

# NATIONAL INFOCOMMUNICATION STRATEGY 2014-2020



2014.12.22.

Development Strategy of the  
Infocommunications Sector  
(2014-2020) v9.0

Executive Summary .....	4
I. INTRODUCTION .....	9
I.1 Motive and mandate: purpose and background of the strategy .....	10
I.2 Interpretation and Delineation .....	10
I.3 Importance of the ICT sector for the economy and the society .....	11
I.4 Review of previous strategic initiatives .....	15
I.5 Methodology .....	17
I.6 Identification and explanation of the pillars .....	18
II. STATUS ANALYSIS .....	20
II.1 Approach .....	20
II.2 Detailed Status Analysis .....	20
II.2.1 Digital infrastructure .....	20
II.2.2 Digital competences .....	36
II.2.3 Digital economy .....	41
II.2.4 Digital state .....	44
II.2.5 Horizontal factors .....	52
E-inclusion .....	52
R+D+I .....	55
Security .....	58
III. SWOT ANALYSIS .....	61
III.1 Digital infrastructure .....	61
III.2 Digital competences .....	62
III.3 Digital economy .....	64
III.4 Digital state .....	66
III.5 Horizontal factors .....	67
IV. VISION .....	70
V. SET OF STRATEGIC OBJECTIVES .....	72
V.1 Complex strategic objectives .....	72
V.2 Objectives by pillars .....	73
V.3 Objectives related to horizontal factors .....	81
V.4 Indicators .....	84
VI. THE SET OF STRATEGIC INSTRUMENTS .....	88
VI.1 Approach .....	88
VI.2 Categories of instruments by pillars and by the nature of the intervention .....	89
VI.2.1 Digital infrastructure .....	89
VI.2.2 Digital competences .....	94
VI.2.3 Digital economy .....	97
VI.2.4 Digital state .....	101
VI.2.5 Horizontal factors .....	105
VI.3 Correlation between the objectives and instruments (objective-instrument matrix) .....	110
VII. IMPLEMENTATION AND MONITORING .....	114
VII.1 Action Plan .....	114

VII.2	Indicative Financing Plan .....	116
VII.3	Institutional and organisational background .....	116
VII.4	Partnership .....	117
VII.5	Monitoring system.....	118
VIII.	THE CONSISTENCE AND COHERENCE OF THE STRATEGY.....	120
VIII.1	The internal consistence of the strategy .....	120
VIII.2	The external coherence of the strategy.....	120
VIII.2.1	Concordance with the relevant Hungarian strategies .....	120
VIII.2.2	Concordance with the Relevant EU Strategies .....	125
VIII.2.3	Concordance with the ex-ante conditionality guidelines .....	126
IX.	SOURCE LITERATURE.....	128
X.	ANNEXES .....	129

## EXECUTIVE SUMMARY

- (1) The infocommunications networks, tools, services and competences contribute increasingly to the **improvement** of the **quality of life** of citizens, the **competitiveness** of businesses and the **efficiency of the operation of the state**.
- (2) The ICT sector, comprising the infocommunications and IT industries, generates **approximately 12% of the Hungarian GDP**, and the number of the employees of this sector is extremely high in Hungary in comparison to the majority of the OECD countries. That position is a good basis for establishing jobs, and producing export products of high added value with adequate development policy instruments in Hungary and to turn the ICT sector into one of the breakthrough sectors of the Hungarian economy.
- (3) Compared to its importance in the macro economy, in **international comparison** of the ICT sectors, the **competent use of infocommunications tools is low among the Hungarian population and SMEs**, which severely impedes the favourable effects of infocommunication devices and services.
- (4) Hungary can compete effectively within the European Union and worldwide only if it consistently and **strategically** demolishes all the **factors that impede development**, in line with a co-ordinated and strategic approach applied to Hungarian market and EU resources, benefiting from the huge direct and indirect potential inherent in the sector.
- (5) **The purpose of this strategy** is to give a comprehensive overview of the current situation of the Hungarian information society and the ICT market, to define the ideal target situation and to identify professional trends and development targets in infocommunications for the same period as the 2014-2020 planning cycle.
- (6) The **“digital ecosystem”** has developed also in Hungary, connecting millions of users and tens of millions of devices with higher capacity networks and increasingly complex electronic services. In the digital ecosystem **the borderlines between information technology, electronic communications and the media slowly fade away**: more and more content and services become available to an increasing number of users through more and more channels. The digital services are present in most areas and actions of the economy, society and the private life in the fields of communication, education, health, energy, environmental protection, transport, security or entertainment.
- (7) This strategy covers **those components of the ecosystem in the case of which any task, backlog, market error or bottleneck can be clearly identified which may be handled more effectively by the state** with the help of public policy, regulatory or support policy instruments than it would be possible through the organic development of the market.
- (8) Graduality and practicality are the main principles of this strategy: apart from the direct tasks of the state, state involvement is recommended only in places and to such an extent where it is absolutely necessary; among the components of the state arsenal, primarily the public policy instruments (strategic orientation, motivation, recommendations, etc.) need to be applied. The regulatory and fiscal (tax credit, support from Hungarian and/or EU resources, direct state role, etc.), instruments can be used only in cases when the identified market error or bottleneck could not be handled at all, or only within an unforeseeable long period, through the autonomous development of the market.
- (9) As the **Status Analysis** chapter and **SWOT analysis** reveal, Hungary has a **mixed performance** in terms of the various components of the digital ecosystem: in some cases, its results are better than the average but, in comparison with other indicators, it is much below the average.

The objective of a strategy is to identify the areas where **the gap is the greatest between the current situation and the set targets**, because although the development of the digital ecosystem is mostly autonomous, in order to ensure balanced development, exploit

the economic and competitive advantages or eliminate threats to equal opportunities or sustainability, the state must continuously monitor the development of the system trying to avoid any durable disruption in the balance of the ecosystem.

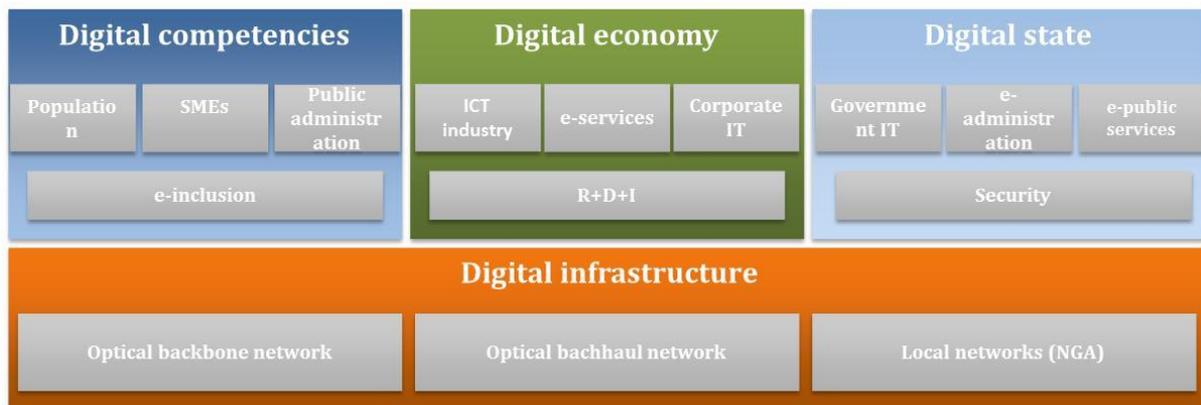
(10) In the strategy, the status analysis was prepared, the targets were defined and the tools were identified **according to the following pillars**. The pillars are the highest level areas which together determine and make understandable the subject matter of the strategy (i.e., the ICT sector) and according to which the major processes and correlations of the discipline can be captured.

- **Digital infrastructure:** availability of the electronic communications infrastructure with a bandwidth required for the supply and use of digital services in all segments of the network (backbone, district and local network). The state-owned MVMNet will have a significant role in the infrastructure development both in the backbone and backhaul segments. The aim is that these developments will be performed by the MVM, bigger market players, even more than 300 Hungarian SMEs. In addition MVMNet will be able to provide such network services for the state with obtaining 450 Mhz frequency, that cuts itself adrift from the market uncertainty. These infrastructure developments will ground for the spread of smart meters and smart grids in the field of energetics;
- **Digital competences:** development of the digital competences of the population, micro, small and medium-sized enterprises and public administration employees, reduction of the primary (digital illiteracy) and secondary (low degree of utilisation) digital divide, enabling micro and small enterprises and public administration employees to recognise business opportunities resulting from the introduction of ICT systems and to make use of those opportunities, as well as making available the benefits of the digital ecosystem to those lagging behind durably (e-inclusion);
- **Digital economy:** development of the external and internal information systems of the ICT sector in a narrow sense of its definition and the enterprises using the electronic (commercial, banking, etc.) services of the sector, and incentives to ICT development and research-development and innovation activities for development based on ICT;
- **Digital state:** supply of internal IT services supporting the operation of the government, electronic public administration services for the population and corporate target groups and other electronic services within the scope of interest of the state (e.g., health, education, library, cultural heritage related services or services aimed at the division of the state data and information assets), as well as ensuring the security of those services.

(11) Three further **horizontal factors** have also been identified which, in terms of context, appear at the most relevant pillars:

- **E-inclusion:** conducting infocommunications development by ensuring that disabled individuals and, without financial resources, competences or motivation, citizens missing out from the digital ecosystem, should also benefit from the digital ecosystem as much as possible;
- **R+D+I:** increase in the research-development and innovation activity of the actors of the digital economy (especially the ICT sector), by taking into account also the requirements of other sectors using ICT instruments and applications intensively, i.e., public administration and the population;
- **Security:** maximum protection of the critical information infrastructures, public administration internal systems and external applications and the user data contained therein, and regular information to the users on the actual security risks and the options of managing them.

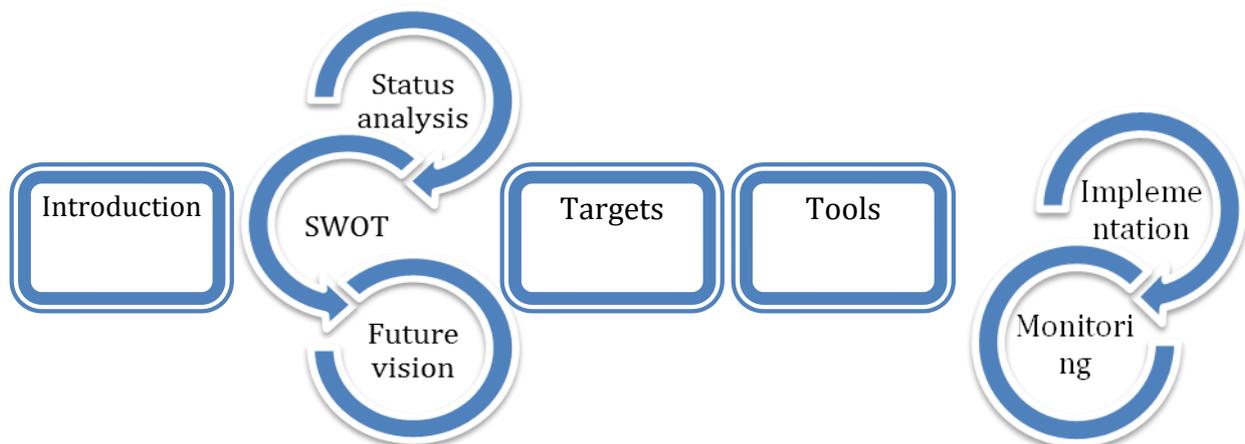
## Pillars of the National Infocommunications Strategy:



6

- (12) The strategy captures precisely the **current situation** and, following the identification of the consequential major **problems, opportunities and risks**, outlines a **vision** and sets **targets** which, with the use of adequate instruments, will enable Hungary to retain its positions in the case of the indicators which are already higher than the average by the end of this decade, and to **eliminate any backlog** in the fields that are currently lagging behind.
- (13) Naturally, the development of the digital ecosystem **cannot be a goal in itself**: the efficiency of the spending of the funds allocated to it can primarily be measured in the stronger competitiveness of companies and the national economy, in the increase of the number of jobs in the Hungarian ICT sector and its exports, in the higher efficiency of the operation of the state, in the improved quality of life of the population, in the continued, widely interpreted sustainability, in improved equal opportunities and in the reduction of the digital divide, and not in better positions achieved in international statistics.

## Structure of the Strategy



- (14) The structure of the strategy follows the methodology generally applied to government strategy building:
- in the **introduction**, it partly specifies the **motive** of the strategy (why) and its **mandate** (the application authorisation), followed by the **interpretation and specification** of the subject matter of the strategy, presenting the **economic and**

**social importance of the sector**, the **former relevant strategic initiatives**, the **methodology** features of the strategy and, finally, explains the **pillars**;

- the **status analysis** first provides a **general** overview of the international and Hungarian situation of the infocommunications sector, and then contains a more **detailed** analysis of each **pillar**, in terms of both demand and supply, and finally analyses the horizontal factors that affect the area covered by the strategy;
  - the **SWOT** analysis lists the strengths and weaknesses, opportunities and risks identified in **each pillar**;
  - in the **future vision** chapter the strategy summarises the **value-based future vision** that represents the starting point in setting targets compared to the current situation;
  - the **strategic targets** are based on the identified differences between the future vision and the current situation. The complex strategic goals are at the highest level of the target structure, and they are elaborated and specified with the pillar objectives and supplemented and further sophisticated in the horizontal objectives; the target system is completed with the indicators assigned to it;
  - the **strategic tools**, established also by pillar, serve the implementation of the pillar objectives; in that system, the tools are classified according to their type (regulatory, public policy and fiscal/support tools); the chapter is completed with the illustration of the **correlations between the strategic objectives and tools**, that is how it may be checked whether a tool is assigned to each set strategic goal and whether all identified tools contribute to the achievement of one or several strategic objectives;
  - **implementation** means the elaboration of the identified actions (tools) which will be described in the Green Paper, closely relating to the Strategy. The Green Paper describes the actions in detail and will also present the resources, responsibilities and deadlines assigned to each action. The planning of resources and their allocation to measures are still in progress and will greatly depend on the resource plan of the operational programmes of the 2014-2020 planning period, and therefore the data contained in the financial table are only indicative figures;
  - the purpose of the **monitoring system** is to monitor the results and impacts of the strategic interventions based on a review system established in the status analysis;
  - the closing chapter describes the **internal consistency** (consistency between the chapters) and **external coherence** (correlation between the Strategy and other relevant Hungarian and EU strategies and ex ante conditionality principles) of the Strategy.
- (15) The main component of the vision of the National Infocommunications Strategy is the balanced development of the digital ecosystem through the collaboration of the population, corporate entities, NGOs and public administration, which will concurrently facilitate
- the establishment of a **digital infrastructure** capable of fulfilling the dramatically increasing bandwidth demand driven by the increasing number of users, increasingly intensive use and more business and public administration services in all components of the network infrastructure, including also the NGA networks directly accessible by the population, corporate entities and public institutions;
  - extensive acquisition of **digital competences** required for the use of advanced technology, devices, applications and services for all members of the society, including the employees of corporate entities and public administrations, and individuals disadvantaged for various reasons, and will also take care of those who miss out on the world of electronic services for any reason (e-inclusion);

- development of the **digital economy** in line with the international trends, including the maximum utilisation of the R+D+I potential of Hungarian ICT companies and the strengthening of the infocommunications presence of SMEs operating in various sectors;

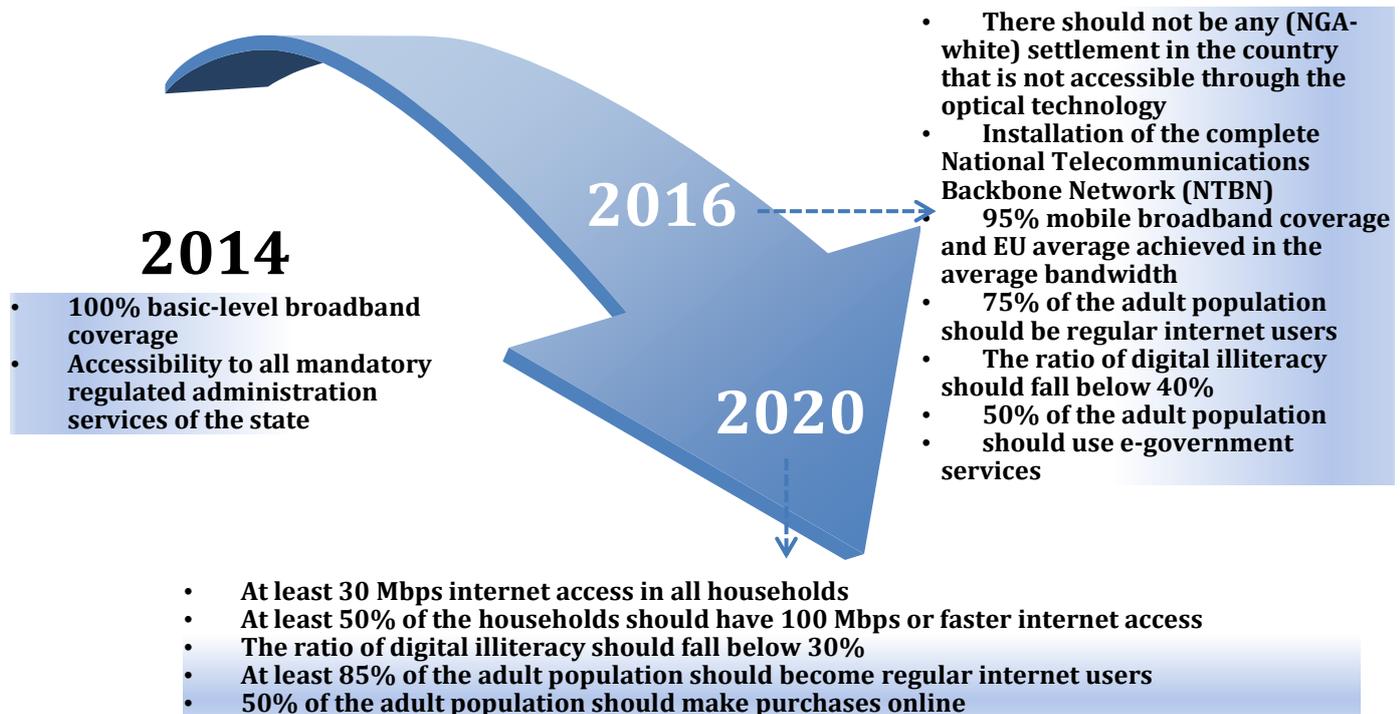
(16) This will lead to an IT background that supports the modernisation of public administration and public services and the development of a **digital state** with access to all residential and corporate electronic public administration services, including also the risk proportionate protection of public networks, government systems and public administration applications. As an overall result, **the complex strategic goal of this document is to facilitate the positive effects of the infocommunications devices and services on competitiveness, growth, employment and equal opportunities through the balanced development of the digital ecosystem in line with the relevant Hungarian and EU economic development and technical policy documents.**

(17) These actions are not exclusively the responsibility of the current government: the implementation of the strategy should begin only in **partnership**, with the involvement of market actors and NGOs through actions taken in line with the objectives of the European Union.

(18) Naturally, there is no strategy, even if it has a very strong underlying institutional background, which would be capable of successfully developing infocommunications, and hence it is extremely important to support public administrative agencies and technical organisations that manage the ICT sector and are active in the areas covered by the strategy during the implementation of the actions laid down in the strategy.

(19) However, the task will not be completed when the implementation of the specific actions, and therefore **indicators** and a **monitoring system**, measuring the indicators, are assigned to each action. The monitoring system will enable state intervention, even in the short term, in those areas where the achievement of the targets does not progress according to the schedule laid down in the strategy or where processes contrary to the original objectives can be identified.

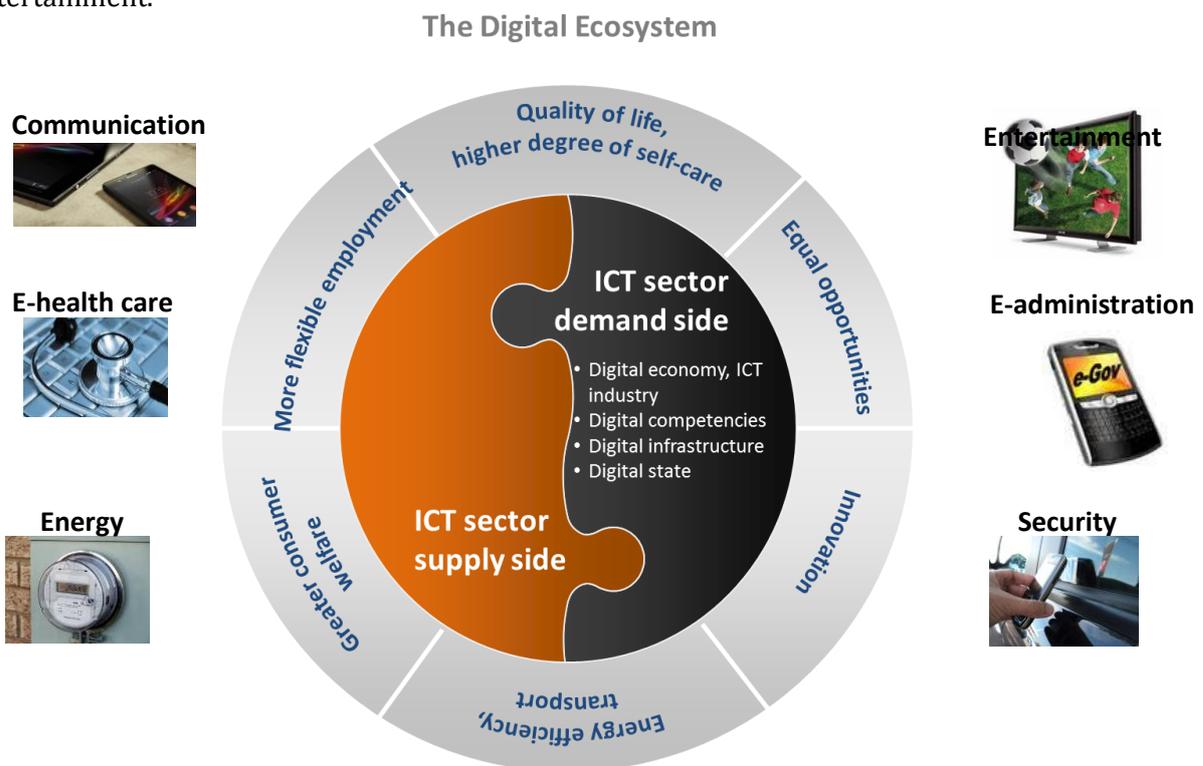
#### Main Objectives of the NIS



## I. INTRODUCTION

As a result of increasingly higher user requirements in terms of quantity and quality on the demand side, and as a result of continuous technology development and innovation on the supply side, the “digital ecosystem” has developed also in Hungary, connecting millions of users and tens of millions of devices with higher capacity networks and increasingly complex electronic services.

In the digital ecosystem the borderlines between information technology, electronic communications and the media slowly fade away: more and more content and services become available to an increasing number of users through more and more channels. The digital services are present in most areas and actions of the economy, society and the private life in the fields of communication, education, health, energy, environmental protection, transport, security or entertainment.



Almost all large enterprises and government institutions, approximately two-thirds of the SMEs and slightly more than 50% of the society are already part of that ecosystem. With the termination of analogue terrestrial television broadcasting, the digital services will soon reach full coverage, and therefore most Hungarian households will connect to the digital world somehow (digital television service, fixed or mobile internet, smart phone, etc.).

The consistent availability of the various components of the digital ecosystem (infrastructure providing broadband access, trained and motivated users, businesses using the achievements of the IT world, infocommunications and IT (ICT) industry engaged in advanced and intensive R+D+I activities - which is an ideal discipline and is one of the development focuses of the Hungarian economy, modern service providing state, online public and commercial services, digital archives, etc.) will significantly improve the quality of life of citizens, the competitiveness of businesses and the efficiency of the operation of the state.

Consequently, a carefully planned and strategically supported development of the ICT sector, relying on the existing strength and deliberately eliminating the inadequacies will have a positive impact on the individual economic actors, and the growth and employment potentials of the economy.

## I.1 Motive and mandate: purpose and background of the strategy

The infocommunications sector has a major role in Hungary both in its economy and society. The ICT industry generates approximately 12% of the Hungarian GDP and the number of employees working in that sector is extremely high even compared to the majority of the OECD member states. Without carefully planned and precisely implemented actions aimed at the destruction of the factors impeding any further dynamic development of the sector, Hungary will not be able to exploit the potentials inherent in the ICT sector and may lag behind in the extremely intensive competition, which already exists among the European countries.

**The purpose of this strategy** is to provide as coherent picture of the current situation of the Hungarian information society and, based on that, to lay down the development trends of the infocommunications sector, the public policy, regulatory and support activities for the same period as the 2014-2020 EU planning cycle, as well as to take into account the instruments/resources required for their implementation.

The Resolution of the Hungarian Government No. 1121/2013. (III. 11.) (*“on the tasks relating to the fulfilment of ex-ante conditions, defined as a prerequisite of the absorption of EU development funds between 2014-2020”*) set a task for the Minister of National Development to prepare the “National Infocommunications Policy Strategy, containing a plan for introducing the New Generation Access Network (NGA)” with the involvement of the Minister of Public Administration and Justice and to submit it to the Government.

## I.2 Interpretation and demarcation

### Interpretation

For the purposes of this Strategy the **digital ecosystem** refers to a distributive, accommodating, open social technology system, which is characterised with self-organisations, scalability and sustainability, and in which millions of users (residents, corporate entities, government), and tens of millions of devices communicate with each other, by using thousands of contents and applications with the help of the broadband networks capable of handling large data traffic. The ICT application is a clear competitive advantage for individuals, corporate entities and national economies, as it increases the R+D potential, improves the quality of life and promotes equal opportunities. Sufficient motivation and preparations on the demand side, and the availability of the infrastructure conditions, and adequate devices and services on the supply side are preliminary conditions for that. Consequently, the digital ecosystem can be sustained if its balance is not disturbed durably: there are enough users, the required infrastructure is in place, the relevant services are accessible and there is a strong digital economy.

### Infocommunication

Inforcommunication is a summary concept which is currently used to refer to the information technology and electronic communications technology used for the transfer of information. Obviously a government strategy intends to strengthen and exploit the features and specificities of this technology group which lead to positive economic and social benefits.

### Demarcation

The government policy documents of the former years gave strategic guidelines typically for particular segments of the information society (broadband infrastructure, e-economy, e-administration, etc.).

However, the complexity of the digital ecosystem and the interrelations between its components justify the extension of the scope of the National Infocommunications Strategy for the period of 2014-2020 to all important components of the ecosystem (infrastructure, digital skills, digital economy and state services, e-inclusion, R+D+I, security) at the level of status analysis.

At the level of identified tasks, objectives and instruments assigned to them, the strategy covers those components of the ecosystem in the case of which any task, backlog, market error or bottleneck can be clearly identified which may be handled more effectively by the state with the help of public policy, regulatory or support policy instruments than it would be possible through the organic development of the market.

Given the horizontal nature of infocommunications, the subject matter of this strategy should not be defined according to TEÁOR (NACE) figures or any other accounting system: the ICT and related developments are present in the everyday activities of people, corporate entities and public administration, and in fact there is no situation in life in which no ICT instrument would be involved (e.g., health, culture, transport, agriculture, energy, etc.).

In terms of demarcation, primarily the contents of the deeds of foundation and Codes of Organisation and Operation of the ministries preparing the proposal shall be applied; however, in the course of building the strategy all ministries contributed documents concerning the infocommunications development plans of their respective portfolio, which were adjusted to the pillar structure and methodology framework of the strategy and included in the document.

Graduality and practicality are the main principles of the approach applied in this document: apart from the direct tasks of the state, state involvement is recommended only in places and to such an extent where it is absolutely necessary; among the components of the state arsenal, primarily the public policy instruments (strategic orientation, motivation, recommendations, etc.) need to be applied. The regulatory and fiscal (tax credit, support from Hungarian and/or EU resources, direct state role, etc.), instruments can be used only in cases when the identified market error or bottleneck could not be handled at all, or only within an unforeseeable long period, through the autonomous development of the market.

### 1.3 Importance of the ICT sector for the economy and the society

Nobody really disputes the clearly positive role of the infocommunications sector in economic growth, increase of employment, improvement of the quality of life, enhancement of the effectiveness of companies and in equal opportunities. The developments of the infocommunications sector enhance the growth potential of an economy and improve the potential quality of life of the employees also in the long term. Consequently, it is hardly surprising that during the years of recession many countries<sup>1</sup> decided to invest into digital infrastructure and develop the complete ICT sector in order to mitigate the damage caused by the recession both at micro and macroeconomic level. The various studies identified the direct and indirect impacts of ICT in five large areas according to macro-economic aspects.

1. contribution to economic growth
2. contribution to productivity increase
3. contribution to the increase of employment
4. creation of consumer added value
5. enhancing the effectiveness of corporate entities, improvement of public administration and public service processes

---

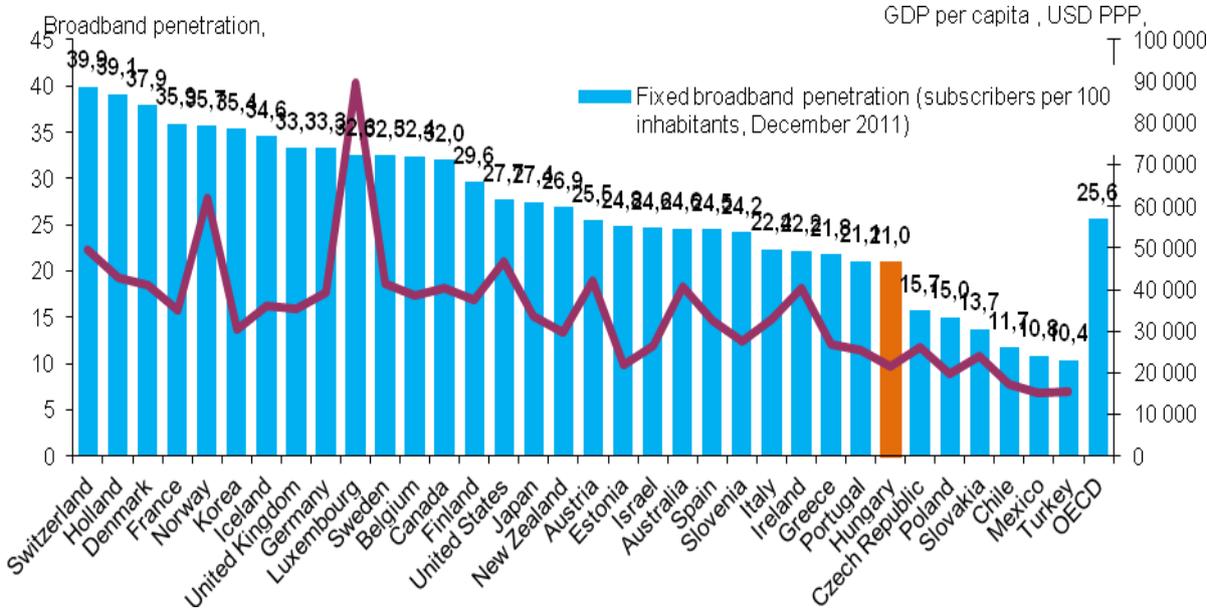
<sup>1</sup> Reinhard Wieck, Miguel Vidal: Investment in telecommunications infrastructure, growth, and employment – recent research, 21st European Regional ITS Conference Copenhagen, 13-15 September 2010

In addition, the investments into the ICT sector and the R+D+I activities of the sector are significant and extend by far beyond the sector: owing to its multiplication effect, infocommunications have a major influence also on numerous other industries. For reasons of limitation in scope, this chapter describes the surveys and expert estimates, indicating the **importance** of the sector **in terms of the economy and society** in the form of a list, without aiming at complexity.

**Economic importance**

- **Broadband penetration and per capita GDP:** according to an OECD conclusion, there is positive correlation between the broadband penetration (number of subscriptions per 100 residents) and the per capita GDP. Some countries, often referred to as infocommunications examples (Korea, Estonia, Slovenia) have higher broadband penetration than “would be justified” by the per capita GDP, but the Hungarian figure is even more favourable than the other V4 countries of similar development.

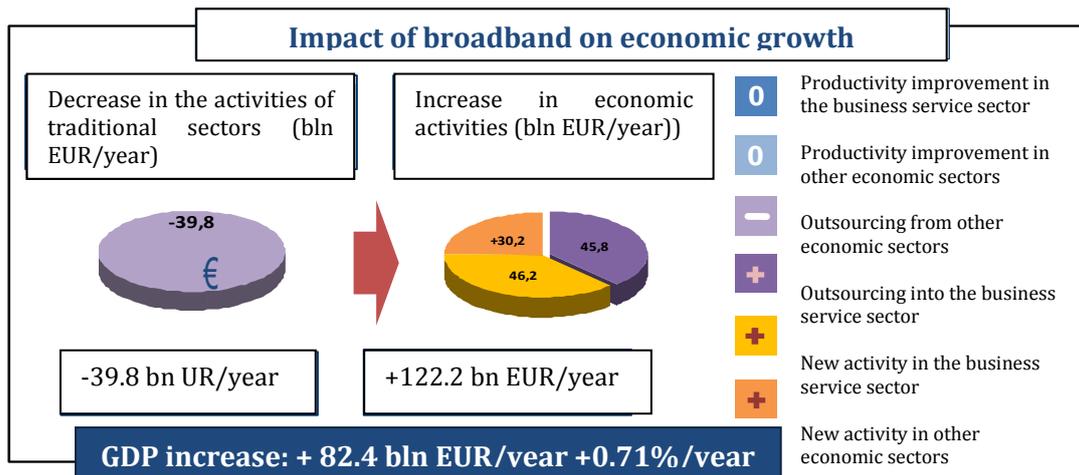
OECD broadband fixed line penetration and per capita GDP, 2011



Source: OECD

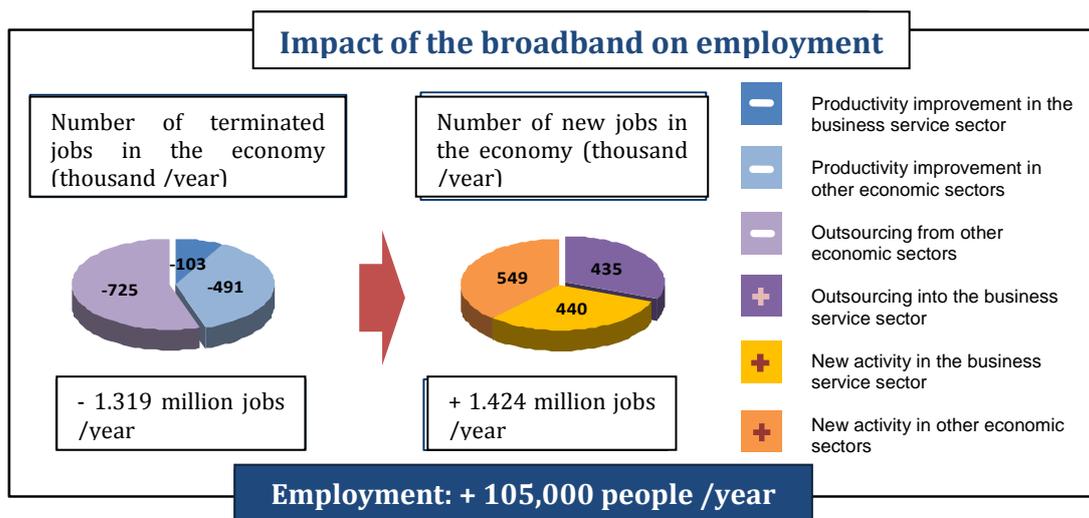
- **Broadband penetration and GDP growth:**
  - Assuming 10% p.a. growth in penetration and 3% p.a. increase in the use of services, broadband will increase the EU GDP by EUR 82.4 billion a year (0.71%), stated the German MICUS company in its analysis, prepared a few years ago based on econometric reviews commissioned by the Brussels Commission<sup>2</sup>.

<sup>2</sup> Micus: The Impact of Broadband on Growth and Productivity, 2008, expert report for the European Commission



Source: Micus, 2008

- According to the Mckinsey study<sup>3</sup> the 10% increase in the broadband penetration of households will increase the GDP of the specific countries by 0.1-1.4%.
- Those countries which belong to the top third of the countries in terms of broadband penetration will be able to realise 2% higher GDP growth than the countries lagging behind in internet use.
- According to a World Bank study<sup>4</sup> each 10% increase in broadband penetration in the low income countries gave 1.38% boost to the GDP between 2000 and 2006. It is greater than the figure observed for the developed countries (1.21 percentage points).
- **Digital dividend and net present value:** according to the conclusion of the Spectrum Value Partners<sup>5</sup> company over a period of 20 years the effective use of digital dividend will represent EUR 750-850 billion net present value for broadcasting providers in the European Union and EUR 63-165 billion net present value for the mobile operators.
- **Broadband and employment:** according to “The impact of broadband on growth and productivity” study prepared by the MICUS company and referred to earlier, the employment balance is already positive: at EU level the number of employees increase by additional 105,000 in relation to the dissemination of broadband and ICT application.



Source: Micus, 2008

<sup>3</sup> Internet matters: The Net’s sweeping impact on growth, jobs and prosperity, 2011, Mckinsey

<sup>4</sup> Qiang et al. (2009) Economic Impacts of Broadband, World Bank

<sup>5</sup> Getting the most out of the digital dividend, Value Partners, March 2008. The conclusion relates to the entire UHF band (470-862 MHz) and not expressly to the digital dividend band (790-862 MHz).

- **Digital competence and GDP:** according to an eNET survey<sup>6</sup> 1% increase in digital literacy generates 0.123% increase in GDP, i.e. additional HUF 34.7 bln GDP.
- **Digital economy and GDP:** the OECD researches showed that 13% of the added value, generated in the business sector of the United States in 2010 was the result of internet related activities.
- **ICT industry and taxation:** the growth of the ICT sector can lead to clear national economy advantages: the net PIT payment of taxpayers classified in the examined sector by their core activity made up 4.7% of the personal income tax revenues of the budget, i.e. the per capita personal income tax payment of the ICT sector was 3 times the national economy average in 2011. The share of the taxpayers of the sector in the net VAT payments was 9.3% in 2011, which was 4.65 times the national economy average in terms of per capita VAT payments.

### Social significance<sup>7</sup>

- **Education:** according to a survey conducted in OECD countries<sup>8</sup> there is positive correlation between the volume of ICT use and the PISA results achieved in mathematics. The same survey also concluded that the performance of schools better equipped with ICT devices was greater than that of the less equipped schools. According to the surveys conducted among students aged 16, those students who have access to broadband connection in their classrooms generally achieved better results in the national student surveys.
- **Research:** the computer technology modelling, especially the high performance computing capacities (HPC) extensively available in Hungary facilitates more effective complex system modelling and replace material intensive experiments in several research areas. Super computers are becoming increasingly dominant instruments in generating (natural) scientific results as a considerable portion of the results are achieved on them, mostly replacing laboratory experiments.

The availability of adequate quality and capacity HPC capacities is a required condition for the value creation potential of the Hungarian scientific society and research sector.

- **Equal opportunities:** with the help of the dissemination of infocommunications technologies, isolated people can return to society, community life can develop, rural areas may integrate and the quality of life may be improved, etc.
- **E-inclusion:** In a narrower sense of the concept, the purpose of the e-inclusion initiatives is to reduce the degree of digital exclusion resulting from the lack of digital competence (digital literacy) and internet access. In a wider sense of the concept it aims at providing digital equal opportunities to the socially disadvantaged and disabled people by removing any impediments stemming from physical mobility or geographical distances.
- **Criminal prosecution, public safety:** accessibility to electronic devices and services, and an advanced IT background can improve the efficiency of crime prevention activities, reduce the response time of criminal investigation agencies and accelerate the operation of justice.

<sup>6</sup> eNET: Impact of the development of digital literacy on the macro economy, research for Google Hungary, 2012

<sup>7</sup> Analysis Mason, Tech4i2 Limited: The socio-economic impact of bandwidth, final report a study prepared for the EC, 2010

<sup>8</sup> The ICT impact report, European Schoolnet, 2006

- **Environmental protection:** the favourable environmental role of the digital ecosystem may be captured primarily in the reduction of travel expenses, optimisation of energy networks and energy consumptions (intelligent electricity energy network, intelligent measurement), in the IT dominance of transport systems (intelligent transport systems), in intelligence solutions, valid at the level of settlements and buildings (intelligent town, intelligent office, intelligent home: lighting, heating/cooling systems, access authorisation systems, security systems, etc.), and in the development of the “green IT” technologies, which is a summary concept reflecting the efforts towards low energy consumption and the use of materials and technologies with little impact on the environment.
- **Household finances, revenues:** the availability of ICT devices and services generates financial savings for households (e.g., e-commerce, e-government services, etc.) through the reduction of travel, waiting and other expenses, and also due to the price reduction resulting from a greater choice, and greater competition without any physical distance (e.g., by benefiting from the price comparative options); in a household the total savings which can be achieved with conscious internet use can significantly exceed the internet subscription cost and the amount invested into the computer.
- **Health:** the role of broadband networks is of key importance in remote diagnostics and remote monitoring systems; the broadband networks facilitate safe and fast transmission of imaging diagnostics, X-ray records, etc. The remote monitoring applications are similarly important, as they represent security for patients and facilitate considerable savings for the health system (by reducing the number of unnecessary patient-physician meetings).
- **Quality of life:** all components of the digital ecosystem improve the quality of life (e.g., simpler, easier contact, time and energy savings, simpler and better access to information channels, presence on the labour market, higher level self-care, easier orientation, etc.), and the same is especially true for the disadvantaged groups of society.

