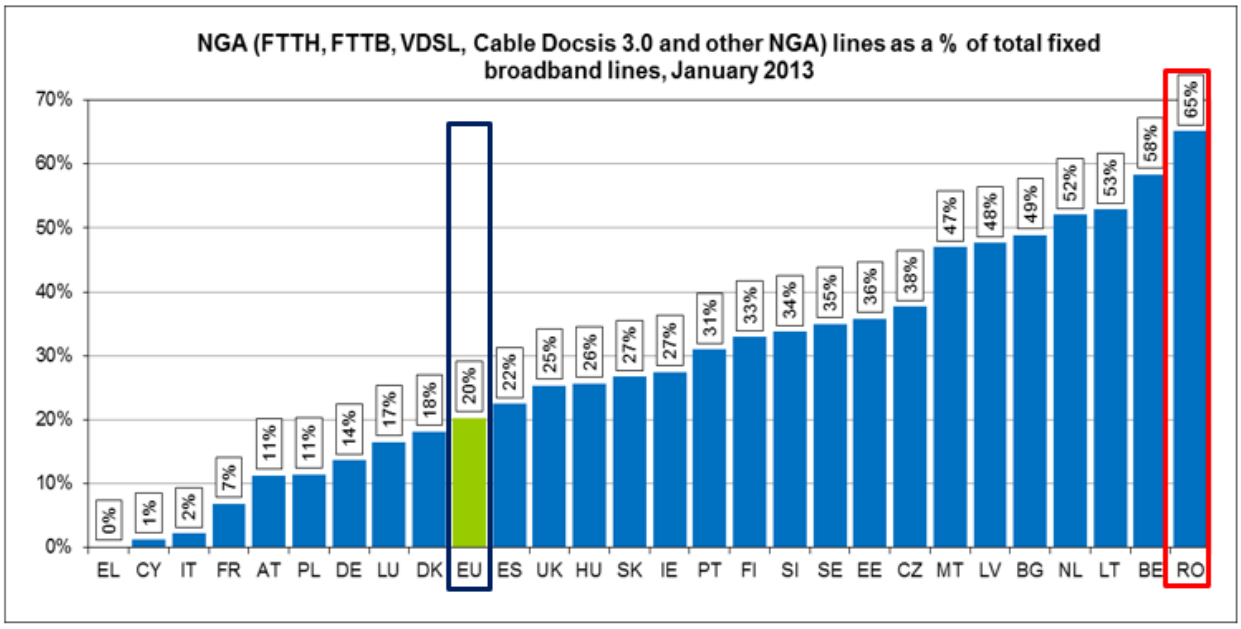
[23] http://www.insse.ro/cms/files/ISI/publicatia_SI_13.pdf

Fixed broadband lines penetration in the EU 28.8% (lines as a % of population)
(equivalent to 72.5% of EU homes subscribing to broadband)



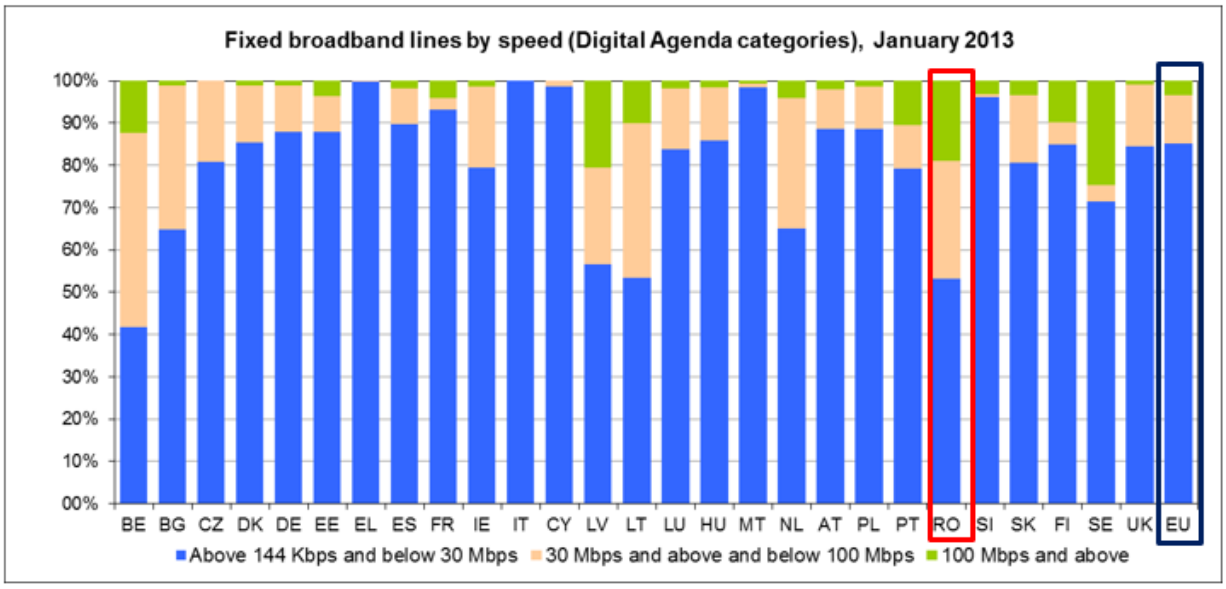
Source: Communications Committee

20% of EU fixed broadband subscriptions are NGA



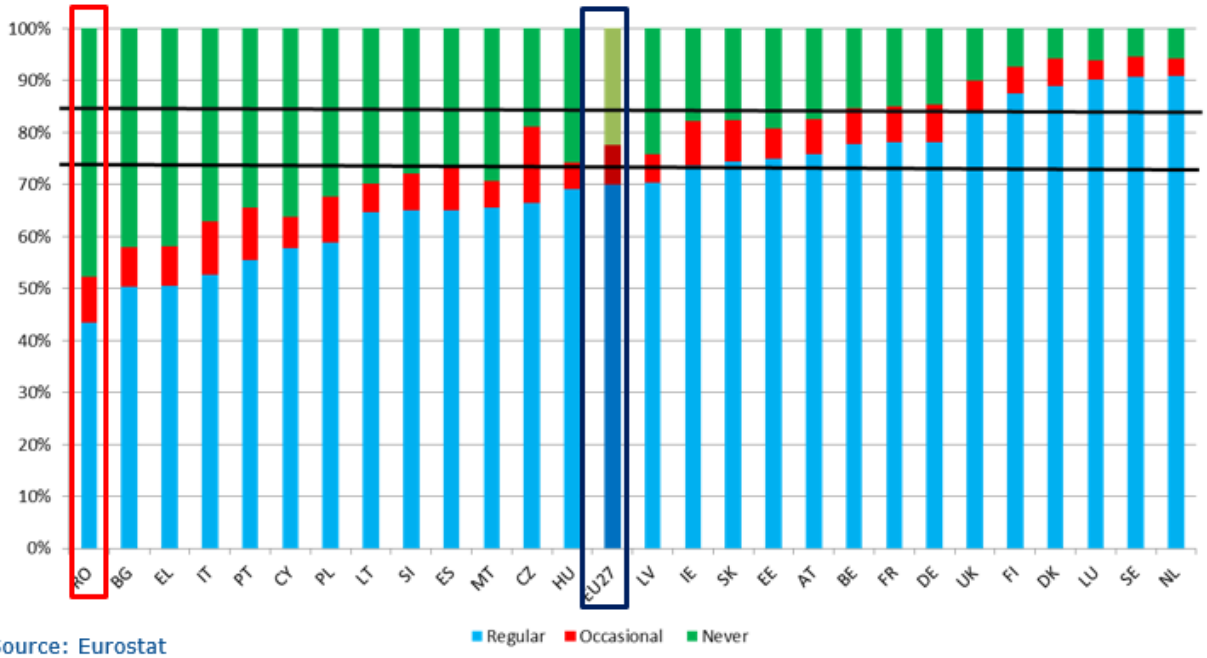
Source: Communications Committee

14.8% of EU fixed broadband subscriptions are at least 30 Mbps and 3.4 % at least 100 Mbps



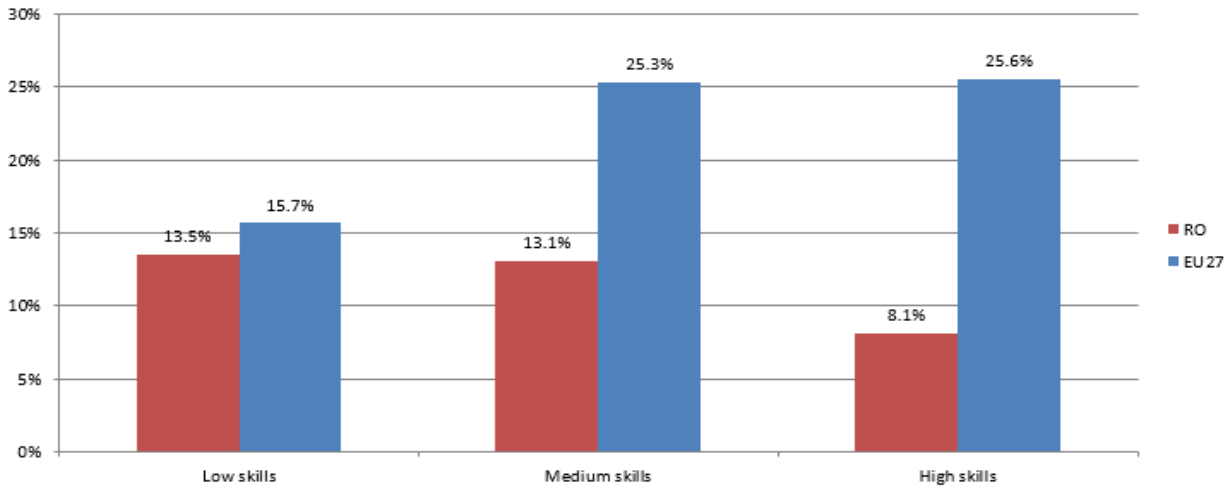
Source: Communications Committee

2% of Europeans have never used the Internet, 70% are regular Internet users (at least once a week) (2012)



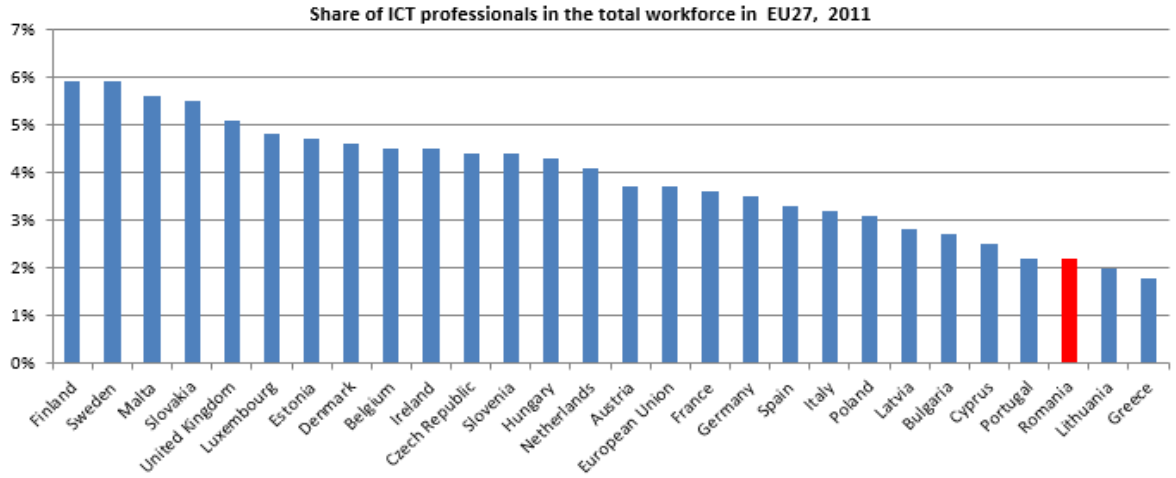
Source: Eurostat

Levels of computer skills (2012)



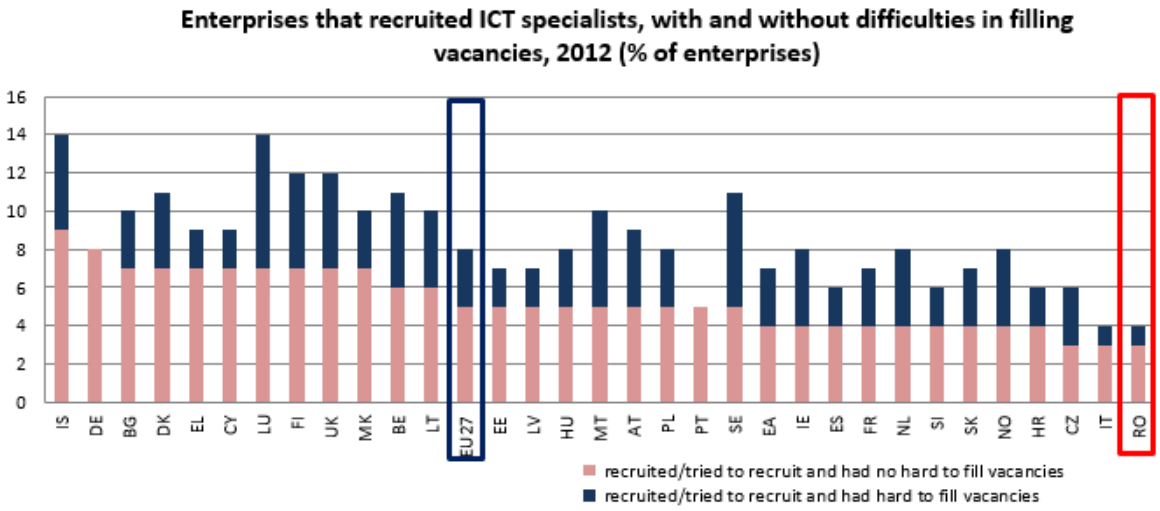
Source: Eurostat

ICT Professionals



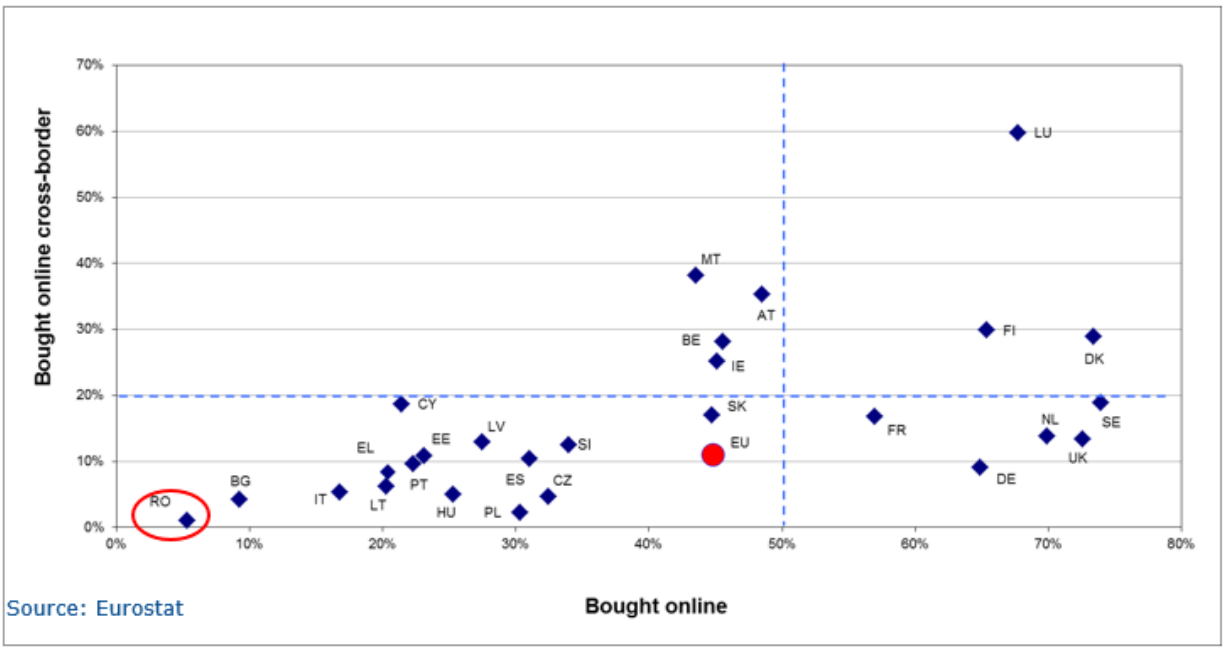
Source: Empirica calculations based on Eurostat Labour Force Survey, 2011

Difficulties in recruiting ICT professionals



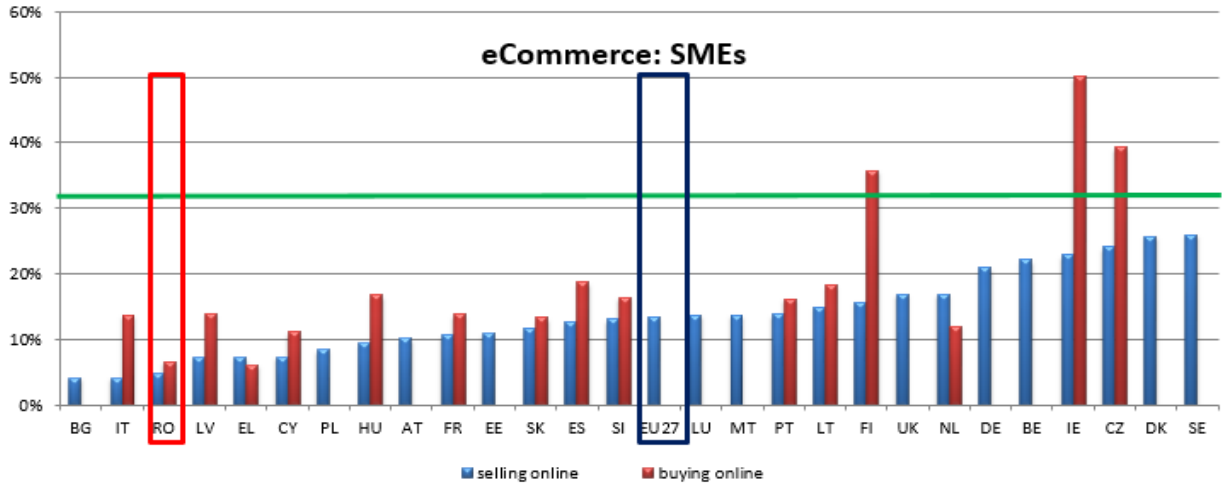
Source: Eurostat

Citizens engaging in eCommerce (domestic & cross border)
(% of all citizens, 2012)