#### I.4 Review of previous strategic initiatives

The importance of infocommunications was stated in all ICT related strategic documents since the turn of the millennium, but the majority of the documents prepared with different logics, methodology, targets and instruments and institutional and financial background covered only parts of the entire domain. The differences were not only due to the different approaches, they also involved the lack or inconsistent use of the monitoring systems, frequent changes in the political assessment of the domain by the Government and the unpredictability of the available resources. Nevertheless, the previous strategies should still be briefly reviewed as some correlations, proposals and objectives that are still relevant have also been integrated into this document. The pillar structure also takes into account the former strategic approaches and tries to overcome any unilateral aspect or imbalance thereof.

Title of the strategic document	NIS pillars				Horizontal factors		
	Digital infrastructure	Digital competences	Digital economy	Digital state	E-inclusion	R+D+I	Security
Hungarian Response to the Challenges of the Information Society ("Hungarian Response", 1999)	xxxx	xxxx	xxxx	xxxx	xxx	x	x
Theses on the Information Society (2000)	xxx	xxx	xx	xx	xxx	x	x
National Information Society Strategy (NISS, 2011)	xxxxx	xxxxx	xxxx	xxxxx	x	xxxx	x
Electronic Government Programme (2001)	xx	xx	x	xxxxx			
Hungarian Information Society Strategy (HISS, 2013)	xxx	xxxxx	xxx	xx	xxxx	xxx	x
National Information Technology Strategy (2005)	xxx	xxx	xx	xxx	x	x	x
E-Government Strategy and Programme Plan 2005	xxxx	x	x	xxxx	x	x	x
National Broadband Strategy (NBS, 2004)	xxxxx	xxxx	xxx	x	x	x	xxx
eEconomy Action Plan (eEAP, 2009)	x	xx	xxxxx	xxx	x	xxx	xx
Digital Literacy Action Plan (DLAP, 2009)		xxxxx					
Broadband Action Plan (BAP, 2007)	xxxxx	x	x	x	x		xx
E-administration Programme 2008-2010	xx	xxx	x	xxxxx			xx
E-administration 2010 Strategy (2008)	xxxx	x		xxxx			
Sectoral Action Plan for the ICT Sector (2009)	x	xxxx	xxxx	x	x	xxxx	x
Digital Renewal Action Plan (DRAP, 2011)	xxxx	xxxx	xxxx	xxxx	xx	xx	xx

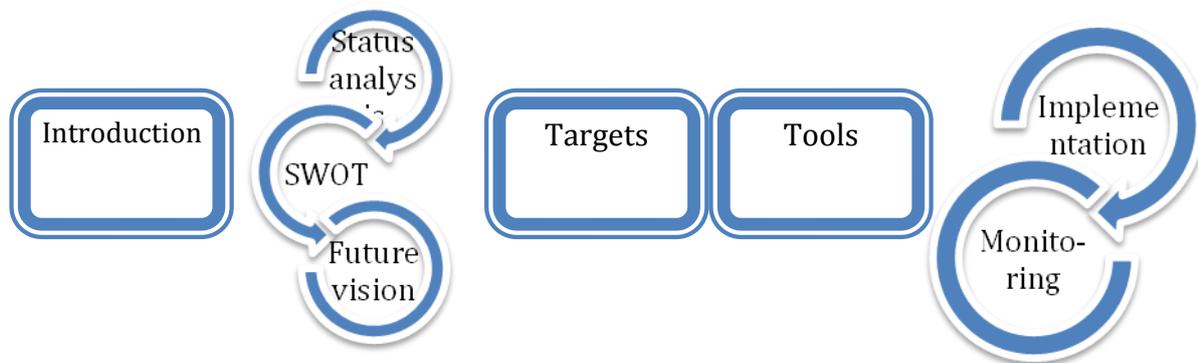
Explanation: Marking with X on a scale of 0-5, where 0 refers to the lack of relevance, and five refers to the complex strategic/conceptual coverage of the domain

## I.5 Methodology

Apart from what is listed in the previous point, this strategy was prepared on the basis of the publicly available government, market and civil strategic documents and proposals prepared over the last ten years, and the basic documents of the resource allocation within the European Union, as well as the operational programmes with infocommunications relevance. In addition, the most recent available Hungarian and EU statistic data, research results and analyses were used as an input in the Status Analysis chapter. They are listed in the Annex (Used documents).

During the elaboration of the strategy the previously prepared Hungarian and international strategic documents, EU recommendations and, during the implementation of the project, the sectoral policy documents prepared by the various ministries were analysed again. Apart from the analyses, interviews were also organised with some recognised experts of the sector.

### Structure of the Strategy



The structure of the strategy follows the methodology generally applied to government strategy building:

- in the **introduction**, it partly specifies the  **motive** of the strategy (why) and its  **mandate** (the application authorisation), followed by the  **interpretation and specification** of the subject matter of the strategy, presenting the  **economic and social importance of the sector**, the  **former relevant strategic initiatives**, the  **methodology** features of the strategy and, finally, explains the  **pillars**;
- the  **status analysis** first provides a  **general** overview of the international and Hungarian situation of the infocommunications network, and then contains a more  **detailed** analysis of each  **pillar**, in terms of both demand and supply, and finally analyses the horizontal factors that affect the area covered by the strategy;
- the  **SWOT** analysis lists the strengths and weaknesses, opportunities and risks identified in  **each pillar**;
- in the  **future vision** chapter the strategy summarises the  **value-based future vision** that represents the starting point in setting targets compared to the current situation;
- the  **strategic targets** are based on the identified differences between the future vision and the current situation. The complex strategic goals are at the highest level of the target structure, and they are elaborated and specified with the pillar objectives and supplemented

and further sophisticated in the horizontal objectives; the target system is completed with the indicators assigned to it;

- the **strategic tools**, established also by pillar, serve the implementation of the pillar objectives; in that system, the tools are classified according to their type (regulatory, public policy and fiscal/support tools); the chapter is completed with the illustration of the **correlations between the strategic objectives and tools**, that is how it may be checked whether a tool is assigned to each set strategic goal and whether all identified tools contribute to the achievement of one or several strategic objectives;
- the purpose of the **monitoring system** is to monitor the results and impacts of the strategic interventions with a review system established in the status analysis;
- the closing chapter describes the **internal consistency** (consistency between the chapters) and **external coherence** (correlation between the Strategy and other relevant Hungarian and EU strategies and ex ante conditionality principles) of the Strategy.

## I.6 Identification and explanation of the pillars

Although the development of the digital ecosystem is mostly autonomous and its direction is essentially determined by the market conditions, in order to ensure balanced development, exploit the economic and competitive advantages or eliminate threats to equal opportunities or sustainability, the state must continuously monitor the development of the system. It is primarily the responsibility of the state to ensure (with the involvement of market actors and NGOs) that the balance of the ecosystem is not disrupted for a long time and that Hungary capitalises on the potentials of economic growth facilitated by the ICT sector i.e.:

- the development of the system is less impeded by infrastructure bottlenecks in all segments of the electronic **communications networks**;
- fewer citizens, corporate entities or public administration employees miss out on the use of digital services due to lack of **competences** or financial resources, and that even those who miss out should have a share in the benefits of the digital ecosystem;
- attractive digital contents, effective services and innovative applications are available for the operation of the **digital economy**, and for the IT development activities of corporate entities and state and non-profit actors generating high added value;
- the **state and public administration** can safely use infocommunications devices and services in the course of their operation and the supply of public administration services.

Based on the above and also on the approaches used in former strategic documents, in this strategy the status analysis was prepared, the targets were defined and the tools were identified **according to the following pillars**:

- **Digital infrastructure**: availability of the electronic communications infrastructure with a bandwidth required for the supply and use of digital services in all segments of the network (backbone, backhaul and local network);
- **Digital competences**: development of the digital competences of the population, micro, small and medium-sized enterprises and public administration employees, reduction of the primary (digital illiteracy) and secondary (low degree of utilisation) digital divide, enabling micro and small enterprises and public administration employees to recognise business opportunities resulting from the introduction of ICT systems and to make use of those opportunities, as well as making available the benefits of the digital ecosystem to those lagging behind durably (e-inclusion);
- **Digital economy**: development of the external and internal information systems of the ICT sector in a narrow sense of its definition and the enterprises using the electronic

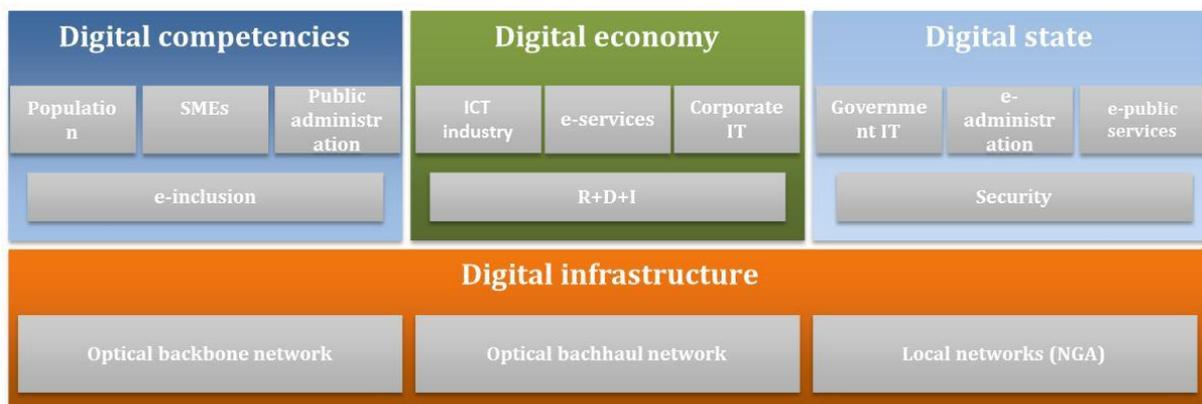
(commercial, banking, etc.) services of the sector, and incentives to ICT development and research-development and innovation activities for development based on ICT;

- **Digital state:** supply of internal IT services supporting the operation of the government, electronic public administration services for the population and corporate target groups and other electronic services within the scope of interest of the state (e.g., health, education, library, cultural heritage related services or services aimed at the division of the state data and information assets), as well as ensuring the security of those services.

**The pillars are the highest level areas** which together determine and make understandable the subject matter of the strategy (i.e., the ICT sector) and according to which the major processes and correlations of the discipline can be captured. Three further horizontal factors have also been identified which, in terms of context, appear at the most relevant pillars:

- **E-inclusion:** conducting infocommunications development by ensuring that disabled individuals and, without financial resources, competences or motivation, citizens missing out from the digital ecosystem, should also benefit from the digital ecosystem as much as possible;
- **R+D+I:** increase in the research-development and innovation activity of the actors of the digital economy (especially the ICT sector), by taking into account also the requirements of other sectors using ICT instruments and applications intensively, i.e., public administration and the population;
- **Security:** maximum protection of the critical information infrastructures, public administration internal systems and external applications and the user data contained therein, and regular information to the users on the actual security risks and the options of managing them.

**Pillar structure of the National Infocommunications Strategy**



## II. STATUS ANALYSIS

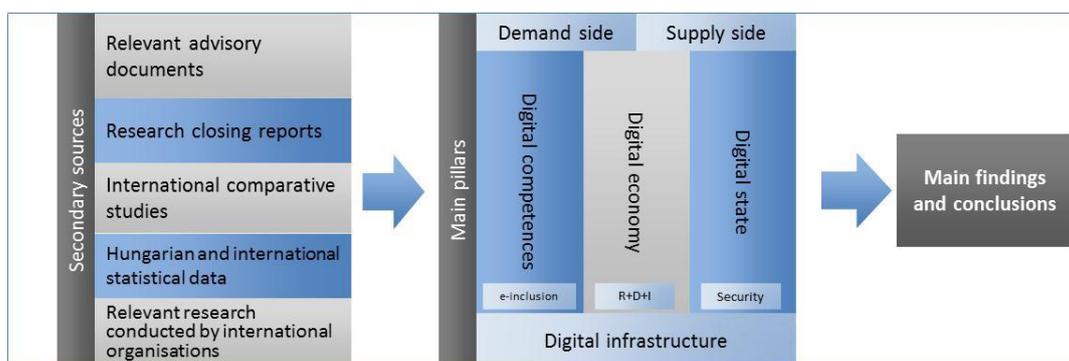
### II.1 Approach

The current Hungarian situation of the infocommunications sector is described, with the help of statistics suitable for international comparison, according to the pillars defined in the previous chapter, while the horizontal factors are covered in a dedicated sub-chapter.

The first analysis describes the qualitative and quantitative parameters of the digital infrastructure indispensable for all segments of the digital ecosystem, followed by the analysis of the indicators of the digital competences, digital economy and digital state, as well as the indicators referring to horizontal factors based on data sources that are suitable for international comparison.

The status analysis chapter was prepared with the parallel analysis of the demand and supply side for each pillar according to the classic economic division. Following the processing of the secondary sources, the analysis discloses the most important problems and inadequacies of the demand and supply sides of each pillar, which are also included in a consolidated structure, supplemented with strengths and opportunities, in the SWOT analysis chapter.

Logical figure of the content development of the status analysis chapter



The impact studies presenting in detail the effect and results of the measures of the 2007-2013 period are still in progress, and therefore the status analysis does not yet contain their conclusions. The results of the former interventions and running operational programmes can be assessed on the basis of the impact studies and they will be covered by the Green Paper, which will summarise the measures of the Strategy in an action plan on the basis of the available information.

### II.2 Detailed Status Analysis

#### II.2.1 Digital infrastructure<sup>9</sup>

##### Supply Side

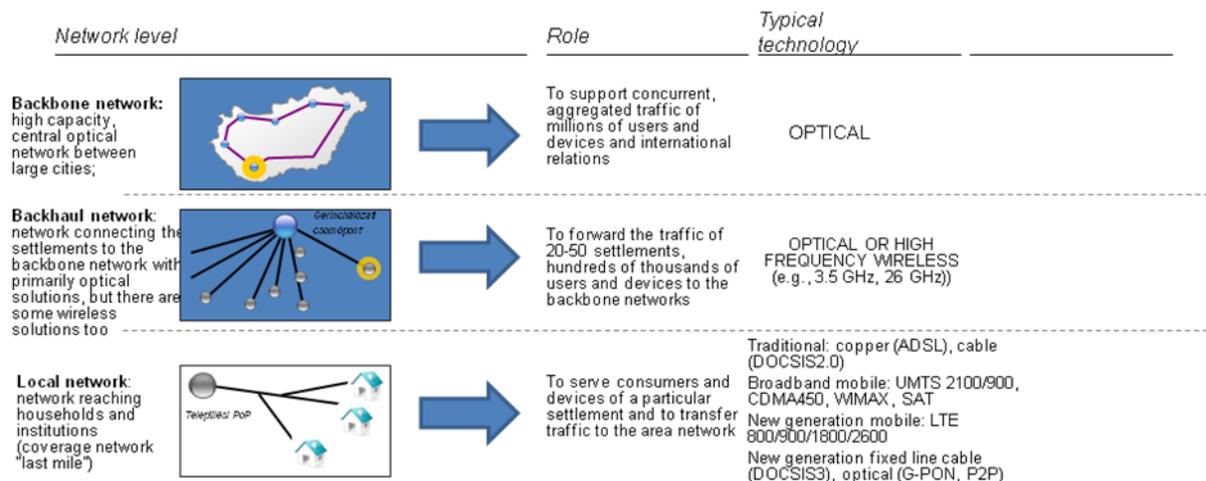
*Quantitative and qualitative parameters of broadband in Hungary*

##### a. Fixed line broadband coverage

<sup>9</sup> In this case the digital infrastructure does not cover the total electronic communication activity, and only refers to infrastructure available for broadband internet access.

**The fixed line network infrastructure exists on three network levels:**

- **Backbone network:** high capacity, central optical network between large cities;
- **Backhaul network:** network connecting the settlements to the backbone network with primarily optical solutions, but there are some wireless solutions too;
- **Local network:** network reaching households and institutions (coverage network “last mile”)



Source: Broadband development concept (MND, 2011)

**Backbone network**

Following the liberalisation of the telecommunications market and the privatisation of the previously state-owned networks competition evolved in the backbone network segment, in which various service providers built nationwide, high quality networks with high service standard by significant investments.

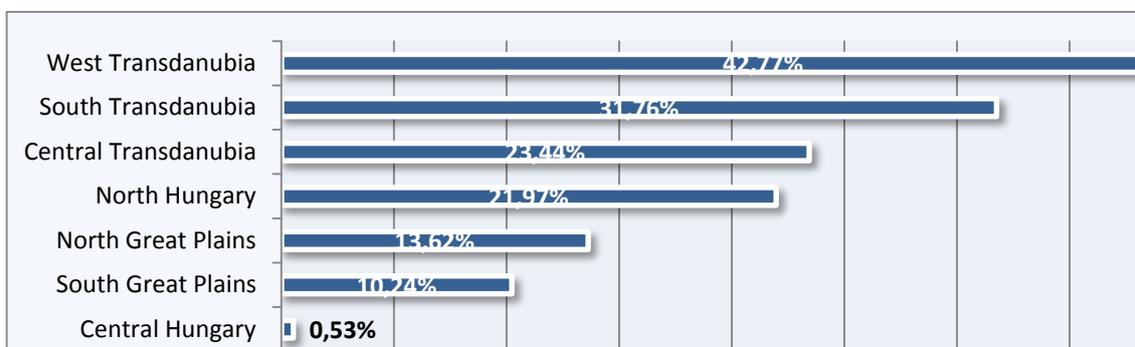
The operation of the National Telecommunications Backbone Network (NTBN) which satisfies the broadband demand of primarily state, public administration and educational institutions is the responsibility of MVM-NET Ltd. At present the optical network is approximately 6,200 km long. The majority of the network is owned by MVM, but in certain places the missing sections are leased from other service providers. The network is gradually developed (e.g., with the help of the 6 blocks recently gained in the 26 GH frequency range). At present 75 Hungarian settlements are connected to the backbone network (including all county seats). The objective is to connect 170 towns (with 6,000 endpoints) by the end of 2013.

Following the liberalisation of the telecommunications market and the privatisation of the previously state-owned networks, a two-party competition evolved in the backbone network segment in Hungary and various service providers built high quality networks with high service standard of different sizes with minor or major investments. Instead of developing its backbone network infrastructure resulting from the developments of the previous decades, Hungarian Telecom focuses primarily on the access network, where it makes its network suitable for providing GPON, FTTx and VDSL services. On the contrary, Invitel, which merged with several companies including Pantel, the largest Hungarian alternative service provider, developed its backbone network, as a result of which it has a nationwide and redundant optical backbone network satisfying the standards of our times. In addition, minor service providers, e.g., BTEL made and are still making developments on certain sections of their own backbone networks, but other market actors currently do not have any nationwide backbone network. The intensity of the competition on the market is therefore determined by the activities of Hungarian Telecom and Invitel, which are currently in fierce competition in terms of prices.

## Backhaul network

The research conducted in 2012 in relation to the *EDOP 3.1.2 Broadband area network development support project* concluded that there are approximately 800 settlements in Hungary (mainly with small population) which had not yet been reached by any sufficient capacity backhaul network infrastructure until the call for proposals was issued. Although the infrastructure required for the operation of traditional broadband networks was available in those settlements (almost without exception), the conditions of the new generation access network (NGA) suitable for services with truly large bandwidths (at least 30 Mbps) were missing in the infrastructure of the backhaul network. Most settlements without services (see the figure below) were situated in West Transdanubia (43%), while the Central Hungary region was the least affected by that deficiency (0.5%).

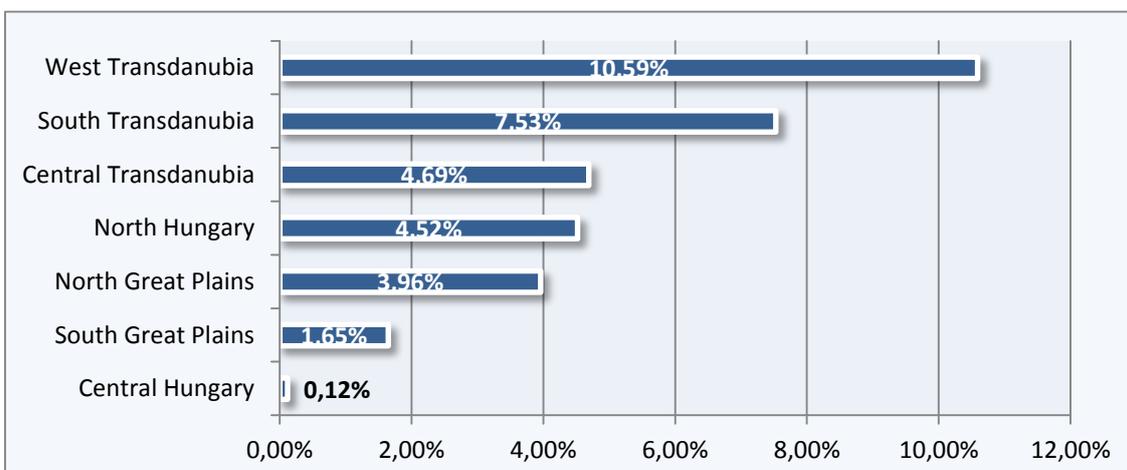
**Ratio of settlements without any backhaul network infrastructure by NUTS2 region, 2012 (as a percentage of the settlements)**



Source: EDOP 3.1.2 list of settlements, January 2012, GKIeNET

During the survey 3.7% of the Hungarian population (approximately 365,000 people) lived in settlements that did not have any access to any optical backhaul network. The data vary by region in that respect too, obviously the highest figure relates to West Transdanubia with 10.6% and the lowest to Central Hungary with 0.1%.

**Ratio of the population living in settlements without any backhaul network infrastructure by NUTS2 region, 2012 (as a percentage of the population)**



Source: EDOP 3.1.2 list of settlements, January 2012, GKIeNET

Based on the developments realized in the frame of the project and the results of the consultation with affected professional organisations there are still 398 settlements without backhaul connectivity with adequate capacity.

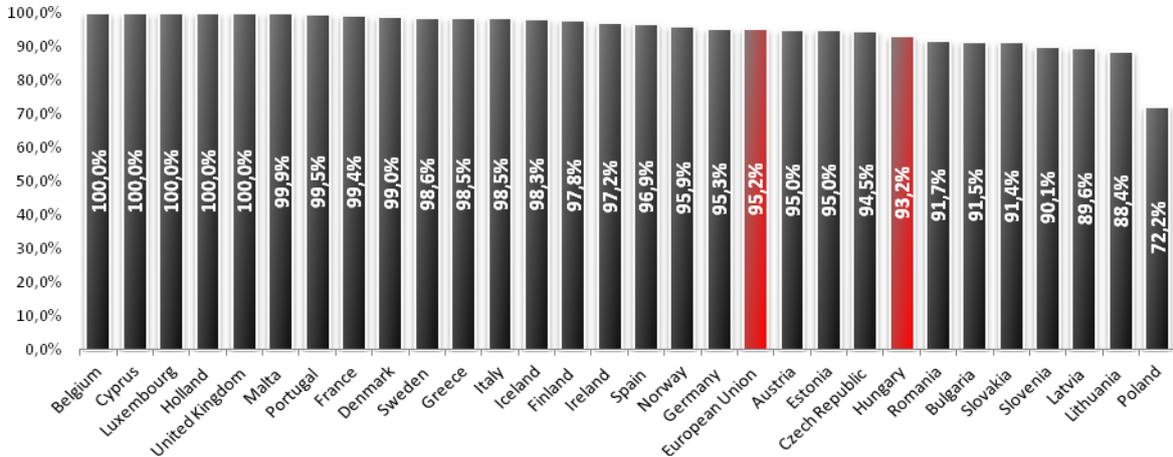
It also needs to be noted however that there are hundreds of thousands of settlements that had access to an optical network even prior to the EOP 3.1.2 project, even though they had access to only one optical network (with occasionally limited capacity), the owner of which was either the same as the owner/operator of the local network (in which case no competition could evolve in the settlement) or was in a monopoly position (giving them a dominant position over the local service provider). In those settlements the installation of the NGA network is economically viable only to the owner of the backhaul network segment, who then can extend the dominant position to the local access segment. The problem of those NGA grey settlements is one of the main subsequent intervention point in infrastructure development, as confirmed also in the EU documents.

**Local network**

**Basic broadband networks (with minimum 144 Kbps download speed)**

In terms of traditional broadband access (over 144 Kbps download speed according to the survey prepared for the European Union), the European Union has not yet reached, but is not significantly behind the 100%<sup>10</sup> coverage set as a goal of the Digital Agenda by 2013. In Hungary more than 94% of the households have access to some traditional broadband service owing to the high DSL coverage which is only slightly behind the European average, and the cable coverage which is far above the EU average.

**Traditional broadband coverage in the countries of Europe, 2011 (as a percentage of the households)**



Source: Broadband coverage in Europe in 2011, European Commission

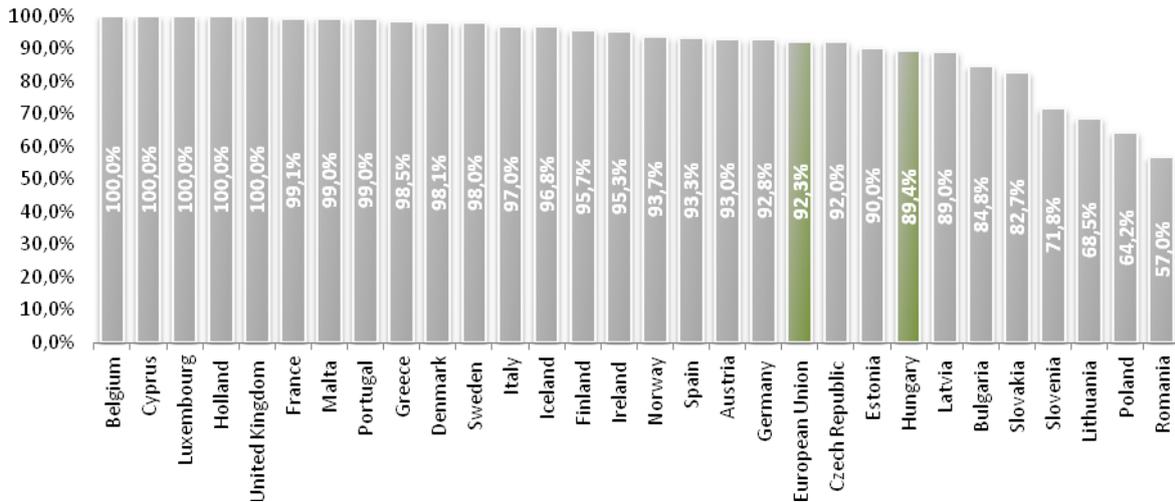
**xDSL<sup>11</sup> (128 Kbps-approx. 8 Mbps)**

In 2011 89.4% of the Hungarian households had access to some basic DSL service, which was only 3 percentage points below the EU average.

<sup>10</sup>See the Commission press release on 100% basic-level broadband coverage achieved across Europe [http://europa.eu/rapid/press-release\\_IP-13-968\\_hu.htm](http://europa.eu/rapid/press-release_IP-13-968_hu.htm)

<sup>11</sup> Digital subscriber line: digital subscriber line, supporting digital data transmission on copper pairs.

## DSL coverage in the countries of Europe, 2011 (as a percentage of the households)

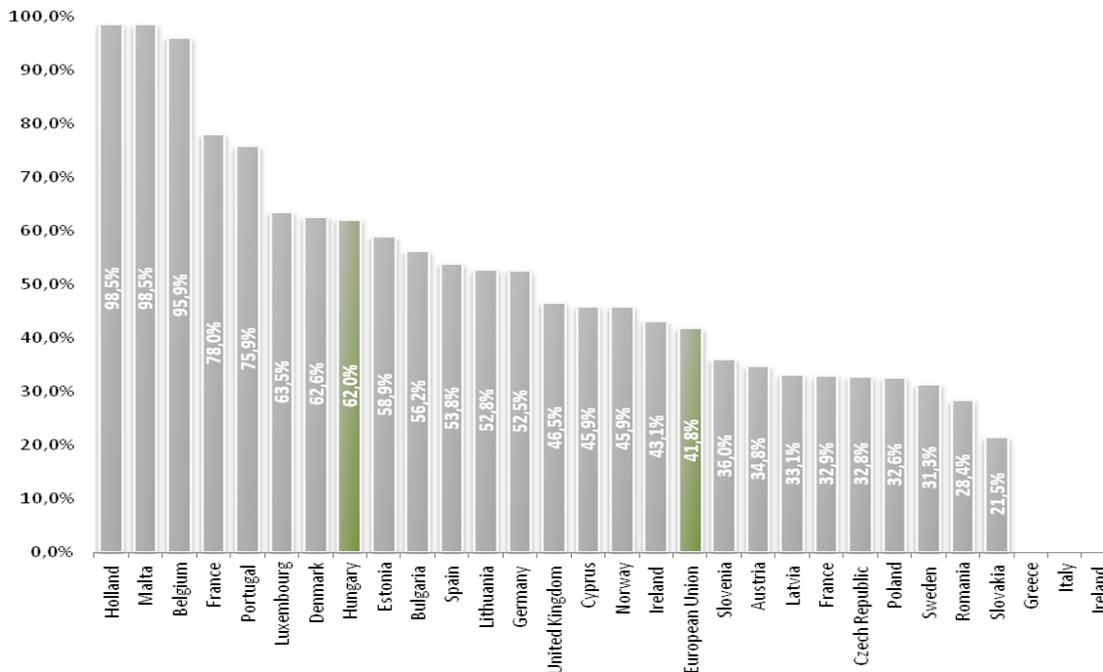


Source: Broadband coverage in Europe in 2011, European Commission

## Cable (128 Kbps-approx. 35 Mbps)

Apart from DSL, the cable television networks suitable for internet services are the most important components of the broadband internet infrastructure; in the case of new subscriptions they became dominant over the traditional xDSL technology in recent years, which is explained primarily by the higher available bandwidth and lower prices resulting from the lower auxiliary expenses. Nonetheless, compared to DSL, cable networks provide still relatively little additional coverage, because both access platforms try to expand primarily in more densely populated areas. In Hungary the cable network coverage is far greater than the European average: 62% of the Hungarian households have access to cable technology based internet services, compared to the 41.8% European average.

## Cable coverage in the countries of Europe, 2011 (as a percentage of the households)



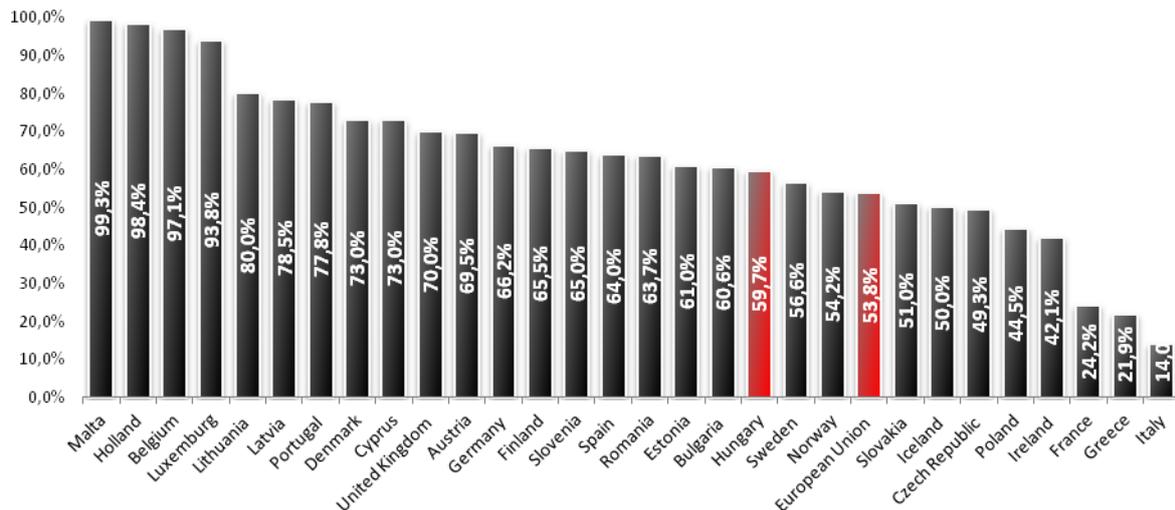
Source: Broadband coverage in Europe in 2011, European Commission

Note: Data are not available for Greece, Italy and Iceland

## New generation broadband networks (NGA) (minimum approx. 25-30 Mbps)

Contrary to the minor backlog observed in traditional broadband DSL services, in terms of access to the new generation high bandwidth services the Hungarian figures are better than the European average: 59.7% of the households have access to some network infrastructure (VDSL, FTTx, or Docsis 3 cable) with high download (over 30 Mbps) speed.

New generation broadband coverage in the countries of Europe, 2012 (as a percentage of the households)



Source: Broadband coverage in Europe in 2012, European Commission

- **VDSL<sup>12</sup> coverage (12-100 Mbps<sup>13</sup>)**

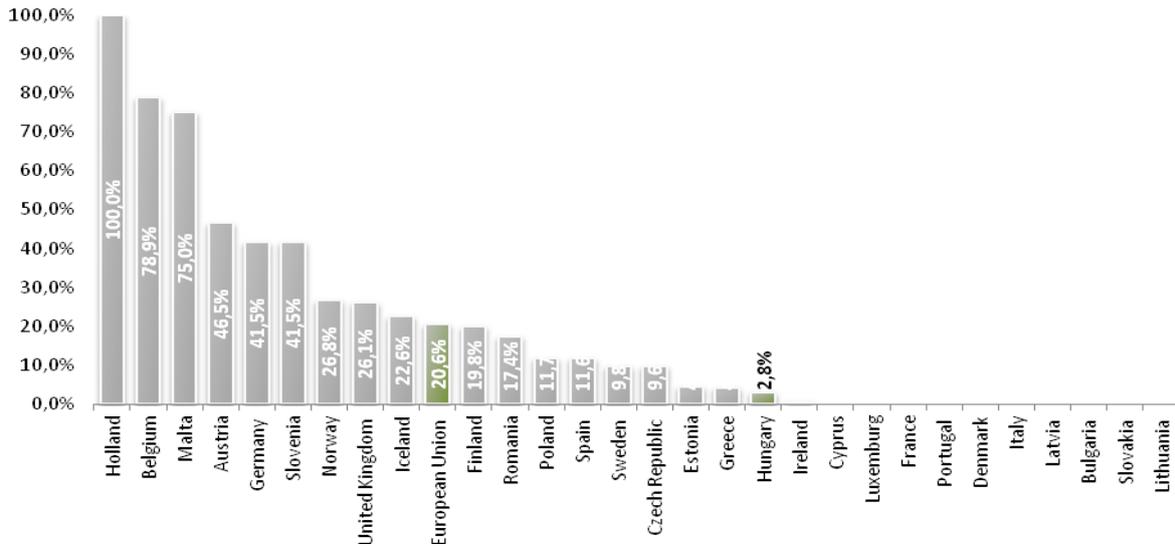
In terms of VDSL coverage the Hungarian figure (2.8%) is significantly lower than the EU average (20.6%), which is explained primarily with the high cable coverage: the VDSL access, based on traditional DSL infrastructure functions only with strong technology limitations (typically its theoretical capacity maximum can only be reached around the DSLAM).

For the service providers an investment with a good return seems to have one centre from which the largest possible area can be covered, but the cable technologies with occasional even 100 Mbps/user speed have already been installed in most housing estates and residential areas with detached and semi-detached family homes.

<sup>12</sup> Very high bit-rate Digital Subscriber Line: high bandwidth digital subscriber line, an advanced version of the currently used ADSL technologies with greater transmission speed

<sup>13</sup> Depending on the distance from DSLAM

**VDSL coverage in the countries of Europe, 2011 (as a percentage of the households)**

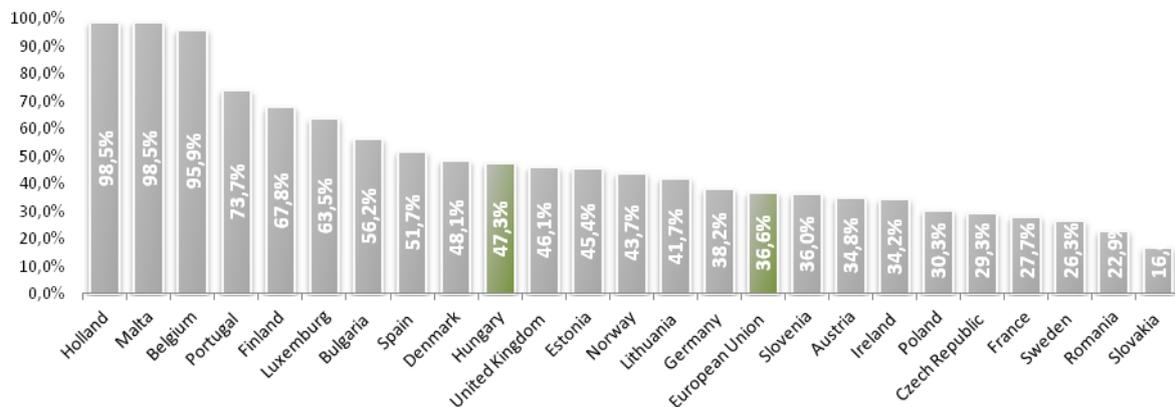


Source: Broadband coverage in Europe in 2011, European Commission  
 Note: the commercial VDSL service is currently not (yet) available in the countries which do not have the respective data

- **Docsis 3 cable coverage (approx. minimum 50 Mbps)**

In terms of Docsis 3 standard cable networks Hungary (47.3%) has a much better, nearly 30% higher figure than the EU average (36.6%), owing primarily to the high cable television coverage and their “Docsis 3 conversion”.

**Docsis 3 cable coverage in the countries of Europe, 2011 (as a percentage of the households)**



Source: Broadband coverage in Europe in 2011, European Commission  
 Note: Cyprus, Greece, Italy, Iceland and Latvia did not provide data

- **FTTx<sup>14</sup> (fibre to the home/premises) coverage**

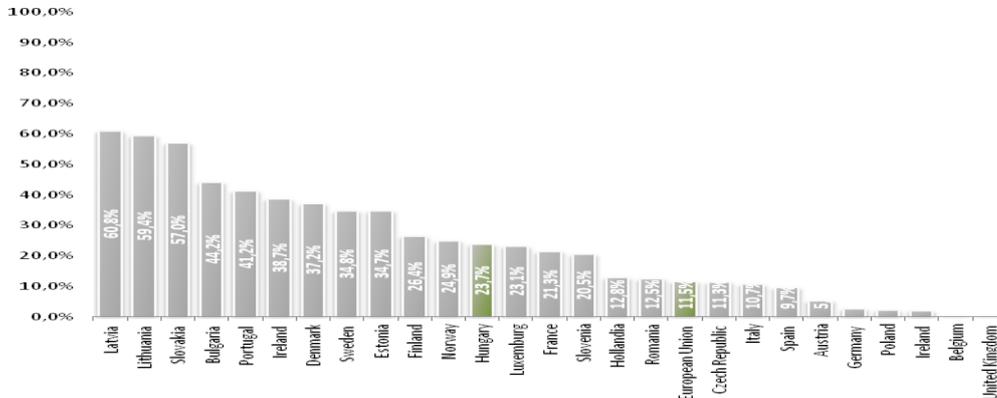
Those countries are leading in the installation of the new generation fully optical networks (fibre to node, to the staircase, household, etc.) considered to be the genuine NGA solution in which the development of traditional networks and/or the fast increase of internet penetration did not take place earlier, and therefore the new investments are likely to generate relatively fast

<sup>14</sup> Optical access networks, supporting data transmission between the local centre and the subscriber with optical cables.

returns (in Latvia and Lithuania the much better figures than the average may be explained with the user habits, similar to those in the Scandinavian countries).

The first four countries with the largest FTTx coverage (Latvia, Lithuania, Slovakia, Bulgaria) are all Member States that joined the EU recently. In this list Hungary lies in the 12th place with its 23.7% figure, which is more than twice the EU27 average (11.5%).