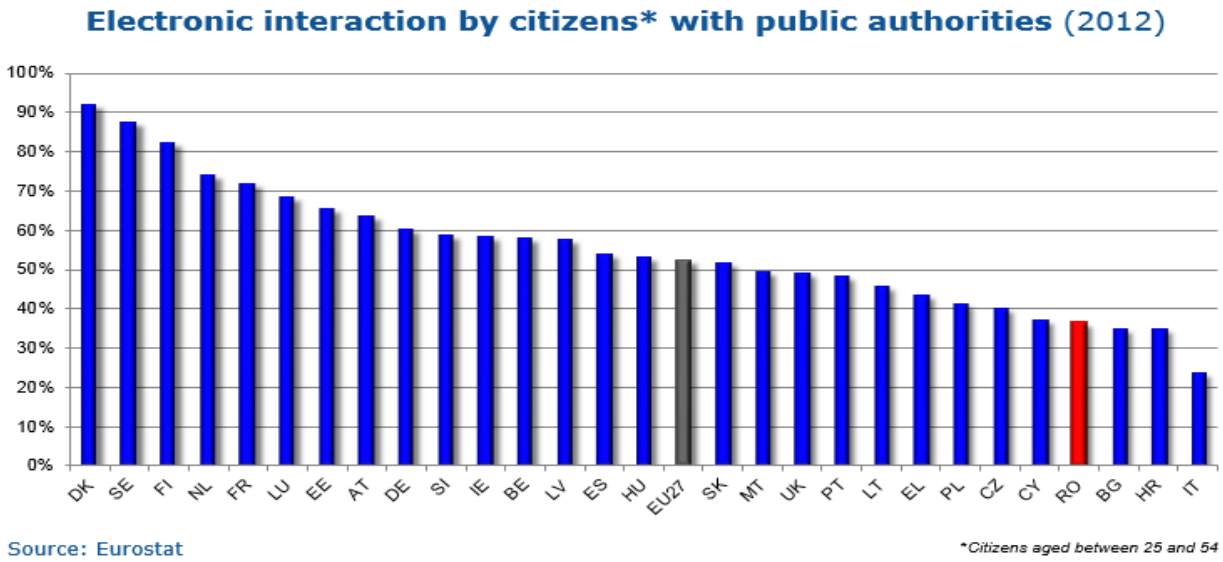


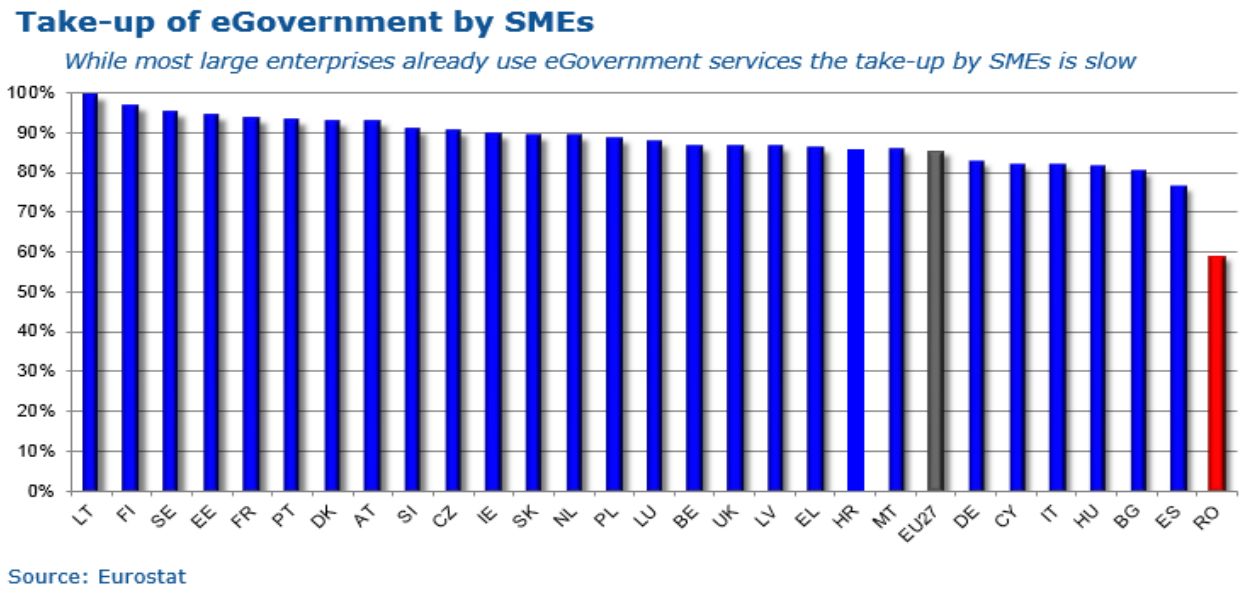
Source: Eurostat

eCommerce: SMEs selling online
(% of all SMEs, 2012)



Source: Eurostat





Source: http://www.insse.ro/cms/files/publicatii/Romania%20in%20cifre%202013_ro.pdf

Administrative division of Romania, December 31 2012

Number of counties	**421 (**including Bucharest)
Number of cities and municipalities	320
Of which: municipalities	103
Number of townships	2861
Number of villages	12957

Population separation based on sexes, age groups and environments, July 1 2012

	2009	2010	2011	2012
Total	**21469959**	**21431298**	**21354396**	**21316420**
Sexes				

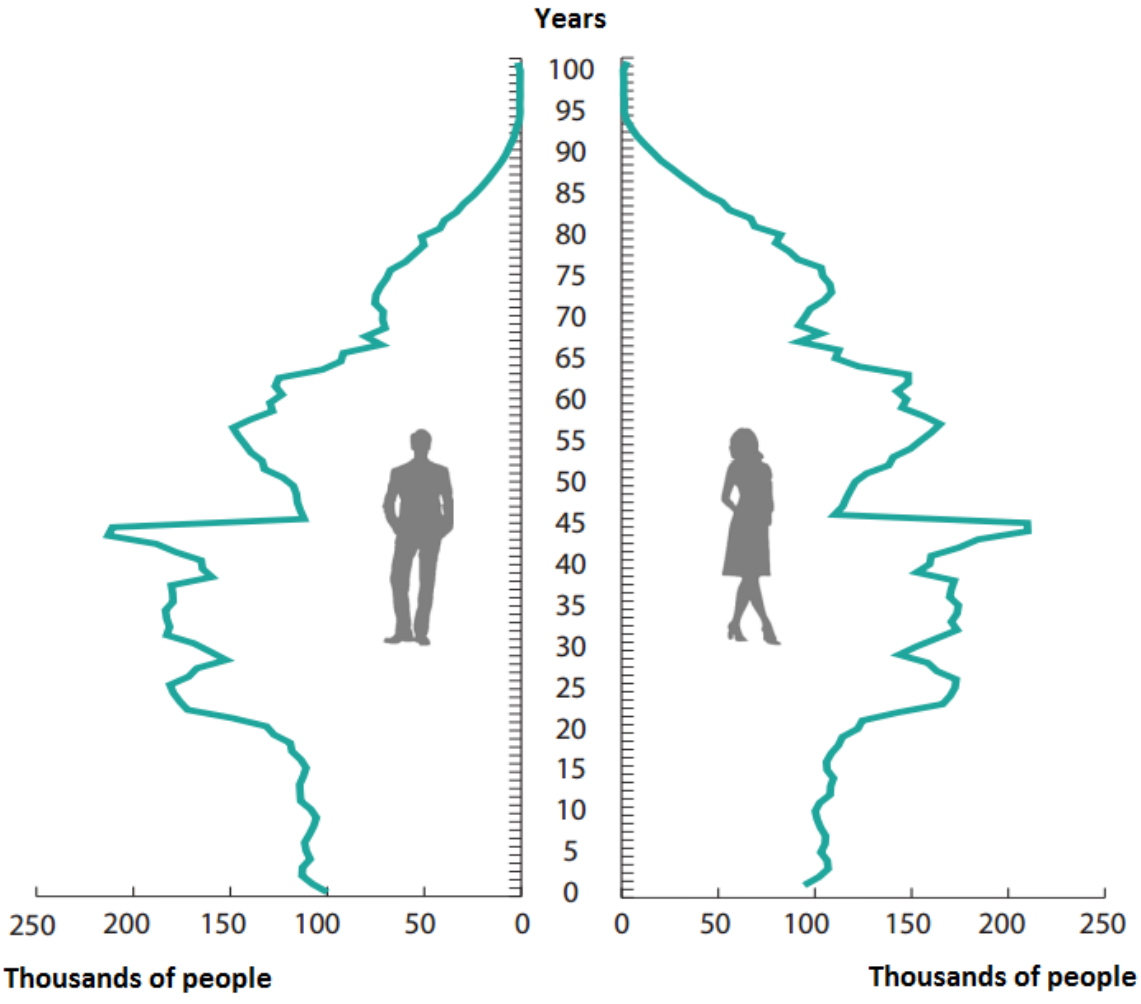
Male	10457219	10434143	10392537	10375200
Female	11012740	10997155	10961859	10941220
Age groups				
0-14 years	3245775	3241295	3213339	321143711[1]
15-59 years	13949544	13837516	13724839	1369556411[1]
60 years and above	4274640	4352487	4416218	44488481[1]
On environments				
Urban	11823516	11798735	11727153	11678600
Rural	9646443	9632563	9627243	9637820

[1] *On the 1st of January 2012.*

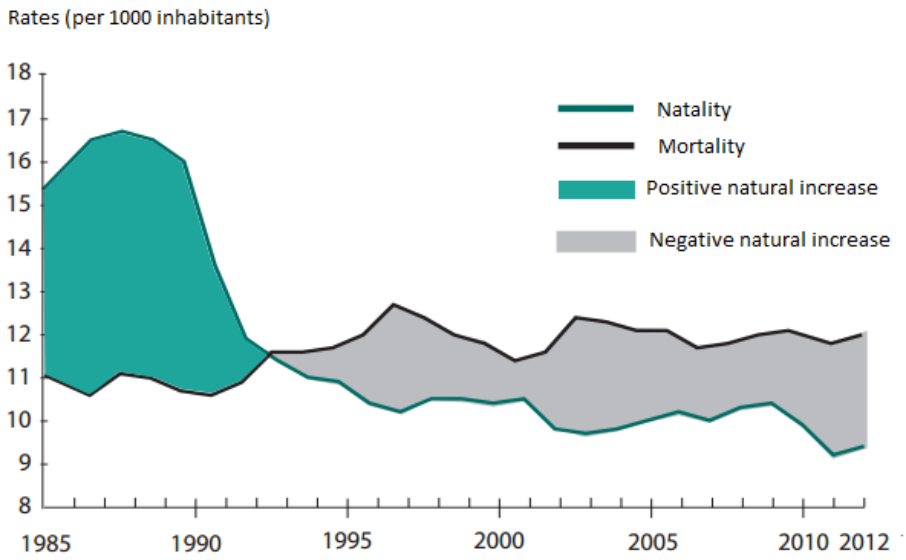
Average age of Romanian population

	2009	2010	2011	2012
Average age of the population				
	39,5	39,7	39,9	40,0

Population division on age and sexes, January 1 2012



Natality, mortality and natural growth indicator of population



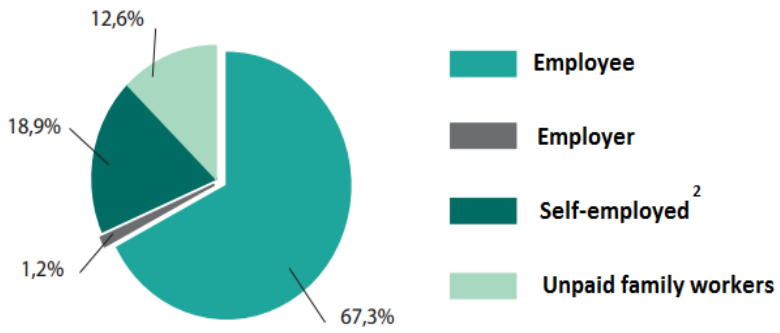
Active population, occupied population and unemployment rate

Thousands of people

	2009	2010	2011	2012
Active population - total	**9924**	**9965**	**9868**	**9964**
- Female	4400	4416	4411	4418
- Urban	5475	5538	5563	5553
Occupied population - total	**9243**	**9240**	**9138**	**9263**
- Female	4143	4128	4112	4137
- Urban	5032	5032	5072	5078
Unemployed BIM[1] - total	**681**	**725**	**730**	**701**
- Female	257	288	299	281
- Urban	443	506	491	475

[1]According to the international definition (BIM-Biroul International al Muncii).
Source: Statistical research of work force in households (AMIGO).

Occupied population structure by professional status, in 2012[1]



[1]Temporary data
[2] Including member of an agricultural society or of an nonagricultural cooperative
Source: Statistical research of work force in households (AMIGO).

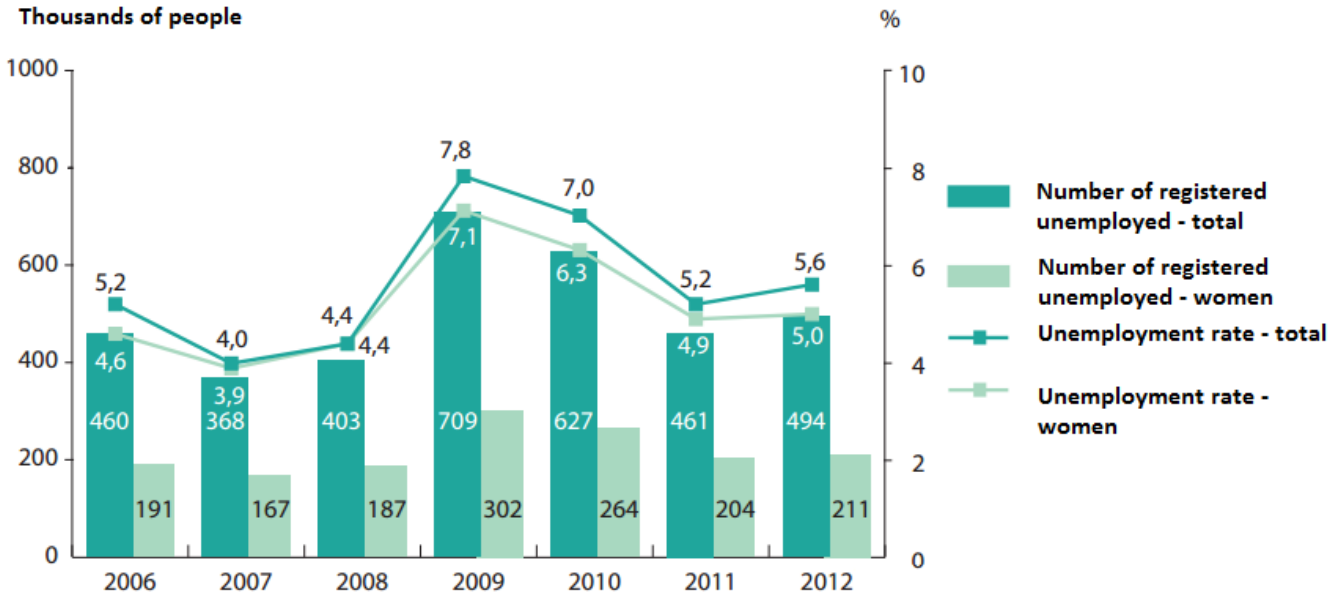
Unemployed registered[1], by level of education

Thousands of people

	2009	2010	2011	2012
Total Unemployed[2]	**709**	**627**	**461**	**494**
Of which: women	**302**	**264**	**204**	**211**
Primary, gymnasium, Professional	503	442	321	347
Of which: women	190	164	127	131
High-school and post high-school	156	135	101	110
Of which: women	83	71	53	57
University	50	50	39	37
Of which: women	29	29	24	23

[1]At the end of the year.
[2]Source: National Agency for Work Force Occupation (ANOFM)

Number of unemployed people registered and unemployment rate



Unemployment rate[1], by groups of ages, sexes and environments (%)

	2009	2010	2011	2012
Total	**6,9**	**7,3**	**7,4**	**7,0**
Under 25 years	20,8	22,1	23,7	22,7
25 years and above	5,4	5,8	5,8	5,6
Male	**7,7**	**7,9**	**7,9**	**7,6**
Under 25 years	21,2	22,3	23,7	22,3
25 years and above	6,1	6,3	6,3	6,1
Female	**5,8**	**6,5**	**6,8**	**6,4**
Under 25 years	20,1	21,8	23,8	23,2
25 years and above	4,5	5,1	5,2	4,9
Urban	**8,1**	**9,1**	**8,8**	**8,6**

Under 25 years	27,1	30,5	32,4	31,8
25 years and above	6,5	7,4	7,0	7,0
Rural	**5,4**	**5,0**	**5,5**	**5,1**
Under 25 years	15,5	15,3	16,7	15,9
25 years and above	4,0	3,6	4,1	3,8

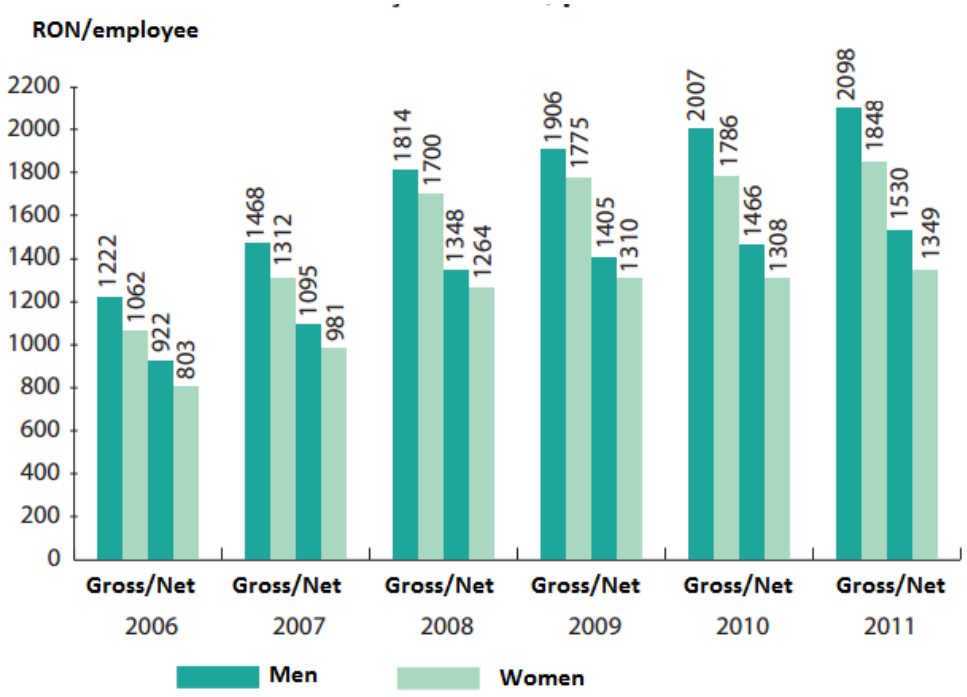
[1]According to the international definition (BIM-Biroul International al Muncii).
Source: Statistical research of work force in households (AMIGO).