**FTTP coverage in the countries of Europe, 2011 (as a percentage of the households)**



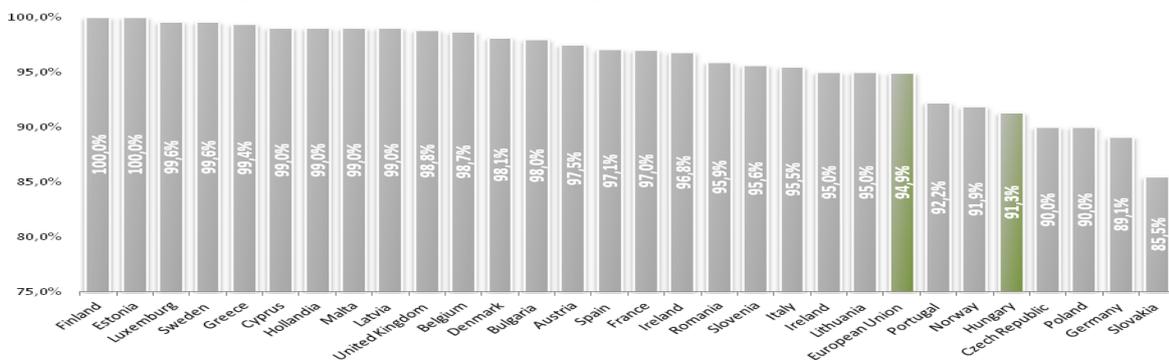
Source: Broadband coverage in Europe in 2011, European Commission  
 Note: Belgium, United Kingdom, Cyprus, Malta and Greece did not provide data

• **Mobile broadband coverage**

**HSPA (3G) coverage**

In terms of 3G geographical coverage (maximum 14 Mbps download and 5.76 Mbps upload speed) Hungary's 91.3% figure is only slightly below the EU average (94.9%).

**HSPA (3G) coverage in the countries of Europe, 2011 (as a percentage of the households)**



Source: Broadband coverage in Europe in 2011, European Commission

**LTE<sup>15</sup> (4G) coverage**

The degree of fourth generation mobile (geographical) coverage with even more than 100 Mbps upload speed is still negligible in most EU countries (even though the Scandinavian countries have very good figures in that respect), and the EU average is only 8.4% too.

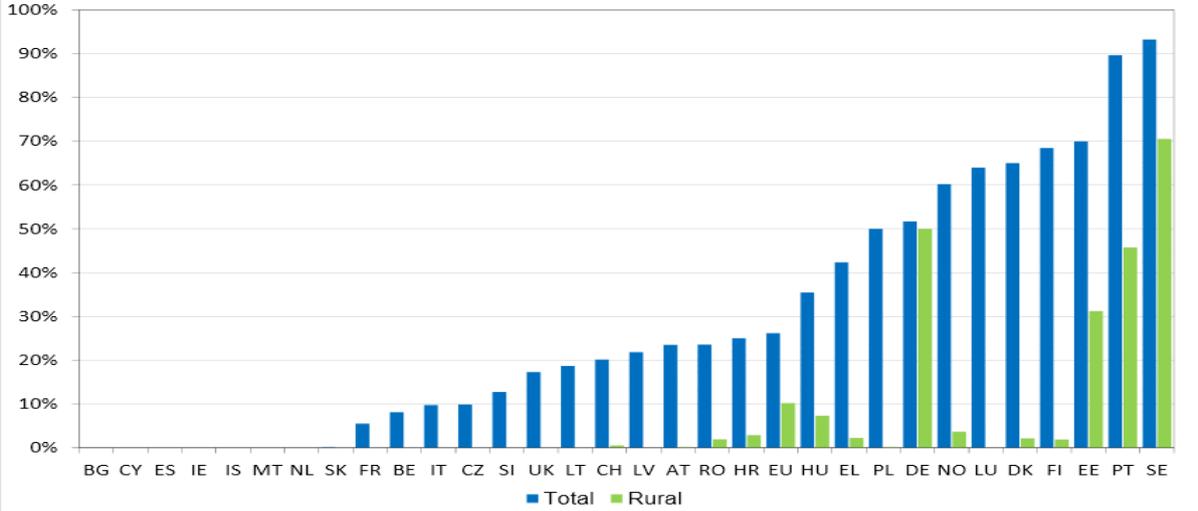
In Hungary the LTE technology is currently available on the T-Mobile network in Budapest, as well as in 87 settlements, for 37% of the population<sup>16</sup>. In June 2013 Telenor offered 4G in 78 settlements, while Vodafone has not yet introduced such a service in Hungary. It needs to be noted that the EU statistics reflecting the situation as at 2011 could be especially inaccurate in relation to LTE, which is one of the most rapidly developing segment of the entire

<sup>15</sup> Long term evolution: fourth generation wireless data transmission standard

<sup>16</sup> Source: <http://www.t-mobile.hu/uzleti/ugyintezes/lefedettseg/lte>

telecommunications sector, because the market of 4G services is expanding day by day. Given the nature of this technology and its infrastructure requirements, the service providers focus primarily on densely populated large cities and agglomeration districts.

**LTE (4G) coverage in the countries of Europe, 2012 (as a percentage of the households)**



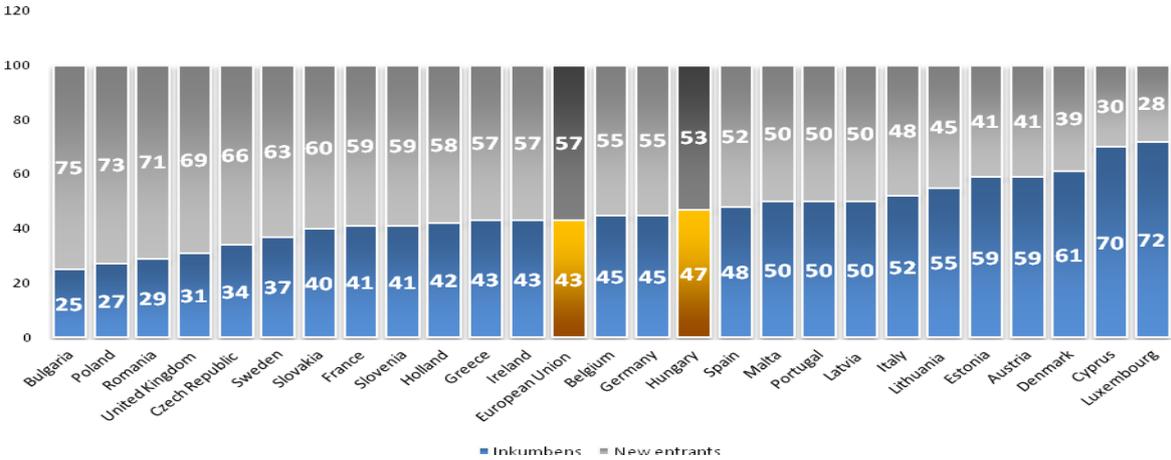
Source: Broadband coverage in Europe in 2012, European Commission

*Quality parameters of the Hungarian fixed broadband*<sup>17</sup>

**a. Choice**

The average market share of incumbents (service providers previously in monopoly positions) has slightly decreased in the EU over the last three years. In July 2012 in total 42.6% of the subscriptions were related to some incumbent service provider, which is on average 0.9% lower than one year before. However, an opposing tendency can be observed in Hungary, in addition to the fact that the figure exceeds the EU average (47%): the market share of alternative service providers (new entrants) has been decreasing for years, reaching the peak in 2010 (59.8%), but at present they have only 53% market share.

**Market share of fixed broadband lines - service providers, July 2012 (as a percentage of subscriptions)**



Source: COMMUNICATIONS COMMITTEE Working Document Subject: Broadband lines in the EU: situation at 1 July 2012, European Commission

<sup>17</sup> With regard to quality parameters we provide only fixed broadband data.

## b. Quality Analysis

More than 88% of internet access in Hungary offers 2 Mbps or higher (nominal) download speed to the subscribers, which is only slightly below the EU average (91.8%), while almost 50% of the connections (49.04%) offers 10 Mbps or greater (practically identical with the EU figures) download speed. The nearly 14% ratio of the subscriptions with greater than 30 Mbps speed is more than one-and-a-half times higher than the EU27 average.

**Breakdown of internet subscriptions by download speed, 2011 (as a percentage of subscriptions)**

	≥2Mbps	≥10Mbps	≥30Mbps
<b>Hungary</b>	88.1%	49.04%	13.72%
<b>EU27</b>	91.8%	48.41%	8.49%

Source: Eurostat, 2011

## c. Satisfaction

The majority of the Hungarian internet users (88%) are satisfied with the download and upload speeds of their internet connections. They do not consider the unavailability of the internet connection a frequent phenomenon (69% tend to agree with the statement that “the internet connection is never interrupted”) and are also generally satisfied with their service providers (73% of the respondents received useful advice from the service provider in the case of any problem occurring).

**The upload and download speed complies with the conditions of the contract (as a percentage of respondents)**

	Completely agree	Tend to agree	Tend to disagree	Completely disagree
<b>Hungary</b>	45%	42%	7%	2%
<b>EU27</b>	32%	35%	15%	12%

Source: E-COMMUNICATIONS HOUSEHOLD SURVEY, Special Eurobarometer 381, 2012

**The internet connection is never disrupted (as a percentage of the respondents)**

	Completely agree	Tend to agree	Tend to disagree	Completely disagree
<b>Hungary</b>	27%	42%	20%	8%
<b>EU27</b>	24%	35%	26%	11%

Source: E-COMMUNICATIONS HOUSEHOLD SURVEY, Special Eurobarometer 381, 2012

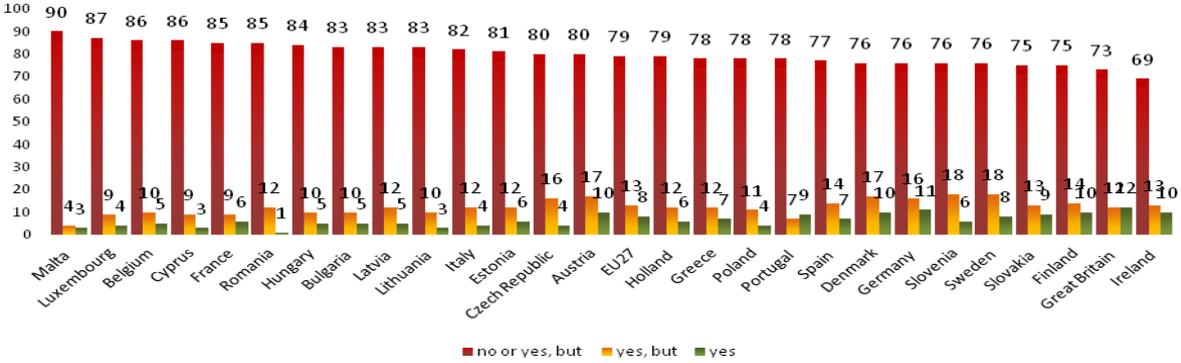
**The internet provider gives useful advice in the case of any problem occurring (as a percentage of respondents)**

	Completely agree	Tend to agree	Tend to disagree	Completely disagree
<b>Hungary</b>	30%	43%	9%	3%
<b>EU27</b>	24%	41%	12%	7%

Source: E-COMMUNICATIONS HOUSEHOLD SURVEY, Special Eurobarometer 381, 2012

The general satisfaction also explains the fact that the majority of the Hungarian users (85%), although for different reasons, have not thought of changing their service providers. Only 5% of the users have changed their service providers or look for the most favourable offers on the market regularly; presumably that can be explained only in part with the quality of the services: the lack of consumer information and awareness is another factor in the evolvement of the situation, which is not ideal for competition.

Have you ever thought of changing your internet provider? (as a percentage of respondents)



Source: E-COMMUNICATIONS HOUSEHOLD SURVEY, Special Eurobarometer 381, 2012  
 Note: **No, or yes, but:** 'We have never considered it', 'Yes, but we are satisfied with the current service provider', 'Yes, but the switch takes too much effort and time,' 'Yes, but we did not know it was actually possible to change provider'  
**Yes, but:** 'Yes, but there are no other Internet access providers in the area which would deliver good value for money', 'Yes, but we are bound by our contract conditions to our current provider', 'Yes, but we are getting Internet access via a package (with other service) which makes it difficult to switch to another provider', 'Yes, but some member(s) of the household do not want to lose their current e-mail address(es)/ web page(s) hosted on the server of the Internet service provider', or 'Yes, but I do not trust other providers'.  
**Yes:** 'Yes, you we have already changed once' and 'Yes, we change each time there are better conditions offered by another Internet provider'.

d. Prices

The gradual decrease in the price of broadband access in almost all broadband domains has been a trend observed for years, driven mainly by the attempts of the cable providers to acquire markets; for them the Docsis 3.0 solution does not entail any major increase in costs in relation to the enhanced bandwidth, and therefore they try to quote the same prices for increasingly high nominal bandwidth to beat the xDSL competitors on the market in terms of prices. The low or falling access fees relate primarily to the higher bandwidth services, while in the lower bandwidth segments prices have remained either high or higher, or the service providers intend to attract users to higher speed bands with deliberate price increases. In February 2012 the cheapest internet service was available in the 8-12 Mbps segment, while the lowest offer for maximum 0.5 Mbps speed internet access was almost 20 EUR/month. Presumably it is mainly the result of the fact that there are no other available services in the region, and therefore anyone wishing to use the internet is forced to accept the offer of the service provider for an expensive subscription with small bandwidth.

Cheapest prices in the various download segments in Hungary, 2012 (total cost/month, EUR/PPP)

144KBPS - 512KBPS	512KBP S- 1024KB PS	1024KBP S- 2048KBP S	2048KBP S- 4096KBP S	4096KBP S- 8192KBP S	8192KB PS- 12MBPS	12MBPS- 30MBPS	30+M BPS
19.57	12.93	16.66	14.64	23.46	11.35	16.46	24.53

Source: BROADBAND INTERNET ACCESS COST (BIAC), final report 2012, Van Dijk, European Commission

The prices in the above table suggest that the Hungarian figures are good in European comparison and, in certain segments, they are extremely good. The cheapest Hungarian prices were among the rather cheap prices in 2012 February in the various segments, even compared to the offers of the countries involved in the comparison.

With one exception (4Mbps-8Mbps) Hungary finished among the top ten countries in each segment, while in the 8-12Mbps range only the Latvian data (9.34 EUR/month) beat the best Hungarian figure (11.35 EUR/month).

**Demand side**

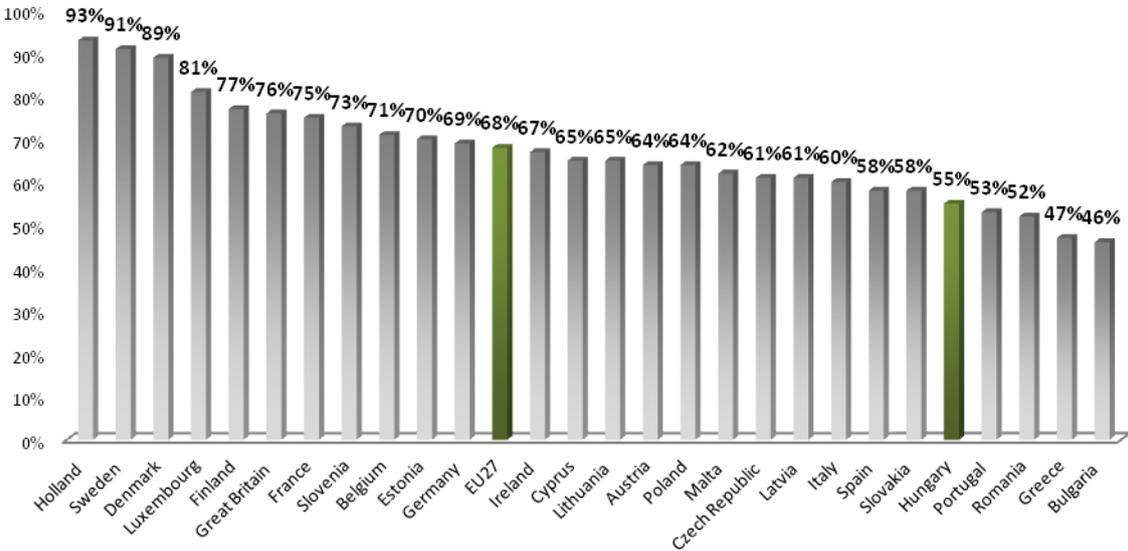
The most important deficiencies of the Hungarian infocommunications market have been clearly on the demand side for years. The dissemination and use of computers is much below the EU average; broadband internet penetration is still significantly behind the EU27 average and the ratio of digital illiteracy is much higher than observed in the European Union both in the 16-74 age group, and in the 15+ age group. In addition, there is also a backlog in the use of (more) advanced online services (e-commerce, e-administration).

**Coverage**

**Low computer coverage**

Compared to the 68% EU average, only 55% of the Hungarian households have a computer. This figure reflects 1% increase compared to the similar period of the previous year and more than 20% shortfall from the EU27 average.

**Ratio of households with computers in Hungary and in the EU27 in 2012 (percentage)**



Source: E-COMMUNICATIONS HOUSEHOLD SURVEY, Special Eurobarometer 381, 2012

**Translation of the above chart**

Holland, Sweden Denmark Luxembourg Finland Great Britain France Slovenia Belgium Estonia Germany EU27 Ireland Cyprus Lithuania Austria Poland Malta Czech Republic Latvia Italy Spain Slovakia Hungary Portugal Romania Greece Bulgaria

The survey of households without computers by geographical area and age revealed that the lowest computer penetration related to rural areas, primarily small towns and villages, and similar usage patterns could be observed also according to the segmentation by age. Accordingly, village residents (less than 50% of the households are equipped with computers) and households including residents aged over 60 are affected, especially, because in these groups computer penetration was only 9%.<sup>18</sup>

Ratio of households with computers in Hungary and in the EU27 in 2012 (as a percentage of households)

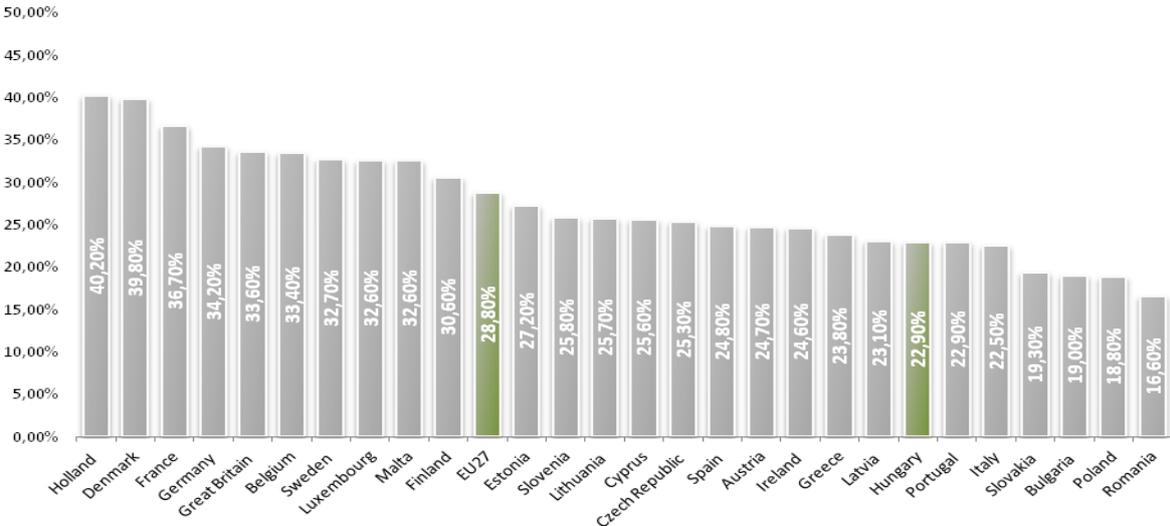
	Village	Small and medium-sized town	Large town	-29	30-59	60+
<b>Hungary</b>	48%	43%	73%	86%	55%	9%
<b>EU27</b>	64%	67%	74%	83%	68%	27%

Source: E-COMMUNICATIONS HOUSEHOLD SURVEY, Special Eurobarometer 381, 2012

**Internet penetration, lower than the EU average**

In Hungary the broadband internet penetration (number of subscriptions per 100 residents) was 22.9% in 2013, involving approximately 2.3 million subscriptions, compared to the EU average (28.8%), which is more than 25% higher than the Hungarian indicator.

Fixed broadband penetration in the European Union, January 2013 (percentage)

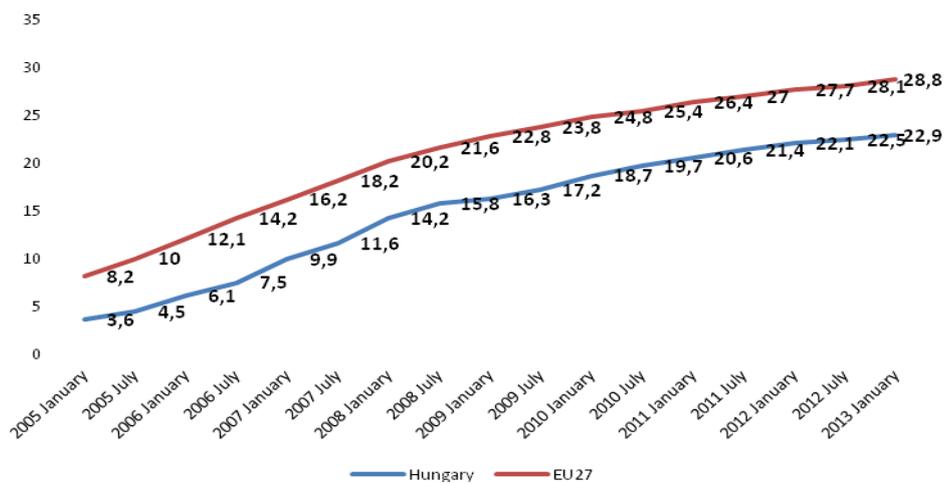


Source: Digital Agenda Scoreboard, 2013

That more or less permanent 25% difference has been persistent between the EU and Hungary in broadband internet subscriptions for 7-8 years.

<sup>18</sup> It is important to note that according to the current trends, the penetration of desktop computers will be a less reliable indicator of the development of the information society.

## Variation of fixed broadband penetration between 2005 and 2013 in the European Union and in Hungary (%)

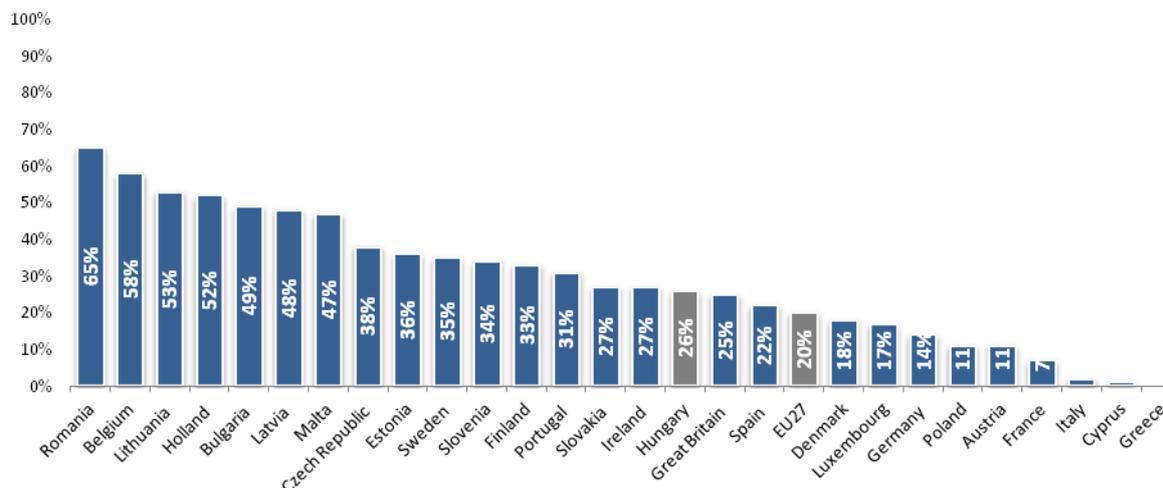


Source: Eurostat, 2012

### High new generation access penetration ratio

Owing primarily to the Docsis 3.0 developments in the cable networks, in Hungary the truly large bandwidth new generation access has a considerable share (26%) in the broadband subscriptions and the figure is significantly higher than the 20% EU average.

### NGA penetration in the European Union, January 2013 (as a ratio of all broadband subscriptions)



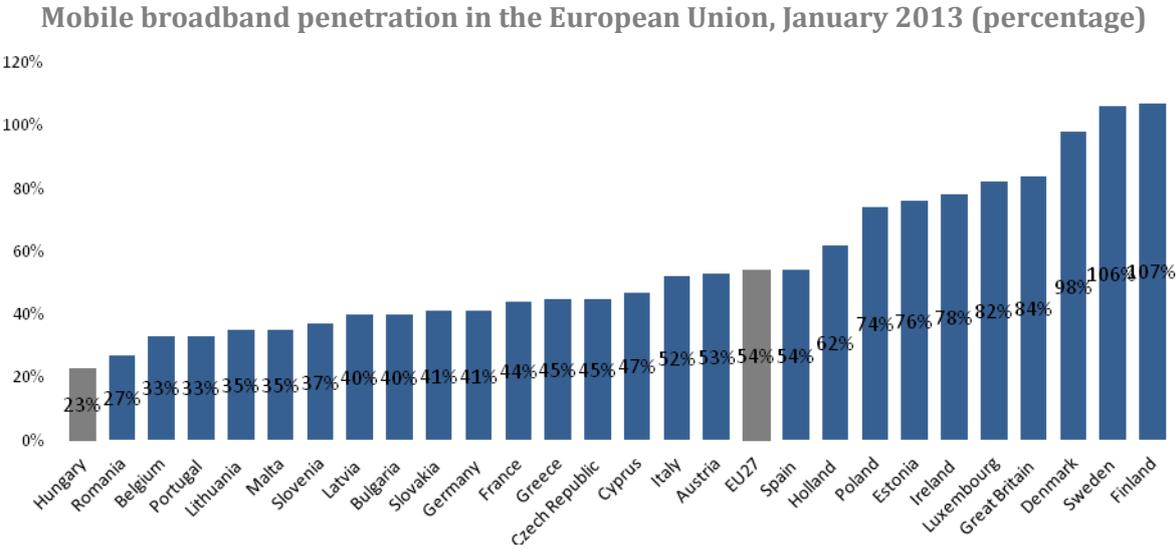
Source: Digital Agenda Scoreboard, 2013

Note: Greece is included in the statistics with 0%, and therefore is not included in the figure

### The use of mobile internet is still much below the EU average

Over the last approx. three years the mobile internet penetration has grown significantly, but our backlog from the EU27 average is still significant (it is not changed the least by the fact that the latest figures of NMHH show slightly different figures).

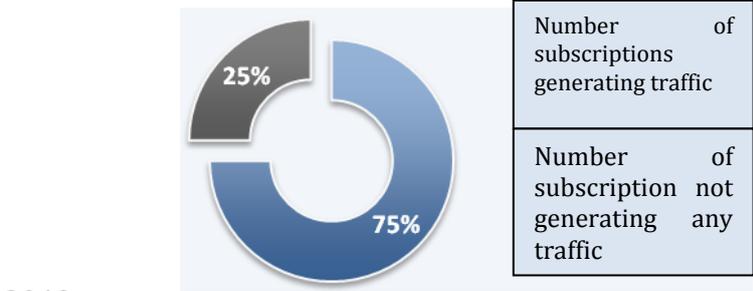
While in November 2011 the National Media and Infocommunications Authority (NMHH) measured 2,023,000 mobile internet subscriptions, the figure in August 2012 grew to 2.76 million (with 2.1 million active users), and reached 3.4 million in April 2013, including 2.5 million users (75% of the total subscriptions) generating traffic.



Source: COMMISSION STAFF WORKING DOCUMENT, Digital Agenda Scoreboard, 2013

The 23% Hungarian figure in the above chart is slightly different from the 25% mobile penetration measured by NMHH in April 2013, but even that figure puts Hungary only in the last place in a European comparison (without any growth in the other countries since the survey), but the ratio is already higher than the fixed penetration figure<sup>19</sup>. (Naturally, the two figures should not be compared, because the fixed subscriptions relate to households, while the mobile subscriptions relate to persons.)

**Breakdown of mobile internet subscriptions (as a percentage of subscriptions), May**



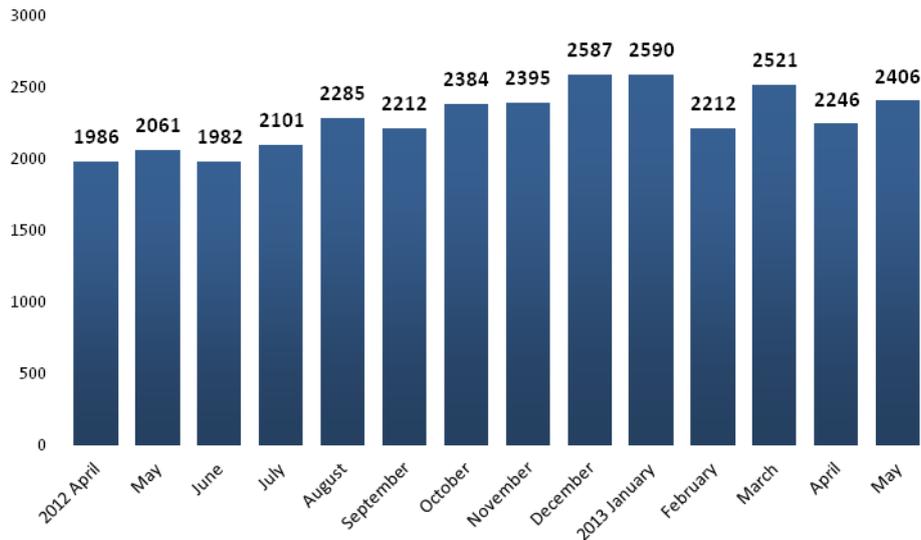
2013  
Source: NMHH, 2013

As an annual overview, the aggregated data traffic on the networks of mobile providers increased by less than 21 % between April 2012 and May 2013. Compared to the peak registered in December 2012, the aggregated data traffic dropped by 9% in 2013<sup>20</sup>.

<sup>19</sup> However, it does not mean that mobile internet would take over the role of the fixed line service. On the contrary, the distribution of fixed internet and mobile internet (WiFi) has a significant role also in the use of mobile devices, primarily when large contents, films, music and games are downloaded.

<sup>20</sup> Apart from the smart phones and portable 3G modems, the tablet penetration is also rising dynamically, and therefore a robust increase may be predicted in mobile data traffic even in the medium term.

### Total Hungarian mobile internet data traffic (thousand GB)



Source: NMHH, 2012-2013

### Basic infrastructure of the government networks

The National Network Development Project (NNDP) resulted in the building of the National Telecommunications Backbone Network (NTBN) in 2011, which served more than 4500 endpoints in the middle of 2013 instead of the almost 2000 institutional endpoints (sites) supported by the EGBH. The NTBN made available high security electronic telecommunications services to more government and public institution sites than ever before.

Based on the infrastructure of the NTBN, electronic telecommunications services are provided to public institutions by state-owned companies. The backbone network used for such purposes is provided by MVM Hungarian Electricity Ltd. and MVM NET Telecommunications Ltd. (MVM NET Ltd) launched on 1 March 2012, using the free capacity of their nationwide optical electronic telecommunications network. The National Infocommunications Services Ltd. (NISZ Ltd.) provides the service to the government users.

#### In summary:

The data indicate well that the basic coverage figures of Hungary in infrastructure are good also in European comparison, as by 2014 the minimum broadband required for joining the digital world will be accessible in the whole of the country. However, the country is still behind in NGA networks, as approximately 1.6 million households are not yet connected to a network capable of at least 30 Mbps speed.

In terms of the basic infrastructure of government networks it can be concluded that with the establishment of the National Telecommunications Backbone Network (NTBN) the first phase of the National Network Development Project launched in July 2011 for the consolidation of the government IT services was completed at the end of 2012. The next phase of the development of the network will be implemented within the framework of the EPAOP 2.2.6 project.

## II.2.2 Digital competences

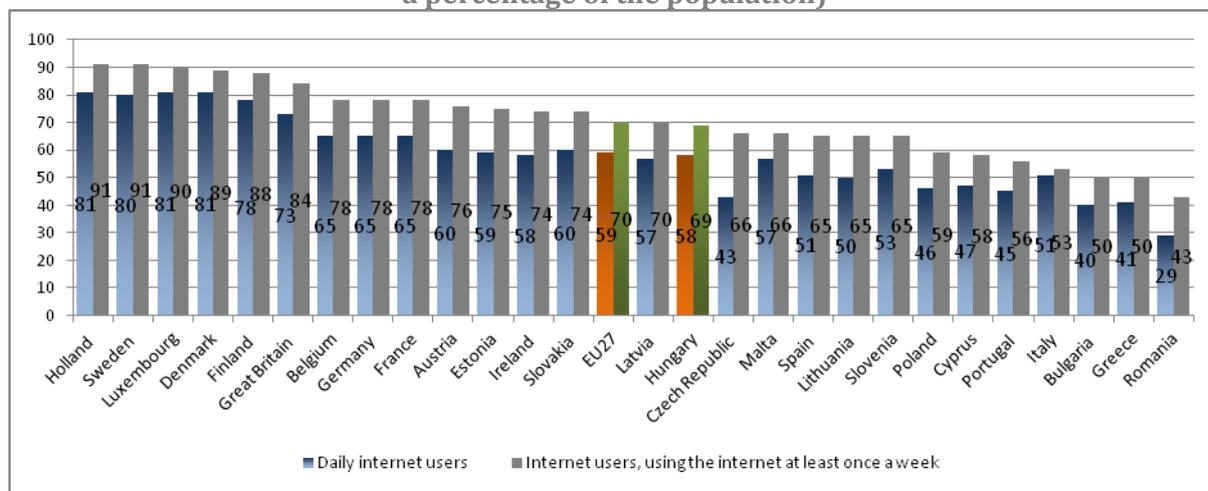
### Digital competences of citizens

#### a. Usage

##### Usage indicators below the EU average

According to the methodology applied by the Eurostat, more than two thirds (70%) of the 16-74 age group are considered regular internet users (at least once a week) in the European Union. The Hungarian data are not significantly different, as the ratio of frequent internet users according to the EU terminology (every day or almost every day) is also more or less the same as the European figures (the EU average was 59% and the Hungarian average was 58% in 2012).

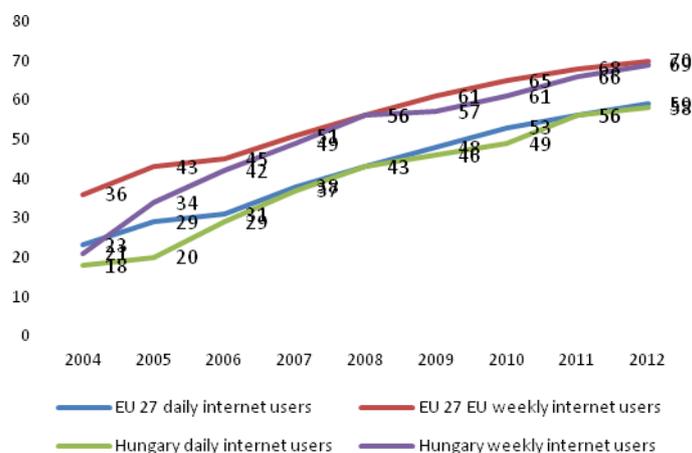
Ratio of internet usage at least once a day or once a week in the 16-74 age group, 2012 (as a percentage of the population)



Source: Eurostat, 2012

Since 2010 the number of weekly internet users has increased by 13%, while the number of daily internet users has gone up by more than 17%.

Variation in the ratio of internet usage at least once a day or once a week in the 16-74 age group, 2012 (as a percentage of the population)



Source: Eurostat, 2012

## The secondary digital divide continues to be significant

The main conclusion of the review of the usage patterns is that the majority of the Hungarian internet users go for almost exclusively basic online services, and are reluctant to use any activity that involves value added, online commercial or payment transactions.

The table below shows that the users opt for simple services in a ratio much higher than the EU average (search for health information, reading online newspapers, magazines, search for information on goods and services) while they are reluctant to use services involving transactions and more knowledge (e.g., electronic banking, e-government services, cross-border online purchases, etc.).

Activities on the internet, 2011 (as a percentage of internet users)

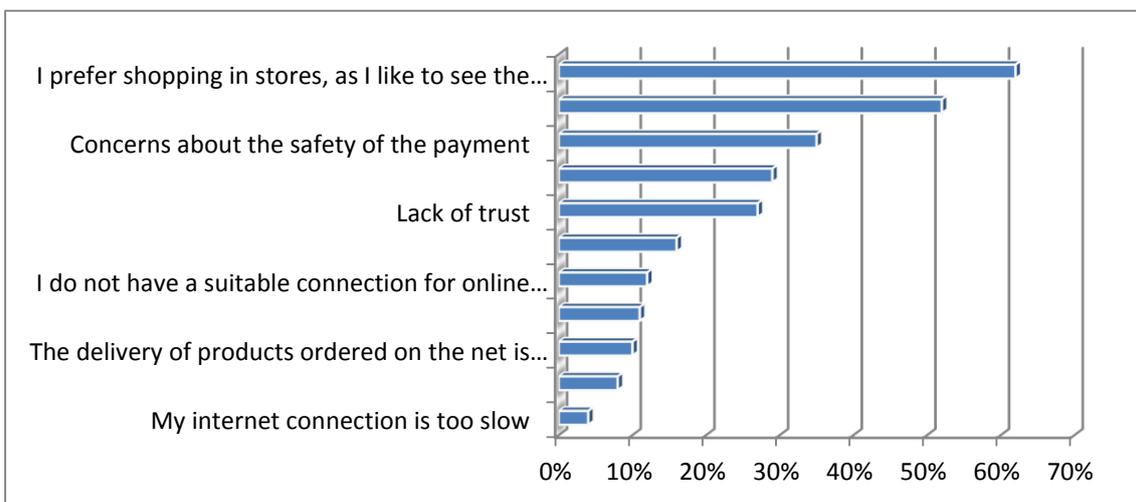
Indicator	HU	EU27	position
<i>Basic usage</i>			
Finding information about goods and services	80%	79%	10.
Reading online newspapers/news	82%	56%	8.
Downloading games, images, films and music*	52%	41%	7.
Seeking health information	71%	54%	1.
Job search or sending an application	30%	23%	6.
Doing an online course	8%	7%	11.
Search for information on education and further training	49%	40%	10.
Participating in social networks	76%	53%	2.
<i>More transactive services</i>			
Internet banking	31%	53%	24.
Use of e-government services*	44%	46%	18.
Online purchases	32%	58%	21.
Ratio of cross-border online purchases	6%	13%	25.
Online sales	18%	23%	13.

Source: Digital Agenda scoreboard, 2012,\* 2010 data

The results of a former survey also revealed that the most frequently mentioned reasons for not choosing online purchase, payment or electronic banking were very similar to the cognitive reasons applicable to primarily digitally illiterate individuals (“I do not need them”, “I cannot use them”, “too complicated”, etc.).

The overall picture is shaded by the fact that such type of reluctance is also the result of deliberate consumer conduct, which may also be related to the misuse of personal data.

Reasons for avoiding purchase on the internet  
(ratio of natural persons not placing online orders at all in 2009)

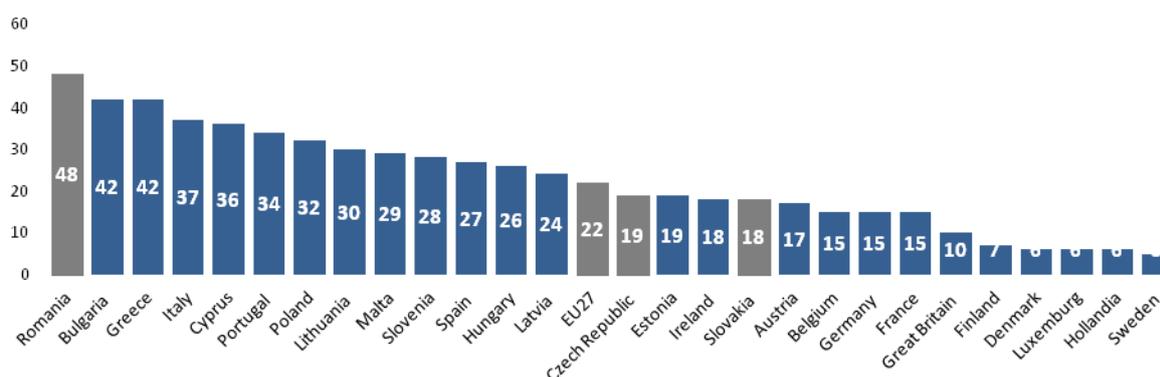


Source: Ariosz Ltd., Bellresearch, 2010

## b. No computer use

The Hungarian figure is approximately 18% lower than the EU average (and the gap is increasing) with regard to non-computer users. According to our calculations, that group included almost two million people in 2012 in the 16-74 age group applied in the European Union.

Residents who never used a computer before, 2012 (as a percentage of the population aged 16-74)



Source: Eurostat, 2012

If the 15-16 age group obviously improving the ratio of users, and the age groups of over 74 presumably deteriorating the ratios are also added to the calculations, then the data will deteriorate drastically. Consequently, the Hungarian research conducted with a methodology different from that of the Eurostat (measuring the internet use in the age group over 15) provide a much more unfavourable picture: according to the data of both GKIE NET and Bell Research the digital illiteracy ratio is approximately 44%, which means that in the 15+ age group 3.7-3.8 million people have never used any computer/internet; that figure represents approximately 37% of the Hungarian population.

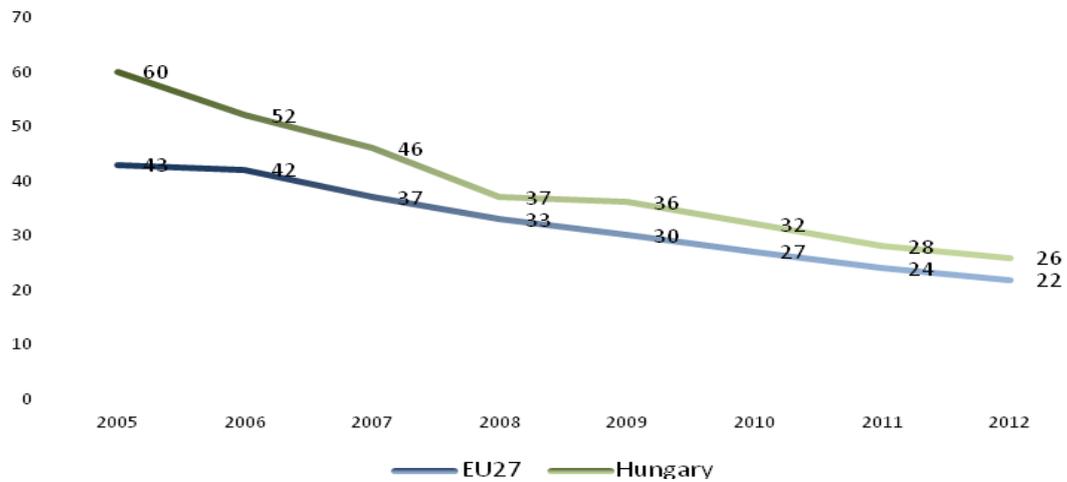
Group of people not using the internet in the various age groups, 2012

Source	Individuals not using the internet		Methodology remark
	%	persons	
Eurostat (2012)	26%	1 990 814	16-74 age group
		persons	
GKIE NET (2012)	44.3%	3 769 361	15+ age group
		persons	
Bell Research (2012)	43.8%	3 726 818	15+ age group
		persons	

Source: Eurostat, eNET: Impact of the development of digital literacy on the macro economy (2012), Bell Research: Hungarian Infocommunications Report (2012)

The group of non-users shrank by approximately 19% over the last three years, but the gap between the EU average (22%) and the Hungarian figure (26%) is still significant.

### Variation in the ratio of population who never used the internet 2005-2012 (as a percentage of the population aged 16-74)



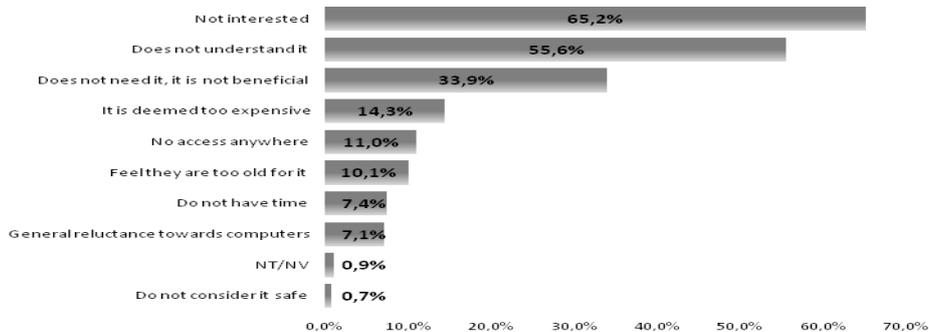
Source: Eurostat, 2012

#### The reasons for not using the internet are still of cognitive, motivation type

The reasons for not using the internet are dominated primarily by cognitive, knowledge and motivation barriers, and the financial aspects are becoming less and less important partly due to the reduction of computer prices and partly due to the drastic decline of the internet access price.

The responses reveal that the majority of this group are still not interested in computers (or the online world) and think that they cannot benefit from its use. There is still a significant ratio of respondents who do not use the internet due to lack of competence, and only 14 of the respondents referred to financial reasons.

#### Reasons for not using the computer (as a percentage of respondents not using the computer)



Source: Hungarian Infocommunications Report (2012)

### Digital competences of SMEs

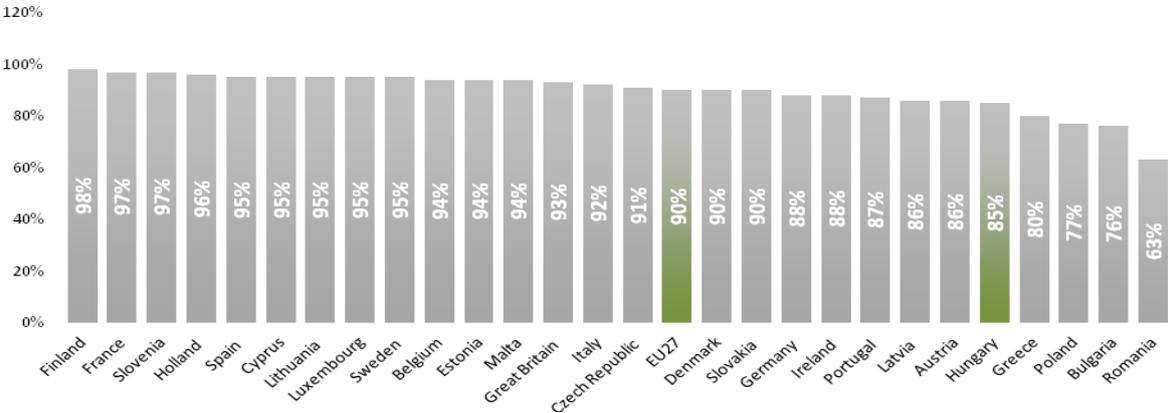
#### Internet use depending on corporate size

The widely used indicator of internet penetration refers to companies employing more than 10 individuals in the corporate segment, and therefore it conceals the fact that the micro and small enterprises may be described more with household rather than corporate penetration ratios. While the penetration is 100% among the large companies and is greater than 98% in companies employing more than 10 people, the respective ratio is only 78.8% in micro enterprises<sup>21</sup>. Due to the high quantitative ratio of small and medium-sized enterprises, the low

<sup>21</sup>Source: Hungarian Infocommunications Report (2012)

indicators of this corporate category reduce the Hungarian average: the 85% value is not significantly below the EU average (approximately 6%), but the gap has increased since the previous year and the figure puts Hungary only in the 20th place in a European comparison.

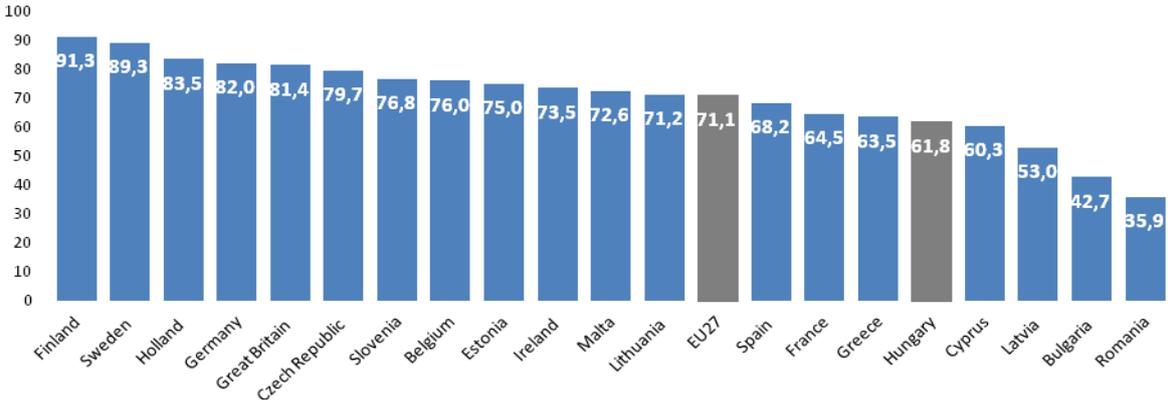
Corporate internet penetration in the European Union in 2012 (in %)



Source: Eurostat, 2012

The website penetration of corporate entities reflects a worse picture. According to a survey conducted among the EU Member States, approximately 62% of the Hungarian companies (without the financial sector) (employing 10 or more people) had their own website in 2012, which reflects a 15% backlog from the EU average. According to the sampling specificities of Eurostat, the figures indicated below would be significantly improved by the financial sector, which is not include in the basic population, although the micro enterprises would significantly deteriorate them. It is also important to note that as a result of the extremely fast penetration of the social media numerous companies do not have their own websites, although they have a corporate profile in a social network.

Ratio of corporate entities with a website in 2012 (as a percentage of corporate entities employing 10+ people, without the data of the financial sector)



Source: Digital Agenda scoreboard, 2012

**Digital competencies of public administration employees**

Although the motivated involvement in the development of e-administration of well-trained **public servants** engaged in the supply of services with a new approach is indispensable for benefiting from the results of the e-administration developments, there are no indicative Hungarian surveys on the e-administration or, in a more wide context, digital competencies, of public administration employees.

The surveys filling the niche area are prepared within the framework of the SROP-2.2.18. **“Encouragement for using public administration services and information thereon”** priority project (“THE OFFICE IS ON THE NET”) implemented by the MPAJ parallel with the elaboration of this strategy, one of the objectives of the project is to enhance the skills and motivation of public servants involved in the supply and in the support of the use of e-administration services.

**In summary:**

Hungary is in a good position in terms of digital infrastructure, but has a huge backlog with regard to digital illiteracy. 3.5 million people are not yet part of the digital revolution, they do not have competitive knowledge, and therefore cannot benefit from that knowledge. The same statement applies also to the employees and managers of micro and small enterprises, and there is also some backlog in the digital competencies of public administration employees.

**II.2.3 Digital economy**

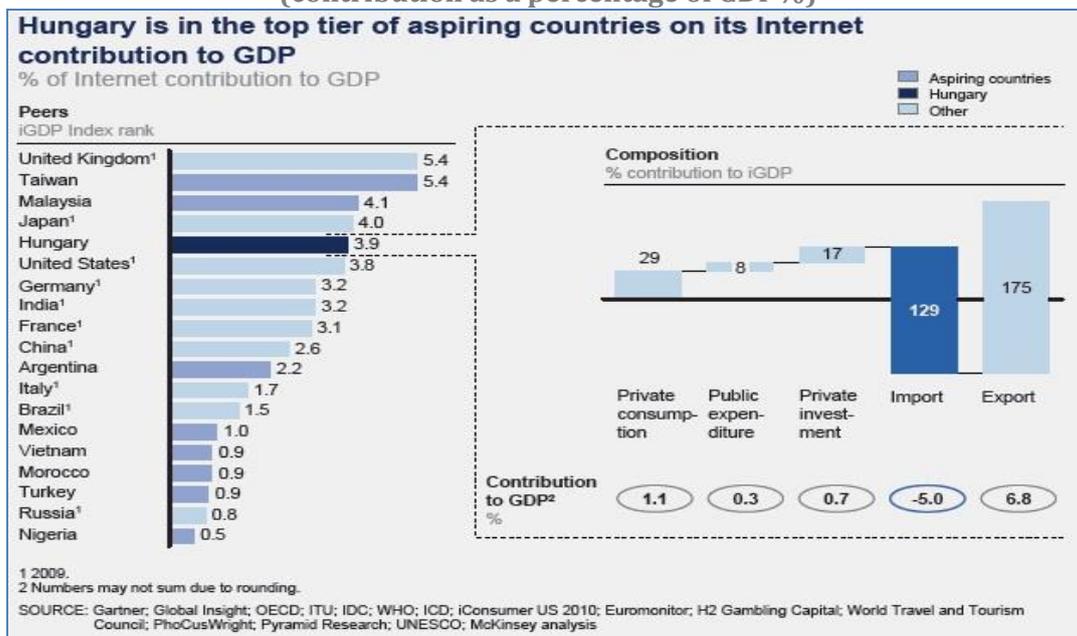
Under the digital economy pillar the status analysis covers the ICT sector, the corporate activities related to e-services, and the internal information technology of corporate entities.

**a. ICT Industry**

According to a McKinsey study published in 2012, the internet economy (i.e., not the complete ICT sector) had one of the largest contributions to the GDP in Hungary (3.9%) among the developing countries. The biggest driving force behind that trend was the export activities relating to the ICT industry.

The other important factor of the contribution to GDP is internal consumption (e.g., broadband revenues, e-commerce) the 1.1% GDP ratio of which is the highest among the surveyed countries.<sup>22</sup> One of the biggest driving forces behind that result is the export activity relating to the ICT industry.

**Contribution of the internet to GDP in some developed and emerging countries, 2012  
(contribution as a percentage of GDP%)**

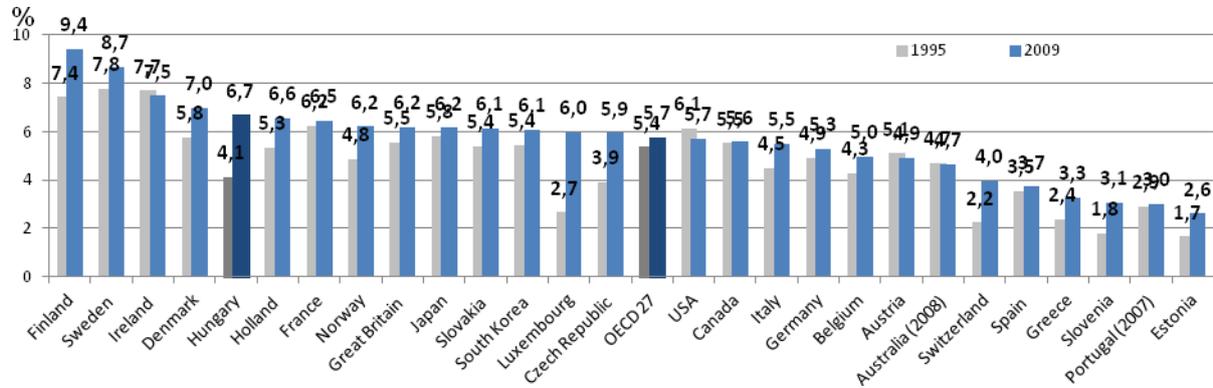


Source: McKinsey: *Online and upcoming: The Internet's impact on aspiring countries, January 2012*

<sup>22</sup> According to a latest HCSO survey, while the output of the majority of the sectors of the national economy stagnated in Q1 2012, the gross added value of the infocommunications sector increased by 4.5% since the similar period of the preceding year.

The outstanding role of the sector in employment is indicated by the fact that according to the respective OECD report compared to the total market sector, the ICT sector provided 6.7% of the employees in 2009, which is a remarkable figure also in a worldwide comparison, and Hungary is beaten in that indicator only by such economically more developed countries as Finland, Sweden, Ireland and Denmark.

### Employment ratio of the ICT sector within the total business sector 1995-2009



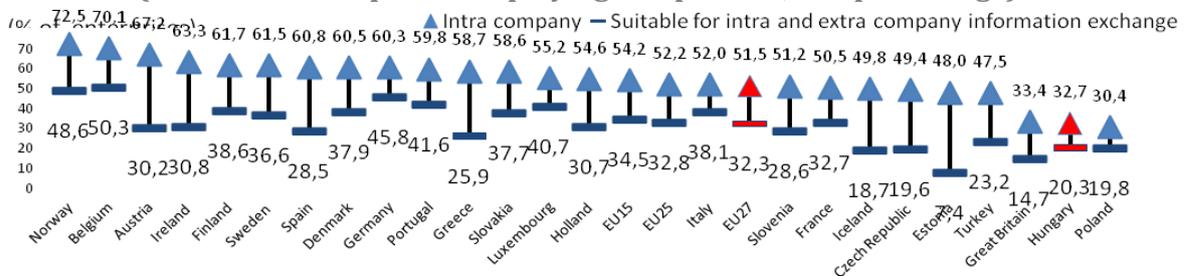
Source: OECD Internet Economy Outlook 2012

## b. Corporate IT

### Low degree of internal corporate information technology in corporate entities

In 2010 only 32.7% of the Hungarian enterprises managed the information generated within the company electronically, compared to the EU27 51.5% ratio (almost 60% backlog), while only 20% of the Hungarian enterprises exchanged data with other companies electronically.

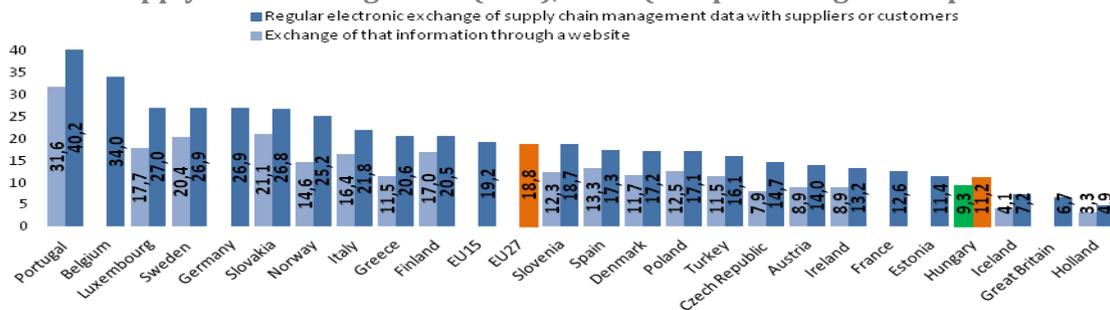
### Corporate entities exchanging (intra or extra company) information electronically, 2010 (as a ratio of companies employing 10+ persons, as a percentage)



Source: Internet Economy Outlook, 2012, OECD

In 2010 on average 18.8% of the companies used some form of the supply chain management (SCM), which reflected 3.3% increase since 2008. In that respect, the Hungarian 11.2% figure is more than 60% below the OECD average.

### Use of the supply chain management (SCM), 2010 (as a percentage of corporate entities)

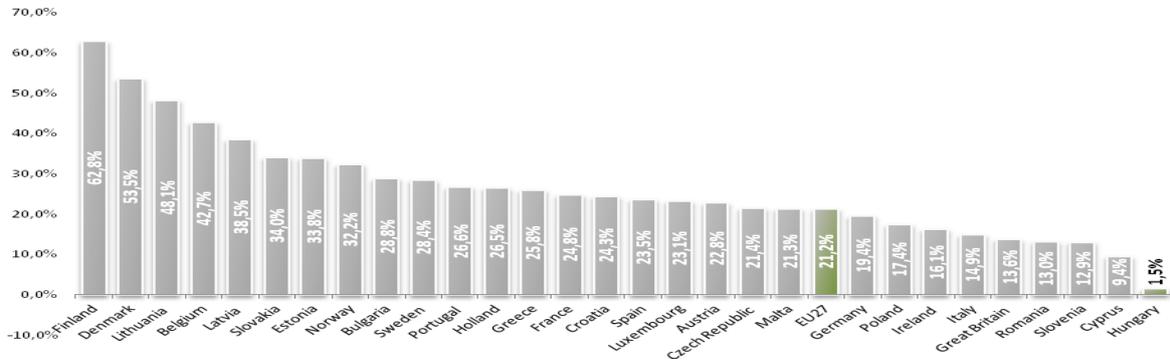


Source: Internet Economy Outlook, 2012, OECD

## Low e-invoice usage

There is also a significant backlog in the issue and acceptance of electronic invoices (in the latter case automatic processing is also a requirement), **where Hungary, with its 1.5%, came last in the international comparison.** In the European countries, on average every fifth company issued or received e-invoices in 2010.

Ratio of companies which sent or received electronic invoices, 2010 (as a percentage of companies)



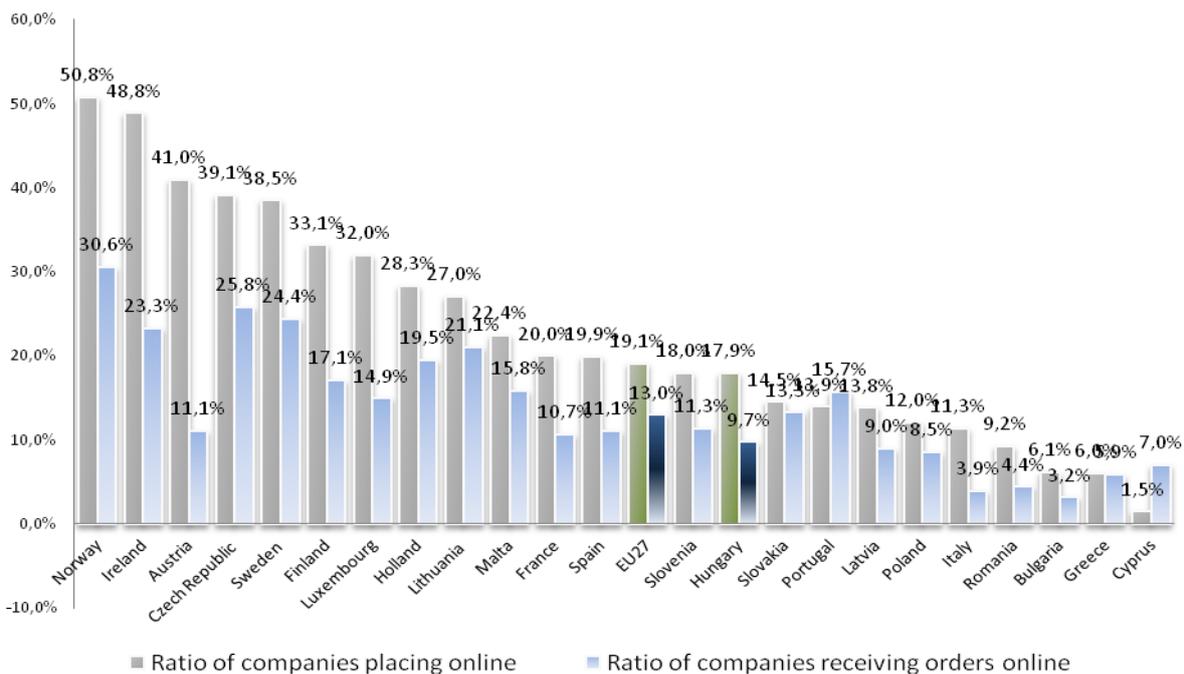
Source: Digital Agenda scoreboard, 2012

## c. E-services

### Improving, but still lower than EU average online purchases and sales

The Hungarian companies developed considerably their online purchasing and sales activities over the last few years, but still have not managed to catch up with the EU average. The previously occasionally 50% backlog from the EU27 average (19.1%) has been reduced to approximately 7% among companies placing online orders (17.9%) in 2-3 years, but the backlog is still more than 30% (9.7%) from the EU27 average in terms of online sales (13%).

Ratio of companies placing or receiving orders online, 2011 (in %) (at least 1%)

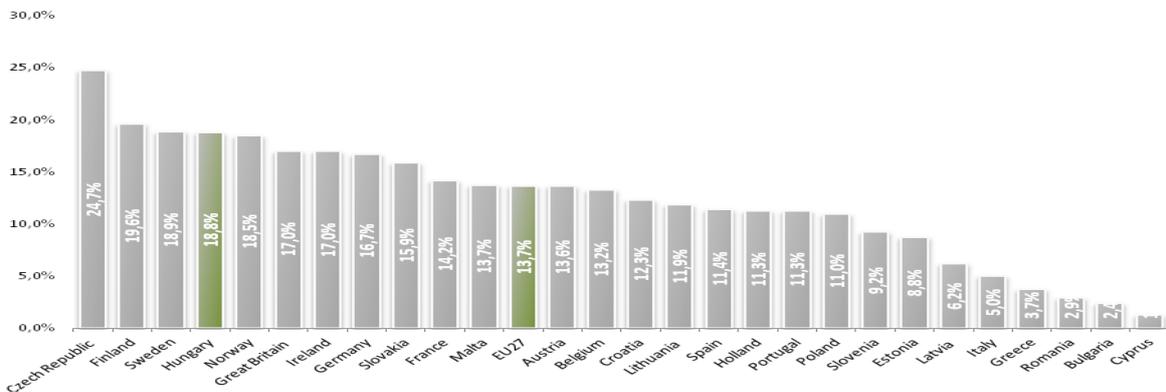


Source: Digital Agenda scoreboard, 2012

## Dynamically growing e-commerce

The above growth data are confirmed also by the e-commerce revenues of the companies. Despite the fact that the ratio of companies engaged in online sales in Hungary is significantly below the EU average, the revenues from e-commerce (18.8%) are increasing each year, primarily because the companies concerned direct their revenues into that channel, and presumably those companies earn higher than average revenues.

E-commerce revenues of the companies, 2011 (as a percentage of total revenues)



Source: Digital Agenda scoreboard, 2012

### In summary:

The ICT industry represents a significant value in the Hungarian economy as it generates almost 12% of the GDP. The internet economy contributes 3.9% of the GDP, while the employees of the ICT sector have reached 6.7%.

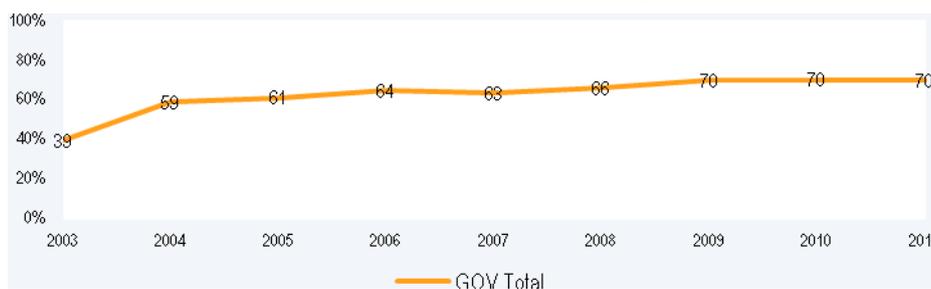
Nonetheless, it is a negative factor that the degree of IT penetration in corporate entities and the involvement of SMEs in the digital economy are still low. The majority of the SMEs do not have websites and they do not perform online transactions. At the same time, e-commerce have achieved considerable growth and is likely to develop significantly, as it grew dynamically over the last few years even despite the financial crisis and an increasing portion of the revenues of the corporate entities originate from online sales.

## II.2.4 Digital state

### a. Government IT

Since 2005 the basic computer penetration in the internal IT infrastructure supporting the operation of the government has been 100%. The ratio of LAN, i.e. local area networks has more than doubled in the government (and social security) institutional segment since 2003, although there has been stagnation in the last 3 years.

LAN penetration, 2003-2011 (as a percentage of institutions)

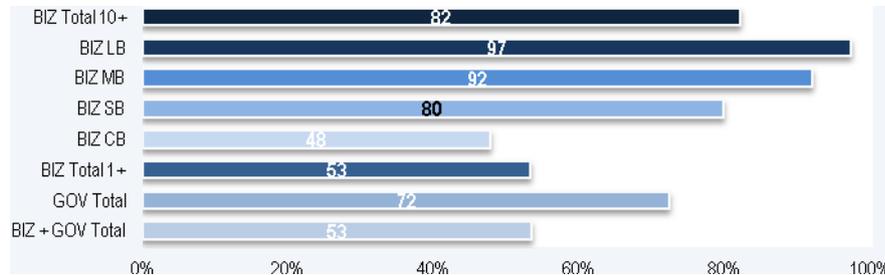


Source: Hungarian Infocommunications Report, 2011

## Popularity of IT support to administration processes

In the majority of institutions (72%) the IT support of administration processes is a general practice. The most popular such solutions cover finance, accounting, controlling, invoicing, registration of customer and supplier data, wage accounting, workforce management, management statements and material management, and stockpiling.

### Ratio of companies using some IT application to support administration processes<sup>23</sup> (%)



Source: Hungarian Infocommunications Report, 2011

The National Infocommunications Services Ltd. (NISZ Ltd.) is the No. 1 actor in government information technology (and electronic communications), as it provides IT and electronic communications services to designated (nearly 130) organisations/institutions (approx. 8,000 users) based on an authorisation/obligation stated in the law. Owing to the central government IT consolidation, the government backbone network infrastructure (MVM-NET Ltd.) and the services running on it (NISZ Ltd.) have been concentrated in the hands of the state, as illustrated on the figure below.

### Place and role of NISZ in the government information technology



Source: NISZ Ltd.

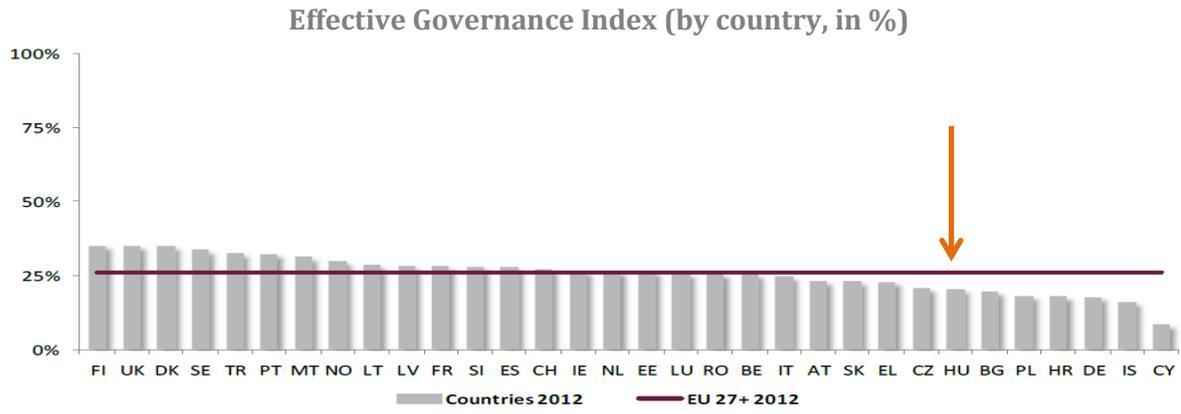
### b. E-administration

The latest review prepared for the European Commission<sup>24</sup> created the “Effective Government Index”, which focuses primarily on the quality parameters of services (usage, user expectations, estimated usefulness, estimated “reuse”, etc.). Accordingly, effective governance refers to what extent the governments can satisfy user expectations and requirements and whether or not they can win the residents as permanent “customers”.

The index is the result of the merger of two main indicators, the e-government efficiency and the e-government impact. The first one measures user satisfaction, while the latter one measures the probability of repeated use and the benefits of the use. The EU27 average is 26%, which is rather low. It is primarily due to the relatively low usage indicators and the lack of user satisfaction with services.

<sup>23</sup> E.g., finance, accounting, controlling, invoicing, registration of customer and supplier data, wage accounting, workforce management, management statements and material management, and stockpiling

<sup>24</sup> eGovernment Benchmark 2012 background report (SMART 2012/0034-2)



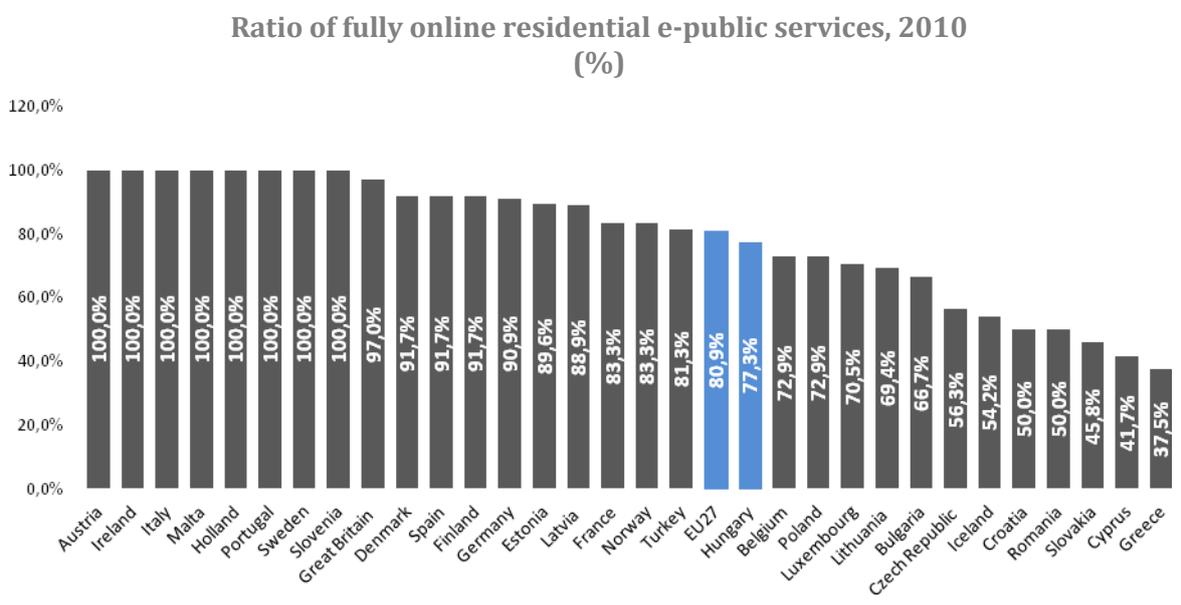
Source: eGovernment Benchmark 2012 background report

In that aggregated list Hungary is in 26th place from the 32 countries, with its performance well below the EU average (impact: EU27:71%, HU: 73%; usage of e-government services: EU27:46%, HU:36%; efficiency of e-government: EU27:40%, HU:40%).

### Supply of e-administration services

**In an EU comparison the supply of residential e-administration services do not indicate any significant backlog**

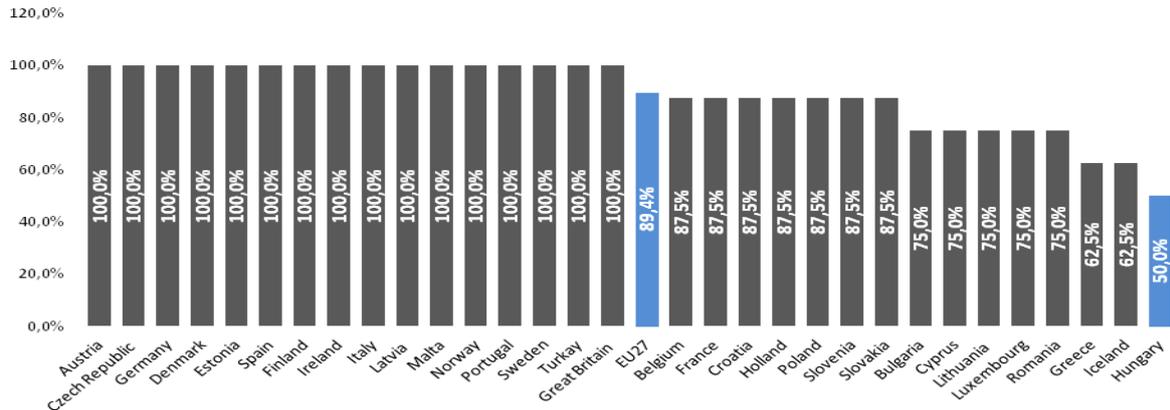
According to the latest Eurostat figures in 2010 77% of the electronic public services offered to the residents were available in Hungary online (the EU average was approx. 4 percentage points higher). In that list Hungary lay in 19th position among the analysed 31 countries in 2010.



Source: Digital Agenda Scoreboard, 2012

Consequently, the backlog of the supply side is not significant in residential services, although according to the Cap Gemini survey commissioned by the European Commission, the ratio of fully online public services provided to companies is only 50% in Hungary compared to almost 90% in the EU, with which Hungary came last in the EU comparison.

## Ratio of fully online corporate e-public services, 2010 (%)



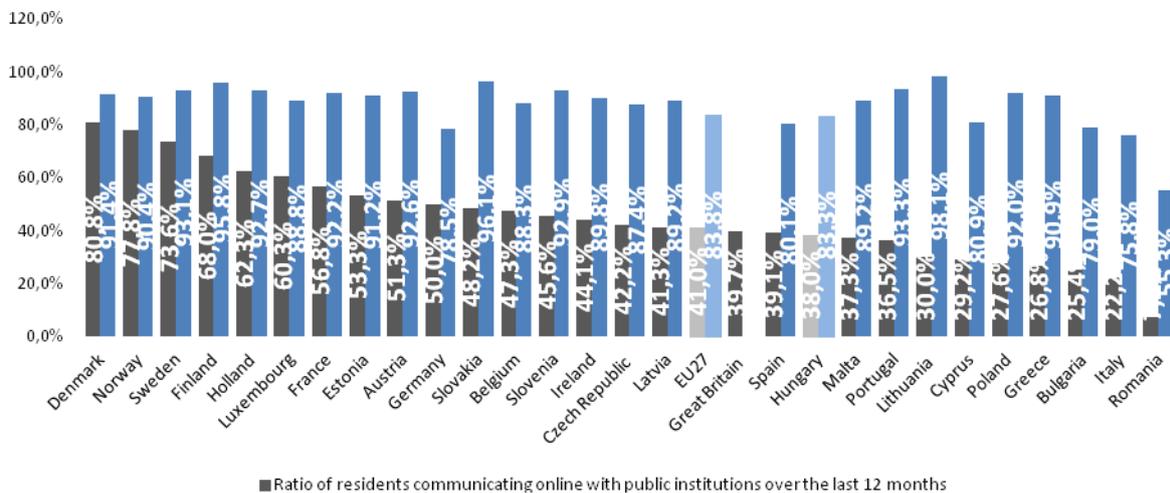
Source: Digital Agenda Scoreboard, 2012

## Demand for e-administration services

**Residential activity is close to the EU average, while corporate activity is twice as high**

In 2011 within the 16-74 age group 38% had some online connection with public institutions, which reflected 3 percentage points shortfall from the EU27 average. The corporate activity, practically identical with the EU average and more than twice as high as the citizen's use is primarily due to the legal requirements and not to the online awareness of enterprises, or the positive attitude towards e-public services.

## Use of e-public services (households and corporate entities), 2011 (%)



Source: Digital Agenda Scoreboard, 2012

The Commission survey, broken down to several user/non-user groups, reached similar conclusions in terms of usage by citizens, although measured greater difference between the Hungarian and the EU27 figures than indicated above. The study classified into four large categories all the users who used some type of e-government service during the period of 12 months prior to the survey (see the table below).

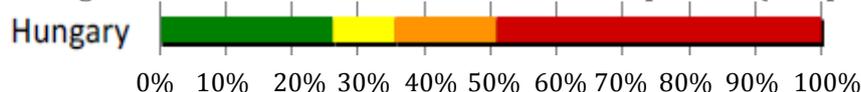
**Classification of e-government service users**  
 (Users of any e-government service in the course of one year prior to the survey)<sup>25</sup>

		Preferred method of usage (e.g., e-mail, website, tablet, smart phone, etc.)	
		Yes	No
Usage of e-government services	Yes	<i>active user</i> (Have you used and do you intend to use in future any e-administration service?)	<i>potential dropout</i> (Previous use of the service, but opting for other (online) channels in future)
	No	<i>potential user</i> (No service used in the past, but usage is planned for the future)	<i>rejection</i> (No previous or future use of such services)

Source: eGovernment Benchmark 2012 background report

There are basically two groups in the formed categories which do not use e-government services: those who did not use such services in the past, and do not plan to do so either, and those who did not use them in the past, but intend to use some type of e-public service online in the future. In Hungary the ratio of individuals who did not use any public services online in the past and do not plan to do so in the future either is especially high (rejective users, or according to the EU terminology “non-believers”) and the ratio of “replacement”, i.e. potential users also seems to be painfully low.