Activity and occupation rate, by sexes and environments (%)

	2009	**2010**	**2011**	**2012**
Activity rate				
Total	**63,1**	**63,6**	**63,3**	**64,2**
Male	70,9	71,5	70,7	72,1
Female	55,4	55,8	56,0	56,4
Urban	62,1	63,1	63,9	64,2
Rural	64,6	64,4	62,6	64,2
Occupation rate				
Total	**58,6**	**58,8**	**58,5**	**59,5**
Male	65,2	65,7	65,0	66,5
Female	52,0	52,0	52,0	52,6
Urban	57,1	57,3	58,2	58,7
Rural	60,7	60,9	58,8	60,7

Comment: Data calculated for people of work age (15 – 64 years).
Source: Statistical research of work force in households (AMIGO).

Average Monthly Nominal Salary: gross and net, by sexes



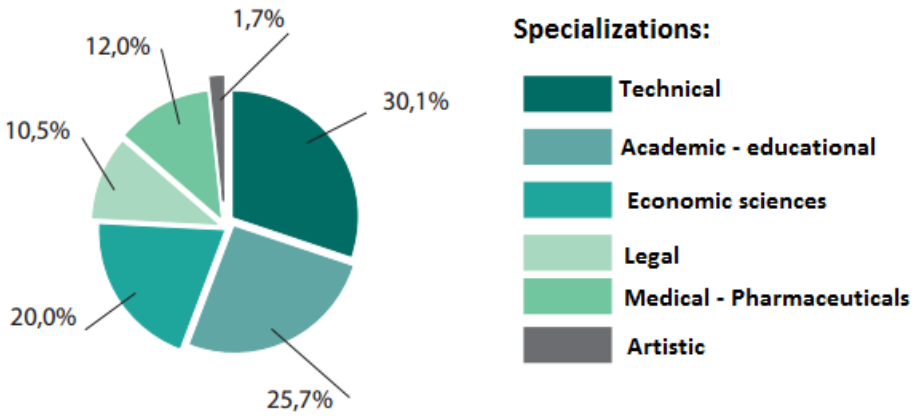
Learning by levels of education

	2009/2010	2010/2011	2011/ 2012	2012/2013
Number of learning facilities				
Total	**8244**	**7588**	**7204**	**7069**
Population enrolled in education systems by levels of education (thousands)				
Total	**4177**	**4029**	**3824**	**3734**
Education level:				
Pre-school	666	674	674	581
- private sector	12	12	17	16
Primary and gymnasium	1720	1691	1629	1744
- private sector	4	5	5	8
High-school	838	867	889	832
- private sector	30	30	26	19
Professional	115	54	12	20
- private sector	2	1	2	1
Post high-school and vocational	63	70	80	93
- private sector	28	32	38	45
Superior	775	673	540	464
- private sector	322	240	140	100

Percent of population of learning age included within the learning system

Total	**78,7**	**77,6**	**76,0**	**76,2**
Sexes				
Male	76,8	76,0	74,9	75,3
Female	80,7	79,3	77,2	77,2

Students structure, by specialization, from superior education, in 2012 / 2013 academic year



Level of participation in the educational process or training of people between 25 – 64 years (%)

Country	2000	2009	2010	2011	2012
UE-27	7,1[1]	9,3	9,1	8,9	9,0
Austria	8,3	13,8	13,7	13,4	14,1
Belgium	6,2	6,8	7,2	7,1	6,6
Bulgaria	...	1,4	1,2	1,3	1,5
Czech Republic	...	6,8	7,5	11,4[2]	10,8
Cyprus	3,1	7,8	7,7	7,5	7,4
Denmark	19,4[2]	31,2	32,5	32,3	31,6
Estonia	6,5[2]	10,5	10,9	12,0	12,9
Finland	17,5[2]	22,1	23,0	23,8	24,5
France	2,8	5,7	5,0	5,5	5,7
Germany	5,2	7,8	7,7	7,8	7,9
Greece	1,0	3,3	3,0	2,4	2,9
Ireland	...	6,3	6,8	6,8	7,1
Italy	4,8[2]	6,0	6,2	5,7	6,6
Latvia	...	5,3	5,0	5,1[2]	7,0
Lithuania	2,8	4,5	4,0	5,7	5,2
Luxemburg	4,8	13,4[2]	13,4	13,6	13,9
Malta	4,5	6,1	6,2	6,5	7,0
Holland	15,5	17,0	16,6[2]	16,7	16,5[3]
Poland	...	4,7	5,3	4,5	4,5[3]
Portugal	3,4	6,5	5,8	11,6[2]	10,6
UK	20,5[2]	20,1	19,4	15,8	15,8
Romania	**0,9**	**1,5**	**1,3**	**1,6**	**1,3[3]**
Slovakia	...	2,8	2,8	3,9	3,1
Slovenia	...	14,6	16,2	15,9	13,8
Spain	4,5[2]	10,4	10,8	10,8	10,7
Sweden	21,6	22,2[3]	24,4	24,9	26,7
Hungary	2,9	2,7	2,8	2,7	2,8

[1]Estimations.
[2]Disscontinued series
[3]Temporary data.
… = Missing data.
Source: Eurostat survey, 2012 & 2013

Household coverage with access to internet (%)

Country	2009	2010	2011	2012
UE-27	**66**	**70**	**73**	**76**
Austria	70	73	75	79
Belgium	67	73	77	78
Bulgaria	30	33	45	51
Czech Republic	54	61	67	65
Cyprus	53	54	57	62
Denmark	83	86	90	92
Estonia	63	68	71	75
Finland	78	81	84	87
France	69	74	76	80
Germany	79	82	83	85
Greece	38	46	50	54
Ireland	67	72	78	81
Italy	53	59	62	63
Latvia	58	60	64	69
Lithuania	60	61	62	62
Luxemburg	87	90	91	93
Malta	64	70	75	77
Holland	90	91	94	94
Poland	59	63	67	70
Portugal	48	54	58	61
UK	77	80	83	87
Romania[1]	**38**	**42**	**47**	**54**
Slovakia	62	67	71	75
Slovenia	64	68	73	74
Spain	54	59	64	68
Sweden	86	88	91	92
Hungary	55	60	65	69

[1]Source: Investigation in households regarding access to ICT.
Source: Eurostat survey, 2012 & 2013

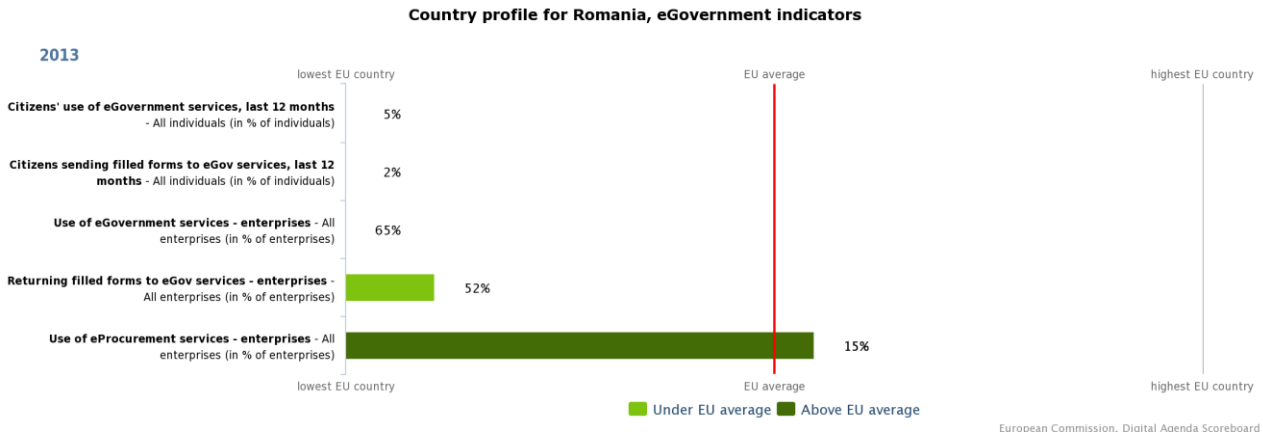
Labor productivity by occupied citizen – GDP in PCS by occupied citizen (UE-27 = 100)

Country	2000	2009	2010	2011
Austria	123,6	116,3	116,6	116,8
Belgium	137,4	128,0	128,7	127,8
Bulgaria	31,3	40,0	41,3	44,0
Czech Republic	65,6	76,0	73,7	74,0
Cyprus	84,4	92,4	91,2	91,1
Denmark	111,2	105,9	111,9	110,5
Estonia	47,2	65,1	68,4	68,0
Finland	115,5	110,3	109,0	109,5
France	119,5	117,4	116,6	116,7
Germany	107,2	104,3	106,2	106,7
Greece	94,2	98,3[1]	93,4[1]	…
Ireland	129,3	132,2	136,6	141,6
Italy	127,5	112,7	110,2	109,0
Latvia	40,1	52,9	53,8	62,4[2]
Lithuania	43,2	58,0	62,6	64,9
Luxemburg	176,9	161,3	167,3	169,1
Malta	100,9	97,5	97,4	95,0
Holland	115,1	112,8	112,3	111,7
Poland	55,5	65,5	67,5	69,1
Portugal	72,1	76,2	77,1	75,6[1]
UK	110,8	105,5	105,4	103,6
Romania	**23,7**	**49,5**	**48,6**	**49,4**
Slovakia	58,4	80,0	81,3	80,2
Slovenia	76,1	80,5	79,4	80,6
Spain	104,3	109,7	108,0	108,6
Sweden	115,0	112,3	114,6	115,8
Hungary	57,1	72,5	70,9	71,2

[1]Disscontinued series
[2]Temporary data.
… = Missing data.
Source: Eurostat survey, 2012 & 2013

APPENDIX 3 – SWOT ANALYSIS

SWOT FOR EGOVERNMENT AND INTEROPERABILITY



Strengths	Weaknesses
The existence of a strong ICT (Information and Communication Technology), with national integrators and the presence of the main global ICT companies on the Romanian market The well-developed ICT infrastructure in the big cities, which is a developing network with respect to the internet access in public points The existence of an operational online acquisitions platform at governmental level (www.e-licitatie.ro) The existence of the MSI which plays the role of a general coordinator of the ICT strategies at governmental level The establishment of CERT-RO with respect to the cybernetic security The existence of certain developed strategies with respect to the cybernetic security and the development of the electronic system for public acquisition - ESPA	The lack of a regulatory framework with respect to the interoperability of the governmental institutions and of the informatics systems The insulation of the public institution's computerisation The lack of certain investment programmes with a unitary vision in the public sector The lack of coordination with respect to adequate security measures The lack of a long term strategy for the training of the ICT personnel in the public sector The absence of an electronic authentication system and of a unique identification of the users The relatively reduced number of computerised public services depending on their level of sophistication The lack of certain functionalities implemented within the online system of public acquisitions The lack of a coordinated and coherent communication process for the promotion of the governmental initiatives within the online media The existence of certain problems with respect to the scalability, actuality and cost efficiency of the IT infrastructure which is in place at the level of different governmental organisations

	The solution involving granular acquisition of hardware and software does not provide transparency at governmental level
Opportunities	**Threats and constraints**
The development of an infrastructure for the eGovernment of the public services The increase of the public services utilisation degree which are available in the online media The preparation of the coordinated implementation of intra-communitarian projects, supporting the development of the interoperability The alignment to the e-Governing European structures The increase of the transparency with respect to the public administration act The development of certain technologies such as Cloud Computing and the data centres' management Increase of the utilisation of the online media for the resolution of the citizen's everyday problems	Reduced investment funds provided by the state budget The digital division recorded at regional level: rural-urban The decentralisation of the public authorities and the difficulty to impose to these authorities the utilisation of certain interoperability standards The changes of the political media which can influence the rhythm of growth or the achievement of the proposed objectives The activities of the organised groups for criminal informatics The absence of the population's trust in the cybernetic security of the online systems

Our conclusion after the SWOT analysis is that the following measures will remediate the most important problems, through these activities:

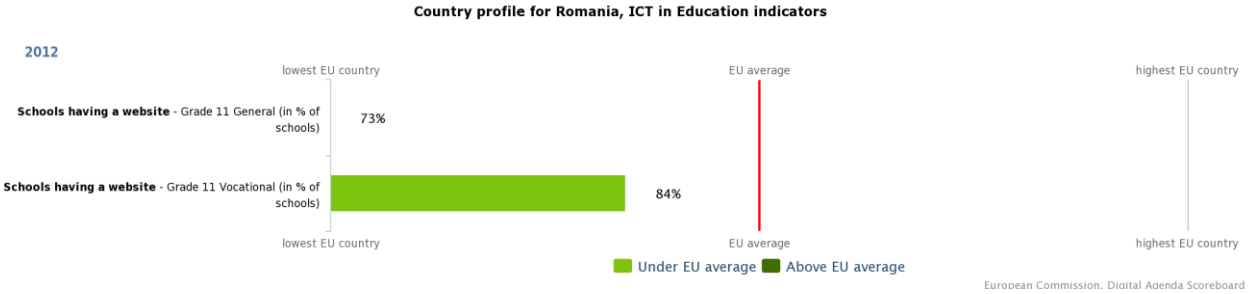
- Preparation of a coherent computerisation process of the public services based on *Life events* and on the increase of the transparency level of public administration's act, including functionalities such as e-Participation, introduction of public services such as e-Identity and development of public services such as *e-Procurement* – ESPA by means of implementing functionalities such as e-Invoicing etc.
- Defining an institutional structure which will provide a unitary vision, to manage in a centralised and coherent manner the issues related to the computerisation of the public services and to perform interoperability actions at European level

On the other hand, a series of measures are suggested in order to benefit from the opportunities which were identified in Romania, in a regional framework:

- Utilisation of European coordination opportunities in order to increase the performance level of the interoperability between the informatics systems implemented at national level and for the improvement of cybernetic security
- Support for the use of open sources and standards for future facilitation and assurance of interoperability of the informatics systems
- Introducing technologies such as Cloud Computing and of unitary management systems of data centres for the decrease of administrative expenses and for increasing the effectiveness level of public administration
- Use of the social media for communication improvement both within governmental institutions as well as for support of activities developed by the private sector's representatives

Detailed conclusions are described in the first field of action.