**Use/non-use of e-government services in the different user profiles (as a percentage)**



Colour codes: “believer”, potential dropout; potential user; “non-believer”

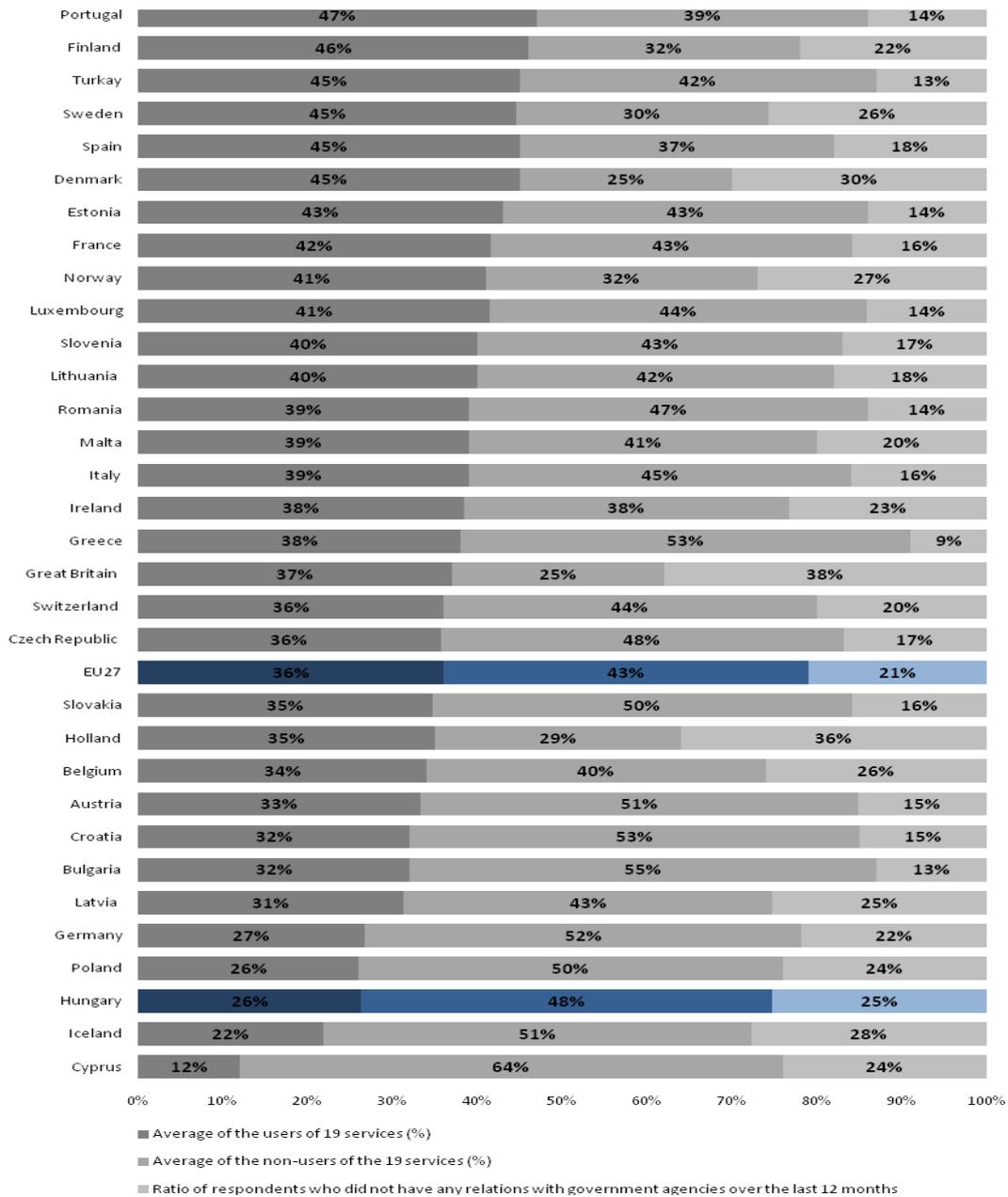
Source: eGovernment Benchmark 2012 background report

**Extremely low ratio in the use of government services**

Having reviewed the use of 19 government services (mostly overlapping with the former 20 EU mandatory e-administration services), the report concluded that the Hungarian usage figures were approximately 40% lower than the European average. With that indicator Hungary finished in 30th place on an aggregated basis among the 32 European countries.

<sup>25</sup>The entire sample was prepared based on 79% ratio, the remaining 21% of the respondents did not use e-government services for one year prior to the survey.

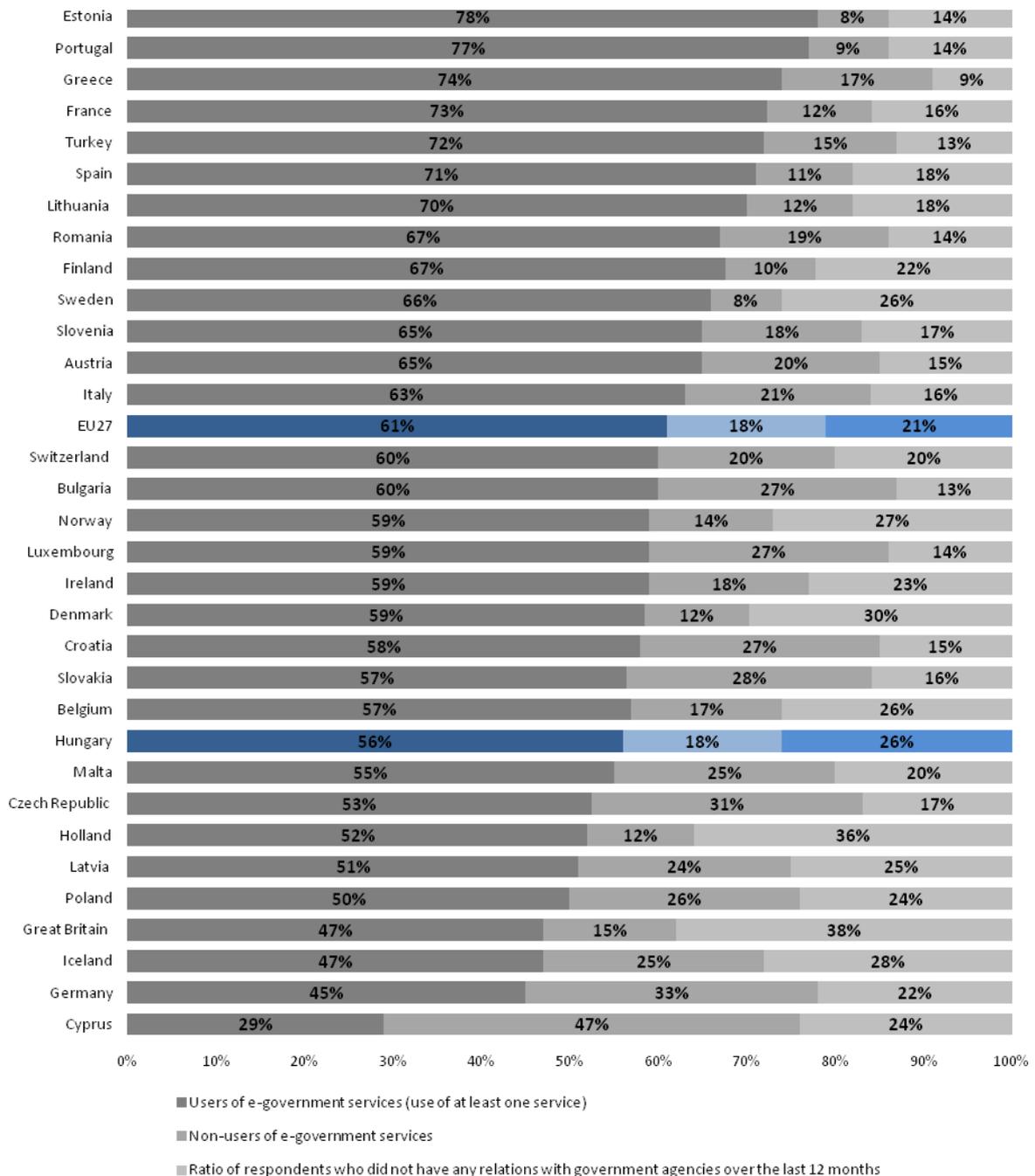
## Use of the e-government services (as an average of 19 services, and as a percentage of internet users)



Source: eGovernment Benchmark 2012 background report

If the factors are extended and the only question is **whether or not the respondent used any e-government service over the last 12 months**, then it becomes clear that slightly more than 50% of the internet users (56%) used such type of services, which does not indicate any dramatic shortfall from the EU average (61%), but even that figure is enough only to take a place in the last third of the reviewed countries.

## Use of e-government services (use of at least one service as a percentage of internet users)



Source: eGovernment Benchmark 2012 background report

According to another important conclusion of the study there is positive correlation between the frequency of internet use and the intensity of the use of e-administration services: the number of daily internet users using e-government services is more than 20% higher than the number of those who use the internet more rarely. Although it may sound surprising at first hearing, there is also positive correlation between mobile internet use and the use of e-administration services:

	Internet use intensity		Mobile internet use	
	Not daily users	Daily users	Not mobile internet users	Mobile internet users
	%	%	%	%
<b>Use of at least one e-government service</b>	50%	62%	55%	66%

Source: eGovernment Benchmark 2012 background report

To the question of why people do not use the e-administration services, the Commission study lists four basic important reasons: lack of willingness (80%), lack of ability to use (24%), lack of awareness (21%), and the lack of trust to use them (11%).

### Public education, higher education and research infocommunications infrastructure and services

#### Low quality broadband infrastructure in public education institutions

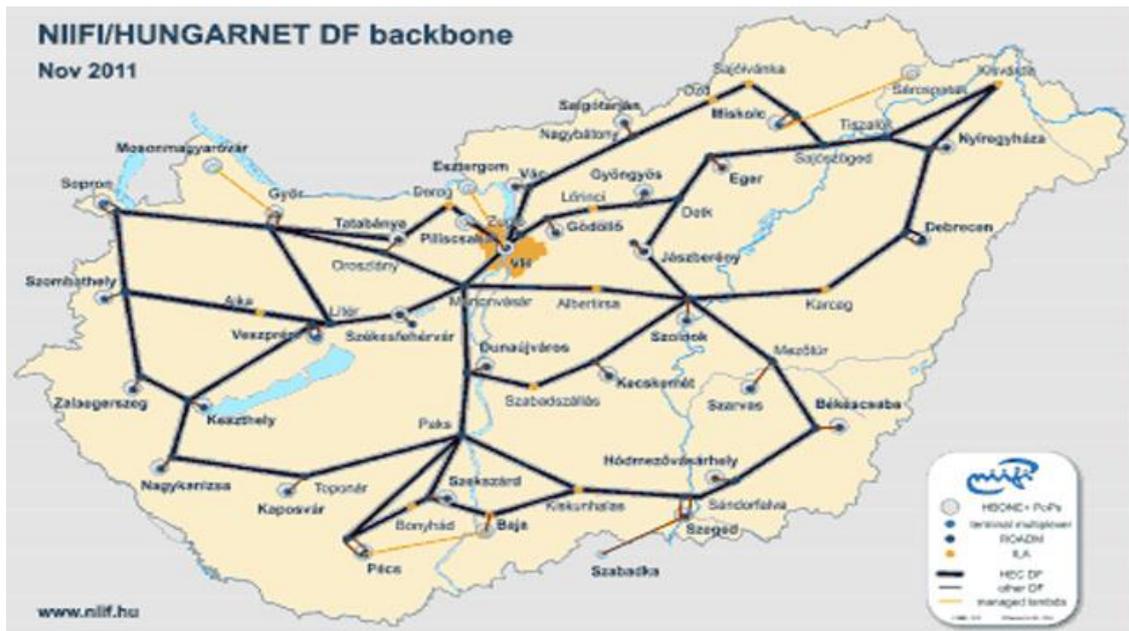
Until H1 2013 all public education institutions were owned by local governments, and therefore the network connection (internet) of those institutions was arranged by the respective local government. Due to the limited availability of budget resources, either there was no broadband infrastructure at all, or its quality was inadequate. Having recognised the problem, the Government launched the Public Network Programme in 2004, which serves more than 2000 endpoints (not all institutions) with internet and mail services. The majority of such network connections has a low bandwidth, typically 1-4 Mbps. In the framework of the National Network Development Project not only the development of the NTBN and other networks, but also the Public Network Programme were reviewed and divided into two sub-networks in 2013. The network of public education, public and other cultural institutions (Sulinet) is provided by NIIFI, while the community internet access points are interconnected (Köznet) by NISZ Ltd. The current network capacity is not suitable for modern digital technologies and applications. Consequently, the institutions are forced to use alternative resources to provide internet access, which is therefore not cost effective and fragments the consistent infrastructure with island-type solutions.

#### Excellent quality broadband infrastructure in higher education and in the research network

The HBONE is the national data network shared by the Hungarian higher education and research community. It connects the Hungarian universities, colleges and research institutes with 40-100 gigabit per second bandwidth, which is still considered fast. The research network has existed since 1986 and has been developed in several phases. Its main purpose is to provide a basic IT infrastructure similar to that in the most advanced countries of the EU also in Hungary for scientific research, innovative development and quality higher education services. Numerous services and applications supporting research development and education are accessible with HBONE, including e.g., the cheap petabyte size data storage facilities, extreme high computing capacity super computer systems and the full HD video conference system supporting free video calls between universities.

As a result of the most recent major HBONE+ network development, DWDM<sup>26</sup> is used not only in the backbone network, unlike in other countries, but is taken all the way to the large end-users, enabling them to enjoy the huge speed. At present HBONE operates with twenty light waves, of which in theory each can offer 100 gigabit per second maximum bandwidth between higher education institutions. At the end of 2012 it was the first network that supported the 100 gigabit per second connection between the Swiss CERN and CERN@Wigner in Budapest. The NIIFI network is used by 2-2.5 million users.

<sup>26</sup>High speed optical network equipment



Source: NIIFI

**In summary:**

Having reviewed the above data it can be concluded that although the IT support of administration process is popular, there is no significant shortfall in the supply side of residential e-administration services and that the activity of residents is close to average, and that of the companies is twice as high, while the use of government services primarily by citizens is extremely low. In addition, the supply of broadband internet in public education institutions is of low quality and often island solutions are applied, which, on the one hand, fragment the consistent infrastructure, and on the other hand, are not cost effective.

**II.2.5 Horizontal factors**

*E-inclusion*

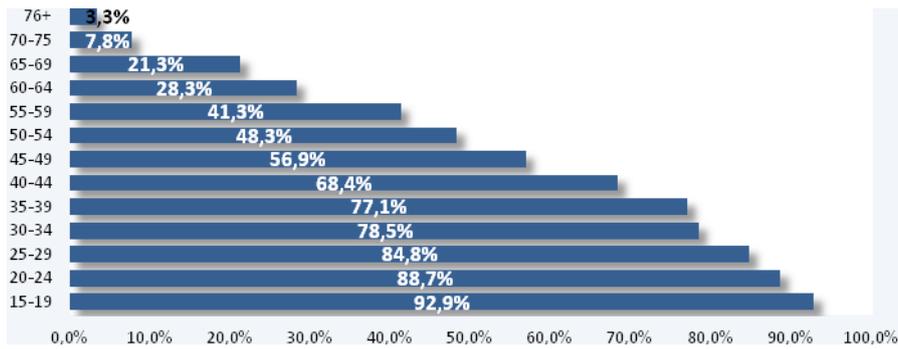
This strategy approaches e-inclusion from several directions: on the one hand, it reviews the various segments of current internet users and non-users in a narrower sense of the definition, and in relation to the wider interpretation of the subject it looks at the initiatives that were/are aimed at providing digital equal opportunities to the socially disadvantaged and disabled people by removing any impediment stemming from physical mobility or geographical distances. Thirdly, it outlines further social challenges (e.g., climatic change, energy efficiency) to which ICT could provide an effective solution.

**Involvement of non-internet users in the information society**

Similarly to many other countries, internet usage in Hungary is strongly influenced by several socio-demographic, economic and cultural aspects. The most important of those include age, school qualifications, home address, economic activity and income status, but to a certain extent the use of the internet among men and women is also different.

**The breakdown by age group** shows well that while among young people nine out of ten are internet users, in the +50 age group just five of ten, while in the 60+ age group only three of ten people use the worldwide web.

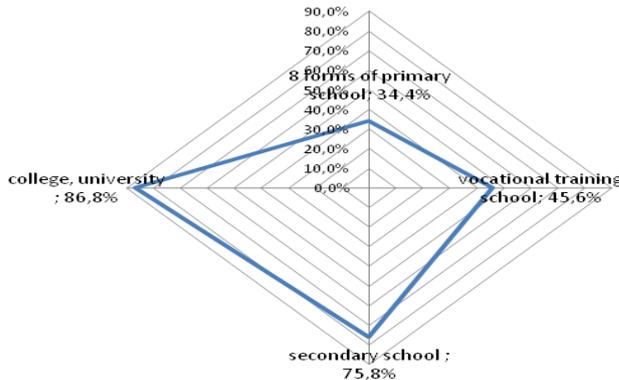
### Ratio of internet users by age groups, 2012 (%)



Source: eNET: Impact of the development of digital literacy on the macro economy, 2012

**In terms of school qualifications** almost 90% of people with higher education qualification are internet users, while the respective ratio is only 34.4% among those who have completed only the 8 forms of primary school.

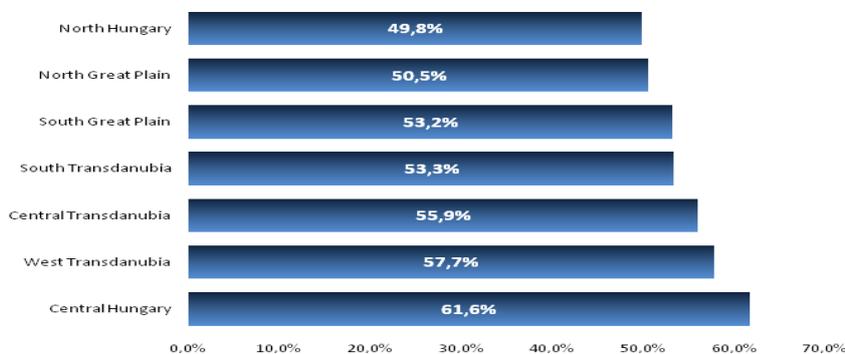
### Ratio of internet users by school qualifications, 2012 (%)



Source: eNET: Impact of the development of digital literacy on the macro economy, 2012

The **residential address** also determines internet usage: the underdeveloped regions, small settlements and rarely populated regions lag behind the economically more advanced regions in terms of usage.

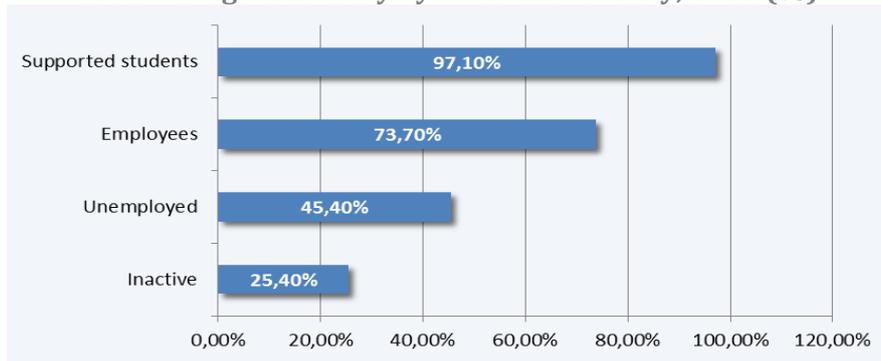
### Ratio of internet users by region, 2012 (%)



Source: eNET: Impact of the development of digital literacy on the macro economy, 2012

Another tendency is also clear, whereby **employees** take part in the digital world in much greater proportions than the unemployed, or the inactive, who perhaps could be assisted the most with the internet use. The ratio of internet use by the employees (73.7%) is almost three times as high as the ratio of the inactive people (25.4%).

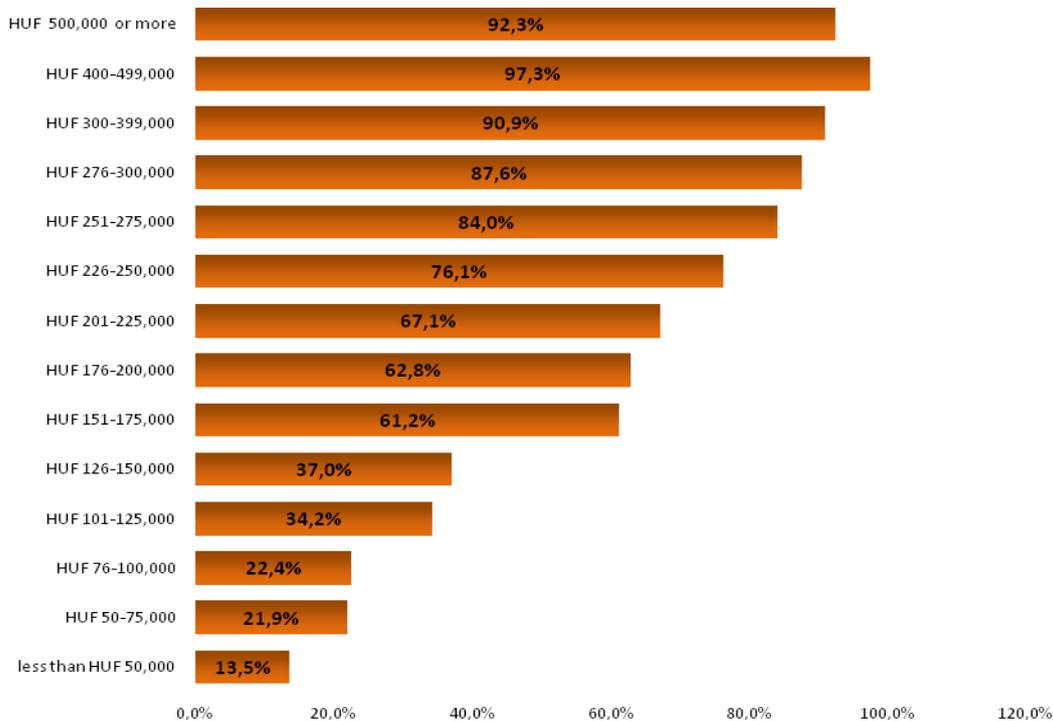
Ratio of digital literacy by economic activity, 2012 (%)



Source: Hungarian Infocommunications Report (2012)

There is close correlation between the **household income** and the internet use as well. The lower the household income is, the greater the chance is that they stay away from the internet. Therefore while only 21.9% of households having maximum HUF 75,000 net income use the internet, the same ratio is already 91% in the HUF 300-400,000 category.

Correlation between the digital literacy ratio and the monthly net income, 2012 (%)



Source: Hungarian Infocommunications Report (2012)

### Involvement of the disabled people

At present there are approximately 450,000-500,000 disabled individuals in Hungary<sup>27</sup>, representing 4.5-5% of the population. The highest ratio among them relates to physically disabled (43.6%), compared to the visually impaired, people with hearing impairment, or mentally disabled and other disability groups.

The ratio of employment among the disabled is also significantly lower than the employment of not disabled people within the economically active population.

<sup>27</sup> Data of EMMI

At the same time the possibilities granted by the information society promote equal opportunities to disabled people, as they assist in the improvement of their quality of life and the enhancement of their employment (e.g., telework options, special employment).

**Other social challenges (climatic change, energy efficiency, etc.)**

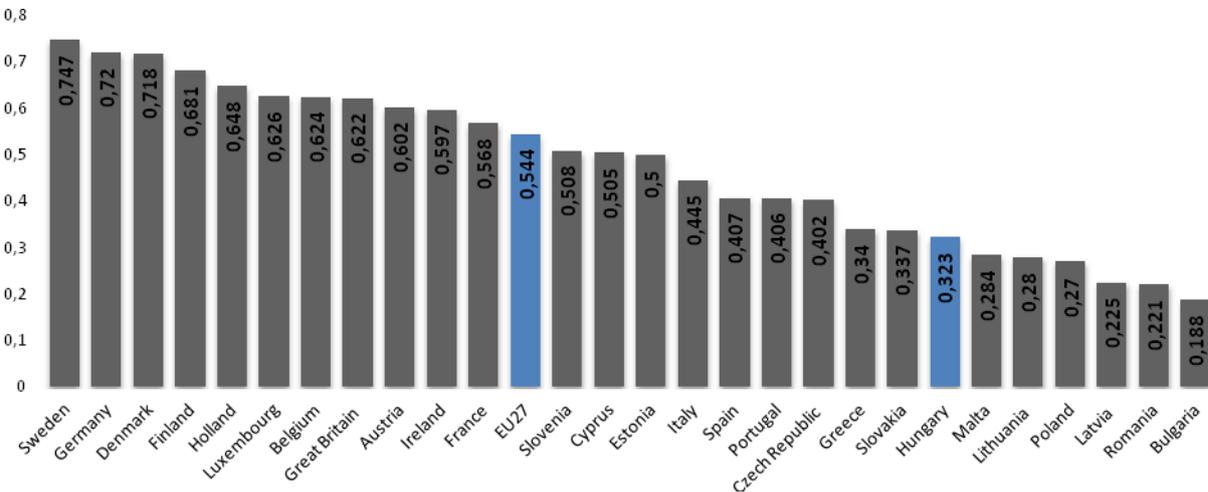
The IT industry is responsible for 2% of the world’s carbon dioxide emission. The internet itself also contributes to global warming with thousands of tonnes. Given the robust increase in communication activity, the energy consumption of the sector is likely to increase very rapidly. Immediate actions are required for managing the trends and mitigating the damages. The IT sector must assist in the dissemination of an environmentally aware approach and serve effectively sustainable development.

The ICT sector may contribute to the management of those social challenges and the improvement of energy efficiency in two ways. On the one hand, with the help of ICT applications, energy effective solutions may be introduced (e.g. intelligent networks, measuring devices) and, on the other hand, through the development and application of ICT devices and “green” solutions in IT which will help reduce the use and emission of substances that pollute the environment.

**R+D+I**

The latest EU analysis<sup>28</sup> presents the research and development status in the Member States of the European Union with the help of a composite indicator, which is the result of the aggregation of 24 various indicators. According to the analysis, **Hungary’s innovation activity is still one of the weakest in the European Union.**

**Innovation results in the countries of the European Union, 2012 (by taking into account values between 0 and 1)**



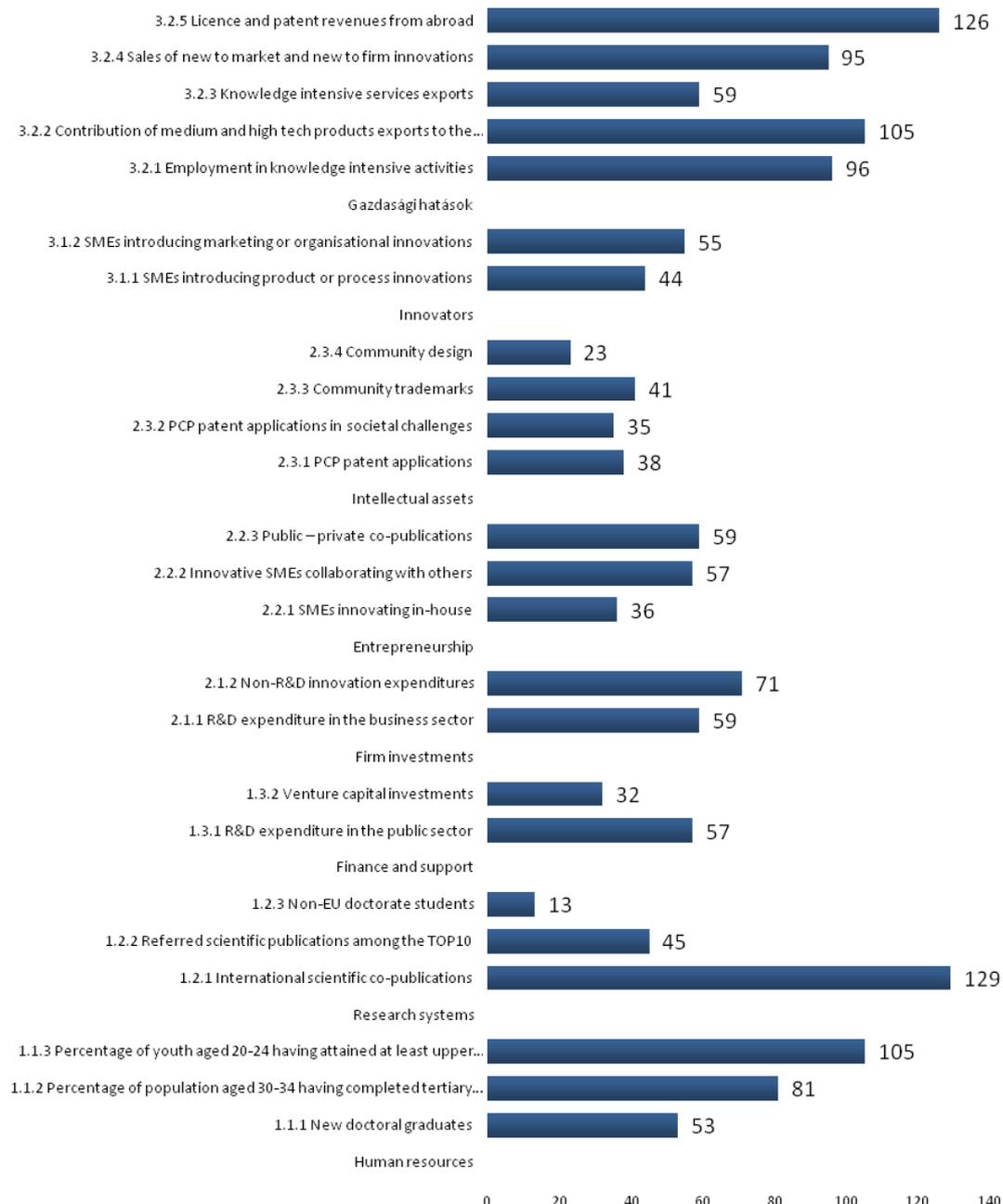
Source: Innovation Union Scoreboard 2013, European Commission

It is the third year that Sweden has been ahead, followed by two Scandinavian countries (Denmark and Finland) and Germany in the subsequent three places. According to the report, classifying the innovation performance of the countries into four categories (modest innovators, moderate innovators, innovation followers and innovation leaders) Hungary has been classified into the group of moderate innovators for years despite the 1.35% growth recorded in 2012.

<sup>28</sup>Innovation Union Scoreboard 2013, European Commission

The data below indicate the factors that influence the above aggregated data in negative or positive directions. In the case of Hungary four of the 24 data are greater than the EU27 average, while 20 are below that. The Hungarian data stand out positive especially in participation in international scientific publications and revenues relating to licences and patents from abroad, secondary qualifications of individual aged 20-24 and the contribution of the export of medium and high-tech products to the trade balance. On the contrary, there is a significant shortfall from the average in the number of doctorate students, in in-house innovation, in the R+D expenses in the public sector, in venture capital investments, or in community trademarks.<sup>29</sup>

### Components of the innovation result table in relation to Hungary, 2012 (EU27=100%)



Source: Innovation Union Scoreboard 2013, European Commission

Note: The figures are in comparison with the EU27 average

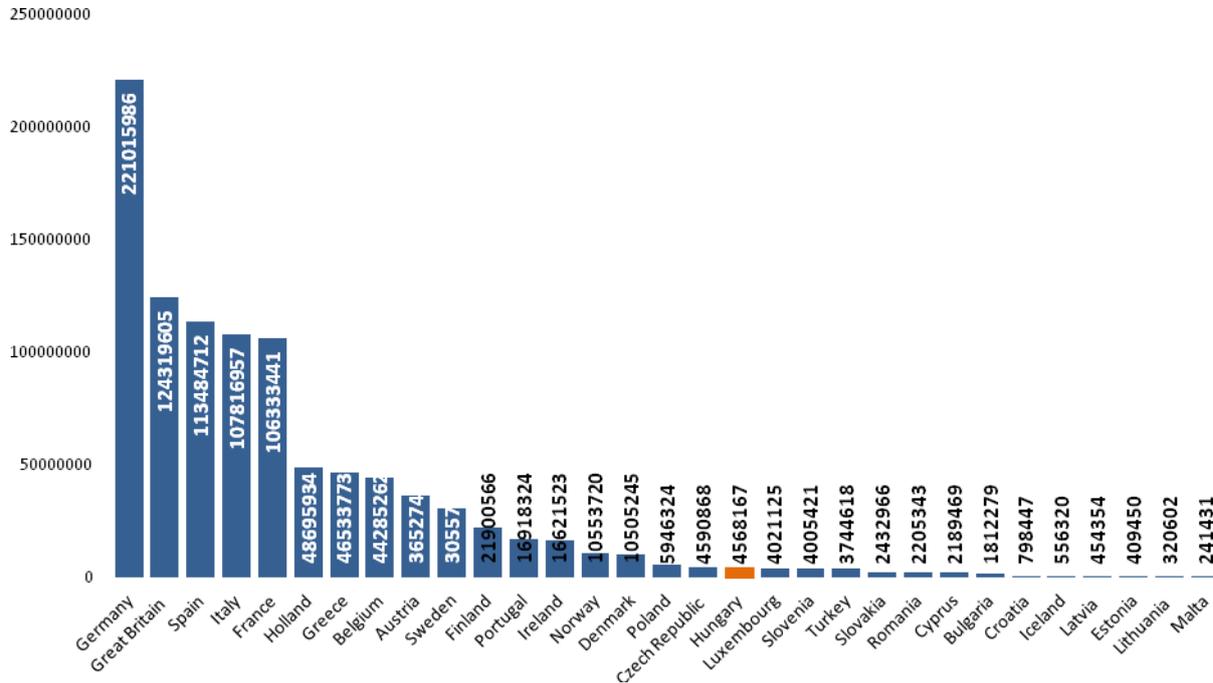
<sup>29</sup> The R+D+I environment is weak also according to the IT Industrial Competitiveness Index, published by BSA (Business Software Association) since 2007, source: <http://globalindex11.bsa.org/>

In 2011 the total ICT R+D public expenditure amounted to EUR 41.6 million in Hungary (ICT GBAORD), which equalled approx. 8.5% of the total government R+D expenses.

This amount corresponded to 0.49% of the GDP, and was lower than the EU average (0.6%)<sup>30</sup>. According to 2010 data the similar spending of Hungarian enterprises (ICT BERD) was approx. EUR 97.4 million (compared to EUR 110 million in the preceding year), which then in the case of ICT made up 14.5% of the total R+D expenses (the EU average was 19%). The amount referred to above represented 0.7% of the GDP and was much lower than the EU average (1.2%).

The above data are illustrated well in Hungary's participation in the EU largest FP7 tenders dedicated to research and development. In terms of the absolute support amounts the country is in the middle of the EU ranking. In 2011 the Hungarian companies and organisations were granted approximately EUR 4.6 million support. With that Hungary lay in 18th position in 2011.

**Support amounts relating to FP7-ICT projects based on the countries participating in the programme, 2011 (in EUR)**



Source: Digital Agenda Scoreboard, 2012

The above R+D+I data and situation are shaded by some outstanding performance in certain areas of ICT.

The research network basic infrastructure in Hungary operated by the National Information Infrastructure Development Institute (NIIF) (HBONE+, part of GEANT) and the high performance computing (HPC) capacities provide significant competitive advantage to Hungary compared to the other countries with similar characteristics. It is another outstanding achievement that the outsourced computer data centre of the European Organisation for Nuclear Research (CERN) is built with the involvement of NIIF in Csillebérc, in the territory of the Wigner Physics Research Centre of the Hungarian Academy of Sciences.

There are also several ICT or ICT-related research and development areas (e.g., health industry ICT), which have research facilities (higher education institutions, academic research institutes), outstanding also in EU comparison, and therefore several institutions are members of EIT ICT KIC, and in some European schemes (FuturICT, Human Brain) of the Future Emerging Technologies (FET) initiative.

<sup>30</sup>Source: Digital Agenda Scoreboard 2013 (Hungary: ICT R&D and participation to FP7)

The venture capital type investments had a very important role in the activities of the industry. The Jeremie-based venture capital programmes launched in 2012 gave a huge impetus to the development of the Hungarian start-up ecosystem. 40% of the capitalised companies were ICT companies. The Jeremie programme directly contributed to the establishment of new innovative companies and enabled them to achieve success similar to the success of aPrezi, UStream, LogMeIn companies, which are good examples with their international results.

With the establishment of the complete start-up ecosystem (different phase investors: seed, angel, VC1, VC2, incubator houses, accelerator programmes) a significant volume of innovation capacity may be launched or attracted to Hungary from the surrounding countries.

## Security

### The size of the institution affects the amount spent on IT security

IT security is an especially important factor in the institutional segment primarily because it is increasingly important to secure the data of the public sector. The significance of this area is illustrated well by the fact that at the beginning of 2013 the Government approved Hungary's National Cyber Security Strategy (Government Resolution No. 1139/2013. (III. 21.)) Act L of 2013 on the Electronic Information Security of State and Local Government Agencies was drafted and approved based on that strategy (hereinafter: IS Act) followed by Government Decree No. 301/2013. (VII. 29.) on the tasks and competences of the National Electronic Information Security Authority and the Information Security Supervision as well as the procedures of the National Security Supervision as an authority (hereinafter referred to as: NEISA Decree), and Government Decree No. 233/2013. (VI. 30.) on the tasks and competences of the Government event management centre of electronic information systems, the sectoral event management centres and the event management centre of the crucial systems and facilities (hereinafter referred to as: GOVCERT Decree). Thus the information security organisations were established and the competences, tasks, procedures and sanctions were specified.

In 2011 almost all companies in the corporate sector used some IT security solution. The size is also a determination factor in that sector: the smaller an institution (naturally there are exceptions as well, including e.g., small institutions performing sensitive tasks in terms of national security), the less attention it pays to the installation/expansion of its online protection capacity.



Source: Hungarian Infocommunications Report, 2011

Among the IT security solutions the penetration of virus protection solutions, firewalls and spam filters is close to 100%.

According to a 2011 Eurostat survey<sup>31</sup> 46% of the Hungarian internet users have already experienced some virus infection on their own computers, which is almost one-and-a-half times higher than the EU average, even though in terms of the use of IT security software the Hungarian figure is not lower than the EU average. The misuse of personal data and various financial transactions does not indicate a dramatically bad picture.

<sup>31</sup> [http://europa.eu/rapid/press-release-STAT-11-21\\_en.htm](http://europa.eu/rapid/press-release-STAT-11-21_en.htm)

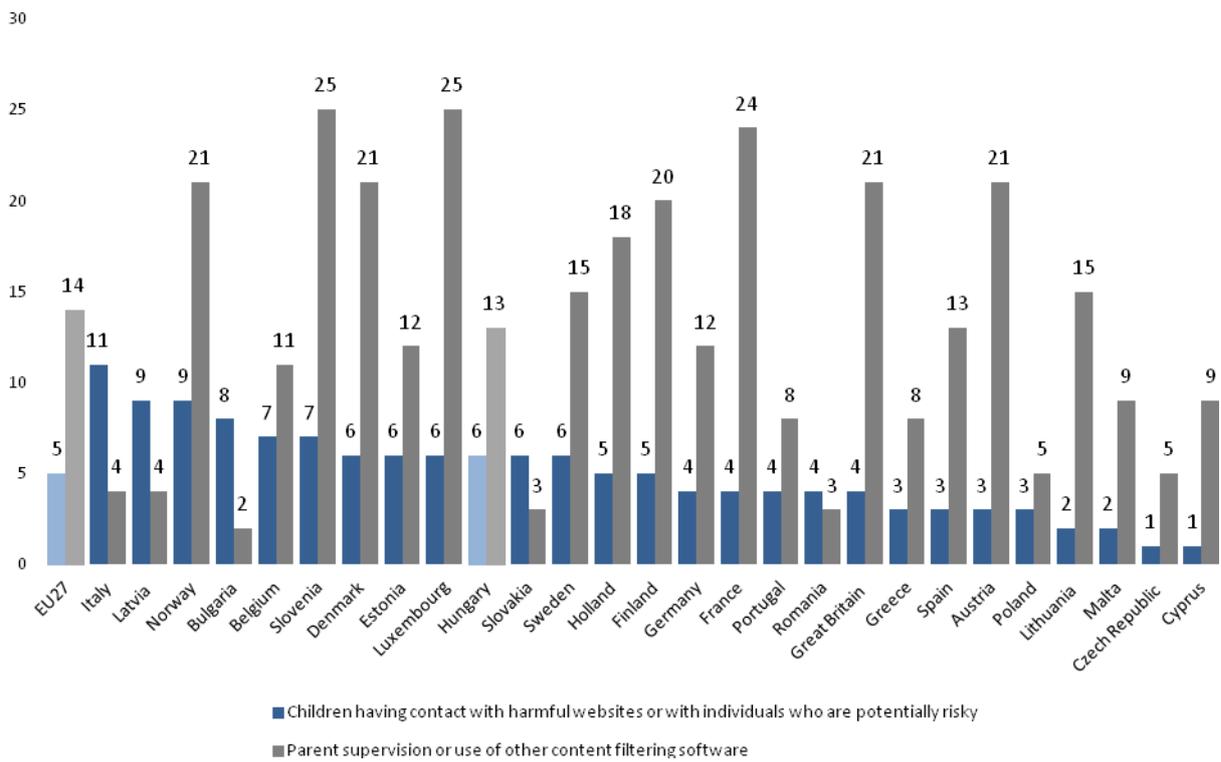
**IT security problems and use of security software, 2011**  
(as a percentage of the individual users over the last 12 months, in %)

	Caught a virus or other computer infection	Abuse of personal information sent on the internet and/or other privacy violation	Financial loss due to "phishing", "pharming" or payment card misuse	Use of any kind of IT security software or tool (anti-virus, anti-spam, firewall, etc.)
Austria	14	3	5	87
Ireland	15	2	4	80
Finland	20	1	2	91
Germany	22	2	3	88
Holland	23	6	3	96
Czech Republic	26	1	1	68
Luxembourg	28	5	3	91
Denmark	29	4	3	89
Poland	30	3	1	79
<b>EU27</b>	<b>31</b>	<b>4</b>	<b>3</b>	<b>84</b>
Great Britain	31	4	7	88
Sweden	31	1	2	89
Belgium	32	3	3	89
Croatia	33	2	2	78
Spain	33	7	4	84
Cyprus	34	1	2	79
Lithuania	34	2	1	79
Greece	34	3	2	83
France	34	5	2	89
Portugal	37	4	2	86
Slovenia	37	1	1	88
Latvia	41	5	8	62
Estonia	42	4	2	65
Italy	45	6	4	67
<b>Hungary</b>	<b>46</b>	<b>4</b>	<b>2</b>	<b>84</b>
Slovakia	47	3	1	86
Malta	50	4	5	91
Bulgaria	58	7	1	73
Romania		5	2	64

Source: Eurostat, 2011

The use of harmful websites and the software use of devices under parent supervision are also similar to the EU average, just like the data in the above categories.

## Child and Internet Security, 2011 (ratio of internet using natural persons who shared a household with dependent children, in %)



Source: Eurostat, 2011

### III. SWOT ANALYSIS

The four parts of the SWOT analysis (strengths, weaknesses, opportunities and threats) were prepared according to the pillars of the strategy (digital infrastructure, digital competences, digital economy, digital state) and horizontal factors (e-Inclusion, R+D+I, security), following, interpreting and supplementing the most important findings and conclusion of the status analysis.

#### III.1 Digital infrastructure

Digital infrastructure	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• advanced backbone network segment</li> <li>• nearly 100% basic broadband coverage (xDSL, cable)</li> <li>• high, above EU average new generation coverage (FTTP, Docsis 3)</li> <li>• 3G coverage close to EU average</li> <li>• the quality parameters of the internet service (speed, satisfaction) are higher than the EU average</li> <li>• the price of internet connections is favourable in a European comparison in the case of lower bandwidth packages, while the ratio of NGA subscriptions is high within the broadband penetration</li> </ul>	<ul style="list-style-type: none"> <li>• the increase in NGA coverage slowed after reaching the big cities and densely populated settlement parts</li> <li>• few hundred settlements are not yet reached by the optical network, and there will still be some even after the EU supported developments (EDOP-3.1.2)</li> <li>• several settlements are only connected to one optical network, the situation resulting in a strong position of its owner over the local service providers and users due to lack of competition</li> <li>• low LTE coverage</li> <li>• owing to the general economic environment the market share of incumbents is higher and that of the alternative providers is lower than the EU average</li> <li>• the crisis reduced the development resources of the companies within the sector</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• the quick use of the digital dividend and unused frequencies can significantly improve the quality parameters of mobile internet services (coverage, bandwidth)</li> <li>• the backhaul network (area network) developments in progress can remove the barriers in the respective settlements from the dissemination of services requiring large bandwidth (e-health, IPTV, etc.) even in the short term (if the local network segment is also developed)</li> <li>• the supply of bandwidth in public institutions can improve significantly, if they can connect to the National Telecommunications Backbone Network</li> <li>• the continued consolidation of the networks held by the state will improve the possibility of effective operation and development</li> <li>• the willingness of market actors to invest can be increased with the fine-tuning of the market regulatory system and the</li> </ul>	<ul style="list-style-type: none"> <li>• the digital dividend (additional frequency resulting from the digital transition) and the lack of utilisation of unused frequencies may significantly slow the mobile internet dissemination</li> <li>• the developments implemented by the service providers cannot keep up with the drastically increasing data traffic and the increasing user demands, possibly resulting in bottlenecks due to lack of development resources</li> <li>• capacity shortage of the EU funds institutions can prevent the scheduled use of financial sources</li> <li>• due to the lack of project management skills the implementation process can be delayed</li> </ul>

<p>improvement of the macro economic conditions.</p> <ul style="list-style-type: none"> <li>• strengthening of the link of the EU funds institutions and government policy makers contributes to the more accurate and efficient preparation and implementation of the programmes</li> <li>• success of the ICT interventions can significantly improve if the relationship between the grant beneficiaries and the EU Funds institutions becomes more efficient with the simplifying of the procedures</li> <li>• clearly laid roles and effective governmental coordination can help the proper use of development funds</li> </ul>	
---	--

### III.2 Digital competences

Digital competences	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• the ratio of weekly and daily internet users is close to the EU average</li> <li>• usage is especially high among young, highly qualified social groups, living in towns</li> </ul>	<p>A) the digital illiteracy is much higher than the EU average</p> <ul style="list-style-type: none"> <li>• strong negative attitude towards ICT use</li> <li>• less than half of the population is digitally literate among the individuals aged +50 (the 65+ age group is especially affected), there is low internet usage among the individuals with 8 forms of primary school</li> <li>• the digital literacy ratio is much lower than the average among the unemployed and inactive</li> </ul> <p>B) the citizens do not understand the advantages of ICT use</p> <ul style="list-style-type: none"> <li>• the ratio of households with computers, broadband penetration and mobile internet penetration are much below the EU average</li> <li>• the internet usage indicators of the residents of less developed regions are lower than the average</li> <li>• high usage of only basic service (e-mail, social network, information, news, etc.) among the internet users</li> <li>• the use of transaction-based services (e-banking, e-payments, e-commerce) is significantly lower than the EU average</li> <li>• lack of awareness or social responsibility in that field even among the ICT users</li> </ul> <p>C) public education problems</p> <ul style="list-style-type: none"> <li>• In public education the subjects other than information technology do not sufficiently develop digital competences, because the development tasks do not contain them at all, or only to a limited extent, or the teachers have limited knowledge, or the devices are insufficient, and the ratio of separate IT</li> </ul>

	<p>programs is low</p> <p>D) Lack of motivation may also apply to citizens with higher school qualifications and higher income;</p> <ul style="list-style-type: none"> <li>there may be a strong negative attitude even in the multiplier target groups (teachers, local government employees, NGOs, social workers, other public employees)</li> </ul> <p>E) low awareness and use of telework and distance education</p>
Opportunities	Threats
<ul style="list-style-type: none"> <li>the ratio of daily internet users has increased by more than 20% over the last 3 years</li> <li>among the digitally illiterate, the reasons of staying behind are often not financial, but stem from attitude (no need for it, do not understand why it is good, etc.), and therefore the situation can be improved with motivation and training</li> <li>the national eHungary and eAdvisory network and methodology, and the national system of community institutions (Integrated Community Service Place (IKSZT), library, school, etc.) are available</li> <li>due to the parallel restructuring of public administration, a lot of training programmes will be launched for public servants, and e-administration could be one of the subjects in it</li> <li>formal adult training is available for various target groups within the framework of EU programmes (e.g., unemployment training, basic competence development, OKJ (National Training Register) training)</li> <li>the digital competence development within the entire framework of education could significantly increase the capacity of the labour market</li> <li>the education institutions may have an important role in achieving eSecurity, and in informing parents and students</li> <li>the IT infrastructure development of public education institutions is a good opportunity to develop the ICT skills of young people and to strengthen their positions on the labour market</li> <li>the state-owned postal and other networks could be a good forum for disseminating digital competences</li> <li>the electronic subject materials prepared by the industrial actors (often available free of charge) and available online can contribute to the improvement of digital literacy</li> <li>the current number of 3M smart phone</li> </ul>	<ul style="list-style-type: none"> <li>approximately 98% of the households with computers have also internet access (consequently, the traditional “reserve” of internet penetration is being exhausted)</li> <li>the 50+ age groups are durably “stuck” in the group of digitally illiterate, and therefore their employment opportunities are also deteriorating significantly</li> <li>the competitive potential of regions significantly lagging behind in internet use is deteriorating and will lead to a further divide in the long term</li> <li>the (re-)integration of the unemployed into the labour market may be impeded by the lack of digital skills</li> <li>the equal opportunities of groups traditionally lagging behind will deteriorate further due to the lack of ICT usage</li> <li>the large number of digitally illiterate imposes economic burden on the society:             <ol style="list-style-type: none"> <li>decreasing employment opportunities</li> <li>hybrid solutions need to be maintained further</li> <li>deceleration in the spread of digital cost efficient solutions</li> <li>the technology advantages (e.g., health solutions) cannot be realised</li> </ol> </li> <li>the lack of ICT development in public education and higher education institutions may cause shortages on the labour market, problems of competitiveness to individuals, companies and the state</li> <li>capacity shortage of the EU funds institutions can prevent the scheduled use of financial sources</li> <li>due to the lack of project management skills the implementation process can be delayed</li> </ul>

<p>users will be doubled in the next 2-3 years</p> <ul style="list-style-type: none"> <li>• with the dissemination of mobile broadband services the internet use can be increased at a cheaper price and in a more easily understandable manner for users</li> <li>• strengthening of the link of the EU funds institutions and government policy makers contributes to the more accurate and efficient preparation and implementation of the programmes</li> <li>• success of the ICT interventions can significantly improve if the relationship between the grant beneficiaries and the EU Funds institutions becomes more efficient with the simplifying of the procedures</li> <li>• clearly laid roles and effective governmental coordination can help the proper use of development funds</li> </ul>	
--	--

### III.3 Digital economy

Digital economy	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• the ICT sector has a high share in GDP and high contribution to GDP growth</li> <li>• the ICT sector managed to grow even during the years of economic recession</li> <li>• the ratio of the employees of the ICT sector within the employees of the business sector is high also in a worldwide comparison</li> <li>• the majority of the Hungarian companies employing more than 10 people use the internet</li> <li>• the companies have significantly increased their revenues from e-commerce compared to the previous years</li> <li>• Hungarian companies can have a good chance to export software and IT services to the neighbouring countries and to some countries outside the EU</li> <li>• presence of development and outsource centres with significant innovation activities (GE, Nokia, Ericsson)</li> <li>• the construction of the start-up ecosystem has started, partly owing to the Jeremie tenders</li> </ul>	<ul style="list-style-type: none"> <li>• the share of the ICT sector is made up primarily by the local subsidiaries of multinational companies engaged in assembly activities</li> <li>• significant shortage of experts in terms of number and quality: according to the sector, at least 4-5000 IT experts are “missing” from the market annually</li> <li>• there are significant differences between demand and supply in terms of the capabilities of the experts leaving the higher education (skills-gap)</li> <li>• the Hungarian ICT SMEs are underfinanced, with little participation in tenders and low export capacity</li> <li>• the online presence of companies (e.g., website) has been falling behind the EU and OECD average for years, especially in the case of SMEs</li> <li>• the companies have not yet recognised the business potential involved in the (intra and extra company) electronic exchange of information and in the interconnection of the logistic systems of enterprises</li> <li>• the ratio of companies sending and/or receiving e-invoices continues to be extremely low</li> <li>• the majority of the managers of Hungarian SMEs</li> </ul>

	<p>have no experience in the strategic use of information technology and still consider IT as expenditure</p> <ul style="list-style-type: none"> <li>• administrative burdens of the Hungarian enterprises are high in international comparison</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• internet access is almost 100% among the Hungarian companies employing more than 10 people, and therefore the conditions of strengthening online presence and IT based business processes are in place</li> <li>• the Hungarian enterprises have significantly increased their e-commerce activities over the last few years</li> <li>• the dissemination of electronic signature and invoicing may give further impetus to the digital presence of companies</li> <li>• better expert training at universities</li> <li>• specialisation in the production of certain high added value software</li> <li>• extension of ICT focused trainee programmes and individual training to the market actors of the ICT industry (supply side)</li> <li>• the exportation of professional expertise as an expert service (e.g., IT security experts) may reduce emigration and may increase the exports</li> <li>• the electronic subject materials, prepared by the industrial actors (often available free of charge) and available online can contribute to the improvement of digital literacy</li> <li>• Continuation of the innovation story - attraction of more international centres to Hungary</li> <li>• Further acceleration of the existing start-up ecosystem</li> <li>• Employment of ICT experts with Hungarian native language in the neighbouring countries</li> <li>• Administrative burdens of the enterprises will be reduced</li> <li>• strengthening of the link of the EU funds institutions and government policy makers contributes to the more accurate and efficient preparation and implementation of the programmes</li> <li>• success of the ICT interventions can significantly improve if the relationship between the grant beneficiaries and the EU Funds institutions becomes more efficient with the simplifying of the procedures</li> <li>• clearly laid roles and effective governmental coordination can help the proper use of development funds</li> </ul>	<ul style="list-style-type: none"> <li>• the lack and emigration of ICT experts may cause durable competitive disadvantages to Hungarian companies on the labour market</li> <li>• the low online presence of companies and the low extent of IT based operations present difficulties on the Hungarian and international markets and may cause efficiency and competitiveness problems</li> <li>• the (computer and) internet penetration at micro enterprises is by far not complete yet, which weakens the business opportunities of such companies</li> <li>• the infocommunications divide between multinational large and Hungarian small enterprises is widening</li> <li>• the expert training cannot keep up with the requirements, and the development centres go elsewhere</li> <li>• capacity shortage of the EU funds institutions can prevent the scheduled use of financial sources</li> <li>• due to the lack of project management skills the implementation process can be delayed</li> </ul>

### III.4 Digital state

Digital state	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• practically full internet penetration in public institutions</li> <li>• definite steps have been taken towards consolidated, consistent IT operation in the central public administration</li> <li>• high local area network (LAN) penetration</li> <li>• sufficiently working central government IT services</li> <li>• significant state-owned data assets, even in international comparison</li> <li>• favourable broadband network access options</li> <li>• there is a government intention to develop the area</li> <li>• advanced, high-capacity telecommunications backbone network</li> </ul>	<ul style="list-style-type: none"> <li>• the truly broadband internet access ratio is low among the rural public institutions</li> <li>• the IT infrastructure and operation have not yet been consolidated in regional administration</li> <li>• the previous development projects did not stress interoperability enough (ability of various information systems to co-operate) and therefore there are many island developments, where the integration costs can even exceed the cost of new logic based (e.g., cloud-based) development</li> <li>• the high ratio of fully online residential services is explained primarily by the opportunity of submitting electronic tax declarations</li> <li>• Hungary is in last place in an EU comparison in online corporate e-public services</li> <li>• the use of e-administration services by the residents is below the EU average</li> <li>• the ICT penetration at local government is heterogeneous, especially the smaller local governments are underdeveloped</li> <li>• the operational processes of the health care system need to be reorganised</li> <li>• the IT support of administrative processes is inadequate</li> <li>• obsolete state IT devices</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• the successful completion of the currently running EPAOP, SROP, SIOP and SOROP projects can significantly contribute to the reduction of the identified weaknesses</li> <li>• there is positive correlation between the frequency of internet usage and intensity of the use of e-administration services, i.e., any increase in such uses is likely to increase also the demand for e-administration services</li> <li>• the new Act on e-administration (new Public Services Act and implementation decrees) facilitates better quality, simpler and more logical e-government services</li> <li>• use of the results of the current government IT and e-administration programmes</li> <li>• utilisation of the synergies of the government IT development</li> <li>• adaptation of new (e.g., cloud-based) technologies</li> <li>• consistent, centralised state governance</li> <li>• compliance with Act I of 2013 may increase</li> </ul>	<ul style="list-style-type: none"> <li>• in Hungary there is an especially high group of “non-believers” who did not use before and do not intend to use in future any online public services</li> <li>• low user satisfaction in relation to e-government services, which may also contribute to the fact that citizens stay away from such services also in the future</li> <li>• delay in the implementation of the state IT programmes implemented in the 2007-2013 period</li> <li>• detrimental impact on the health care reform</li> <li>• the transformation of the regional administrative sector is further delayed</li> <li>• parallel development, purchases, infrastructure</li> <li>• fragmented fund management, sectoral and non-central professional governance</li> <li>• capacity shortage of the EU funds institutions can prevent the scheduled use of financial sources</li> <li>• due to the lack of project management skills the</li> </ul>

<p>the security of services</p> <ul style="list-style-type: none"> <li>• simpler implementation owing to the centralisation of the last few years [IT infrastructure (NiSZ), development (KIFU), network (MVM) and governance (MND)]</li> <li>• availability of adequate legislative and organisational background: MI, ML, KET, University of Public Services</li> <li>• strengthening of the link of the EU funds institutions and government policy makers contributes to the more accurate and efficient preparation and implementation of the programmes</li> <li>• success of the ICT interventions can significantly improve if the relationship between the grant beneficiaries and the EU Funds institutions becomes more efficient with the simplifying of the procedures</li> <li>• clearly laid roles and effective governmental coordination can help the proper use of development funds</li> </ul>	<p>implementation process can be delayed</p>
---	--

### III.5 Horizontal factors

E-inclusion	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• successful programmes in the past (e.g., WiFi village, NET-prepared grandchild-grandparent contests, eHungary Points)</li> <li>• intelligent town, intelligent home initiatives</li> <li>• active health remote surveillance systems (GSM-based)</li> <li>• at present, 913 of the 1602 eHungary network points operate in disadvantaged regions</li> <li>• the infocommunications disabled access has been provided on government websites, several large projects assisted in the dissemination of the single standard</li> <li>• large corporate research centres</li> </ul>	<ul style="list-style-type: none"> <li>• the internet use of rural residents of older age groups in socially disadvantaged positions is extremely low</li> <li>• smart metering (Smart Network Model Project), intelligent town initiatives often get stuck in the pilot phase due to lack of funding or inadequate preparations</li> <li>• the services assisting independent life are unknown and/or unaffordable to a particular target group;</li> <li>• there is no programme for people living with disabilities and/or physically disabled to support IT device purchases or internet subscriptions, and therefore the equal access to e-public services cannot be achieved by them; ICT has not yet been recognised as one of the most effective tools for the integration of disadvantaged individuals</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• the training (e.g. SOROP) and/or infrastructure (e.g., SIOP, EDOP) programmes funded by the European Union can improve the realignment/integration of disadvantaged groups into the information society</li> <li>• the ICT-based sectorial or regional development programmes (e.g., intelligent town, e-health, intelligent transport systems, etc.) accessible for anyone, will make the</li> </ul>	<ul style="list-style-type: none"> <li>• the internet usage is the lowest in those groups of society whose opportunities in life could be extended the most through those services</li> <li>• weaker social solidarity deteriorate also the chances of digital solidarity and weakens the internal cohesion of society</li> </ul>

<p>benefits of the digital ecosystem clear and accessible even to those who miss out due to any reason</p> <ul style="list-style-type: none"> <li>• if society and the corporate entities recognise the importance of e-inclusion, then the situation could improve owing to natural solidarity (passing on used machines, free training, assistance services, etc.)</li> </ul>	
---	--

R+D+I	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• internationally recognised research workshops and universities</li> <li>• skilled and reputable researchers and experts</li> <li>• the R+D+I strategy developed by the government gives priority to the ICT sector</li> <li>• There is an ICT Labs hub <sup>32</sup>also in Hungary, which facilitates effective integration into programmes</li> <li>• start-up programme, which fundamentally supports innovation</li> <li>• presence of R+D centres: Nokia, Ericsson, GE</li> <li>• outstanding high-performance computing capacity (HPC) and consequential modelling opportunities in R+D+I</li> <li>• the competence of the Hungarian Intellectual Property Office (SZTNH) with regard to the rating of research-development activities since the beginning of 2012 can contribute to an increase in the use of direct and indirect R+D incentives, the improvement of their efficiency and the increase of legal certainty</li> </ul>	<ul style="list-style-type: none"> <li>• Hungary’s innovation performance is still one of the weakest in the European Union (significant shortfall from the average in terms of the R+D expenses of the private and public sectors, venture capital investments, etc.)</li> <li>• low participation in large research projects and tenders implemented with international co-operation</li> <li>• low co-operation culture, weak clusters and inter-institutional and inter-disciplinary relations</li> <li>• low number of patent reports and industrial right protection procedures (especially at international level)</li> <li>• low level of information about the available applications</li> <li>• the complexity and extensive administration of tenders as well as financing of own funds is a problem for SMEs in taking part in tenders</li> <li>• low Hungarian participation in European technology platforms, research networks and programmes</li> <li>• low demand for ICT-based innovative products, as the citizens are not aware of their advantages or significance</li> <li>• inflexible tender procedures during the implementation of tenders</li> <li>• weak innovation management knowledge at SMEs, hence they do not use innovation to enhance competitiveness</li> </ul>
Opportunities	Threats

<sup>32</sup> The EIT ICT Labs Hungarian National Associated Hub is based on the knowledge triangle model. Its innovation efforts are not limited to R+D activities, but are extended also to education and the industry along with the knowledge triangle model.

<ul style="list-style-type: none"> <li>• Hungarian enterprises have high (higher than the EU average) licence and patent revenues from abroad</li> <li>• the share of high-tech products within the Hungarian exports is higher than the EU average</li> <li>• the availability of tax or innovation contribution credits could significantly boost innovation</li> <li>• Horizon2020 ICT-based analysis, preparation for projects</li> <li>• introduction and extension of direct and indirect R+D incentives</li> </ul>	<ul style="list-style-type: none"> <li>• the below than EU average innovation activity could undermine the international competitiveness of Hungarian products and services</li> <li>• the innovative SMEs do not co-operate with other (international) companies</li> <li>• the ratio of individuals with Ph.D qualifications is falling</li> <li>• the further reduction of innovation could undermine also adaptation, which may deteriorate knowledge transfer and can have a negative impact on the Hungarian industrial structure (assembly, mechanical works, instead of developments and innovative activities)</li> </ul>
---	--

Security	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• the ratio of institutions using some IT security solution is almost 100% in the public administration sector</li> <li>• the government has a section specifically dedicated against cyber crime</li> <li>• there are authorities and civil initiatives (NMHH hotline, child friendly internet program, etc.)</li> <li>• reports through a website operated by NISZ <a href="http://www.biztonsagosinternet.hu">www.biztonsagosinternet.hu</a></li> <li>• International Child Rescue and CERT Hungary have been performing tasks and providing information concerning the safe internet for years via tenders</li> <li>• the law regulates the electronic information security of state and local government agencies (Act L of 2013)</li> <li>• service providers, industrial initiatives and self-regulatory mechanisms are in place</li> </ul>	<ul style="list-style-type: none"> <li>• the SLA-based operation in public administration is not present widely in public administration</li> <li>• the parents and teachers do not understand the actual risks of the internet and the options for managing them</li> <li>• the legislative framework of regulatory actions against cyber crime is not complete (crime against children, digital hacking, digital data and information theft, etc.)</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• a regular and complex security surveillance, involving all subsystems of central and regional administration could contribute to the security of systems and to the image of residents, entrepreneurs and politicians about it</li> <li>• the dissemination of SLA-based operation in public administration could enhance the level of security, because clearly regulated tasks and responsibilities will be created</li> <li>• factual information will help easing the concerns of parents and teachers, and will also prepare them how to prevent actual risks</li> </ul>	<ul style="list-style-type: none"> <li>• the new waves of cyber crime represent surprises for the Hungarian network and system security experts and cause severe damages to the country</li> <li>• lack of information keeps many away from internet services, which will weaken the digital economy</li> <li>• cyber attacks can paralyse the inadequately protected infrastructure</li> <li>• the fight against cyber crime is not adequate, and the economy may suffer a lot of damage</li> </ul>

## IV. VISION

The level of development of the infocommunications sector, the wide range use of digital tools, applications and services are of major importance in the success of a country, as well as the creativity and innovation of its citizens and enterprises. In terms of infocommunications development, Hungary is currently in the medium range of the European Union: some of its indicators are significantly higher than average, while there is a major gap in other areas.

The balanced development of the infocommunications sector, which is continually changing and improving in terms of access technologies and tools, applications, business models and the impact it exercises on other industries requires that no lasting bottlenecks or unremediable lagging behind should be present in any one area. It has at least three major reasons:

- it is a material dimension of the **digital ecosystem** that **its components are in interrelationship with each other**, so if any area is long-term lagging behind, it will damage the quality of the whole ecosystem; in that way, neither the improvement of broadband networks, nor the widespread distribution of digital competences, nor the strengthening of the digital economy, nor the development of the internal IT and e-administration of the state should suffer from a disadvantage;
- the deficiencies **and gaps are generated fairly fast**, but making up for them subsequently may take years or even decades (e.g., infrastructure, digital competences);
- finally: the area **changes so fast in terms of technology and business**, or in terms of users' habits and preferences that no enterprise or government may afford to respond slowly or wait it out comfortably;

In light of the above, the **balanced improvement of the digital ecosystem is a central component of the vision of the** National Infocommunications Strategy to be implemented with the joint effort of the population, the enterprises, the NGOs and public administration. It must ensure at the same time:

- building a **digital infrastructure**, which is able to meet the demand for bandwidth dramatically increasing as a result of an increasing number of users, more intensive usage and a higher number of business and public administration services in all components of the network infrastructure including the NGA-networks aimed to directly access the population, the enterprises and public institutions.
- to provide the option of obtaining the **digital competences** required for the employment of tools, applications and services of high technology for all members of the society including the employees of enterprises and public administration as well as people in a backward position for different reasons, and taking also care of people who remain outside the world of electronic services for any reason (e-inclusion). Even in short-term we cannot have adult employees who are not digitally competent, because they will be lagging behind in the competition on the labour market;
- the development of the **digital economy** in line with international trends including the maximum use of the R+D+I potential of the Hungarian ICT enterprises and strengthening the infocommunications presence of SMEs operating in other sectors. Major technological changes have been ongoing in the ICT sector. Not only bandwidth and the traffic on it has increased but also the tools employed and the software running on them develop at such a pace that cannot be neglected in creating our vision.

In Hungary, the ICT industry must be a major driving industry. To achieve that goal, the number of experts trained in higher education must be doubled. Highly trained professionals could attract further development centres to Hungary; Hungary intends to target the acquisition of 30-50,000 new jobs out of the 750,000 IT jobs forecast of the European Union. New ICT jobs can be generated not only in the development centres of

large companies but also with new companies, start-ups. By generating new jobs, ICT may become the industry exporting the highest added value;

- an IT background supporting the modernisation of public administration and public services as well as the establishment of a **digital state** providing full access to citizens' and entrepreneurs' electronic public administration services including the risk proportionate protection of public networks, the government systems and public administration applications;

The improvement of the digital ecosystem **cannot be a goal in itself**: the efficiency of using the funds spent on it cannot only be measured in a better ranking in international statistics but in the strengthening of the competitiveness of companies and the national economy, in the improved efficiency of government operations and in the improvement of the quality of life of the population; in general terms, in ensuring sustainability at all times and in improving the equality of opportunities and mitigating digital division.

All that is not only the responsibility of the government at all times: the implementation of the strategy must be started in partnership involving both market players and NGOs, and adjusted to the objectives of the European Union. Such partnership is **responsible** for ensuring that the digital ecosystem should not be in a state of imbalance for a long time: there should be a high enough number of users, the necessary infrastructure should be built, there should be many useful and user-friendly services and a strong infocommunications sector acting as a catalyser for the improvement of other areas of the economy.

## V. SET OF STRATEGIC OBJECTIVES

### V.1 Complex strategic objectives

The differences between the status described in the situational analysis and the target status intended to be achieved in the period 2014-2020 as described in the Chapter 'Vision' (value-based vision) identify the framework of the set of strategic objectives. In technical sense, the objective of the strategy, building on the 'strengths' of the SWOT analysis by each pillar, is to eliminate the factors identified as 'weaknesses' and to utilise the 'opportunities' while avoiding or mitigating the 'risks'.

Therefore, the government must employ a strategic approach ensuring by regulatory, public policy and subsidising measures that the digital improvement in progress independent of state involvement should promote to the largest measure possible the growth of the economy, employment and employability, social welfare and equal opportunities, as well as the competitiveness of individuals, enterprises and of the national economy.

The Digital Agenda for Europe (DAE) approved in 2010 by the European Union is another benchmark. It makes proposals to maximise the potentials offered by ICT and to eliminate the factors currently hindering it to launch a 'self induction process' in which the ICT stimulates the economy of the EU: attractive services become accessible in an Internet environment without borders, then their availability and use creates a demand for a faster Internet; that demand creates opportunities for investment into faster networks, and faster networks will open the way to even more innovative services. The DAE identifies the areas Europe must focus its efforts on in order to launch such a process.

As a result, the complex strategic objective of this document - as the political strategy of the government - is to provide the competition, growth, employment and equal opportunity impacts of infocommunications tools and services by ensuring balanced development for the digital ecosystem in line with the decisive documents of economic development and the policy documents of Hungary and the European Union.

In terms of individual components of the ecosystem (and of the strategic pillars of the present), it means the following:

- Digital infrastructure:

- no lasting bottlenecks should occur in any segment of the infocommunications networks that could prevent the provision and use of digital services;

• Digital competences:
○ no citizen, small enterprise or public administration officer should be excluded from the digital ecosystem as a result of the lack of the proper digital competences (digital literacy, computer use, knowledge of software, IT and administrative systems, etc.);
○ citizens averse to digital tools consciously or due to a lack of the necessary knowledge should also be able to enjoy the advantages of the digital age (e-inclusion).



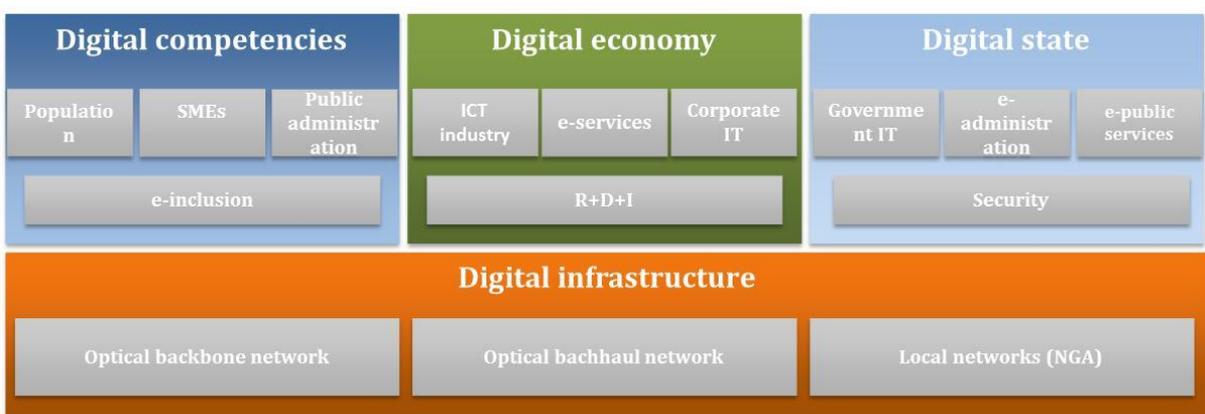


- Digital economy:

- the Hungarian ICT sector as the engine of the development of the digital ecosystem should contribute to strengthening the digital economy by innovative improvements and applications, while other enterprises and the public administration should participate in the process by establishing the electronic basis of its internal processes and external set of relationships, by digitizing its contents and using information technology in its operations;

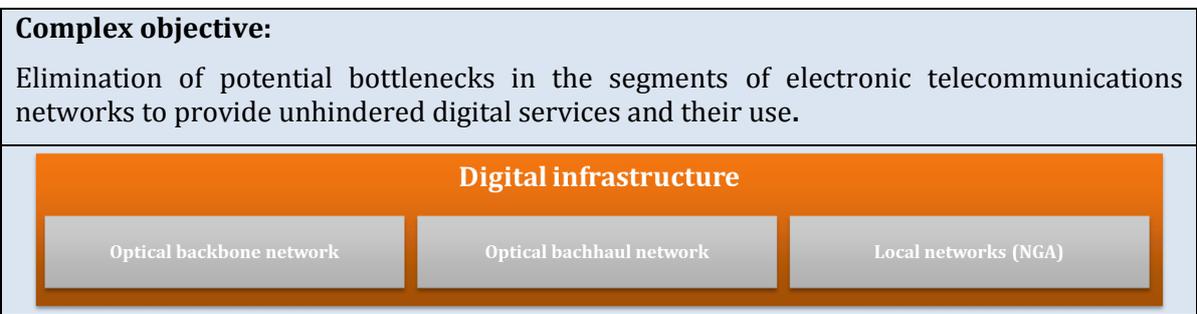
- as a result of programmes aimed to improve the **electronic services** (commercial, banking, etc.) and of those promoting **research-development and innovation the international competitiveness and the export potential** of the players of the Hungarian infocommunications sector should be strengthened;
- **Digital state:**
  - the operation of the government, public administration and public services should be supported by a stable and secure IT background that allows for a high rate of electronisation of the internal processes of public administration and of public administration services targeting the population and the enterprises, also promoting the full-scale digitalization and public access to information and contents in the interest area of the government;

## V.2 Objectives by pillars



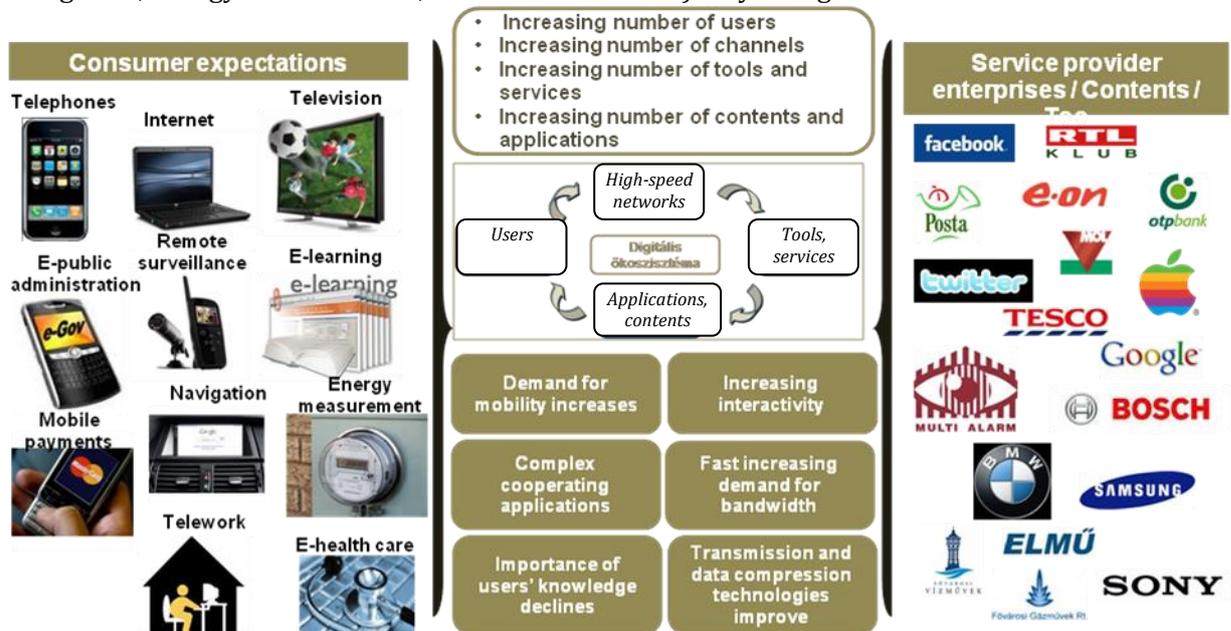
The objectives by pillars are presented in a uniform structure: first, the complex objective of a given pillar is presented, then the whole set of objectives broken down by the components of each pillar. The **horizontal perspectives** within the pillars (e-inclusion, R+D+I, security) are discussed in the next chapter (**Hiba! A hivatkozási forrás nem található.** Horizontal objectives), because they go beyond the given pillar from time to time (for instance, government tasks can be identified both in the areas of e-inclusion and in R+D+I, as the issue of security also has an impact on the areas of digital competences and digital economy although at different levels and to a different extent).

### Digital infrastructure



At every level of the infocommunications infrastructure we need broadband networks of such capacity that ensure a complete and up-to-date broadband coverage for all enterprises and households of the country.

As a result of the continuous increase of the number of users and the increased demand for average bandwidth per user, the traffic of digital networks is expected to multiply in the coming few years in Hungary; the main driver of the growth is the spread of mobile internet and smart phones, as well as the increased traffic of digital TV/video, but special mobile applications (such as navigation, energy measurement, remote surveillance) may also generate mass demand.



Source: Broadband development concept (NMD, 2011)

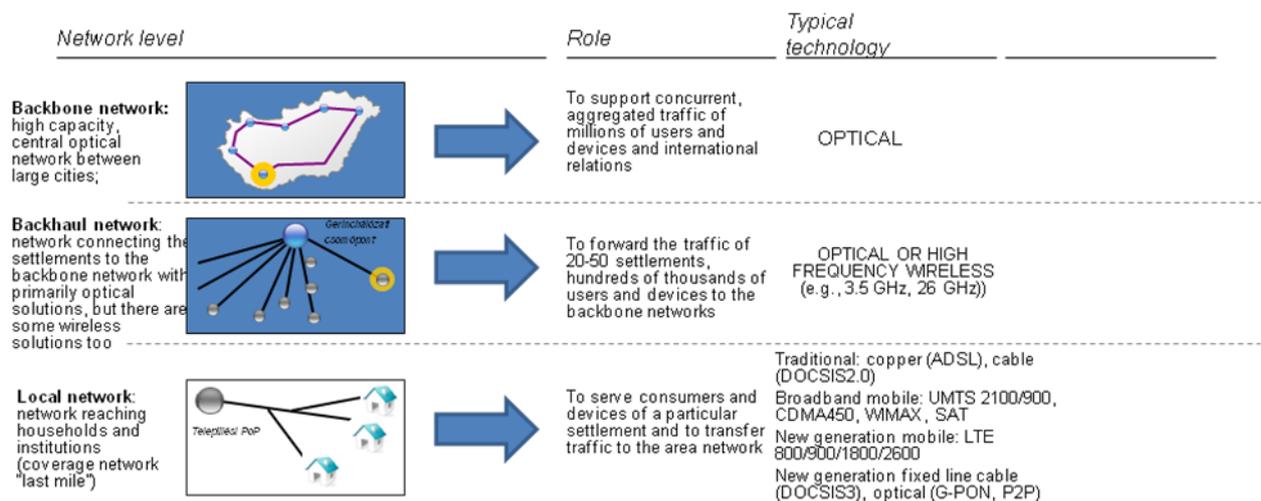
Connecting electronic instruments into networks, the appearance of **machine to machine (M2M) communications** (or 'Internet of things' by EU terminology), also increase the demand for bandwidth. Expert forecasts<sup>33</sup> regarding the increase of bandwidth may even prove to be conservative, if the demand and use of **cloud computing, and e-public administration and e-health care** increase faster than expected. In addition to improving competitiveness, cloud computing also has a risk mitigating effect (expertise, compliance with market dynamics, availability), which is extremely important for SMEs to enter the market and survive there.

In accordance with the above, the set of objectives of the pillar 'digital infrastructure' is as follows:

- **C1. Network capacities should be suitable to meet the increasing demands for the intensity of use and bandwidth:**
  - by 2014 broadband services should be accessible for each Hungarian household and enterprise (100 % coverage, minimum 4 Mbps downloading/1Mbps uploading);
  - by 2018 minimum 30 Mbps internet service should be accessible for each household;
  - by 2020 minimum 50 % of the households should have 100 Mbps or faster access;
- **C2. In each network segment the missing network sections should be built to provide unhindered access for cable and mobile broadband services:**
  - building the broadband new generation (NGA) networks should be continued and by 2020 some kind of broadband network (NGA, Docsis 3.0 or higher) should be made available for the population at every district seat;

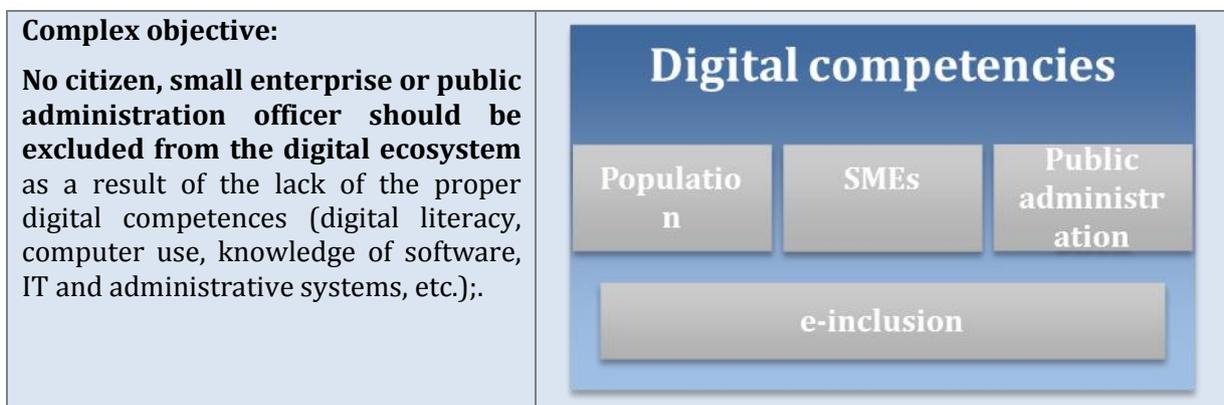
<sup>33</sup> Cisco Visual Networking Index: Forecast and Methodology, 2012–2017

- the development of optical backhaul networks should be continued and by 2016 there should not be any cities or villages in the country not covered by optical instruments (NGA-white)<sup>34</sup>;
- by 2016 the National Telecommunications Backbone Network (NTG) should be fully built so that public institutions should have access to the services via a cheaper ICT infrastructure;
- mobile broadband coverage and the available bandwidth should be expanded; coverage should reach 95% and average bandwidth should reach the European Union average by 2016;
- by 2014 a system of infrastructure mapping should be designed that allows the mobilisation of infrastructure synergies and the reduction of the costs of network building;
- the development of Hungarian educational networks and the services built on them should be continued in line with modern European development guidelines, the public educational IT services should reach the level of IT in higher education.