SWOT FOR ICT IN EDUCATION



Strengths	Weaknesses
Increase in the internet use within the rural environment The computerisation of the pre-academic system, by means of governmental programmes and several other means The majority of the pupils in the urban environment have a satisfactory level of digital alphabetisation A great number of universities have already been equipped with e-learning platforms (more than 70%) The achievement of basic ICT competences by the students and the improvement of the access to technology irrespective of the provisions of the academic environment The computerisation of the libraries and the formation of digital competencies in the rural environment leading towards	The decrease of the scholastic population in the pre-university teaching system Low level of scholastic competencies, including digital competencies, compared to the European averages Contents which are based on memorising, by volume of notions, concepts, and reduced capacities to adapt to the exterior world The use of e-learning instruments is reduced as a result of their insufficient number and of the difficult use due to the lack of flexibility in the generation and the use of the content Insufficient materials which are available in digital format (books, thesis, articles, magazines, etc.) The existence of very few e-learning projects dedicated to the adult population The lack of a coherent approach for the continuous formation also during the adult life
Opportunities	**Threats and constraints**
National and international financing programmes in the field of education, of ICT utilisation, research, development and culture The development of the infrastructure for internet access in Romania The utilisation of the OER and Web 2.0 technologies for educational purposes, providing flexibility to the educational process The intensification of the trans-national collaboration between universities The students and the teachers' mobility	The lack of collaboration between the business environment and the educational institutions The lack of correlation between the e-learning programmes included in the Sectoral Operational Programme "Increase of economic competitiveness" (SOP IEC) with the e-learning programmes included in the Sectoral Operational Programme "Human resources development" (SOP HRD) The lack of clarity with respect to the manner in which the initial and the continuous training of the teachers is performed The difficulty to include the rural areas in the activity of digital competencies development in a natural manner, non-targeted – Digital division

According to the results of the SWOT analysis we can use the identified opportunities, such as:

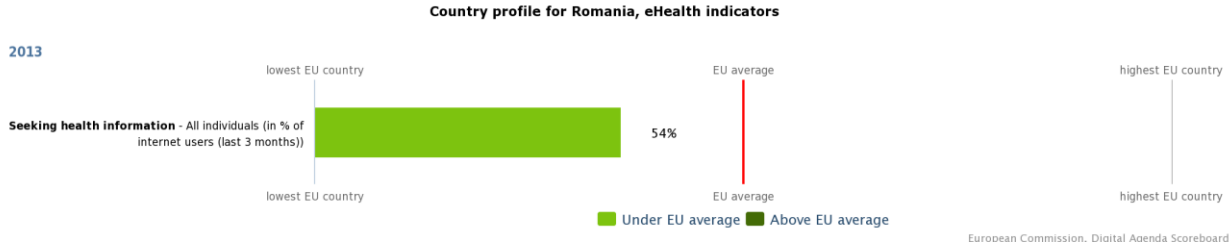
- Development of flexible OER and WEB 2.0 technologies and their utilisation for educational purposes
- Promotion of development of digital competencies at European Union level among all the inhabitants of the country: pupils, students, adults being in the process of continuous training, persons which are in the situation of social exclusion: persons with disabilities, persons which are below the poverty threshold, persons who live in under-privileged rural areas etc.
- Support for homogenous and complete development of the digital infrastructure in order to assure the free internet access for all country's inhabitants and to support the homogenous internet utilisation among all groups of inhabitants and among all the regions of the country

The opportunities which were identified at the ICT level in education will be partly used to propose a series of measures which will deal with the weaknesses recorded in this area, such as:

- Continuous support of the ICT infrastructure development within pre-academic environment
- Improvement of the level of digital competencies recorded in Romania by means of organising training sessions in the scholastic environment and not only
- Additional and direct support of the development of digital competencies in areas in which there is an increased degree of social excludability (ex. Rural environment, areas which are below the poverty threshold)
- Preparation and promotion of the OER and Web 2.0 instruments' usage for continuous training among adult persons – LLL – *Life Long Learning*

Detailed conclusions are described in the second field of action.

SWOT FOR ICT IN HEALTH



Strengths	Weaknesses
The increase of the level of inter-hospital cooperation based on the ICT tools – telemedicine – especially in the field of emergency medicine and of speciality medicine The reporting centralisation at national level The existence of the DRG reporting for the assessment of the hospital's results Providing computers for the family practitioners	The absence of a national registry of the persons who suffer from chronic diseases The limited utilisation of the informatics systems The lack of coherent collection and analysis of the data resulted from the healthcare's informatics system Low level of interoperability for the applications in the healthcare system Insufficient informatics support (telemedicine) for the customers – citizens and patients The lack of availability of the medical practitioners' with increased ICT competencies
Opportunities	**Threats and constraints**
The development of the informatics infrastructure in Romania, in order to be able to support the ICT utilisation The development of certain regional, national and European e-Heath projects Standardisation in compliance with the EU Directives of all the medical acts support activities, for the support of the medical system's interoperability The possibility of integration among the e-Heath platforms which exist at European level The existence of a significant volume of data generated in the healthcare informatics systems which can be analysed and used for the management of the healthcare system's resources	The sub-financing of the healthcare system The increased ageing index among the population which can generate significant costs for the treatment's support

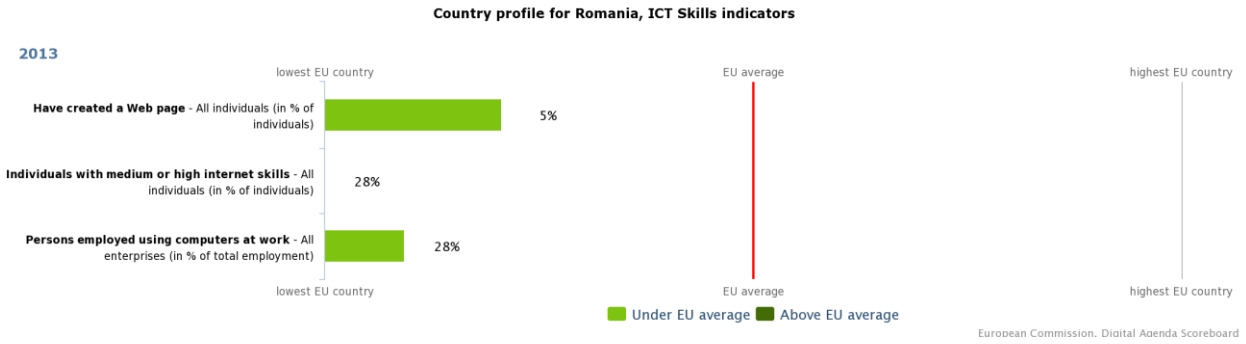
According to the results of the SWOT analysis, a series of measures will remedy the most important problems, by means of the following activities:

- Increase of informatics support granted to the population by means of promoting and implementing telemedicine technologies, both for the relationship between the doctors as well as for the relationship between doctors and patients
- Provision of ICT training for development of the digital competencies of medical and administrative personnel

Also, the technological developments recorded lately and healthcare regional development policies provide development opportunities applicable to the healthcare system in Romania, such as:

- Provision of the interoperability of informatics systems in the healthcare field, targeting the utilisation of common standards for the performance of the pan-European communication of these systems
- Utilisation of certain Big Data technologies for the review of data generated by healthcare informatics system and reporting of these data so that they will stand for management and assignment base of the available resources etc.
  Detailed conclusions are described in the second field of action.

SWOT FOR ICT IN CULTURE



Strengths	Weaknesses
Diversification of the services provided in the library (eInclusion) Increase of the citizen's informing level with respect to the Romanian cultural inheritance Materialisation and preservation of the national cultural creations within a vast digital universe The promotion of the rural tourism and of the social inclusion of the persons located in difficult accessible areas by means of indirectly educating them and of developing digital competencies	Reduced number of cultural objects recorded in the Europeana.eu, as compared to the final target Reduced level of preparation for the library's personnel for training and support of the development of digital competencies among the users The degree of provision of the cultural institutions with ICT equipment
Opportunities	**Threats and constraints**

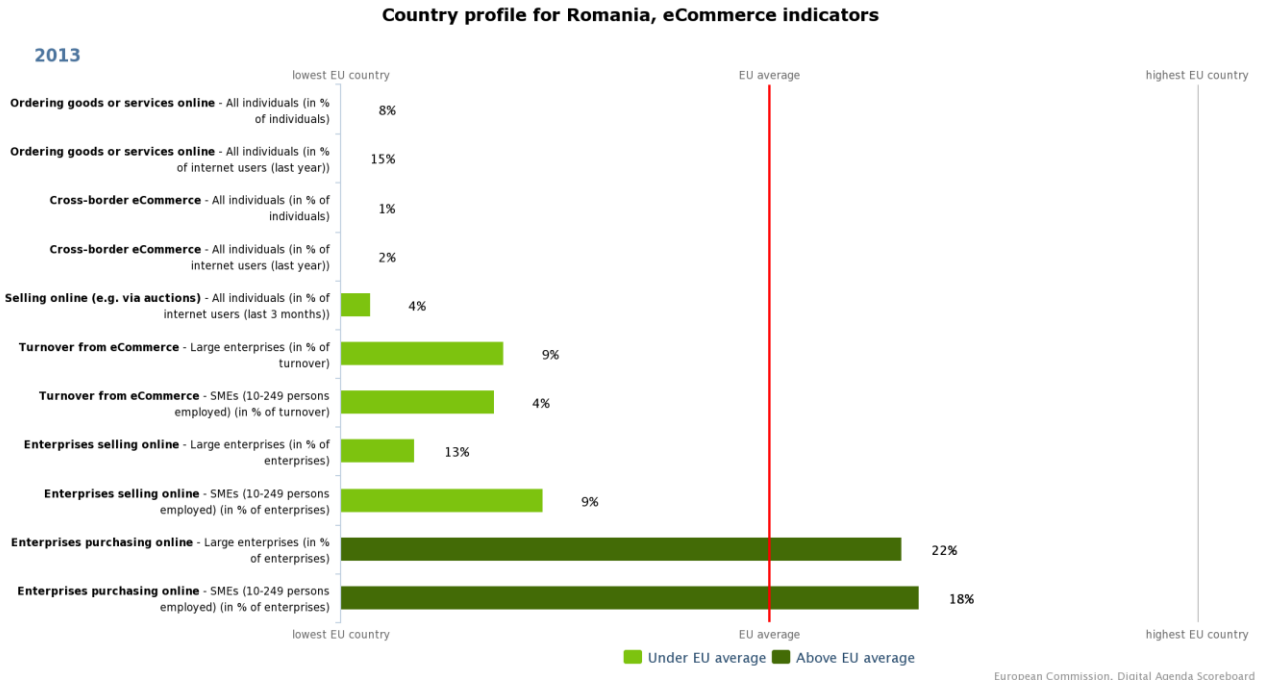
The development of *Europeana.eu* – the unique European Library The existence of an international framework for the support of the cultivation of the human and cultural potential The liberalisation of the access to the documents resulted from the research activities financed by the public sector The development of cultural projects by means of ICT utilisation, for the increase of the human potential from the beneficiary communities.	Low level of interactivity between the digital content – the individual Increased degree of digital division with respect to the rural environment

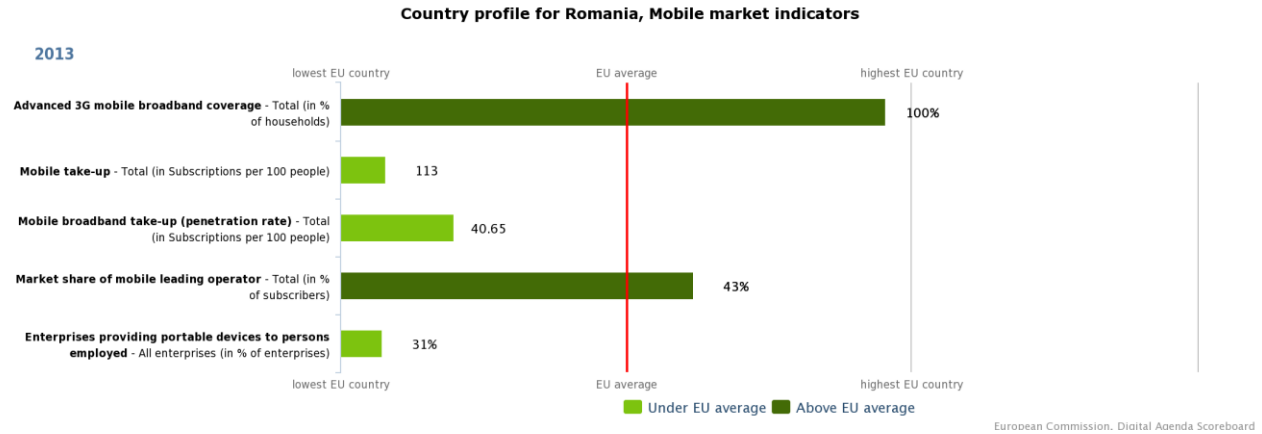
According to the results of the SWOT analysis a series of ICT measures in the field of culture deal with the weaknesses identified with respect to the social inclusion and the preservation of the cultural inheritance:

- Involvement of social excluded population in activities which deal with the development of original digital content, which is specific for Romanian communities, and which leads to the development of the Romanian communities' digital competencies
- Development of the Romanian digital archives and their contribution in the Europeana.eu (with the specific target of exposing in the Europeana.eu ~750,000 of digital elements by 2015)
- Improvement of the interaction between digital content and the individual by means of ITC resources
- Training of libraries' personnel in order for them to become facilitators of the digital competencies development

Detailed conclusions are described in the second field of action.

SWOT FOR ICT IN ECOMMERCE





Strengths	Weaknesses
The awarding of funds available through the EU 2014-2020 programme The easy and rapid information exchange between the seller and the buyer The possibility to shop from home, providing process flexibility Instantaneous delivery for the digital products (i.e. software) The rapid launch of the new products	The existence of fake web sites The acceptance of the new on-line payment systems by the clients The impossibility to establish the quality of the purchased product prior to its physical delivery Increased costs with the product shipment/delivery
Opportunities	Threats and constraints

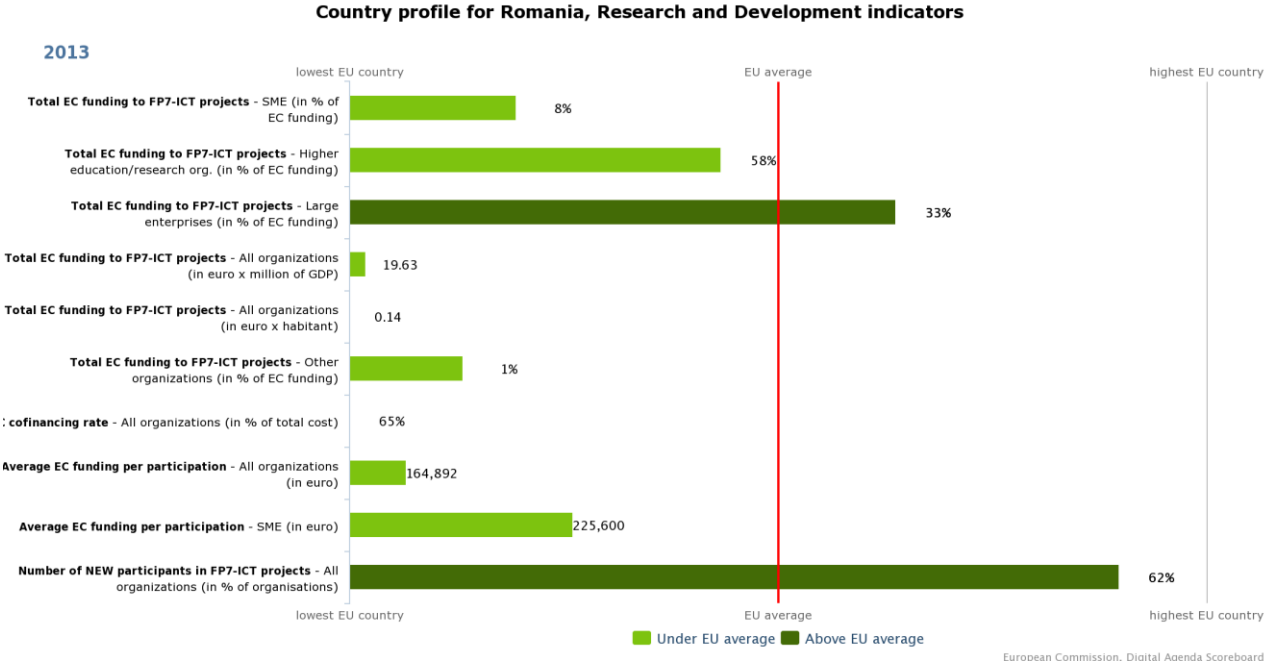
Supporting the development of the unique digital market within the European Union Opening and easy access towards new markets The possibility to develop in several media (ex: mobile phones, tablets etc.) The preparation of technologies for the monitoring of the fraud attempts of the payment systems and the unique identification of the users The increase of the competitiveness, the development of a competitive environment, having a result significant price reductions for the clients Allows the persons form the rural areas and from the areas in which the access is difficult to have access at products and services, which otherwise would not have been accessible Access to products and services which are not available at national level	The security of information, low confidence of a certain part of the citizens The continuous change of the environment and of the legal framework and the absence of a consistent development strategy in this field Language and cultural aspects in case of cross-border acquisitions Informatics fraud and criminality The lack of universal acceptance of the bank cards Significant fiscal system differences between the member states of the European Union

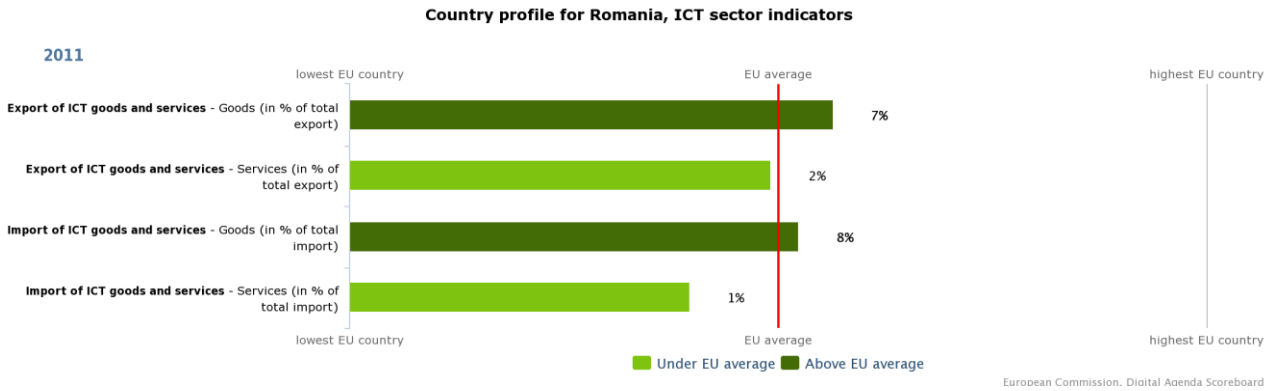
According to the results of the SWOT analysis, a series of measures will be prepared for overcoming the weaknesses and for supporting the e-commerce sector, as a development opportunity within future unique digital market of the European Union:

- Development of legal framework with respect to the cross-border online services offer with the aim of reducing the legal and fiscal barriers of to the cross-border e-commerce
- Improvement of the level of informing the online service operators and of the internet users
- Support for development and implementation of online payment and delivery systems in order to achieve flexibility and facilitation of the product acquisition and delivery services by means of the e-commerce system
- Easy resolution of abuses and litigations specific for the eCommerce system by means of special organisms provided in this respect

Detailed conclusions are described in the third field of action.