Source: Broadband development concept (MND, 2011)

## Digital competences



<sup>34</sup> Development of the broadband electronic telecommunication infrastructure of all cities and villages, where no broadband optical infrastructure has been built after the EDOP 3.2.1. project was completed

Digital literacy is already considered a **key competence for employability**, and in a few years' time there will not be practically any jobs that would not require at least a basic knowledge of infocommunications tools and services. Digitally illiterate potential employees may fall back forever, so it is of key importance both for the national economy and for individuals that **the rate of digitally literate people should increase within the population.**

In addition, the low level of motivation for digital literacy prevents the mass spread of online educational and training forms, therefore it prevents mass participation in adult education programmes, which has an adverse effect on competitiveness on the labour market and reduces the chances to be employed. It is a key target of the strategy to **include as many members of the society as possible in the digital world (or to improve their digital competences)** improving in that way their competitiveness on the labour market and the quality of life.

**Increasing the low rate of use of the internet of Hungarian** micro and small enterprises, which is typical to them in international comparison, both at the level of national economy and in terms of the competitiveness and efficiency of the enterprises involved has a major importance as an objective. In the case of micro enterprises employing 10 people or fewer and of SMEs, the owner and/or the executive should be persuaded and his competences should be developed as a realistic objective, because decision-making in that corporate segment is similar to that of families or households (since those companies often have no separate office or company site, cf. Small Office/Home Office (SOHO)).

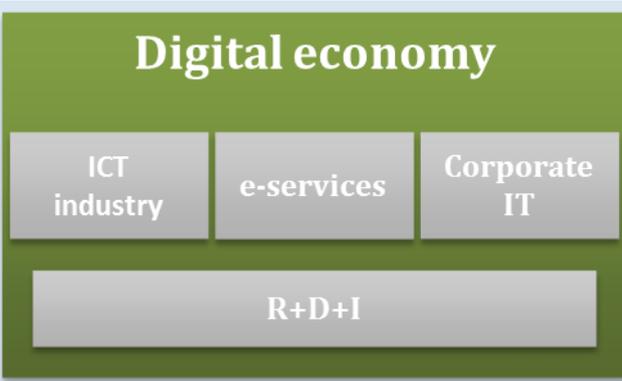
To improve the digital competences of the population and small enterprises it is of key importance that the **pedagogues and trainers** participating in public education and adult education **as well as the public servants and officers** themselves should be able to use electronic services (public administration and other) at a high level, therefore improving their digital competences is another strategic objective. To achieve that goal, the eMagyarország and eTanácsadó networks as well as the libraries will play an important part in obtaining digital competences.

**In accordance with the above, the set of objectives of the pillar 'digital competences' is as follows:**

- **C1. The spread of digital competences and internet use should accelerate among the population:**
  - the rate of digitally illiterate adults (people who have never used the internet) should be reduced to below 40% by 2016 and to below 30% by 2020;
  - the indicator of regular internet use (people who use the internet at least once a week) should reach 75% by 2016, or 60% in the case of those at a disadvantage, and the rate should reach 85 and 75% respectively by 2020;
  - 60% of the adult population should use e-government services by 2016;
  - 50% of the adult population should make purchases online by 2020;
- **C2. The rate of internet user micro and small enterprises should increase dynamically:**
  - 90% of the micro and small enterprises should have internet access by 2016, and 99% by 2020
  - 50% of the micro and small enterprises should have internet presence (website, Facebook profile, etc.) by 2016, and 80% by 2020
- **C3. The digital competences of people working in the public sphere (public servants, civil servants, teachers, etc.) should be expanded and improved:**
  - the knowledge of e-public administration services should be complete among public servants by 2016;

- basic digital competences should be obtained by all people employed in public education as teachers or supporters of educational work, and by those working in adult education by 2016;
- the teaching of infocommunications should be re-visited in public education both in the case of information technology as a subject and in infocommunications as an approach and valuable additional teaching aid.

## Digital economy

<p><b>Complex objective:</b></p> <p>The Hungarian ICT sector as the engine of the development of the digital ecosystem should contribute to strengthening the <b>digital economy by innovative improvements</b> and applications, while other enterprises and the public administration should participate in the process by establishing the electronic basis of its <b>internal processes and external set of relationships, by digitising its contents</b> and using information technology for its operations;</p> <p>As a result of programmes aimed to improve the <b>electronic services</b> (commercial, banking, etc.) and of those promoting <b>research-development and innovation</b></p>	<div style="text-align: center;">  <p><b>activities, the international competitiveness and the export potential of the players of the Hungarian infocommunications sector should be strengthened.</b></p> </div>
---	--

Europe is facing more and more problems of quantity and quality in terms of labour with a high grade of ICT qualifications, which hinders ICT enterprises from finding competitive employees. There is a **lack of IT professionals in terms of quality and quantity** also on the Hungarian labour market, which impacts both the ICT sector and other sectors using ICT, and **clearly hinders the growth of the sector.**

In addition, in Hungary **the rate of experts with producers' qualifications is also low**, therefore increasing the training of ICT professionals both in terms of quantity and quality and ensuring their replacements are also key tasks.

In order to mitigate the lack of experts in the long term, it is an important objective to increase the capacity of higher educational institutions, **to motivate applicants for the training** (e.g., with scholarships), **to improve the standard of training** and **to ensure that training meets the demands of the ICT sector**, with particular attention to ensuring an optimum rate of special engineers dealing with software development and infrastructure. To provide **replacements in IT areas, the standard of IT education** in primary and secondary school education is also important (in order to improve the motivation, number and level of knowledge of students applying for higher IT education).

To manage the financing problems of the sector, particularly those of start-up SMEs, it is an important objective **to provide development capital** required for innovative, knowledge and technology intensive enterprises to enter the market and to grow dynamically in their early lifecycle.

The ICT sector and particularly the SMEs operating in the sector may play a key part in promoting economic growth and increasing competitiveness in Hungary; due to the small size of the domestic market, however, the ICT sector can only fulfil that role if its export capacity and presence on foreign markets improves significantly. Therefore, it is an important objective to **promote the appearance of Hungarian ICT SMEs on foreign markets**, and to enhance software and service exports.

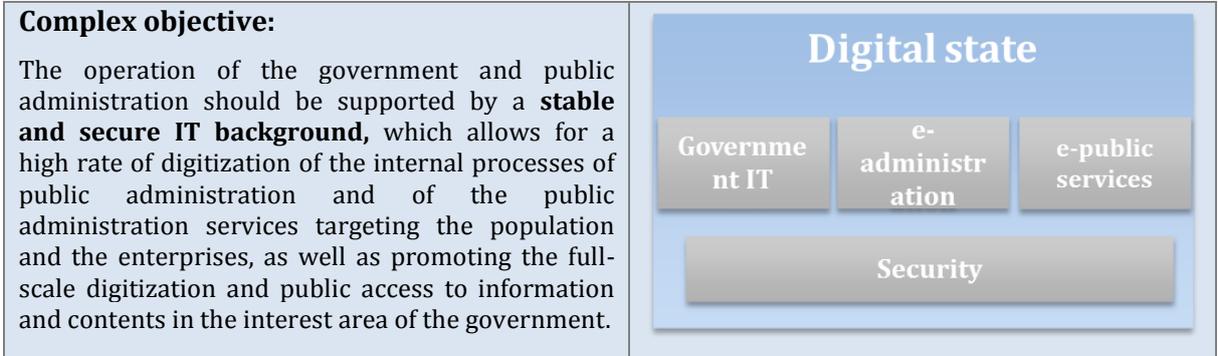
The majority of domestic enterprises have the infrastructure that is a pre-condition to take part in the e-economy (computer or broadband internet), the **micro and small enterprises** employing 10 people or fewer, however, are still significantly lagging behind their peers in the European Union. Therefore, promoting internal and external corporate IT developments and ICT-based innovations is an important objective.

The prioritisation of investment priorities within the digital economy pillar was carried out based on the development needs and identifying the biggest market failure.

**In accordance with the above, the set of objectives of the pillar ‘digital economy’ is as follows:**

- **C1. the shortage of ICT experts both in quantity and quality<sup>35</sup> should be significantly reduced**
  - the number of participants in higher ICT education should increase by at least 100% by 2020;
  - the difference between market needs and educational supply (skills gap) should be significantly reduced.
- **C2. The ability of ICT enterprises to attract venture capital and FDI should improve, the scope and exports of applications and electronic services developed in Hungary should expand:**
  - the value of Hungarian software and services exports should increase by 100% by 2020.
- **C3. The rate of IT use in domestic SMEs and their participation in the digital economy should increase:**
  - 33% of the SMEs should make purchases or sales online by 2020;
  - the rate of SMEs having integrated corporate systems should reach the then EU average by 2020.

**Digital state**



It is of key importance both for the reliable and stable operation of the public administration and for providing electronic public administration services and electronic public services that the

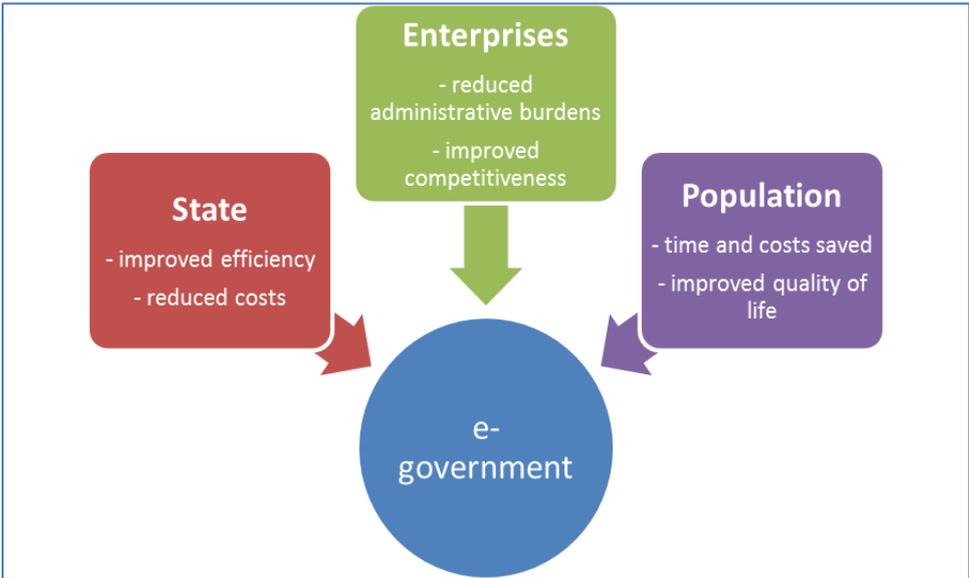
<sup>35</sup> Strengthening higher education to provide the knowledge expected by the labour market and keeping pace with the processes there.

government IT systems should operate safely, in an interoperable\_mode and serving all sub-systems, institutions and users. A precondition for that is to build a government IT background systematically that is able in terms of infrastructure, operation and development to provide the traditional IT services as well as cloud computing expected to be spread in more and more areas, and ASP and SaaS services in a stable and reliable manner. Currently the development of a Municipal ASP is in progress for the Central Hungary Region. In addition to portfolio expansion, horizontal expansion is also necessary; i.e., the availability of ASP centres should be rolled out to the whole country. Taking into account that municipalities may use ASP services free of charge, billions of forints may be saved if such spending of the municipalities is eliminated. It is, naturally, necessary that the services of ASP centres should meet the highest state-of-the-art demands; they should provide access to a wide range of services, because it is a precondition if we want the municipalities to use the services of the ASP centres instead of other services available on the market.

**The effective and cheap operation of public administration**, the simplification of administrative processes, the reduction of the bureaucratic burdens of the population and the enterprises and the development possibilities provided by technological development to be utilised reasonably and in a cost reducing way have placed electronic public administration services in the limelight all over the world. The programme of public administration development marked with the name of **Zoltán Magyary** considers its most important strategic objective **to establish an effective national public administration**, making it clear that **the improvement of electronic services** is a necessity if public administration wants to be effective, operating well and meeting the requirements of good governance.

Electronic public services are **at the point of intersection of government intentions targeting effective and cheap operation of the state and increasing users' demands** to have access to internet use and electronic services. **E-public services improve efficiency**: info-communications technologies help the more efficient processing of mass data of the public sphere (government companies providing statutory public and community e-services), while internet-based applications make data collection, forwarding and the provision of information for the clients of the public sphere cheaper. Significant future savings can be expected if data are shared within the government or between the municipalities and the central public administration.

**E-public administration is advantageous for all actors**



**The state**

- **the operating effectiveness of** public administration is improved by reducing the costs of data collection and processing and collecting electronically back office and front office services;
- **the quality of services** is improved due to increasing awareness of users' demands and feedback;
- **policy and economic policy objectives** are implemented more efficiently by a wide range of information sharing and exchange of information;
- **business and citizens' trust** is strengthened by increasing transparency and reducing the possibilities of corruption.

### Enterprises

- costs are mitigated and **productivity and competitiveness** are improved by reducing the administrative and bureaucratic burdens;
- **the IT competence of enterprises** is developed, in addition to the electronic development of their internal and external processes.

### Population

- lost working hours are reduced by cutting **the time spent in offices managing affairs**, travel or queuing up, and/or the time available for other purposes is increased, therefore the quality of life is improved;
- the additional costs of managing affairs in offices are reduced by **saving travel costs**;
- **continuous feedback** is established via the opportunity to provide opinions electronically, strengthening in that way the relationship between citizens and the state.

**Users' habits are shifted more and more to online, digitally available contents**; fewer and fewer people want to spend many hours travelling several kilometres to get a book, a music piece or technical documents required for some research. The most important clients' demands are that such contents should be made available as fast and as comfortable as possible, and possibly free of charge. In accordance with the above, in addition to the services of e-public administration in the narrow sense, it is an important objective to improve electronic public services (e.g., digital library, archive services, digitalisation projects linked to cultural heritage or local history research,<sup>36</sup> etc.) that have tangible advantage for the participants of the digital ecosystem.

**In accordance with the above, the set of objectives of the pillar 'digital state' is as follows:**

- **C1. A stable and secure government IT background should be established and operated reliably:**
  - uniform government IT background (infrastructure and operation) should be established by 2016 that also allows for cloud computing in government services;
  - at least 20% of the general applications widespread in public administration should be made available as cloud computing infrastructure by 2020;
  - by 2020 the capacity of government ASP/SaaS services should be such that 100% of public administration institutions would be able to use them;

---

<sup>36</sup> In the course of digitising and making available source works of science and culture, care must be taken of observing copyright

- the rate of **open source code** applications should reach 15% for new software and applications installed in public administration, taking into consideration the requirements of neutrality of technology and IT security.
- **C2. The development of electronic public administration should continue. Where it is economical, the group of online services<sup>37</sup> should be complete (taking into account the experiences and results of the earlier period):**
  - by 2018 citizens and enterprises should be able to manage all their public administration affairs electronically (where the nature of the process allows it, including cross-border management of affairs as well);
  - in 2016 all statutory electronic administrative services of the state should become available in line with the 2012 and 2013 amendments of Act CXL of 2004 on the general rules of public administration procedures and services (hereinafter: Ket) and its implementing decree (szeűsz);
  - by 2016 the regulatory environment supporting the implementation of inter-operability should be established;
  - by 2020 inter-operability among major government records should be established at the level of databases;
  - by 2020 80% of the processes of central public administration agencies should be paper-free.
- **C3. The development of electronic public services should be given more emphasis:**
  - by 2014 a complex e-Health Care Action Plan should be designed identifying the objectives of the period until 2020 with respect to all relevant components of the area;
  - by 2020 the proportion of the public financed medical events available in the central electronic health care record system will reach 95% by 2016 internet with minimum 30 Mbps bandwidth should be available in every educational institution and the number of IT devices (PC, laptop, tablet) to be used by students should reach at least 20% of the number of students;
  - by 2016 the group of collections to be digitised (libraries, archives, cultural, arts, etc.) should be surveyed and 50% of those documents should be digitised by 2020;
  - the use of cloud computing services in public education, higher education and in research institute networks should follow European Union trends and should fulfil the relevant specific professional demands.

## V.3 Objectives related to horizontal factors

### V.3.1. E-inclusion

The term **e-inclusion** is often used as a synonym for initiatives to transfer digital literacy, although the two terms are only partially identical. In a narrower sense, the objective of e-inclusion initiatives is to mitigate digital exclusion due to the lack of digital competence (digital literacy) and access to the internet.

In a wider sense, its objective is to achieve equal digital opportunities for the socially deprived by eliminating the hindrances resulting from geographical distance and physical mobility,

---

<sup>37</sup> Government Decree No. 83/2012. (IV.21.) (on regulated electronic administrative services and on the services provided as mandatory by the state) identifies the public services stipulated by law

therefore it cannot only serve the reduction of the number of digitally illiterate people, but also a wider range of social policy goals, albeit indirectly. Mention should be made here of other strategic objectives, such as the reduction of poverty, the reduction of the number of poor families with children, or the reduction of the rate of youth dropping out of schools without any skills obtained. Those are general objectives of social inclusion undertaken with objective values to which the set of objectives of the information society can also contribute via e-inclusion.

### The partial areas of e-inclusion initiatives of the EU

- **E-equal opportunities:** access to ICT tools with particular attention to specific needs;
- **ICT & Old age:** supporting the independent life of the elderly (65+) and improving their quality of life with ICT tools;
- **Digital literacy and competences:** transfer of the knowledge and skills required to use ICT tools and of the approach of lifelong learning;
- **Social-cultural e-inclusion:** promoting the integration of minorities, immigrants and refugees into communities and the society via ICT tools;
- **Regional/Geographical e-inclusion (Digital division or Digital gap):** promoting social and economic welfare in backward areas at a disadvantage economically or in rural (isolated) regions with the help of ICT;
- **Inclusive e-Government:** providing better quality and varied public services to encourage participation in a democratic community.

In the interpretation of this strategy, e-inclusion means an approach characteristic of all pillars and components that makes efforts to achieve that **citizens averse to** digital tools and services consciously or due to lack of access and/or the necessary knowledge **could also share the advantages of the digital age**, so, among others, an improved quality of life thanks to the spread of **green IT** technologies, as well as intelligent health care, transportation and environmental protection solutions.

Accordingly, **the objectives of e-inclusion relating to horizontal factors are as follows:**

- **C1. Citizens excluded from the use of digital tools and services consciously or due to the lack of access and/or the necessary knowledge could also share the advantages of the digital age:**
  - by 2016 at least two nationwide programmes should be launched to help the digital convergence of the socially deprived groups of the society ;
  - by 2015 a complex strategy should be prepared to support the digital inclusion of groups long-term excluded from, or averse to the digital ecosystem;
  - by 2016 at least three intelligent city projects should be launched.

### V.3.2. R+D+I

In a global economy the key to competitiveness is the ability of enterprises to create added value. The response of the EU to the challenges of globalisation is the promotion of innovation-based growth. For this objective the European Union has made available major funds and possibilities in the framework of several programmes (e.g., FP7, CIP), but **Hungarian participation** in the programmes, particularly by SME enterprises, **is declining**,

**Hungary's innovation indicators are quite poor today**, the signs of a dual economy can be detected: on the one side, there are large, foreign owned companies well integrated into

international production and trade that are often connected to innovation networks, but they are connected to the Hungarian innovation system by weak threads. On the other side, there are a high number of SMEs of low efficiency and weak or unrecognised abilities of innovation. Another major component is the lack of trust strongly impacting the economy and the sometimes short-term approach resulting from it.

In addition, due to the enabler nature of ICT, it is the basis of the R+D+I activities of a number of other sectors; ICT more and more ensures the critical infrastructure of production and business processes, communication and transactions, so the research-development and innovation activities of the ICT area have a roll-out effect. It is also indicated in the 'Industrial Strategic White Book of the R+D+I Activities of the Information Technology and Info-Communications Sector<sup>38</sup>', which identifies the following complex objective:

*'the ICT sector should create value in several related sectors (such as health care, education, transport, energy and also other industries) using its characteristic instruments and increasing R+D+I activities, and should find the breakout points using which we can accelerate the process of joining the frontline of Europe.'*

The economic weight of the ICT sector and its R+D+I potential surpass that of other sectors also involved in important research activities from many aspects. On the other hand, if you look at the spending on R+D, its CAPEX and asset needs, they are lower than the indicators of other sectors, so the ICT sector can generate high added value with relatively low CAPEX demands. Therefore the increased support of research and innovation activities targeting ICT is a task of key importance, because the added value resulting from R+D+I activities can be ensured in that case.

**Taking into account the above, the set of objectives of the R+D+I horizontal component is as follows:**

- **C1. The activity of the ICT sector including the R+D+I activities of SMEs should increase with particular attention to the needs of other industries intensively using ICT tools and applications:**
  - by 2020 the value of **research and development investments** should be doubled in ICT;
  - The participation of Hungarian **ICT SMEs at R+D+I tenders** should increase significantly and their income from it should double by 2020.
  - The adequate super-computing (HPC) capacities should be available for the R+D+I sector at a proper pace (at minimum 6.9 Pflops by 2020);
  - The participation of Hungarian research workshops, higher educational institutions, research centres of the Academy and corporate research centres should increase in ICT related European research projects, networks and programmes (Horizon2020 applications, EIT KIC, FET).

### V.3.3. Security

**Reliability and security** to be equally interpreted at the level of end-users and applications, access, information technology infrastructure and networks are equally key components in the provision and use of infocommunications services. Network security is of critical importance in terms of national security, but it is also an expectation for each service provider and user.

It is extremely important for the electronic government services that **the security of networks, systems, processes and user data** could be guaranteed to a maximum extent in public

---

<sup>38</sup> MND, December 2012

administration. One of the success criteria of e-public administration services is to ensure that both citizens and enterprises may be confident that the systems can operate continuously, the services are available and their data can only be visible for the purposes they identify and by only the systems and persons authorised.

**Fears of security risks** play an important part in reservations related to internet services (e.g. electronic commerce and banking) and in aversion to them. To mitigate such fears, it is an important task **to provide realistic information about security risks and** actual threats, to present how to defend ourselves against them and **to eliminate unjustified fears resulting from the lack of knowledge** that has been present among the population and corporate users. The issue of **the protection of children** is to be given special attention, because they cannot be expected to assess actual risks, so informed adults in their environment (parents and teachers) are responsible for transferring the relevant information and knowledge related to the issue.

**In accordance with the above, the set of objectives for the horizontal component ‘Security’ is as follows:**

- **C3. The information infrastructures, the internal systems and external applications of public administration and the user data in them should be given maximum protection as they are of key importance in terms of national security and the availability of the internal operation and the electronic public administration services. On the other hand, the different user groups should be provided with credible and objective information on actual security risks and how to manage them, with particular attention to the protection of children:**
  - by 2016 full-scale SLA-based operation should be established for the IT systems in public administration while ensuring the level of availability and guaranteed security parameters relevant to the desired availability of a given system/application;
  - by 2016 an overall national information programme should be designed on realistic security risks and how to mitigate them, and the regulatory environment of managing security risks should be established; at the same time a hotline for the protection of children and for the prevention of cybercrime should be known to a large group of people.

**V.4 Indicators**

In the following section the indicators to be used to measure the implementation of the objectives identified in the set of strategic objectives are presented. The indicators related to the horizontal components are presented separately.

**5.4.1. Digital infrastructure**

Pillar	Indicator	Base value (year)	Target value (year)
Digital infrastructure	broadband coverage (4 Mbps downloading/1Mbps uploading)	94,4% (2013)	100% (2014) <sup>39</sup>
	minimum 30 Mbps internet service availability	75.7% (2013)	100% (2020)
	minimum 100 Mbps internet service availability	0,52% (2012)	50% (2020)
	availability of NGA networks in cities and villages of 5,000+	350	80%

<sup>43</sup> Following the implementation of the project EDOP 3.2.1 ‘Regional Network Developments’

	population	(2014)	(2020)
	number of cities and villages not covered by optical networks <sup>43</sup>	35,2% (2013)	0 (2016)
	rate of readiness of the National Telecommunications Backbone Network (NTG)	35,2% (2013)	100% (2016)
	mobile broadband coverage	97% (2013)	95% (2016)
	Fourth generation (LTE) mobile broadband coverage	39,1% (2013)	EU average <sup>40</sup> (2016)

#### 5.4.2. Digital competences

Pillar	Indicator	Base value (year)	Target value (year)
Digital competences	rate of digitally illiterate adults	41,2% (2013)	>40% (2016) >30% (2020)
	regular internet use	71,1% (2013)	75% (2016) 85% (2020)
	regular internet use by people at a disadvantage	52,8% (2013)	60% (2016) 75% (2020)
	rate of adults making their purchases online (last 12 months, in the rate of the internet users)	38% (2013)	50% (2016)
	rate of adults using e-government administration services (last 12 months, in the rate of the internet users)	49,8% (2013)	60% (2016)
	rate of micro and small enterprises with internet access	84,8% (2013)	90% (2016) 99% (2020)
	rate of micro and small enterprises with internet presence	61,2% (2013)	65% (2016) 80% (2020)

#### 5.4.3. Digital economy

Pillar	Indicator	Base value (year)	Target value (year)
Digital economy	number of participants in higher ICT education	2400 (2013)	+100% (2020)
	number of vacant ICT positions	10000 (2013)	<1000 (2020)
	Hungarian software and services exports (billion HUF)	240 (2013)	+100% (2020)
	rate of SMEs making their purchases or sales online	15,4%/10% (2013)	33% (2016)
	rate of SMEs with integrated corporate systems	13,2% (2013)	EU average (2020)

#### 5.4.4. Digital state

Pillar	Indicator	Base value (year)	Target value (year)
1	a uniform government IT environment is established		yes

<sup>40</sup> LTE network coverage in households was 59.1% in the EU in 2013

	(infrastructure, operations)		(2016)
	access to cloud computing for applications in public administration	0% (2013)	>20% (2020)
	government ASP/SaaS service capacity in percentage of potential use	0% (2013)	100% (2020)
	rate of open source applications in software or applications to be installed in state administration	5% (2013)	15% (2016)
	online availability of electronic public services for citizens and enterprises (where the nature of the process allows) including cross-border management of affairs	77,3% / 50% (2010)	100% (2018)
	availability of e-services to be provided by the state	0% (2013)	100% (2016)
	establishment of a regulatory environment supporting the implementation of inter-operability		Yes (2016)
	database level inter-operability for state records		Yes (2020)
	inter-operability for institutions or for processes and systems within institutions		Yes (2020)
	rate of paper-free processes in central public administration institutions	20% (2013)	80% (2020)
	complex E-Health Care Action Plan		Yes (2015)
	The proportion of the public financed medical events available in the central electronic health care record system	0% (2013)	95% (2020)
	the number of IT devices (PC, laptop, tablet, etc.) to be used by students at schools in percentage of the number of students	15,8% (2012)	20% (2016)
	a survey of the group of collections to be digitized (libraries, archives, cultural, arts, etc.)		yes (2016)
	the degree of digitization of the analogue stocks of archives	11,5% (2013)	100% (2020)
	the infrastructure and IT preconditions of full scale online availability of the public data assets of the state are available		Yes (2016)

#### 5.4.5. Horizontal components

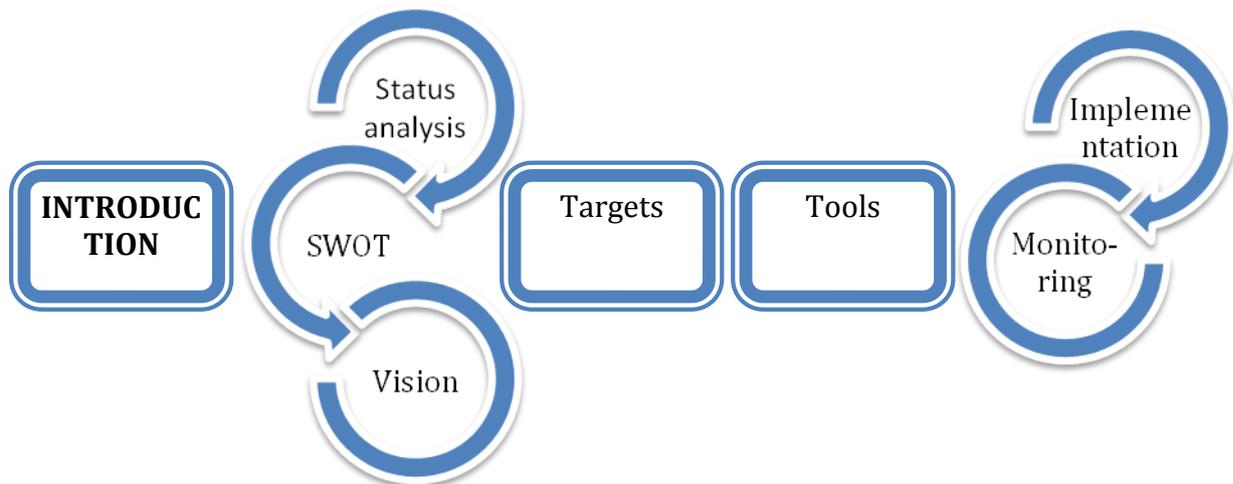
Pillar	Indicator	Base value (year)	Target value (year)
E-inclusion	by 2016 at least two nationwide programmes should be launched to help the digital convergence of the socially deprived groups of the society;		yes (2016)
	by 2014 a complex strategy should be prepared to support the digital inclusion of groups long-term excluded from, or averse to the digital ecosystem;		yes (2014)
R+D+I	research-development investments in ICT	2,141 (2010)	+100% (2020)
	ICT SMEs income from R+D+I tender applications	x	+100% (2020)
Security	full-scale SLA-based operation for the IT systems in public administration		yes (2016)
	by 2016 the rate of people averse to internet services (electronic commerce, banking and public administration) due to fear of security threats should decline by 20%, and by 50% by 2020		-20% (2016) -50% (2020)

	an overall national information programme should be designed on realistic security risks and how to mitigate them and the regulatory environment of managing security risks should be established; at the same time a hotline for the protection of children and against cyber crime should be known to a large group of people		yes (2016)
--	---	--	---------------

## VI.SET OF STRATEGIC INSTRUMENTS

### VI.1 Approach

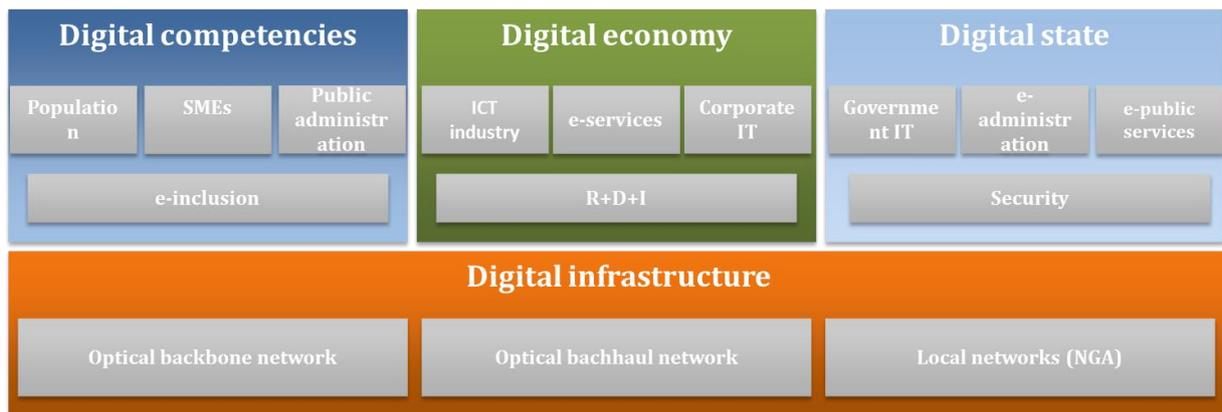
Applying the systematic approach presented in the Methodology chapter, the set of instruments is presented in accordance with the indicated pillars similarly to the analysis of situation and the set of objectives.



It is a major expectation for the set of strategic instruments that it should directly or indirectly support the implementation of all components of the set of objectives designed to bridge the gap between the current situation presented in the **analysis of the situation and the SWOT analysis**, and the desired future state identified in the Vision chapter; on the other hand, it should not include any elements that will not contribute to the implementation of any objective. The objectives/instruments matrix presenting the interrelations of the set of objectives and set of instruments is used to check if the above dual expectations are met.

In addition, the set of strategic instruments also categorises the instruments by their nature (**regulatory, public policy and fiscal/supporting instruments**), which lays the foundations for the preparation of an indicative financial table: the cost requirements of instruments of public policy and regulatory environment are significantly different from that of instruments including support components or fiscal intervention (e.g., tax relief). In that regard, the basis of the approach is that relying on the employment of supporting/fiscal instruments is only reasonable in areas, where neither regulatory nor public policy measures are suitable to achieve similar results.

The description of the content of the instruments and their programming in action plans will take place in the next phase of the design of the strategy. The authors of the ICT strategy closely collaborate with the institutions involved in designing action plans, taking into account the scope of responsibilities of independent regulatory agencies and the deadlines resulting from the set working procedures of the institutions.



## VI.2 Categories of instruments by pillars and by the nature of the intervention

### VI.2.1 Digital infrastructure

Due to the high costs of NGA and network infrastructure developments, and in order to accelerate rural developments which are not economical at a market rate, **the state takes part, in some form, in most countries in promoting the development of optical networks, sometimes in its financing or even implementation:** using public policy measures, it assists the acceleration of market initiative developments, it introduces regulatory measures, provides budgetary sources or involves European Union funds to implement the infrastructure developments of key importance. Similarly, major state responsibilities can be identified in making up for the missing optical elements of the network infrastructure or in promoting the development of mobile broadband services.

On the other hand, state participation should observe the **principle of gradualism:** before spending money, it must investigate the possible regulatory measures and before regulating, it should survey the relevant public policy measures. The authors of the strategy think the strategic objectives of the pillar 'digital infrastructure' can be achieved including the relevant indicators if the following measures (actions) of public policy, regulatory and support/development policy instruments are fully implemented:

#### ***E1. Promoting the development of NGA networks***

To achieve the strategic objectives identified in line with the European Digital Agenda, it is absolutely necessary that the optical (FTTx) or Docsis 3.0 technology digital cable network, which is able to provide a similar large bandwidth, should be extended to reach the highest possible number of households and institutions in the local segment of the electronic telecommunications network infrastructure. It is intended to be ensured by accelerating the pace of NGA developments, by providing opportunities for the developments that cannot be currently implemented on a market basis, and by regulatory measures encouraging competition and promoting investments.

Based on market estimations 180 – 210 Billion HUF (600 - 700 Million €) investment is needed in order to assure at least 30 Mbps internet network connection in all households in Hungary. Such an investment would affect further 25 – 40 % (1 -1,6 Million of households) coverage of households with new generation access network. To be able to specify the exact figures of the households and the investment costs affected in the large broadband project a new database with whole scale of infrastructure is needed, as indicated in Action A1.

***The measures (actions) of the set of instruments:***

- **A1. Establishment of a broadband infrastructure recording system (mapping)** (accurate infrastructure and coverage map);
- **A2. Promotion of market initiative NGA developments with public policy measures** (e.g., detailed needs assessment, in the case of state/municipality public utility developments and road building recommendations to share the substructures, promotion of the forms of self-regulation and peer-regulation, simplification and shorten the timeframe of construction permission processes, employment of public interest agreements, spread of investment risks, etc.);
- **A3. Further development of the market regulatory system to encourage investments and competition** (liberalisation of wholesale price regulations, consideration of regional differences, and employment of obligations compliant with the new EU recommendations);
- **A4. Employment of development policy instruments** (credit lines, credit guarantees, reimbursable subsidies, non-reimbursable subsidies, other EU funds, etc.) to support network development and network migration.

Development policy measures can be used exclusively in the areas where market failures can be indicated, which means that the market players don't want to use market based investment with adequate capacity of infrastructure deployment, because they cannot expect their return of investment taking into account relevant features (considering the geographical features of the territory (i.e topography), population density, elements affecting demand such as levels of income, education, ICT training, employment status, aging structure etc) and the development objectives of the country/region.. According to the Commission's terminology these are called "NGA white" spots. By the developments priority will be given to rural settlements which are rarely populated, located in deprived areas and possessed with unfavorable conditions in terms of market investments. Areas which will be covered by an operator on market basis, will not be granted. This will be monitored before any public subsidy is given.

***Development areas (NGA white spots)***

In order to minimize the risk of private investment extrusions, changing of commercial investment stimulations and competition distortion against the EU rules a new generation network countrywide database and map will be established. The mapping database will support both the development and operation planning. In midterm the solution will be extended to a complete electronic communication infrastructure recording system supported by geospatial applications. Based on the information gained from the system for the developing NGA white areas geographical and service based limitations can be made and capacity and technological conditions can be laid down in the different network segments. After implementing the database the list of affected settlements can be validated via market consultation. Following the consultation a final list of development areas will be drafted.

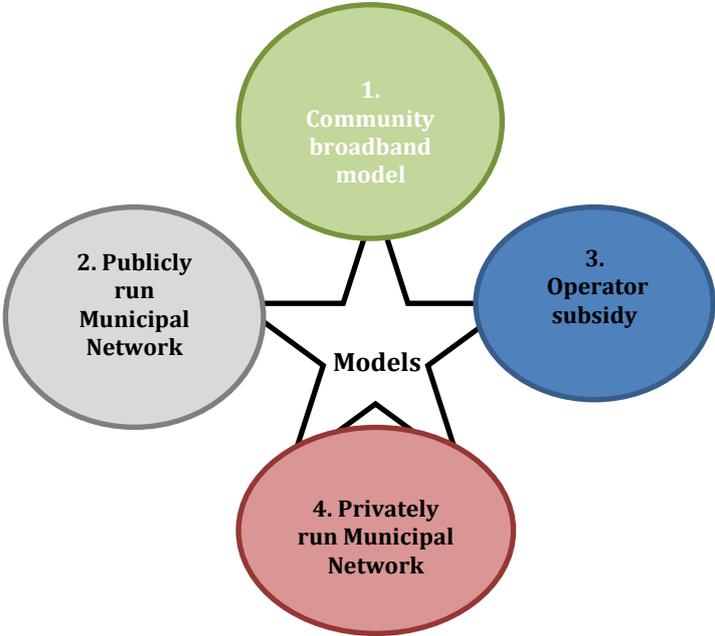
***Investment models***

There is no single model that suits every situation. There are many different aspects in the selection of investment model. The primary aspect is to guarantee the high speed broadband access for the costumers in long term to be able to offer advanced services. Another aspect is that due to the large investment required in deploying broadband networks, public investment of some kind will often be required in less developed towns and rural areas. The third aspect is the amount of available EU and national resources.

Based on the above listed aspects and requirements different investment models can be chosen in order to achieve the most efficient utilization of resources for the NGA access network deployment in the next seven year period.

Concerning the selection of investment models, domestic network development experiences, results coming from EU financed developments and economic issues have been taken into account.

Possible investment models<sup>41</sup>



The most probable model should be the third one, when a private company builds and operates the network and it is therefore a business property. If funding had been issued the state imposes certain obligations for the beneficiary, which the network owner/ operator has to fulfil. (e.g. open access offering for other service providers via wholesale services, pricing based on reference prices, etc.) The model can be used typically in those areas where private companies will not invest into network development on market based returns of investment. but if it is partially funded, they will perform investments.

About the investment plans of the service providers information will be required in consultation in the framework of annual strategy monitoring. In certain cases if it is necessary to achieve the goals, public outsourcing (Model 4) is also reasonable.

In case of public outsourcing the state will perform a contract with the private sector for the construction and operation of the network but the network will stay state property and the state will perform controls.

Implementation of the broadband programmes can be continuously followed up by the government with the help of a Infrastructure Registry and Monitoring System, the experiences learned from this system will be integrated into the preparations of the new actions.

**E2. Promoting the development of the new generation (4G, LTE) mobile broadband services**

Promoting the 4th generation and LTE (Long Term Evolution, collecting term of the latest generation mobile technologies) developments, which is absolutely necessary for large bandwidth mobile Internet use, is just as important as the development of a cable broadband.

<sup>41</sup> Source: Guide to broadband investment, European Commission (Analysys Mason)

As a first step, a national spectrum strategy should be established, which - thanks to the efficient management of the available frequencies and the frequencies released following the digital switch-over - can contribute to ensuring 100% mobile broadband coverage and to increasing the available bandwidth.