SWOT FOR R&D AND INNOVATION IN ICT





Strengths	Weaknesses
The existence of specialised human resources The significant development of the ITC sector compared to the region The connection to international innovation and competencies flows, the existence of certain R&D centres in Romania of some private companies The development of competitive products both on the internal and on the external market Reduced development costs – using the local human resource The quality improvement and the modernisation of the research infrastructure, including the technical calculation infrastructure used in the field of research	Low level of investment and innovation in the field of research The free migration of the researchers within the European area The insufficient access of the local SMM, especially to the private credits start-up for providing the co-financing Decrease level of the public financing Low budget allocations for innovation and technological transfer The fragmentation of the Romanian research system – the existence of an increased number of research institutes specialised on different fields of activity

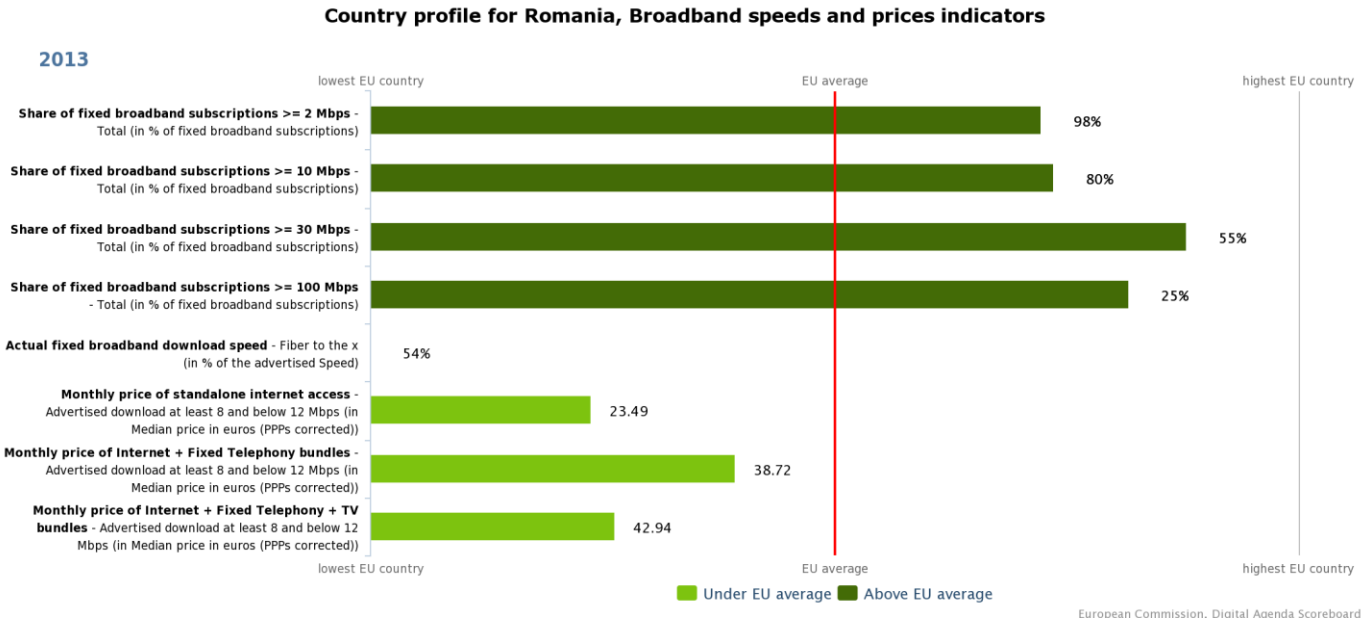
Opportunities	Threats and constraints
The increase of the requests with respect to autonomous systems which include elements of artificial intelligence The increase of the volume of transferable data between the ICT systems The development of new working places by means of the development of the sectors with competitive regional advantages such as the ITC sector The development of the industry driven research The development of the business incubators or of the clusters which have a stimulating role for the regional development by means of reuniting all actors from the chain value: universities, SMM, regulatory forum The introduction of fiscal facilities for the companies which invest in the research, development and innovation activity	The technological advantage of the developed states from an economical point of view The increase competency at global level due to the advanced research infrastructure The non-adequate utilisation of the financing sources The mobility of the man-power towards other states, due to the attractive compensation systems and to the superior conditions provided by other states

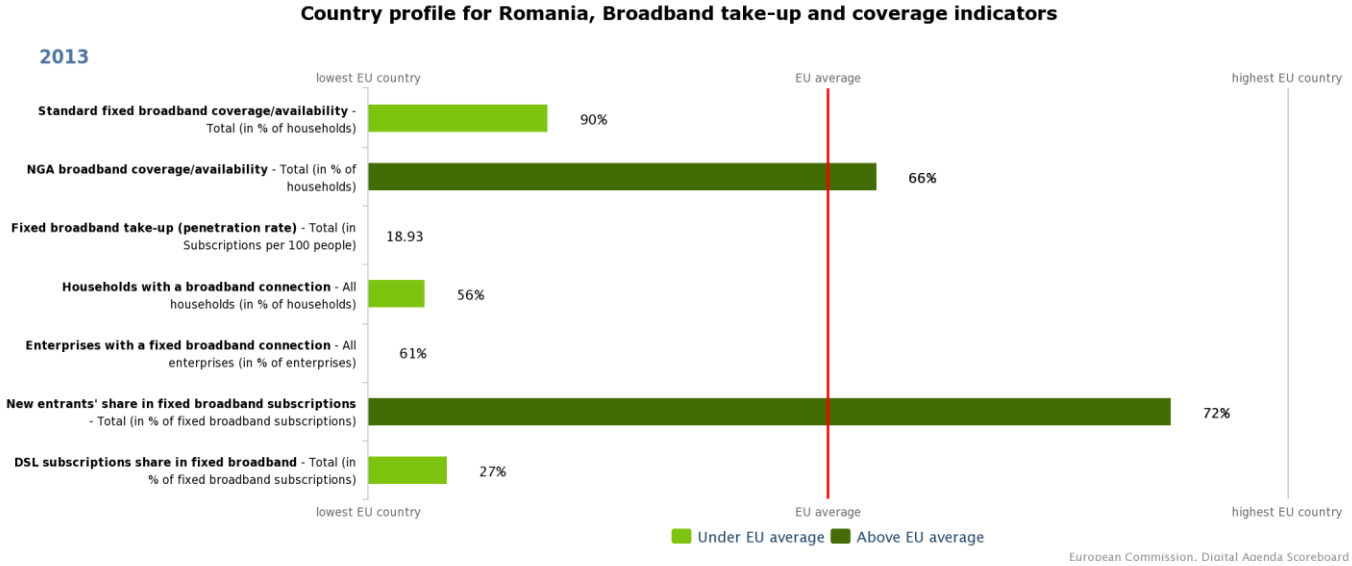
According to the results of the SWOT analysis, a series of measures will be prepared mainly for the improvement of opportunities in the field of ICT innovations, such as:

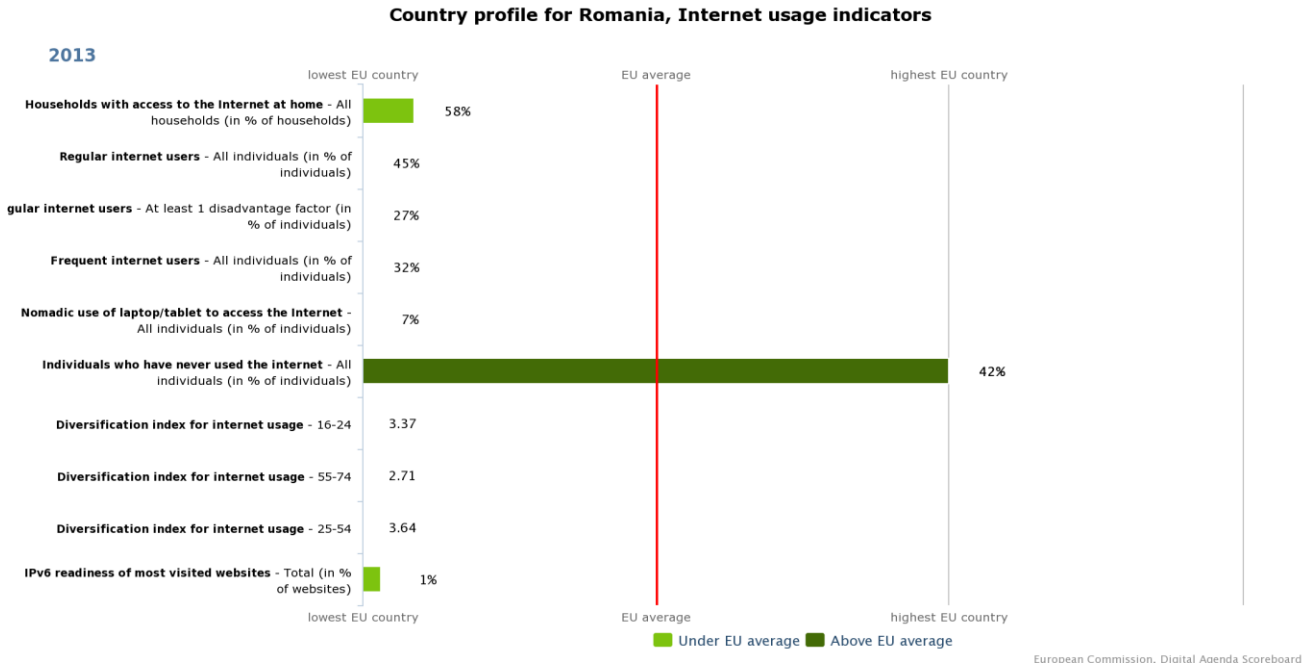
- Support of innovation clusters and competitiveness poles for the provision of externalities and of regional development in the field of ICT systems
- Development of research infrastructure and of attractive competency centres at regional level
- Support of European innovation partnerships

Detailed conclusions are described in the third field of action.

SWOT FOR ROMANIAN ICT INFRASTRUCTURE







Strengths	Weaknesses
Romania is a technology agnostic market with high level of availability of NGN choices for the consumers. Also, the high take-up of ultra fast broadband (>100Mbps) is attributed to the maturity of the market as well as the sophistication and appetite of the consumers (mainly the youngsters segment). Mobility is also encouraged by the high availability of 3G mobile coverage (96%) and the most recent fast development of LTE coverage, driving fixed to mobile substitution.	However, the low purchasing power, the demographic structure of the population as well as the low e-literacy of the older population result in low penetration of Internet connections even in grey and/or black areas; in addition, there are still many white spots that are not covered by private investments and require public intervention (especially in rural areas) This low take-up is applicable both to fixed access networks as well as mobile broadband and discourages private investments driving unavailability of financing both for start-ups and existing operators.
Opportunities	**Threats and constraints**
RONET project laying backhaul will harmoniously complete the NGN developments into an overall NGN Plan for Romania; Romania is one of the lowest markets regarding prices for broadband and triple play which drives up the competition between operators; A fairly large high proportion of companies are using e-procurement platforms; Structural Funds are still available for Romania; despite a low absorption rate these funds are expected to fuel	State aid notification delays; Administrative delays in updating the necessary legislation framework; providing assistance and aids for rollout of broadband infrastructure in both urban and rural areas; Difficulties in implementing RO-NET initiative; Deployment of 4G networks requires significant investment and operators are prudent in coverage plans (Romania has good 3G coverage but below average for 4G).

further developments of the market; The existing access networks provide fast uplink speeds and this comes to the benefit of Romania serving as outsourcing destination for Shared Service Centers and IT/Software development hubs as well as providing cloud services to the rest of the European markets.	

APPENDIX 4 – LIFE EVENTS FRAMEWORK

Business environment		Process	Fragmentation	Impact
Starting a business	How to start a business	1. Orientation (obtaining the information necessary to start a business, to create a business plan, exploring financial opportunities) 2. Evidence of qualification (confirming general management skills to the authorities, confirm to the authorities the specific qualifications provided) 3. Administrative requirements (obtaining the fiscal clearance certificate, getting references for good behavior, getting certificates to attest the absence of debts to the social insurance and health care fund, obtaining the capital certificate on the capital deposited)	Very High	Number of new businesses launched in: • First 11 months of 2013 – 118.241 • 2012 - 125.000 • 2011 - 132.000 *Source: National Trade Register Office*
Developing a business	Selling or purchasing the business	1. Application for documents submission and mention 2. Elaboration of the amending document of the Articles of Incorporation (decision of the general meeting of shareholders/sole shareholder decision) 3. If applicable, obtaining a special power of attorney (authenticated) or delegation for the persons delegated to fulfil legal formalities 4. Proves regarding the payment of legal charges/fees: registration fee with the Office of Commerce Registrar; publication fee in the Official Gazette	High	
	Amendments in the operation of the business	1. Changing the name of the company 1.1 verification of name availability 1.2 name reservation 1.3 elaboration of the registration documents 2. Changing the headquarters address 2.1 Registration of the contract on the space use with the Tax Administration of headquarters registration 3. Changing the object of activity 3.1 Verification of activities for which	High	• 12.308 businesses suspended within the first half of 2013 *Source: National Trade Register Office*

		the law provides authorizations before the registration 4. Changing on the decrease of the share capital or assignment of shares 4.1 The resolution of the shareholders/partners/resolution of the sole shareholder to increase the share capital or to assign the shares shall be submitted to the Office of Commerce Registrar to be mentioned and published in the Official Gazette of Romania 4.2 The fiscal clearance is electronically obtained from the Ministry of Public Finances 4.3 Registration application to which the resolution of the shareholders/partners/resolution of the sole shareholder and the updated Articles of Incorporation with all updates, and the other documents supporting the application 4.4 Registration with the Office of Commerce Registrar of the amendment on the Articles of Incorporation		
Obtaining a funding	Obtaining the sources of funding	1. Choosing the source of funding, depending on needs 2. Applying for funding 3. Evidence of ability to pay back the amount borrowed-securities 4. Client authenticity is verified by the bank 5. Decision 5.1 Approval, if the client has a positive financial history 5.2 Refusal, if the client has a reputation of a bad payer/does not hold the resources to return the loan	Very High	
	Support for companies	1. The company submits the bank a loan application, stating that it wants to complete the real personal securities with the guarantee fund in order to grant the loan 2. If the loan application meets its conditions own financing, the Bank requests the Fund to grant the security (standard/cap amount)	Medium	
Terminating a business	Bankruptcy			• 2013 - 27.145 insolvency

				proceedings of which 9.936 were rated as bankruptcy in the first half of 2013 • 2012 - 26.755 insolvency proceedings of which 20.691 bankruptcy • 2011 - 22.503 insolvency proceedings of which 19.884 bankruptcy *Source: National Trade Register Office*
	Liquidation	Stage 1 1.1 The registration application is submitted 1.2 The irrevocable court order on the dissolution is obtained in copy legalized by the court 1.3 The liquidators appointment document is issued, if they have not been appointed by the court order 1.4 Liquidators' specimen signature 1.5 If applicable: special power of attorney or delegation for the persons delegated to fulfil legal formalities 1.6 Proofs on the payment of legal fees/charges + publication fee in the Official Gazette of Romania) Stage 2 2.1 Submission of the de-listing application 2.2 Submission of the liquidation financial situations and of assets distribution approved by the partners/members 2.3 Submission of the registration certificate 2.4 Submission of the certificate issued by the competent tax	High	Number of businesses affected: • 2011- 11.660 • 2012 - 22.500 • 2013 - 23.208 *Source: National Trade Register Office*

		authority indicating that the company has no outstanding liabilities to the consolidated state budget		
	Transfer of ownership		Medium	

For citizens		Process	Fragmentation	Impact
Becoming independent (adult age)	Obtaining the driving license	1. Enrolling with a licensed driving school 2. Promoting the psychological test 3. Participation in theoretical courses 4. Promoting the theoretical test 5. Assignment to a licensed private instructor affiliated with the school 6. Proper driving lessons 7. After completion of the practical course, the training sheet is requested from the instructor 8. Obtaining the criminal record certificate 9. Payment of fees related to obtaining the driving license, at the Bank and the Treasury 10. Programming for the practical test at the police station, based on the file prepared in advance 11. Practical examination 11.1 Promoting => Obtaining a driving license 11.2 Failure => replay steps 9-11	Very High	n 2012: • a total number of 7.164.331 driving licenses, of which 2.219.357 women and 4.944.974 men • 691,975 people sustained the driving test, with 46.1% graduation rate Source: Directorate for Driving Licenses and Vehicle Registration
	Concluding contracts		Medium	
	Voting	1. Authentication (providing personal data in the ID) 2. Handing the stamp necessary to vote 3. Choosing the candidate 4. Returning the stamp 5. Putting the ballot into the ballot-box	Medium	Between 2008-2012: • 1-1.5 million young people voted in almost every election

				Source: National Institute of Statistics
	Insuring personal future		High	
Payment of taxes and charges	Registration of tax liabilities	1. Filing a statement of assets under property/extra income 2. Registration of data in the register of Local Public Finance Public Service	High	Oct 2013: Registration of tax liabilities affects over 5.1 million employees Source: The Labour Inspection
Purchasing a vehicle	Registration of the vehicle	1. Obtaining a certificate of authenticity from the Romanian Auto Register 2. Payment of registration fees and vehicle registration certificate to the post office/ CEC 3. Obtaining a duty stamp and the vehicle registration certificate 4. Payment RCA Policy 5. Fee for new plate numbers at the police station	High	In 2013: • 57,700 new cars were put into circulation Source: Directorate for Driving Licenses and Vehicle Registration
Purchasing or renting a lodging place	Purchasing/renting a lodging place	To elaborate the contract of sale of a lodging place: 1. Obtaining the original property deed 2. Obtaining the tax certificate from the Local Tax and Charges Administration or from the City Hall where the apartment is located 3. Fiscal clearance certificate – Real Estate Registry extract, obtained from the National Agency for Cadaster and Land Registration, Cadaster and Land Registration Office or District Land Registry Office. The Real Estate Registry extract is obtained from the notary's office 4. Conclusion of Real Estate Registry issued by the court or the National Agency for Cadaster and Land Registration 5. Obtaining a certificate from the association of owners showing that the apartment is not encumbered by	High	In 2013: • the number of real estate transactions recorded at the national level has increased by 16.85% compared to 2012, reaching 824.989 (a plus over 119,000 such operations). Source: National Agency for Cadastre and Real Estate Publicity

		a debt for the maintenance charges 6. Obtaining a certificate to change the postal address if the address from the ownership title does not match with the address from the Fiscal clearance certificate		
Obtaining a job	Registration with a library	1. Communication of personal data 2. Filling in a library sheet, based on the personal data indicated before 3. Registration in the database of a library	Low	• 11309 libraries in 2012 Source: National Institute of Statistics
	Looking for a job	1. Submitting an application to be recorded in the data base of ANOFM 2. Submitting a resume 3. Selecting the areas of interest 4. Depending on the positions available, the applicant is placed in an appropriate position	Low	By February 2014 • 528.041 unemployed, of which 219.038 aged over 45 years. Source: National Agency for Employment
	Losing the job	1. The employment agencies are informed by the employers which intend to have certain reorganizations 30 days before the notice of dismissal 2. Submitting a notice of dismissal by the employer to the employees that are to be dismissed 3. The employment agencies support the newly unemployed in searching of a job and placement on the available local positions	Medium	In 2012: • 25.834 Romanians became unemployed Source: National Agency for Employment
	Accidents at work and work incapacity	1. Notification submitted to the labor protection department 2. Preparation of a Finding Report describing how the accident occurred 3. Requiring a declaration from the injured person and witnesses 4. Diagnose the situation 4.1 If the accident was due to the fault of the employee, he/she shall	High	In 2012: • 3,686 people suffered an accident at work, of which 215 have lost their lives; compared to

		have the obligation to pay damages 4.2 If the accident was due the negligence of the company, the employee's compensation procedures are initiated		2011, the number of accidents has dropped by 8%. Source: The Ministry of Labour
	Retirement	1. Retirement at the age limit 1.1 Application for Retirement 1.2 Submission of documents proving the fulfilment of the full seniority required for retirement 1.3 Issue of the retirement decision 2.Early retirement 2.1 Application for Retirement 2.2 Submission of documents attesting to the amount of work placements 2.3 Submission of documents for the infirmity that causes early retirement request	High	• 234,000 retirees between January 2011 - January 2013 • 5.4 million retirees registered until Dec 2013 Source: National Institute of Statistics
Health	Registration of allocation for disabled people	1. Registration, based on a medical act evidencing the infirmity in Register National Authority for People with Disabilities 2. Determination of disability 3. Determining the amount of the allowance 4. Communication of the decision	High	Jun 2103: • 700,736 people with disabilities, that means 3.48% of the population • 29,184 people with disabilities are employed, below the EU average of 45,8% . Source: General Directorate of Protection of People with Disabilities
	Programming a medical consult in a hospital	1. Choosing typology hospital as needed 2. Verification of availability 3. Programming 4. Receiving confirmation		• 1,358 health units in 2011, of which 464 hospitals Source: National Institute of Statistics

Family	Birth	1. Registration of the newborn to marital status, based on a certificate issued by maternity where the birth took place 2. Submission of data to identify parents 3. Issue of birth certificate	High	• In 2008, 229,854 children were born alive in Romania, the figure decreased to 196,242 in 2011 and reached about 179,300 at the end of 2013. Source: Directorate for Persons Evidence and Databases.
	Marriage	1. Making an appointment at the registry office 2. Presenting the necessary documents, including medical certificates 3. Formalizing marriage 4. Obtaining a marriage certificate to be registered to the Marital Status or City Hall	High	• 105,599 marriages were registered in 2011, in Romania Source: National Institute of Statistics
	Divorce	1. Making legal proceedings for divorce at a notary / court 2. Signing a statement by mutual agreement of the parties regarding the marriage dissolution 3. Submitting the document of marriage annulment to the Civil Status	High	• over 35,000 couples divorced in 2013, up with 13% compared to 2012 Source: National Institute of Statistics
	Death	1. Establishing the cause of death 2. Obtaining a death certificate from the doctor in charge (in case of death in hospital) or family doctor (when death occurs at home) 3. Death certificate and identity document of the person are filed by family members of the deceased to the civil status officer of the locality where the person's death occurred 4. If nobody claims the deceased	Medium	• 251,439 deaths in 2011 Source: National Institute of Statistics

		documents are submitted by the doctor from the health unit where the death occurred or by any person who is aware of the death.		
	Obtaining child raising allowance	1. Application for obtaining financial support from the Romanian State 2. Analysis of the financial situation of the applicant and determining the amount of allowance as a percentage of salary but not less than the threshold set 3. Awarding the allowance	High	2011: • average monthly number of beneficiaries 196,680 • amount 2176419025 RON Source: National Institute of Statistics
	Releasing IDs	1. Submitting the application and the identification documents to the Public Community Service of Personal Records 2. Payment of the fee for the issuance of identity card and stamp duty 2.1 The payment for temporary identity card, for Romanian citizens residing abroad or those who do not have all the documents necessary for issuing identity card 3. Delivery of the ID card to the holder	Low	January-March 2013: • 572,266 identity cards realised, of which 549,176 ID cards and 23,090 temporary identity cards Source: National Institute of Statistics
	Adoptions	1. Choice of the parents of an adoption agency 2. Preliminary discussions between prospective parents and agent 3. Establishing eligibility for the application performed 4. If the decision is favorable, applicants express their preferences about the characteristics of their future child 5. Based on these takes place the selection of the child 6. Placing the child in the adoptive family	Very High	• over 530 children from Romania were adopted in the first 10 months of 2013 Source: Romanian Office for Adoptions

Enrolment in education	Primary school / high school / university	Primary school 1. Enrolling based on the identity documents of parents and the birth certificate of the child in the school nearest the applicant's home 2. Submission of the document issued by the previous graduate education High school 1. Prior opting for desired high schools 2. Automatic allocation in high schools, based on the means of the 8th grade exam, depending o preference University 1. Submission of Registration 2. Payment of the examination fee (if applicable) 3. Examination 4. Result 4.1 In case of promotion, the high school graduation diploma is submitted in original at the faculty chosen 4.2 In case of failure, you either repeat the registration process, you opt for a tax paying place, case in which you must pay the fee before starting the academic year in order to secure the place	Low	Academic year 2011/2012: school population 3,823,515 of which: • preschool - 673,641 • primary and gymnasium – 1,629,406 • high-school – 888,768 • vocational – 12,382 • post high-school and foremen - 79,466 • academic – 539,852 Source: National Institute of Statistics
Immigration	Immigration in Romania	1. Request filed with IGE for establishment in Romania 2.Verification by IGE of fulfilment of eligibility criteria 3. Approval / disapproval of the request	Medium	In 2013: • 198,839 immigrants were living in Romania, of which 13,000 were refugees Source: National Institute of Statistics

	Obtaining citizenship	1. Verification of eligibility (3 cases: applying on their own behalf; apply as a husband / wife of a Romanian citizen, apply for your child) 2. Preparation of necessary documents (mainly, application form For Citizen) 3. Submitting the documents to the Citizenship Service of the Ministry of Justice 4. Payment of the fee 5. Making an appointment for citizenship interview 6. The interview itself 7. Notification of the outcome of the interview 7.1 Granting Citizenship => completing the formalities for obtaining citizenship: application to obtain an ID and a passport 7.2 Withholding citizenship	Medium	• The Romanian government has provided over 183,000 citizenships in 2011, 2012 and the first half of 2013 Source: Citizens National Authority
Travels	Guides and travel information			
	Obtaining a visa	1. Applying for a visa 2. Appointment for a visa interview organized 3. The interview 4. The result is favorable / unfavorable	High	• denial rate for U.S. visa applications submitted by Romanian decreased to 11.5% in 2013, compared to 17% in 2012 Source: Ministry of Foreign Affairs
	Obtaining a passport	1. Applying for a passport 2. Submitting necessary documents, including a recent photograph 3. If applicable, the payment of a fee for issuing an emergency passport 4. Delivery of the passport	Low	
Social Responsibility	Denunciation of illegalities	1. Notification of Police Inspectorate on committing an illegality 2. Preparation of a report 3. Verification made by the police to track accuracy offered by the one who made the complaint 4. If the complaint proves to be founded, appropriate measures shall	Low	In 2013: • 632,167 interventions at the request of the citizen (no 112); Source: Romanian

		be taken 5. If the complaint is found to be false, the applicant will be penalized		Police Department

Source: Digital Agenda Scoreboard 2013 - Commission Staff Working Document, Brussels June 2013

APPENDIX 5 – IMPLEMENTATION METHODOLOGY FOR DIGITAL AGENDA IN ROMANIA

IMPLEMENTING THE DIGITAL AGENDA IN ROMANIA

Abstract

Implementing the National Strategy on Digital Agenda for Romania will have an important impact on the institutional structures of public administration and a significant reform needs to be undertook in order for Romania to achieve the objectives stated in this document. With the main objective to create a European Digital Single Market, Digital Agenda will generate both horizontal and sectorial effects and which will have the destination a wide variety of public and private participants. The implications of the Digital Agenda will have reform purpose and involves the implementation of an extensive process of governmental transformation. This type of implementation involves a common and effective coordination in order to ensure full cooperation of direct participants (Ministries, institutions, agencies, private sector representatives, etc).

Having an implementation methodology that can act as a framework for reference for all public bodies is a key mechanism for ensuring the successful application of the Fields of Actions in Romania and also can provide the required evidence to assess the benefits realization.

In order to ensure the success of the Digital Agenda for Romania 2014 – 2020, we outline the key characteristics of the implementation methodology:

- Every Ministry in charge of Fields of Actions or Lines of Actions outlined within the National Strategy for Digital Agenda 2020 will include their specific Fields/Lines of Actions complete with target indicators and a methodology for assessing these indicators in a National Implementation Plan for the Digital Agenda. The Technical Economic Committee will oversee the implementation of the Implementation Plans for Digital Agenda for Romania and will provide best practices, guidelines and advices for the Ministries during the development of the National Implementation Plans
- In the National Implementation Plans for the Digital Agenda, each Ministry will be responsible for defining the indicators that will be used in order to track the completion of their specific objectives and targets
- Each initiative developed by public entities under the Digital Agenda for Romania Program will define a set of specific indicators that can directly impact the Strategic Targets for Romania (those specified above) or present a correlation methodology for describing the impact of their indicators on the Strategic Targets. These indicators will be reviewed by the Technical Economic Committee as part of their usual ICT project assessment
- Each public entity implementing projects under the Digital Agenda for Romania Program will send to the Technical Economic Committee bi-annually a status report for monitoring purposes in a

format agreed by TEC, which will highlight the key achievements and missed milestones. At the end of the each implementation initiative, a detailed report will be sent to the Technical Economic Committee.

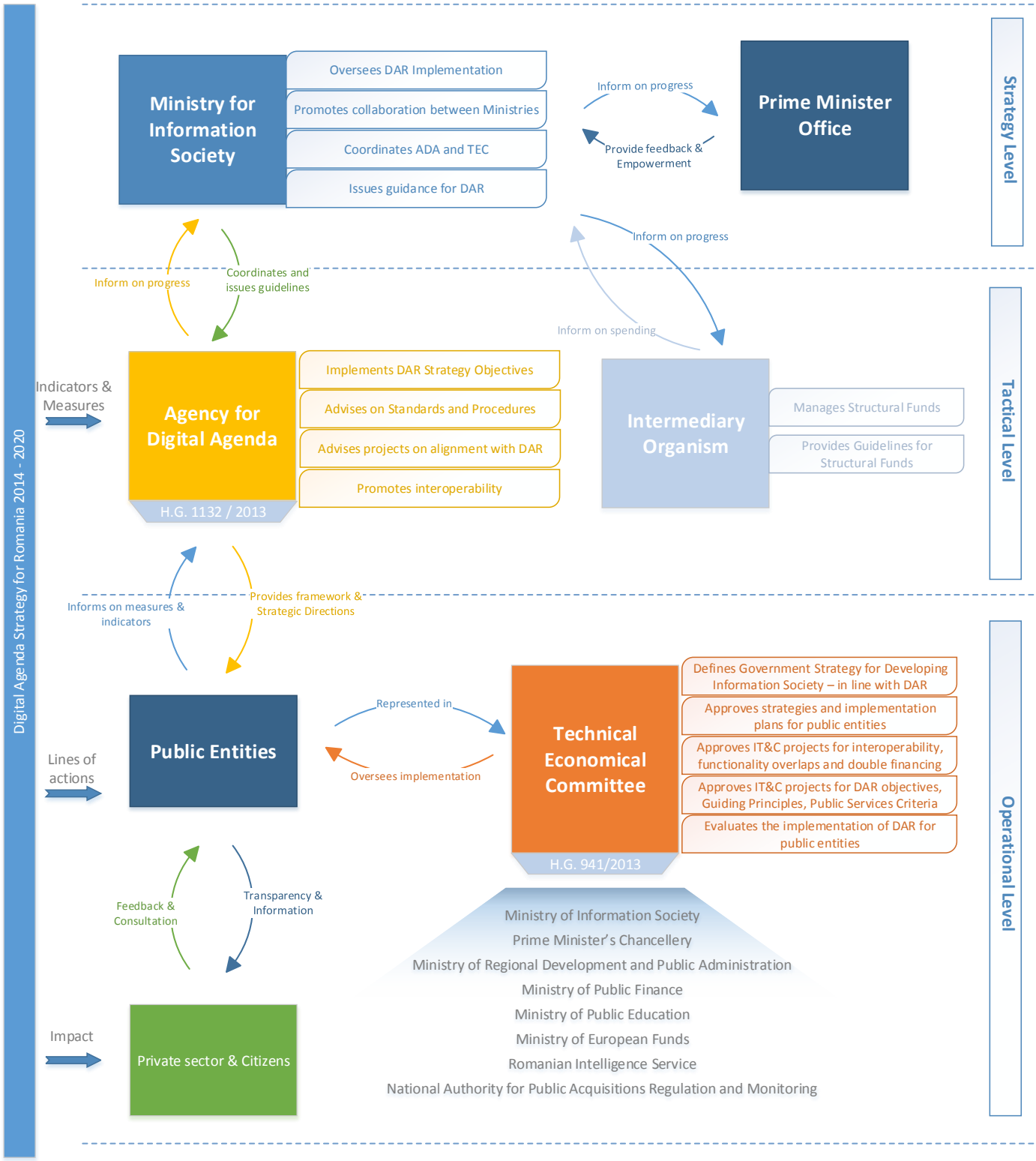
- The evaluation of the impact for the Strategic Targets for each initiative will be conducted annually by each supervising authority under the Ministries and will be sent for review and consolidation to the Technical Economic Committee.
- The Agency for Digital Agenda Romania will be in charge with monitoring the implementation of the Strategy and the delivery of the Programme to track overall progress and ensure that the lessons from monitoring and evaluation evidence are fed back into decision making and shared across policy and programme areas.
- As such, the Agency for Digital Agenda Romania will act as a consultancy agency for all public bodies in respect to the objectives and strategy of the Digital Agenda and a monitoring and evaluation body for the progress on the Digital Agenda Roadmap, and the Technical Economical Committee will act as the operational body that will be in charge with supervision at the project / program level.

Accelerating the implementation of the Digital Agenda for Romania

A workgroup has been created at the Prime Minster Chancellery level in order to accelerate the implementation of the Digital Agenda for Romania Strategy. This workgroup, composed of the major Ministries in Romania that will be involved in the reformation process for Digital Agenda in Romania, aims to provide a joint responsibility for the objectives and initiatives outlined in this document and adopting a plan of measures. A series of steps have been identified, that irrespective of other significant initiatives – such as the Government Enterprise Architecture, can be used in order to stimulate the adoption of the Strategy and its principles:

- Consultations on the Digital Agenda for Romania with the Ministries responsible for Lines of Actions with the clear objective of having the document approved by all the involved parties within a clear timeframe
- Defining the major (strategic) projects with all the involved parties for Field of Action I
- Starting the development of the National Interoperability Framework for Romania
- Out setting the discussions with other parties that can finance the Strategic Lines of Development and minimize the financing gap – World Bank, Ministry of Finance, European Bank for Reconstruction and Development
- Signing a protocol with all the Ministries for the Government Enterprise Architecture initiative (described below)

The relationship between all the stakeholders involved in the Digital Agenda Strategy for Romania 2014 – 2020 is depicted below.



PRIORITIZATION MECHANISM FOR THE INITIATIVES

Guided evaluation life cycle

In order to develop a systematic approach that can guide an end-to-end implementation of the pursued objectives outlined above in this document, the following concepts will be defined by this framework.

- **Define –** Every definition of an initiative will need to follow a set of guidelines in order to make sure that all the necessary data is collected for the following phases and that the project will contribute to Romania achieving its Strategic Targets. In aiding the public entities pursuing initiatives under the Digital Agenda for Romania, The Ministry for Information Society will be the publishing the Structured Meta Model and will review the initiatives based on the Digital Agenda Guiding Principles (found below)
- **Prioritize –** In this phase, initiatives will be assessed based on their impact against the targets set by this document and their benefits realization in accordance with the necessary budget.
    - Prioritization for the initiatives will be done based on the following criteria (guidelines will be published by the Ministry for Information Society and will be refined iteratively):
        - Funding sources and requirements
        - Estimated impact of the initiative on the Strategic Targets versus funding needs
        - Type of project: strategic enabler projects that aim to create the necessary context for other projects to be implemented will be prioritized
        - Evidence of stakeholder involvement and feedback from the targeted users requesting the initiative through the means of consultation
        - Evidence of realistic planning in terms of funding, resources, phases etc.
        - Evidence of benchmarking done in other EU countries / similar projects in order to assess the feasibility of the initiative
        - Adherence to National Strategy of the Digital Agenda and Guiding Principles and Ministry Strategy
        - Adherence to National Standards (security, interoperability, etc)
    - Prioritization for the lines of actions will be done based on the following criteria (guidelines will be published by the Ministry for Information Society and will be refined iteratively):
        - Strategic lines of actions are the first lines of actions for which funds will be allocated due to their important nature in the roadmap for the Digital Agenda

  - Enabler lines of actions are the second priority for implementation projects, as these are the projects that will facilitate the implementation of other projects (included the ones in the Operational status)
  - Operational lines of actions are tertiary in terms of importance for the Strategic Targets, and calls for this lines of actions will be made after the successful implementation of the Strategic and Enabler lines of actions

- **Monitor –** This phase in the lifecycle of an initiative will check progress against the planned targets and will ensure that the necessary evidence for the spend and outputs is collected. For monitoring purposes, the Ministries will send consolidated data for each initiative to the Technical Economic Committee in a format published by the Ministry for Information Society in which the status of the projects will be reported and the missed milestones / targets will be transparent, along with a list of risks and mitigation actions
- **Evaluate –** This phase will assess the effectiveness of an initiative and its efficiency during and after implementation. In order to evaluate the impact of each initiative, in the definition phase of the initiative, each entity will be responsible for defining the indicators and the methodology used for the evaluation of the initiative in the context of the Digital Agenda for Europe and its targets. The methodology for evalution will have clear indicators on how the stakeholders of each project will be involved in evaluating the impact and the success of each program / project. This methodology and the indicators will be reviewed by the Technical Economic Committee.

Structured Meta Model

Apart from the strategic perspective of the Digital Agenda, a much needed improvement in Romania is introducing a set of standards for describing, running, managing and evaluating initiatives and projects.

In order to have a coherent mechanism for defining an opportunity and assessing change in the current context, Romania will adopt a Structured Meta Model for projects and initiatives. This is a strategic endeavor of Digital Agenda Romania with the purpose of bringing structure and clarity to the description and rationale for each project and will be systematically applied all the Field of Actions contained in the Digital Agenda and all projects under each Line of Action.

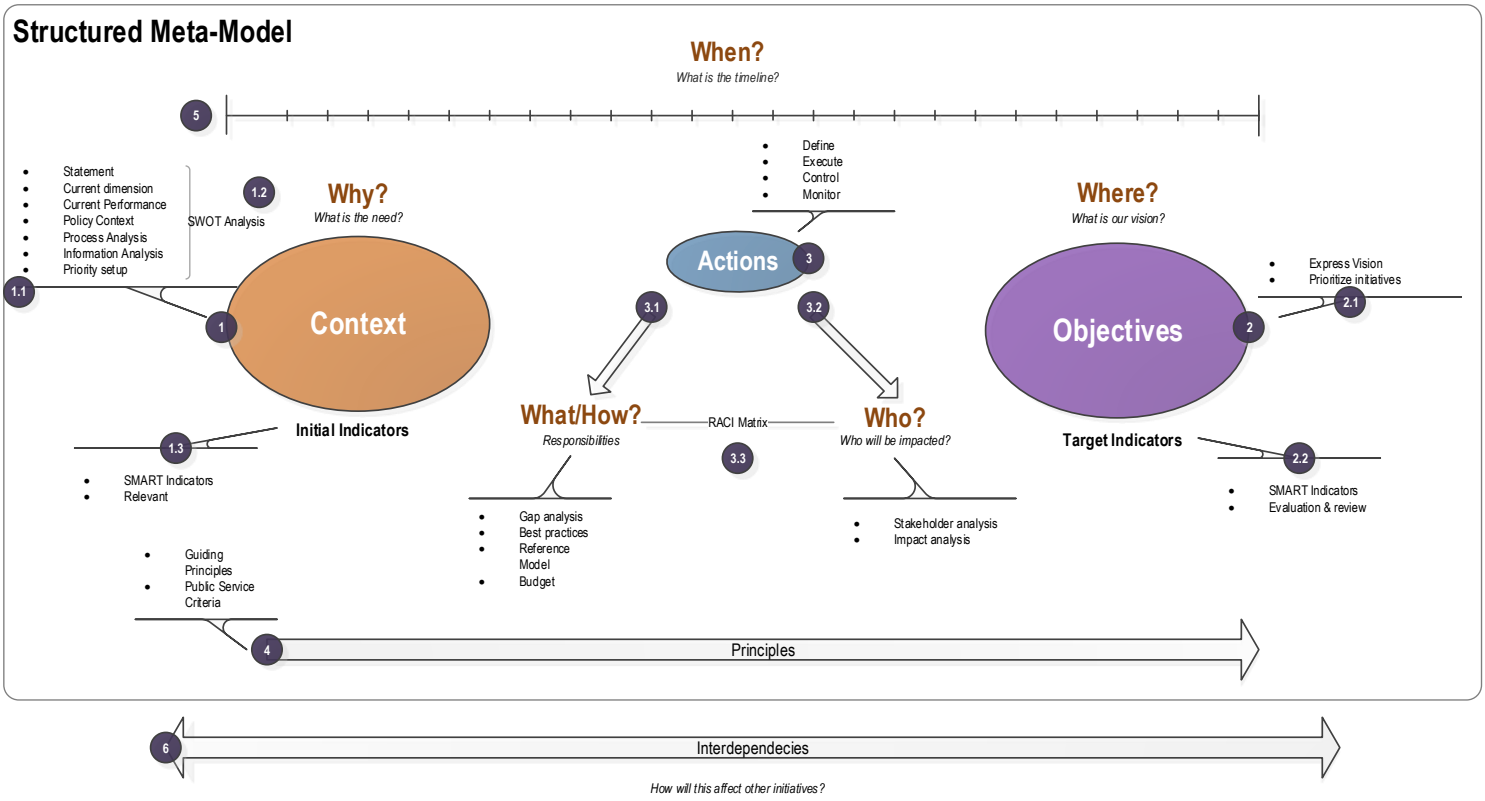
Adopting a Meta Model will bring the following benefits:

- Maintain the same structure for the description of the initiatives / projects
- Relay the right messages to all the stakeholders
- Adopt a uniform description of the projects that will ensure the minimal amount of re-work
- Act as a checklist/starting point for any entity commencing an initiative, easing the burden of creating the initial documents
- Ensure that the necessary data is collected for the Monitoring and Evaluation phases

This Meta Model can be applied iteratively starting from strategic initiatives to programs and individual projects pertaining to the overarching governance and needs to be completed and refined from the first iteration to the most granular approach.

Regardless of the document structure in which the following information will be provided, each public entity will have the recommendation of using these data points as a checklist to confirm against the completeness and accuracy of a project.

The six mandatory components for defining the Meta Model will be: Context, Objectives, Actions, Principles, Timeline and Interdependencies.



CHALLENGES AND RESOLUTIONS FOR DIGITAL AGENDA IN ROMANIA

Creating the necessary Administrative Capacity for Implementing Digital Agenda in Romania

One of the essential challenges that Romania needs to overcome in order to successfully implement the strategic lines of development issued by the National Strategy for the Digital Agenda in Romania 2014 – 2020 is reinforcing and supporting the right administrative capacity in order to develop and implement policies[1].

Understanding the causes, effects and resolution of this pervasive issue is outside the scope of this strategy, but having the right mechanisms and tools to address it is paramount for reaching the objectives and indicators assumed by Romania. As such, the National Strategy for Digital Agenda in Romania 2014 – 2020 proposes different approaches that can be used to provide better administrative capacity for developing, implementing and monitoring initiatives and policies, which are outlined below. The feasibility of these approaches and any other options and will be explored as part of the Government Enterprise

[1] http://ec.europa.eu/europe2020/pdf/csr2014/csr2014_romania_en.pdf

Architecture initiative, being one of the most important factors of the business perspective of the Romanian Administration.

- **Using better operational models –** Romania needs to analyze ways in which to build and sustain for longer periods the right levels of competency in distinct areas (such as Program Management, Enterprise Architecture, specific public sector consultancy) – this will be done in the initial Government Enterprise Architecture exercise. In the past, capacity outsourcing to private sector and creating dedicated Project Management Units (with separate funding for personnel) have shown great promise in maintaining the necessary administrative capacity
- **Increasing the cooperation between public entities –** The Romanian Administration will look for ways to increase the cooperation between public institutions and entities – in terms of knowledge, skill sets, competencies and information. Example: CTE (Technical-Economical Committee)
- **Increasing the cooperation between public and private entities –** One of the most important success factors in building the proper administrative capacity is increasing the cooperation between public and private entities, by encouraging the public administration to collaborate with the business environment (companies and associations of companies) for innovative solutions and new paradigms for overcoming this shortcoming
- **Having a clear strategy and consensus –** By adhering to a strict set of Guiding Principles and Public Service Criteria and by enforcing them at an operational level through the Technical Economical Committee, the public administration will ensure that all the efforts are channeled to a cohesive strategy

Government Enterprise Architecture – the core initiative for eGovernment

- Creating the legislation and operational framework for implementing **Government Enterprise Architecture**. After its adoption, the Minister for Information Society will become the responsible entity for Government EA at the Executive Level. The framework for Government Enterprise Architecture will be tailored from industry recognized standards and will include at a minimum the Business, Data, Application, Technology and People perspectives. The main objective of the Government Enterprise Architecture will be to define a uniform set of standards, policies and architectural guidelines which the agencies will use for ICT initiatives and investments. Key outcomes of this initiative that will be prioritized before all other lines of actions are:
    - Developing solutions for building administrative capacity for implementing the Digital Agenda and creating the necessary Enterprise Architecture capabilities
    - Creating the necessary legal framework with clear ownership for services, data and initiatives
    - Creating the as-is map with public systems available or in the implementation phase

- Creating the to-be roadmap for public administration in terms of Business, Data, Technology and Applications that adheres to the Digital Agenda Strategy
- Developing the National Interoperability Framework (see below more details) and the roadmap for this implementation in current context
- eGovernment ICT Standards Checklist (See below more details)
- Creating the mechanism for managing the Digital Agenda Strategy throughout the implementation period

PURPOSE: CREATING THE GOVERNMENT ENTERPRISE ARCHITECTURE FRAMEWORK FOR ROMANIA

BENEFITS: UNIFORM VISION IMPLEMENTATION AND PROMOTION FOR ALL PUBLIC ENTITIES AND PROJECTS

TIMELINE: MID 2015

- Creating the **Government Enterprise Architecture capabilities** within the Ministries - empowering and educating the agencies for using and applying the Government Enterprise Architecture for their initiatives

PURPOSE: SUPPORT PUBLIC ENTITIES IN ADOPTING GOVERNMENT ENTERPRISE ARCHITECTURE

BENEFITS: BETTER ADOPTION OF GOVERNMENT EA, UNIFORM IMPLEMENTATION OF EA

TIMELINE: MID 2015

- **Evaluating the ICT investments in Romania** on following and meeting the Guiding Principles and Public Service Criteria

PURPOSE: EVALUATE ICT INVESTMENTS

BENEFITS: OVERSEE ALL ICT INVESTMENTS IN ROMANIA ARE IN LINE WITH THE GUIDING PRINCIPLES, PUBLIC SERVICE CRITERIA AND ROMANIA'S STRATEGY

TIMELINE: END 2014 IN PLACE, CONTINUOUS IMPROVEMENT

- Issuing and overseeing the implementation of the **National Interoperability Framework** that will ensure end-to-end interoperability between future systems from the public sector, following the European Interoperability Framework guidelines. Major outcomes of the National Interoperability Framework should be reducing the number of redundant data sources in public administration and increasing the ability to provide services that are cross-organization by using standard data formats

PURPOSE: NATIONAL INTEROPERABILITY FRAMEWORK

BENEFITS: ENSURE INTEROPERABILITY BETWEEN NATIONAL SYSTEMS. ADHERE TO BEST PRACTICES. ADHERE TO EUROPEAN LEGISLATION

TIMELINE: MID 2015

- Issuing the **eGovernment ICT Standards Checklist** which will provide the list of recommended standards for ICT projects (Mandatory, Recommended, Optional, Obsolete, Not recommended etc.), together with the lifecycle process for these standards (Proposing, Approving, Commenting, Decommissioning etc.) For specialized standards (healthcare, banking, finance etc.), the

corresponding entity from other Ministries will propose these standards and they will enter the approval process defined by the Ministry for Information Society

PURPOSE: ICT STANDARDS CHECKLIST

BENEFITS: CONSISTENT SET OF STANDARDS TO BE APPLIED BY ICT PROJECTS

TIMELINE: MID 2015, CONTINUOS IMPROVEMENT

- Issuing **best practices and recommendations for ICT** acquisitions and implementations (including but not limited to: Software Delivery Process, Design Guidelines for the Public Entities, necessary key data points for any public service, system lifecycle management, infrastructure management)

PURPOSE: BEST PRACTICES AND RECOMMENDATIONS

BENEFITS: CONSISTENT SET OF STANDARDS TO BE APPLIED BY ICT PROJECTS

TIMELINE: MID 2015, CONTINUOS IMPROVEMENT

THE PRINCIPLES TO MOVE FORWARD

Definition of public services – Digital Agenda for Romania will offer better public services

The definition of public services, as expressed in this document, means any endeavor undertaken by the Romanian Government on behalf or for the advantage of the citizens or the businesses under jurisdiction of Romania, regardless of their transactional (e.g. issuing a birth certificate) or transformational nature (e.g. taxation legislation). From a European Union terminology, public services in Romania encompass both Services of General Interest and Services of General Economic Interest. That is why, entities pursuing to implement services adhering to the Digital Agenda for Romania should take into account the following criteria, on which quality public services should be defined and managed:

- **C1 - Center on user needs** – All public services exist to server their customers, their needs and they should be built, adapted and maintained for a particular and real demand. Each entity has to identify all types of potential users, understand what they want and need and create or reform services with respect to these - because in the end quality represents achieving maximum customer satisfaction
- **C2 - Be integrated** – Partnerships between entities should be implemented in order to provide to the customer a one stop shop for addressing a particular need (starting from the Life Events). This will in turn increase the confidence in public services, make them easier to user and also increase the collaboration between public entities. This can be met only by planned and systematic collaboration between the parties involved in offering an integrated service, with shared goals that are agreed consensually.
- **C3 - Be easy to use** – Simple and responsive services which the public can understand. Users should have a choice of service delivery in terms of payment methods, location of points of contacts, opening hours and delivery times.
- **C4 - Meet a publicly committed service level** – All public services should meet a publicly committed quality standard in terms of responsiveness, availability and performance. The users of a public service should be able to quickly identify what kind of services are available, what are criteria for that public service and also should be able to swiftly identify what to expect from that service and should be able to have the mechanism with which to ask questions and file complaints about that service.

- **C5 - Be safe** – The services should protect all the information provided by the public. Security should cover all the requirements for safety, privacy, confidentiality, availability and integrity for data or processes in order to ensure trust in that specific public service.
- **C6 - Be accessible** - Identify and work to eliminate barriers to access to services for people experiencing poverty and social exclusion, as well as those facing geographic barriers to services.
- **C7 - Be cost-effective** – Services should be efficiently operated, adequately staffed and highly productive for both the internal and external users. A public service should be able to demonstrate how it can contribute to national, initiative or projects objectives and outcomes.

Adopting the Guiding Principles and the Public Services Criteria

We understand that in order to have a consistent application of Digital Agenda for Romania for every Field of Action, it is essential for the Guiding Principles (found in chapter 1.2) and Public Services Criteria to act as the foundation to build upon projects pertaining to Digital Agenda in Romania, regardless of their Field of action. As such:

- All public bodies will include the Guiding Principles in their Implementation Strategy, together with specific recommendations and implications
- All public bodies will need to make sure they document the implications of following the Guiding Principles and the Public Services Criteria in their detailed eGovernment plans
- The 7 Public Services Criteria will act as a reference for defining the as-is and to-be state for any public service
- The Minister for Information Society will be responsible for evaluating the adherence to the Guiding Principles and how eGovernment projects are meeting the Public Service Criteria
- For each criteria from the Public Services Criteria, the Minister for Information Society is responsible for defining the proper mechanisms of describing, evaluating, controlling and governing
- The Agency for Digital Agenda (described below) will be responsible for evaluating and supporting the public bodies in adopting the Guiding Principles and Public Services Criteria

The Technical - Economical Committee

It is essential for the success of the Digital Agenda in Romania to create one public entity under the authority of the Ministry for Information Society (the issuer of DAR) which will oversee the implementation of this strategy, from an operational and tactical perspective. The objectives of the newly formed Technical-Economical Committee are to define, correlate, control and monitor the ITC framework in Romania, acting as the Lead Design Authority for eGovernment projects in Romania.

Support systems for the Technical Economical Committee

In order to make the Technical Economical Committee fully operational, a series of information systems need to be created. These will act as the knowledge base for the committee and for other public entities that want to build ICT project, supporting them in structuring and collecting information that can help

sustain a rapid growth of investments in this field, while making sure that all these initiatives are coherent and adhesive to our vision.

The first system is the **National Register for Information Systems (NRIS)**, which will hold general and specific information pertaining to information systems in Romania (Authority, Description, Funding, Technical Components, Supplier, Integrations with other systems, Lifecycle status, Exceptions etc.). This system needs to be fully integrated and automated with the e-Procurement system and needs to make its data available to the general public and to other public entities. The committee will use this system for Knowledge Management and it will update it based on the Evaluation Forms used for evaluating ICT investments in Romania. The public bodies will inform the owner of this system for any changes in the lifecycle of their project (for example, when decommissioning a system which is registered in NRIS).

BENEFITS: KNOWLEDGE BASE FOR ICT SYSTEMS IN ROMANIA

RESPONSIBLE: TECHNICAL ECONOMICAL COMMITTEE

SUPPORT: ALL PUBLIC ENTITIES

TIMELINE: END OF 2016

The second system, **National Register for Data and Metadata (NRDM)**, will act as the repository for data standards and metadata pertaining to ICT projects (for example, data sets and types of data handled by a specific project). This system will evolve into automated access gateway to all the National Registers. This will ensure that the appropriate owners of data at the Government level are responsible and accountable for data which they provide. Clear responsibilities for data sets and data types will be identified and defined by the Technical Economical Committee and steps will be taken to safeguard against public entities using data sets which are not provided by the responsible bodies.

BENEFITS: KNOWLEDGE BASE FOR DATA TYPES AND DATA STANDARDS. REDUCING OVERLAPPING RESPONSABILITIES ON THE DATA IN ROMANIA.

RESPONSIBLE: TECHNICAL ECONOMICAL COMMITTEE

SUPPORT: ALL PUBLIC ENTITIES

TIMELINE: END OF 2016

Governing rules for Broadband Infrastructure

- **Mapping and a detailed analysis of the coverage:**

ANCOM to implement a mapping of the national telecommunications/broadband infrastructure as per obligations imposed by Law 154/2012.

- **Public consultation**

All measures will be publicly communicated and public consultation will allow stakeholders and public opinion to be expressed, at the national level..

- **A competitive bidding procedure**

Whenever the authorities that grant their support will select an operator to build and/or manage the subsidized infrastructure, a bid will be organized.

- **The most beneficial bid in economic terms**

In the context of a competitive bidding procedure, the authority granting support will establish qualitative award criteria based on which the submitted bids will be evaluated (e.g. addressing coverage priorities, co-financing, etc.);

- **Technological neutrality**

In principle, broadband services can be provided by means of a network infrastructure platform based on wired, wireless, satellite and mobile technologies, or on a combination thereof. The future bids will thus not favor or exclude a certain technology or network platform.

- **Use of the existing infrastructure**

Since the possibility to re-use the existing infrastructure is one of the main factors that determine the cost related to the introduction of broadband communications, the government will encourage bidders to use the available existing infrastructure, in order to avoid any useless and inefficient duplication of resources and to reduce the amounts assigned to public financing.

- **Wholesale access**

Effective wholesale access of third parties to a subsidized broadband infrastructure is a requisite component of any State measure to support broadband communications. Especially, wholesale access allows third party operators to compete with the selected bidder (when such bidder is present also at the level of retail market), thus consolidating the supply and competition in the areas envisaged by the measure while avoiding at the same time the creation of regional service monopolies.

- **Rationalizing investments**

In the rural area, with a low density of the population, where there are limited broadband services, imposing all the types of access products might disproportionately increase the investment costs, without obtaining significant benefits as far as the stimulation of the competition is concerned. In such a situation, consideration might be given to the possibility that those access products which imply costly and unforeseen interventions at the subsidized infrastructure (for instance, collocation in the intermediate distribution points) should be offered only of there is a reasonable request from a third party operator.

- **Price policy in case of wholesale access**

The prices for wholesale access should be based on certain principles for establishing the prices as defined by ANCOM and on certain reference criteria, and they should take into account the aid received by the network operator.

- **Monitoring and claw-back mechanism**

The authorities granting aid will closely monitor throughout the entire term of the project the implementation of the broadband project. The inclusion of a repayment mechanism may contribute to the ex post and retroactive minimization of the value of the aid initially estimated to be necessary.

- **Transparency**

The aid beneficiary has the obligation to provide entitled third parties with global and undiscriminating access to the information about its infrastructure (including, inter alia, pipes, street cabinets and fiber optic) developed under a State aid agreement. The aid beneficiary must provide all the useful information

about the broadband network to a central register of broadband infrastructures to be developed by ANCOM and/or at local administration level.

- **Reporting**

Every two years, the authority grating the State aid will communicate to the European Commission essential information about the aid project, commencing on the measure application date

APPENDIX 6 – LIST OF STAKEHOLDERS INVOLVED IN DIGITAL AGENDA FOR ROMANIA 2014 – 2020

Following is a list of public authorities, institutions and entities involved in the IT Thematic Committee that was in charge of giving feedback and insights for the Digital Agenda for Romania 2014 – 2020.

Authorities and institutions from central public administration	
Ministry of European Affairs	National Institute for Research and Development in IT
Ministry for Information Society	National Authority for Consumers Protection
National Supervising Authority for Communications	Ministry of Interior
Ministry of Labour	Ministry of Defence
Ministry of Education	Special Telecommunications Service
Ministry of Health	Ministry of Transport
Ministry of Public Finance	Ministry of Agriculture
Intermediary body for Information Society Promotion	Competition Council
National Registrar of Companies	Ministry of Justice
National Centre for Response on Cybernetic Security Incidents	National Information Service
National Centre for Managing the Information Society	Ministry for Regional Development and Public Administration
National Centre for Digital Romania	National Institute for Studies and Research in Communications
Private Entities	
Romanian Association of Consultants on Accessing European Funds	Romanian Association for the Software and Electronics Industry
National Association for Internet Service Providers	Association of Producers and Distributors of ITC Equipments
Romanian Association for Telecom Operators	Association for Technology and Internet
EOS Foundation Romania	

First Workshop	
Agenda	Statute approval for the Thematic Consulting Committee for ITC (CCT CTI) CCC CTI has 32 members, from central public administration (25) and private entities (7)

Date	August 2012
Working groups	Broadband working group Digital Agenda working group
Second Workshop	
Agenda	- Foreword by Dan Nica, Ministry, Ministry for Information Society, Bebe-Viorel Ionică, Secretary of State, CCT CTI Coordinator, Mihaela Toader, Director, Ministry of European Funds - National Strategy on Digital Agenda for Romania - Cloud Computing in public sector - Fast access – internet broadband - Presenting the socio-economic study for the Digital Agenda Romania - Debate & Conclusions
Date	April 11th 2013
Third Workshop	
Agenda	- Presenting the draft version of the National Strategy for Digital Agenda in Romania and the National Plan for developing the NGN infrastructure - Debate & Conclusions
Date	May 16th 2013
Fourth Workshop	
Agenda	- Presenting the draft version of the National Strategy for Digital Agenda in Romania and the National Plan for developing the NGN infrastructure - Validating the socio-economic study for the Digital Agenda Romania - Debate & Conclusions
Date	July 9th 2013

APPENDIX 7 – GENERAL AND SPECIFIC INDICATORS MAPPING

Name of targets	Covered by broadband	Covered by broadband above 30 Mbps	Subscriptions to fixed broadband above 100 Mbps	SMEs to make online sales	Population to buy online cross-border	Population to buy online	Among disadvantaged people	Regular internet usage overall	Population that has never used the internet	Citizens using eGovernment	Returning completed forms
% related public services Life Events brought on 4th level of online sophistication (from the 36 Life Events identified).	direct	indirect	indirect	direct	indirect	indirect	direct	indirect	direct	direct	direct
online availability of Life Events (from the 36 Life Events Identified).	direct	indirect	indirect	direct	indirect	direct	direct	indirect	direct	direct	direct
% of eGovernment projects completed in time (from the overall number of eGovernment projects pertaining to Life Events).	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	direct	direct
% of eGovernment projects for Life Events with user satisfaction above 3 (on a scale from 1 to 5 – User Satisfaction Surveys are in the responsibility of each project owner).	indirect	indirect	indirect	direct	indirect	direct	indirect	indirect	indirect	direct	direct
% of citizens using online services for customization / e-Participation	direct	indirect	indirect	indirect	indirect	indirect	direct	indirect	indirect	direct	direct

Name of targets	Covered by broadband	Covered by broadband above 30 Mbps	Subscriptions to fixed broadband above 100 Mbps	SMEs to make online sales	Population to buy online cross-border	Population to buy online	Among disadvantaged people	Regular internet usage overall	Population that has never used the internet	Citizens using eGovernment	Returning completed forms
% of citizens / businesses using the online services pertaining to Life Events to obtain information.	direct	indirect	indirect	direct	indirect	direct	direct	direct	indirect	direct	direct
% of citizens / businesses using the online services to download official forms for Life Events	indirect	direct	indirect	direct	indirect	indirect	direct	direct	direct	direct	direct
% of citizens / businesses using the online services pertaining to Life Events to send the official forms	direct	direct	indirect	direct	indirect	indirect	direct	direct	direct	direct	direct
% of users using the online services for Life Events for complete electronic transactions.	direct	direct	indirect	direct	indirect	indirect	direct	direct	direct	direct	direct
% of data registries implemented pertaining to Life Events from the overall data registries of Life Events.	indirect	indirect	indirect	direct	indirect	direct	indirect	indirect	indirect	indirect	indirect
% of applications re-used within public administration.	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
% of adoption of e-identity	direct	direct	direct	direct	indirect	indirect	direct	direct	direct	direct	direct
% of public officers trained.	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect

Name of targets	Covered by broadband	Covered by broadband above 30 Mbps	Subscriptions to fixed broadband above 100 Mbps	SMEs to make online sales	Population to buy online cross-border	Population to buy online	Among disadvantaged people	Regular internet usage overall	Population that has never used the internet	Citizens using eGovernment	Returning completed forms
% of staff costs related to IT services (from an overall budget for each entity)	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
# of cyber-attacks / threats registered by the Government on private data	indirect	indirect	indirect	direct	direct	direct	direct	direct	indirect	direct	direct
Achieve a Cluster 3 rating for Maturity based on EU NIS Market Maturity	indirect	indirect	indirect	indirect	direct	direct	direct	direct	direct	direct	direct
IT Spending for Security	indirect	indirect	indirect	direct	indirect	indirect	direct	indirect	indirect	direct	direct
# of training programs regarding cyber security	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
# of applications performed based on Governmental Cloud	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect	direct	direct
# of applications performed based on Big Data.	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect	direct	direct
# of public initiatives promoted by social media.	direct	indirect	indirect	direct	indirect	direct	direct	direct	indirect	indirect	indirect
# of companies supported related to communication by social media.	direct	indirect	indirect	direct	direct	direct	indirect	indirect	indirect	indirect	indirect

Name of targets	Covered by broadband	Covered by broadband above 30 Mbps	Subscriptions to fixed broadband above 100 Mbps	SMEs to make online sales	Population to buy online cross-border	Population to buy online	Among disadvantaged people	Regular internet usage overall	Population that has never used the internet	Citizens using eGovernment	Returning completed forms
# of data sets and reports available for public use.	direct	indirect	indirect	indirect	direct	direct	direct	direct	direct	direct	direct
# of social projects / applications developed using open data	direct	indirect	indirect	indirect	indirect	indirect	direct	direct	indirect	indirect	indirect
# of applications developed using Big Data databases	direct	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect	indirect
% individuals using the internet regularly.	direct	direct	direct	direct	direct	direct	direct	direct	indirect	indirect	indirect
% individuals from the category of those disfavored using the internet.	direct	indirect	indirect	indirect	indirect	indirect	direct	indirect	direct	direct	indirect
% of pupils trained with TIC skill.	indirect	direct	direct	direct	direct	direct	direct	direct	indirect	direct	direct
% education facilities using OER, Web 2.0 in education	direct	direct	direct	direct	direct	direct	direct	direct	indirect	direct	indirect
% LLL resource e-learning systems	direct	direct	direct	indirect	indirect	indirect	direct	direct	indirect	direct	indirect
# of application developed using Big Data databases	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
% of data registries identified and implemented.	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
# of applications performed based on Big Data.	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect

Name of targets	Covered by broadband	Covered by broadband above 30 Mbps	Subscriptions to fixed broadband above 100 Mbps	SMEs to make online sales	Population to buy online cross-border	Population to buy online	Among disadvantaged people	Regular internet usage overall	Population that has never used the internet	Citizens using eGovernment	Returning completed forms
# of localities and medical centers benefiting from telemedicine services.	direct	direct	direct	direct	indirect	indirect	direct	direct	indirect	direct	direct
% of households benefiting from access to telemedicine services	direct	indirect	indirect	direct	indirect	indirect	direct	direct	indirect	indirect	indirect
% of representatives trained in the field of health.	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
% facilities of cultural patrimony digitalized and uploaded in European Library.	direct	indirect	indirect	direct	indirect	direct	direct	direct	indirect	indirect	indirect
% of cultural facilities/libraries implementing TIC resources of biblioteconomy or similar.	direct	indirect	indirect	direct	indirect	direct	direct	direct	indirect	indirect	indirect
# of application developed using Big Data databases	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
# of digitized units of cultural heritage, uploaded in Europeana	direct	indirect	indirect	direct	indirect	direct	direct	direct	indirect	indirect	indirect
% individuals using the internet regularly	direct	direct	direct	direct	indirect	indirect	direct	direct	indirect	indirect	indirect
% individuals from the category of those disfavored using the internet.	direct	indirect	indirect	direct	indirect	direct	direct	direct	indirect	direct	direct
% of individuals who have never used the internet	direct	indirect	indirect	direct	indirect	direct	indirect	direct	direct	direct	direct

Name of targets	Covered by broadband	Covered by broadband above 30 Mbps	Subscriptions to fixed broadband above 100 Mbps	SMEs to make online sales	Population to buy online cross-border	Population to buy online	Among disadvantaged people	Regular internet usage overall	Population that has never used the internet	Citizens using eGovernment	Returning completed forms
% of pupils trained with TIC skill.	indirect	indirect	indirect	direct	direct	direct	indirect	indirect	indirect	direct	direct
% education facilities using OER, Web 2.0 in education.	direct	direct	direct	direct	direct	direct	direct	direct	indirect	direct	indirect
# of application developed using Big Data databases	indirect	indirect	direct	direct	direct	indirect	indirect	indirect	indirect	indirect	indirect
% SMEs which receives orders online	direct	direct	indirect	direct	indirect	direct	direct	direct	indirect	indirect	indirect
% individuals who use the internet to order goods and services from other countries members of the UE. .	direct	direct	indirect	direct	direct	direct	direct	direct	indirect	indirect	indirect
% individuals who use the internet to order goods and services.	direct	indirect	indirect	direct	direct	direct	direct	direct	indirect	indirect	indirect
# of competency centers developed on a regional level.	direct	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
# of innovative ICT products and services	direct	direct	direct	direct	indirect	direct	direct	direct	direct	indirect	indirect
# of SMEs which have developed innovative products and services	direct	direct	direct	direct	direct	direct	direct	direct	direct	indirect	indirect
# of innovative projects, financed and implemented in ICT. .	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct

Name of targets	Covered by broadband	Covered by broadband above 30 Mbps	Subscriptions to fixed broadband above 100 Mbps	SMEs to make online sales	Population to buy online cross-border	Population to buy online	Among disadvantaged people	Regular internet usage overall	Population that has never used the internet	Citizens using eGovernment	Returning completed forms
% of individuals who have developed competencies, certifications by means of ICT communities developed through the improvement of the ICT innovation.	indirect	direct	direct	indirect	direct	direct	direct	indirect	indirect	indirect	indirect
# of centers of ICT innovative competencies established at regional level	direct	direct	direct	direct	direct	direct	direct	direct	direct	indirect	indirect
# of active connections - Mobile Internet access	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct
# of broadband internet connections	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct
# of fixed telephony lines	indirect	indirect	indirect	indirect	indirect	indirect	direct	indirect	indirect	indirect	indirect
# of subscribers to re-broadcasting services	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect	indirect
% penetration of bundle offers per hundred inhabitants	direct	direct	direct	direct	direct	direct	direct	direct	direct	indirect	indirect
Investments in infrastructure	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct
# of households with access to internet broadband (at least 30Mbps)	indirect	direct	direct	direct	direct	direct	direct	direct	direct	direct	direct