***The measures (actions) of the set of instruments:***

- **A1. Promoting the development of wireless broadband services;**
- **A2. Establishing a regulatory environment to strengthen competition on the mobile market** (e.g., availability of new business models, etc.).

***E3. Promoting the building of the missing sections of the backhaul network***

In the development policy cycle completed in 2013, the lack of optical backhaul network sections that have not been built under the EDOP 3.1.2. scheme continue to represent a bottleneck for the cities and villages impacted (NGA-white cities and villages). Based on the outcomes of the consultation conducted in early 2014 with service providers and professional organisations there are still 398 settlements without backhaul network with the necessary capacities. A number of other cities and villages are only reached by a single, low-capacity optical network (NGA-grey cities and settlements), which represents a disadvantage both in terms of quality and price. The set of instruments – in line with the EU recommendation relating to NGA developments - allows that the establishment of local NGA networks could be possible in those cities and settlements, or real broadband internet access could be provided for the population, the enterprises and the public institutions. It is an important point that high capacity optical backbone and backhaul networks are absolutely necessary for the transmission of the data traffic of mobile broadband services.

***The measures (actions) of the set of instruments:***

- **A1. Laying the policy foundations for the promotion of development of the optical backhaul network** (concept and action plans);
- **A2. Promotion of market development using public policy and regulatory measures** (e.g., detailed infrastructure map, in the case of state/municipality public utility developments and road building recommendations to share the substructures, simplify and shorten construction permission procedures, employment of public interest agreements, spread of investment risks, etc.);
- **A3. Establishment of development credit schemes or tender schemes** to support developments that cannot be implemented on a market basis; (e.g., tax relief for developments, allocation of application funds to support investments not recoverable on a market basis, etc.).

Development policy tools – similarly to E1 measures – will be used exclusively in those areas where market failures are perceived i.e. the market service providers are not interested in market based investments for construction of infrastructure with affordable capacity because they cannot foresee their return of investment.

***Investment model***

For backhaul network developments beside the models 3 and 5 the model marked with 2 can also be used. That case involves the public sector owning and operating a network without any private sector assistance. All aspects of network deployment are managed by the public sector. A public sector operating company may operate the entire network, or may operate the wholesale

layer only (with private operators offering retail services). The case can be used if the private companies doesn't have any willingness to invest even if they would receive public funding, because they can't assume their return of investment even on long term.

**E4. Developing network access of public institutions**

The development of broadband optical networks and local NGA networks will form the infrastructural basis of broadband band internet access of public administration, education, health, cultural and other public (or local government) institutions, but further network elements need to be installed and the internal infrastructure of the institutions needs to be developed in order to make those connections live.

**The measures (actions) of the set of instruments:**

- A1. Developing network access of public and local government institutions (health, education, social, child welfare and child protection, cultural institutions, local governments).

**E5. Full consolidation and increase of the capacity of government networks**

The development of the advanced and the state of the art and telecommunications networks of the government and authorities, forming the basis of high quality and secure electronic administration and public services, the modernisation of obsolete active devices, and the completion of the consolidation started over the last few years will take place within the framework of this set of instruments. The developments will facilitate more effective capacity management, the replacement of parallel sections, as a result of which higher capacity can be provided and the current service standard may be increased.

**The measures (actions) of the set of instruments:**

- A1. Professional and technical conceptional foundation of the completion of the public network consolidation, further development, enhancement and capacity increase of the National Telecommunications Backbone Network;
- A2. Developing the telecommunications and communications networks of standby agencies.

**Investment model**

In case of governmental and institutional networks access development the consideration of the second (all aspects of network deployment are managed by the public sector – governmental planning, constructing and operation) or the fourth (public outsourcing) model seems to be practical. If the second model is used, the infrastructure deployed by the government will remain state-owned and the network will be operated by the government via a state owned service provider company. In the instance of NTB (National Telecom Backbone) development the realization will be carried out by NISZ Infocommunications Service Ltd. while for alarm organisations communication network development the task will be given to Pro-M Ltd.

**Review of the instruments by pillar of digital infrastructure**

Pillar	P1. Digital infrastructure	type of instrument
Set of instruments	E1. Promoting the development of NGA networks	
Measures (actions)	A1. Establishment of a broadband infrastructure recording system (mapping)	public policy, fiscal
	A2. Promotion of market driven NGA developments	public policy, regulation
	A3. Further development of the market regulatory system to encourage investments and competition	regulation

	A4. Use of development policy instruments	fiscal
--	---	--------

<b>Pillar</b>	<b>P1. Digital infrastructure</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b><i>E2. Promoting the development of the new generation (4G, LTE) mobile broadband services</i></b>	
<b>Measures (actions)</b>	A1. Promoting the development of wireless broadband services;	public policy, regulation
	A2. Establishing a <b>regulatory environment to strengthen competition on the mobile market</b> (e.g., availability of new business models, etc.).	regulation

<b>Pillar</b>	<b>P1. Digital infrastructure</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b><i>E3. Promoting the building of the missing sections of the backhaul network</i></b>	
<b>Measures (actions)</b>	A1. Laying the policy foundations for the promotion of development of the optical backhaul network	public policy
	A2. Promotion of market development using public policy and <b>regulatory</b> measures	public policy, regulation
	A3. Establishment of development credit schemes or tender schemes to support developments that cannot be implemented on market basis	fiscal
<b>Pillar</b>	<b>P1. Digital infrastructure</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b><i>E4. Developing network access of public institutions</i></b>	
	A1. Developing network access of state and local government institutions	fiscal

<b>Pillar</b>	<b>P1. Digital infrastructure</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b><i>E5. Full consolidation and increase of the capacity of government networks</i></b>	
<b>Measures (actions)</b>	A1. Professional and technical conceptional foundation of the completion of the public network consolidation, further development, enhancement and capacity increase of the National Telecommunications Backbone Network	public policy, fiscal
	A2. Developing the telecommunications and communications networks of standby agencies.	fiscal

### VI.2.2 Digital competences

The internet is used increasingly every day even in the most ordinary life situations. However, still a considerable portion of the Hungarian population, almost one-third has never tried using the internet, and therefore they have got no personal experience of its advantages. Consequently, the programmes aimed at the dissemination of digital literacy must be given priority among the instruments of the “digital competences” pillar.

Even among those who consider themselves regular internet users, the ratio of individuals who limit their activities on sending mails, entertainment or using social networks and applications but never use online services, and never use the internet for job search, purchases, banking or

electronic administration is very high. This phenomenon is referred to as the secondary digital divide.

The usage statistics slightly distort the situation in that sense, because youngsters who spend hours in front of various screens every day (TV, laptop, smart phone), but typically use only the media and, simultaneously chat on social sites are also included among the regular internet users. Consequently, any programme that is aimed at intensifying the internet use of individuals hesitant to use online transactions for various reasons (security concerns, lack of information, lack of motivation, etc.), the increase of their interactivity and the recognition of the actual advantages of digital services are also important instruments in that pillar.

### **E1. Development of digital competences within the population**

The understanding of ICT devices and services, and the possession of competences required for using them are prerequisites in an increasing number of jobs; consequently, the lack of digital competences preserves the disadvantaged situation of the groups lagging behind. Unfortunately, those groups recognise that correlation the least (e.g., older employees, durably unemployed, residents of small settlements, residents of disadvantaged regions, sometimes individuals living in deep poverty, etc.), who would need most badly the new skills. They are the ones who enrol for training the least, primarily due to lack of money and motivation, which will further increase the gap and deteriorate their chances on the labour market.

According to international experience, individuals not using digital devices or services can be involved more effectively through their **families, friends or colleagues**. That is a spontaneous process, which is difficult to accelerate with coordinated actions, hence **public internet access points (PIAP)** were established together with **training programmes, focusing and specifically targeted on particular local communities**. The success of those programmes is based on their **local features**: the participants learn about digital services locally, in a known environment, close to their home, with the help of a local assistant.

According to European experience those programmes launched on the basis of a complex **infocommunications strategy** can be successful that are targeted at a **particular age or social group** and rely on the **involvement of local communities**. (That is referred to in the technical literature as “community-led local development” (CLLD). The success of the training programmes may be supported by the local and national **communications initiatives** which create awareness in the general public of the positive features of the internet and its impacts on the quality of life (population), efficiency, cost reduction (corporate entities).

In Hungary the e-Hungary program is in line with the best international practices in almost all of its components, and therefore the programme should be continued, either in coordination with an ICSS network, or with some other (educational, cultural, community) institutions, relying on the professional knowledge and local integration of trained e-Advisers.

Any training organised for disadvantaged groups already possessing basic digital competences (durably unemployed, individuals living in disadvantaged regions, etc.) is aimed to intensify online activities, pass on the ability to search for jobs on the internet, to enable the participants to take part in distance learning and telework programmes, and to strengthen self-employment and mobility.

#### ***The measures (actions) of the set of instruments:***

- **A1. Reducing the digital divide between various groups of society**, on the basis of community points (eHungary Points, ICSSs, libraries, etc.), and educational, cultural and community institutions, focusing on the target groups with the highest needs (e.g., unemployed, disadvantaged families, old people, etc.); online campaigns for improving social solidarity among ICT users.

- **A2. Promotion of the dissemination of online government, public administration and e-health services;**
- A3. Improving the quality of life of citizens with the help of ICT;
- **A4. Development of the community internet service spaces** and strengthening the relationship between public education and community internet access points (**integrated community service space** (e.g., eHungary Points, Postal Agora sites, ICSSs, community houses, telehouses, libraries, etc.) **and support to the establishment of programmes and network organisation;** strengthening of the relationship among e-Advisers, teachers and other opinion leaders, ensuring the development of digital literacy in a community framework within a particular settlement.

## **E2. Measures aiming at the enhancement of internet penetration and online presence of micro and small enterprises**

According to the status analysis the Hungarian SMEs, including especially micro and small enterprises, have lower internet penetration than the EU average, they use less the internet for their activities, and fewer of them have their own website or profile on any community portal. That backlog is a considerable competitive disadvantage in comparison with the major Hungarian and international companies, and this set of instruments contains all the measures with which it can be reduced or eliminated.

### ***The measures (actions) of the set of instruments:***

- **A1.** Training and motivation programmes targeted at the **owners and managers** of micro and small enterprises in order to make them aware of the benefits of the use of the internet and the infocommunications devices and applications.

## **E3. Development of digital competences among the public sector employees (public service employees, public servants, health and social workers, teachers, etc.).**

Over the last ten years governments devoted a large amount of Hungarian and EU resources to digitisation of internal processes of e-administration and to the development of e-administration services. However, as the projects could not be coordinated with the public administration reform concepts, and **not enough stress was put on the training of public servants, public employees and government officials involved in the supply of e-administration services,** or to the competence development of the individuals involved in training the residents (e.g., teachers, customer service employees, etc.), those projects could not be efficient. The purpose of this set of instruments is to develop the digital competences of the public sector employees, including also teachers and public servants.

### ***The measures (actions) of the set of instruments:***

- **A1. Integration of practical e-administration skills in the public administration training** (basic and high level) **programmes** designed for public service employees and other public sector workers;
- **A2.** Support for acquiring **basic and high level digital competences** among public education and higher education employees (teachers, tutors working in higher education) and launch of training programmes providing special infocommunications methodology information.
- **A3. Review** and repositioning of the **infocommunications education** (IT, as a subject and infocommunications as a type of approach and a useful supplementary tool in training);

## Review of the instruments by pillar of digital competences

Pillar	P2. Digital competences	type of instrument
Set of instruments	<b>E1. Development of digital competences within the population</b>	
Measures (actions)	A1. Reduction of the digital divide between various groups of society	public policy, fiscal
	A2. Promotion of the dissemination of online government, public administration and e-health services to reduce the secondary digital divide;	public policy, fiscal
	A3. Improving the quality of life of citizens with the help of ICT;	public policy, fiscal
	A4. <b>Development of the community internet service spaces</b> and strengthening the correlation between public education and public internet access points	public policy, fiscal

97

Pillar	P2. Digital competences	type of instrument
Set of instruments	<b>E2. Measures aiming at the enhancement of internet penetration and online presence of micro and small enterprises</b>	
Measures (actions)	A1. Training and motivation programmes targeted at the owners and managers of micro and small enterprises	public policy, fiscal
		public policy, fiscal

Pillar	P2. Digital competences	type of instrument
Set of instruments	<b>E3. Development of digital competences among public sector employees</b>	
Measures (actions)	A1. <b>Integration of practical e-administration skills in the public administration training</b> (basic and high level) programmes designed for public service employees and other public sector workers	public policy, fiscal
	A2. Support of acquiring <b>basic and high level digital competences</b> among public education and higher education employees (teachers, tutors working in higher education) and launch of training programmes providing special infocommunications methodology information	public policy, fiscal
	A3. <b>Review</b> and repositioning of the <b>infocommunications education</b>	public policy

### VI.2.3 Digital economy

It is one of the significant barriers to the development of the digital economy that the higher education system does not train enough IT experts either in terms of quality or structure, or quantity, and therefore a high number of IT jobs is vacant constantly.

The quantitative and qualitative deficiencies may be remedied by coordinating the training activities and market demand, strengthening cooperation between higher education and the market, establishing research workshops and competence centres, and by making IT careers more attractive.

The Hungarian ICT SMEs struggling with capital shortages also have very few chances to join the international market, which may be improved with incubation programmes, seed capital financing, and support to any exportable product or service. The support of integration of the SMEs operating on the consumption side of the digital economy into the world of electronic services (internal systems, connections between systems) is of outstanding importance, similarly to the wide dissemination of e-commerce, invoicing and payments. The basics for all that need to be established in primary and secondary education, because the age at which a student comes across the possibility of opting for an IT career and whether or not there is any encouragement to do so are important factors. The IT teachers have an extremely important role in that process.

### **E1. Improving the quantitative and qualitative indicators of higher level ICT training in order to reduce the shortage of experts**

Investment into human resources is of key important for the Hungarian ICT companies. Considering the development trends of the IT sector and the current status of the educational system, cooperation between the educational system and the industrial actors interested in the development of the IT sector is indispensable even in the short term.

It is important to ensure the availability of well-trained and experienced workforce through the development of the primary, secondary and higher education systems, and by strengthening vocational and adult education.

#### ***The measures (actions) of the set of instruments:***

- A1. Strengthening of IT as a subject and digital culture in the new content regulations of public education, attracting students to ICT profession,
- A2. Regular monitoring of higher level IT trainings **and their adjustments to market requirements** with the involvement of market actors and/or their NGOs (e.g., ICT Association of Hungary);
- A3. Encouragement and support of **cooperation between educational institutions and ICT enterprises** (establishment of competence centres, research cooperation, educational cabinets, etc.);

A4. Encouragement and support of ICT **adult training programmes** in order to enable employees to swap from areas, close to IT (e.g., graphic artist, designer, mathematician, etc.) to IT, encouraging girls to opt for an IT career, and encouraging female workers for retraining

### **E2. Support of the development of exportable application and electronic services of Hungarian ICT companies**

At the beginning of their life cycle, Hungarian ICT companies suffer from the shortage of capital, which is followed by the lack of trained and experienced experts (sales, marketing, management, etc.); hence there is need for a life-based support programme, which will help marketable ICT companies perform on external markets.

#### ***The measures (actions) of the set of instruments:***

- A1. Seed capital financing and incubation support for ICT start-up companies;
- A2. Targeted support of marketization of products and services produced by ICT companies;

- A3. Support in the initial international efforts of ICT start-up companies (exhibitions, conference, private start-up events, etc.);
- A4. Support programmes to export-oriented micro, small and medium-sized enterprises, operating in the IT sector in entering new international markets and, indirectly, to increase the Hungarian software exports;

**E3. Support to the development of internal IT and electronic services of SMEs**

The use of ICT devices and services clearly strengthens the competitiveness and efficiency of an enterprise. As numerous companies have not yet recognised that correlation, programme(s) need(s) to be launched that encourage the use of ICT devices in the SME sector, in a manner tailored to the sectoral requirements, and create awareness of the benefits of the use of digital services.

***The measures (actions) of the set of instruments:***

- A1. Support of the introduction of **IT systems** (integrated corporate governance, management information, administration, etc.) **within the company**;
- A2. Encouragement and support of the web based appearance of micro, small and medium enterprises, introduction of product and service **sales support online solutions** (web shops, web stores, market places, auction sites, in compliance with E2/A2 actions of the Digital competences pillar);
- A3. Instruments aimed at **increasing the IT skills of employees** (e.g. training)
- A4. Support of the development and implementation of **cloud-based** (e.g., IaaS, PaaS, SaaS) corporate services and ICT solutions and ICT-based innovation.

**E4. Boosting the market of electronic commerce, electronic invoicing and electronic payments, dissemination of the use of e-signatures**

An increase in the infocommunications skills of the already online enterprises and intensification of the use of ICT devices can contribute to the achievement of the objectives of the digital economy pillar; the support to the dissemination of electronic invoicing and signature, the integration of electronic invoicing and payments into the everyday practice, which is closely related to the issues of securities, are important conditions for that.

***The measures (actions) of the set of instruments:***

- A1. **identification** and mitigation of **the factors impeding the dissemination of electronic services** (business and consumer trust, regulatory background, framework, etc.);

**Review of the instruments by pillar of digital economy pillar**

Pillar	P3. Digital economy	type of instrument
Set of instruments	<b>E1. Improving the quantitative and qualitative indicators of higher level ICT training in order to reduce the shortage of experts</b>	
Measures (actions)	A1. <b>Transformation of IT curricula and subject materials</b> , ICT repositioning and making it attractive to students;	public policy
	A2. Regular monitoring of higher level IT trainings <b>and their adjustments to market requirements</b> with the involvement of market actors and/or their NGOs (e.g., ICT Association of Hungary);	public policy

	A3. Encouragement and support of <b>cooperation between educational institutions and ICT enterprises</b> (establishment of competence centres, research cooperation, educational cabinets, etc.);	public policy, fiscal
	A4. Encouraging and support of ICT <b>adult training programmes</b>	public policy, fiscal

<b>Pillar</b>	<b>P3. Digital economy</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b>E2. Support to the development of services of Hungarian ICT companies eligible for export</b>	
<b>Measures (actions)</b>	A1. Seed capital financing and incubation support for ICT start-up companies;	fiscal
	A2. Support of the involvement of venture capital (advice, mediation, legal, marketing and management support);	public policy, fiscal
	A3. Support in the initial international efforts of ICT start-up companies (exhibitions, conference, private start-up events, etc.);	public policy, fiscal
	A4. Support programmes to export-oriented micro, small and medium-sized enterprises, operating in the IT sector in entering new international markets	fiscal

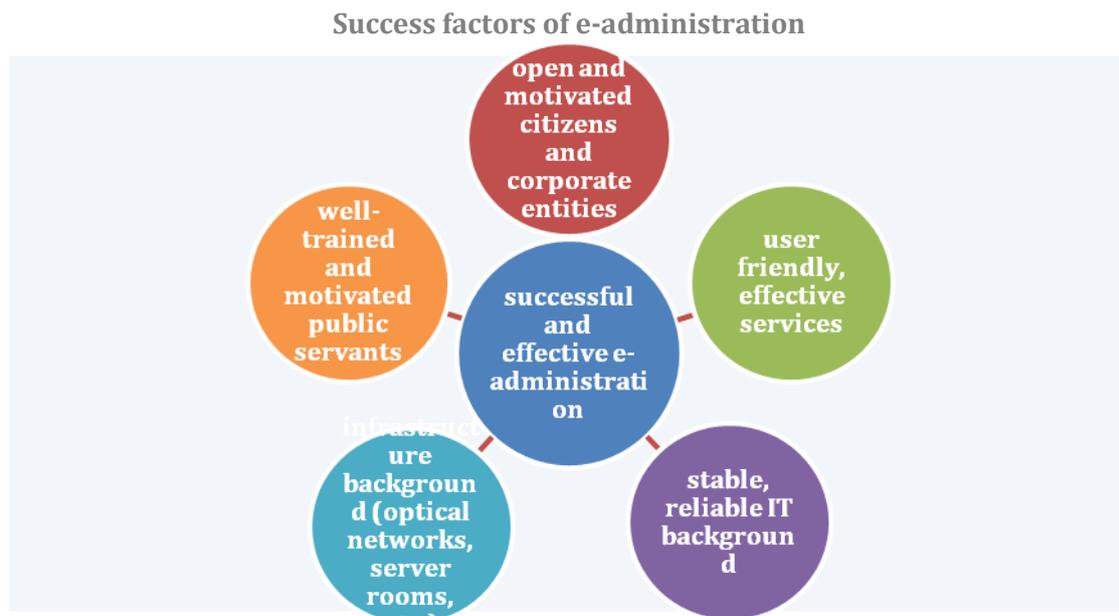
<b>Pillar</b>	<b>P3. Digital economy</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b>E3. Support to the development of internal IT and electronic services of SMEs</b>	
<b>Measures (actions)</b>	A1. Support of the introduction of <b>IT systems</b> (integrated production management, management information, administration, etc.) <b>within the company</b> ;	fiscal
	A2. Encouragement and support of the introduction of product and service <b>sales support online solutions</b> (web shops, web stores, market places, auction sites(	public policy, fiscal
	A3. Instruments aimed at <b>increasing the IT skills of employees</b> (e.g. training);	public policy, fiscal
	A4. Support of the development and implementation of cloud-based (e.g. IaaS, PaaS, SaaS) corporate services.	fiscal

<b>Pillar</b>	<b>P3. Digital economy</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b>E4. Boosting the market of electronic commerce, electronic invoicing and electronic payments, dissemination of e-signatures</b>	
<b>Measures (actions)</b>	A1. <b>Identification</b> and mitigation of <b>the factors impeding the dissemination of electronic services</b> (business and consumer trust, regulatory background, framework, etc.);	public policy, regulation

## VI.2.4 Digital state

A predictable and stable infrastructure and IT background required for electronic administration,<sup>42</sup> the digitisation of the internal processes of public administration in a methodologically consistent way, in line with the principle of interoperability, and the introduction and operation of advanced e-administration services to the residents and corporate entities are basic requirements of the development of the digital state.

The success factors also include open and motivated users (citizens and corporate entities), and well-trained public servants (the latter two factors are contained in the “Digital competences” pillar).



In terms of regulations, the most important development of the recent period is that at the end of 2011 Parliament approved the modification of the Public Services Act, and then in April 2012 the implementation decrees of the act were passed (Government Decrees No. (82-85/2012). The Parliament recently approved a new amendment of the Public Services Act, primarily relating to the restructuring of regional administration. These legal acts reviewed the legislative environment of the e-administration services and facilitated the implementation of the EPAOP and SROP projects, putting in place the infrastructure and professional and human resource background for the development of e-administration services within the scope of responsibility of one institution (MND).

Following the reform of the regulatory environment, the tasks remaining for the subsequent years include the development of the infrastructure required for the electronic services (IT, back office), the development of e-administration services and their connection at an adequate level, with the greatest possible interoperability.

### **E1. Supply of the IT background supporting the internal public administration processes and electronic public administration services**

<sup>42</sup>In 2010 a complex government IT consolidation process was launched to achieve that goal. Within the framework of the consolidation, the services, previously provided on the market, were transferred into the competence of the state, the services provided by several state institutions (including organisational units and occasionally whole organisations) were integrated into one institution (NISZ Ltd.), and then a legal act was adopted laying down the mandatory, typically public administration tasks of NISZ Ltd.

- A1. Further development of the single government IT background (hardware and software infrastructure, operation), IT background supporting the **internal processes and services of government institutions (G2G)**;
- A2. Development of information systems supporting the internal public administration processes, development of IT (e.g., economy support, personnel, document management) government services and cloud-based state IT services;
- A3. Digitisation of internal and external processes of the sectoral institutions;
- A4. **Development of the IT background supporting the operation of regional administration** (government offices, district offices, government windows)

## **E2. Digitisation of public administration processes, ICT support to the public administration reform**

- A1. Encouragement and support to paperless processes in central public administration institutions;
- A2. **Coordination of any background** development required for the implementation of regulated electronic administration services (REAS);
- A3. **Extension of local government IT developments and the local government ASP service portfolio** in order to digitise the internal processes of the local government sector and to improve the operational efficiency of the institutions.

## **E3. Interoperability and common standards**

Effective interoperability is required between IT systems and services in order to create efficient digital services. The availability and application of adequate ICT standards, especially in public procurement and legislation are important factors for attaining that goal. Authorisation management between networks needs to be developed, and standard formats and solutions with open source codes need to be further disseminated in the Hungarian public administration.

- A1. **Putting in place a legislative framework** for the transferability of infocommunications technologies, elaboration of a system of requirements and recommendations for the application of widely used standards in order to achieve interoperability;
- A2. Putting in place a **legal framework** for cross-border recognition and interoperability of **secure e-authentication systems**;
- A3. **Modernisation of public records and electronic identification** (IT and organisational development, interoperability, methodology, human resources, legislation);
- A4. **Strengthening the cooperation and transferability of databases**, performing data cleansing processes, secure data exchange and further increase in data protection;
- A5. Apart from technology neutrality and consideration of IT security requirements, development based on software with **open source codes** need to be encouraged.

## **E4. Introduction of high level and advanced residential and corporate e-services**

In line with the “Good state” concept, user friendly, fast and comfortable electronic (G2B, G2C) services need to be introduced with which the public administration time and the number of actors involved in administration can be reduced and the digitisation of the processes can be enhanced. The developments must result in standard e-administration services accessible on all

digital platforms (including also local government), with major reduction in the administrative burden of the citizens and enterprises.

- A1. **Electronisation of public administration services** to residents and corporate entities, elaboration of a system of REAS, which form mandatory obligations of the state and are available also on the market;
- A2. Decisions on **matters that can be managed primarily electronically** and development of a complete switch-over schedule (roll-out plan).

#### E5. Development of electronic public services and accessibility of the digital data assets

- A1. Preparation of an e-health Action Plan;
- A2. Development of e-health services;
- A3. Assessment of the **collections to be digitised** (library, archive, cultural, artistic, etc.), e-archive developments;
- A4. Full implementation of the directives regulating the re-utilisation of EU **public data**, ensuring public access to public data also in practice, and creating transparent conditions on the markets of re-utilisation of public data;
- A5. **Development of public education and higher education, as well as research infocommunications infrastructure services and content**, supply of state of the art infocommunications devices to institutions, introduction of cloud-based services, gradual expansion of the research-based network basic infrastructure (GEANT, HBONE) and computer technology (HPC) capacities.

Pillar	P4. Digital state	type of instrument
Set of instruments	<b>E1. Supply of the IT background supporting the internal public administration processes and electronic public administration services</b>	
Measures (actions)	A1. Further development of the single government IT background (hardware and software infrastructure, operation), IT background supporting the internal processes and services of government institutions (G2G);	fiscal
	A2. Development of information systems, supporting the internal public administration processes, development of IT (e.g. economy support, personnel, document management) government services and cloud-based state IT services;	fiscal
	A3. Digitisation of internal and external processes of the sectoral institutions;	fiscal
	A4. Development of the IT background supporting the operation of regional administration	fiscal

Pillar	P4. Digital state	type of instrument
Set of instruments	<b>E2. Digitisation of public administration processes, ICT support to the public administration reform</b>	
	A1. Encouragement of paperless processes in	public policy, fiscal

<b>Measures (actions)</b>	central public administration institutions;	
	A2. Coordination of any background development required for the implementation of regulated electronic administration services (REAS);	public policy, fiscal
	A3. Extension of local government ASP service portfolio	fiscal

<b>Pillar</b>	<b>P4. Digital state</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b>E3. Interoperability and common standards</b>	
<b>Measures (actions)</b>	A1. Putting in place a legislative framework for the transferability of infocommunications technologies	regulation, fiscal
	A2. Putting in place a legal framework for cross-border recognition and interoperability of secure e-authentication systems;	regulation, fiscal
	A3. Modernisation of public records and electronic identification (IT and organisational development, interoperability, methodology, human resources, legislation)	fiscal, regulation
	A4. Strengthening of cooperation and interoperability between databases	public policy, regulation, fiscal
	A5. Development based on software with open source codes need to be encouraged	public policy, fiscal

<b>Pillar</b>	<b>P4. Digital state</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b>E4. Introduction of high level and advanced residential and corporate e-services</b>	
<b>Measures (actions)</b>	A1. Electronisation of public administration services to residents and corporate entities	fiscal
	A2. Decisions on matters that can be managed primarily electronically	public policy

<b>Pillar</b>	<b>P4. Digital state</b>	<b>type of instrument</b>
<b>Set of instruments</b>	<b>E5. Development of electronic public services and accessibility of the digital data assets</b>	
<b>Measures (actions)</b>	A1. Preparation of an e-health Action Plan	public policy
	A2. Development of e-health services	fiscal
	A3. Survey of the group of <b>collections to be digitalised</b> (libraries, archives, cultural, arts, etc.)	public policy
	A4. Full implementation of the directives regulating the re-utilisation of EU public data	regulation
	A5. Development of public education, higher education and research infocommunications infrastructure services and content	fiscal

## VI.2.5 Horizontal factors

### E-inclusion

The purpose of the **e-inclusion** initiatives is to reduce digital exclusion resulting from the lack of digital competencies (digital literacy) and internet access. In a wider sense, the initiative aims at offering digital equal opportunities to socially disadvantaged people by removing barriers stemming from physical mobility and geographical distances.

For the purposes of this strategy, e-inclusion refers to the complex approach which aims at enabling **citizens rejecting** digital devices and services either deliberately or due to lack of access and/or the required skills and knowledge **to enjoy the benefits of the digital age**.

Consequently, the e-inclusion horizontal factor identifies instruments that are aimed at the **convergence** of typically **disadvantaged groups** missing out on the digital ecosystem due to any reason other than their own decision and propose measures, with which the benefits of ICT use can be extended to **all citizens** irrespective of the reason for their staying away. In this latter context, it is especially important to implement **e-health** initiatives, which share the benefits primarily with older age groups, as well as to introduce **intelligent transport and energy** (e.g. smart grid), as well as **environmental** (e.g. reduction of the emission of greenhouse gases) solutions, which are beneficial to the whole society, as well as the completion of development projects, beneficial to each member of a small community (e.g., **smart city, intelligent measurement**) are especially important.

### E1. Targeted programmes for the infocommunications realignment of disadvantaged citizens missing out on the use of digital tools and services due to the lack of access and/or the required knowledge and skills

The digitally literate and illiterate, the users of the devices and individuals not using them at all are getting further and further apart from each other.

The lower (**lagging behind**) groups can realign with the others only with an **integrated social policy approach**: no positive changes can be expected in digital openness among the increasingly disadvantaged individuals or without any willingness or capability to complete basic social interactions.

There are also examples showing that breakthrough is facilitated by the knowledge of digital devices: in the previous years the WiFi Village initiative was rather successful in increasing the openness to the digital world of disadvantaged, primarily Roma communities.

Both the programme referred to above and international experience suggest that the lagging behind (digitally illiterate) groups may be realigned only with **integrated access, device providing and educational** programmes organised locally with the involvement of the opinion leaders.

- A1. Complex **e-inclusion strategy** in relation to the government strategies aimed at the social realignment of disadvantaged groups;
- A2. Creating social awareness of the importance of e-inclusion (with national communication support);
- A3. “Digital solidarity” programme, within the framework of which natural persons and companies can offer devices, education or other support, in an organised framework, to assist the realignment process of those lagging behind.

### E2. ITC-based sectoral or regional development programmes reaching everyone

the development of **smart cities** is a typical example of e-inclusion of all members of communities, because the higher quality of life resulting from co-ordinated transport systems, environmental development, investments into the modern infocommunications infrastructure is beneficial to all residents of the particular settlement in terms of technology development, regardless whether they are digitally illiterate or not. Social child welfare and child protection services supported with infocommunications tools have similar effects, because they provide benefits to citizens without being active participants in the digital ecosystem. The positive impacts of intelligent logistics, transport or environmental developments and green IT projects also affect the whole population, irrespective of digital literacy.

- A1. Support of **smart city** development;
- A2. **Sectoral application developments** (e.g., intelligent logistics, transport and environmental systems);
- A3. Extensive encouragement of **Green IT<sup>43</sup> developments**.

## R+D+I

The research and development activity attached to innovative infocommunications technologies is one of the most dominant factors of international competitiveness, because the extensive application of advanced technologies in all aspects of the economy and society is increasingly important in economic growth.

Nonetheless, the Hungarian ICT enterprises take very little part in Hungarian and international tender co-operations relative to the economic importance and innovative potential of the sector. This is why the encouragement and support of the Hungarian and international R+D activities of the sector, co-operation between market, academic and public institutions and more intensive activities in Hungarian and EU tenders are of key importance for encouraging the R+D+I activities of the ICT sector and the Hungarian enterprises.

The ICT innovative infrastructure, which supports industrial innovation, provides innovative competitive advantage and higher efficiency, and therefore any increase in the innovative capacity of the ICT companies has a knock-on effect, contributing to the extension of the innovative potential of other sectors and to economic growth.

### E1. Encouragement and support of the R+D+I activity of the ICT sector

- A1. Launch of a separate **ICT specific R+D+I programme** in the new EU financial planning period, and announcement of mirror calls in the Central Hungary Region;
- A2. **Support of the innovation activities** of knowledge and technology intensive ICT companies **to develop marketable products**, especially in the following areas:
  - e-government
  - e-health care
  - smart city
  - digital, intelligent home development
  - intelligent transport/logistics
  - intelligent energy applications, smart metering, smart grid
  - e-health and health industry ICT, digital diagnostics, ICT-based medical instrument development and public health and environmental health data mining
  - m2m communication (“internet of objects”)
  - e-commerce, mobile payment systems, etc.

---

<sup>43</sup> The main objective is to reduce and rationalise energy consumption with the help of different IT solutions.

- Future Internet technologies and applications (cloud-based solutions, smart technologies, etc.)
- digital media and 3D, interactive media technologies, virtual applications
- research focusing on the development of embedded systems and cyber-physical systems;
- new general computer technology;
- artificial intelligence;
- technology relating to micro and nano electronics and photonics;
- supercomputers and data centres, big data (methodological collection and analysis of mass data);
- software development technologies and methodologies (process management, interoperability, architecture issues, etc.)
- software technology development (metamodel, software refactorisation method, model transformation, test systems, etc.);
- IT and data security, security of research networks and e-administration systems, cyber security and reliability.

## **E2. Encouragement and support of the participation of ICT SMEs and professional workshops (higher education institutions, academic institutions) in Hungarian and EU R+D+I tenders**

- **A1. Improving the information and dissemination<sup>44</sup> relating to available tenders and encouragement to participate in international tenders** (assistance in partner search, consortium organisation, project writing, etc.);
- **A2. Encouraging Hungarian participation in the activities of European technology platforms, research networks and programmes** (e.g., ARTEMIS, ENIAC, Photonics, Robotika, FET Flagship, European Innovation Partnership etc).

## **E3. Strengthening the co-operation culture and supporting its forms in R+D+I**

- **A1. Support of any closer co-operation** between ICT companies and universities and research institutes, with special regard to increasing the efficiency of participation in tenders;
- **A2. Support to ICT cluster development** (e.g., training of cluster managers, establishment of model clusters, etc.).

## **Security**

**Trust and security** at the level of networks, IT infrastructure, access, applications and user endpoints are important requirements of any further dissemination of infocommunications services.

Users must believe that they can secure their data and computers against unauthorised access, viruses or data phishing. In the case of electronic government services, it is extremely important to guarantee to the maximum extent **the security of networks, systems, processes and user data** in public administration.

---

<sup>44</sup> Dissemination refers to the spreading of project results in order to maximise the impact of the project and the benefits from the costs of project implementation. It also includes the transfer of the *products* resulting from the projects and the *experiences* of project implementation (project management, co-operation, methodology, etc.). For the time being, there is no Hungarian term in the Hungarian technical literature which would accurately capture the concept, and therefore the English word seems to have been integrated into the Hungarian language.

The **clear separation of justified and unjustified security concerns**, and the **presentation of the effective protection methods in relation to the former**, and **credible description of the actual facts** in relation to the latter may be equally important instruments in overcoming any resistance against electronic administration and e-commerce services.

**Child protection** is a crucial issue, because the transfer of accurate and controlled information to children is primarily the responsibility of the informed adult (parents and teachers) living in the same environment.

### **E1. Maximum protection of networks, IT infrastructure and applications serving the internal systems and external services of public administration**

- A1. Complex **security surveillance** over all subsystems of central and regional administration;
- A2. Preparation of a network and **service security manual and methodology guideline** and organisation of training for all experts engaged in public administration IT;
- A3. Introduction of **IT security solutions and instruments**, operating according to high-quality standard regulations in public administration, with special regard to the spread of cloud-based solutions;
- A4. **Complex SLA-based operation** of the IT systems in public administration with availability reflecting the requirements of the particular system/application and guaranteed security parameters;

### **E2. Handling of concerns relating to the use of electronic services through factual information about actual risks and their management**

- A1. **Complex national information programme** on the actual security risks and the methods of their mitigation, primarily for parents raising children aged 6-14 and teachers working in public education;
- A2. Integration of combating cybercrime into teacher training programmes and school subject materials;

### **E3. Establishment of hotlines and a national assistance service in order to combat cybercrime and to protect children;**

- A1. Putting in place the legislative framework for effective authority action against **cybercrime** (crime against children, **digital hacking**, digital data and information theft, etc.)
- A2. Strengthening the Hungarian component of the **fast response European network against cyber attacks** (CERT) .

#### **Objectives related to horizontal factors**

<b>Pillar</b>	<b>Horizontal factors / E-inclusion</b>	<b>type of instrument</b>
<b>Factor</b>	<b>E1. Targeted programmes for the infocommunications realignment of disadvantaged citizens</b>	
<b>Measures (actions)</b>	A1. Comprehensive e-inclusion Strategy	public policy
	A2. Creating social awareness of the importance of e-inclusion (with national communication support);	public policy/ fiscal
	A3. "Digital solidarity" programme	public policy/

		fiscal
--	--	--------

<b>Pillar</b>	<b>Horizontal factors / E-inclusion</b>	<b>type of instrument</b>
<b>Factor</b>	<b>E2. ITC-based sectoral or regional development programmes, reaching everyone</b>	
<b>Measures (actions)</b>	A1. Support of smart city development	fiscal
	A2. Sectoral application developments (e.g. intelligent logistics, transport and environmental systems);	fiscal
	A3. Extensive encouragement of Green IT developments.	fiscal

<b>Pillar</b>	<b>Horizontal factors / R+D+I</b>	<b>type of instrument</b>
<b>Factor</b>	<b>E1.Encouragement and support of the R+D+I activity of the ICT sector</b>	
<b>Measures (actions)</b>	A1. Launch of a separate ICT specific R+D+I programme in the new EU financial planning period	fiscal
	A2. Support of the innovation activities of knowledge and technology intensive ICT companies	fiscal

<b>Pillar</b>	<b>Horizontal factors / R+D+I</b>	<b>type of instrument</b>
<b>Factor</b>	<b>E2. Encouragement and support of the participation of ICT SMEs and professional workshops in Hungarian and EU R+D+I tenders</b>	
<b>Measures (actions)</b>	A1. Improving information and dissemination relating to available tenders and encouragement of participation in international tenders	public policy
	A2. Encouraging Hungarian participation in the activities of European technology platforms, research networks and programmes	public policy

<b>Pillar</b>	<b>Horizontal factors / R+D+I</b>	<b>type of instrument</b>
<b>Factor</b>	<b>E3. Strengthening the co-operation culture and supporting its forms in R+D+I</b>	
<b>Measures (actions)</b>	A1. Support of any closer co-operation between ICT companies and universities and research institutes	public policy
	A2. Support of cluster development	public policy, fiscal

<b>Pillar</b>	<b>Horizontal factors / Security</b>	<b>type of instrument</b>
<b>Factor</b>	<b>E1. Maximum protection of networks, IT infrastructure and applications of public administration</b>	
<b>Measures (actions)</b>	A1. Complex security surveillance over all subsystems of central and regional administration	public policy, fiscal
	A2. Preparation of a network and service security manual and methodology guideline and organisation of training	public policy
	A3. IT security solutions and instruments operating according to high-quality standard regulations	public policy
	A4 Complex SLA-based operation in public administration	public policy, regulation

<b>Pillar</b>	<b>Horizontal factors / Security</b>	<b>type of instrument</b>
<b>Factor</b>	<b>E2. Handling of concerns relating to the use of electronic services through factual information</b>	
<b>Measures (actions)</b>	A1. Complex national information programme on the actual security risks and the methods of their mitigation, primarily for parents raising children aged 6-14 and teachers working in public education	public policy, fiscal
	A2. Integration of combating cybercrime into teacher training programmes and school subject materials;	public policy

<b>Pillar</b>	<b>Horizontal factors / Security</b>	<b>type of instrument</b>
<b>Factor</b>	<b>E3. Establishment of hotlines and a national assistance service in order to combat cybercrime and to protect children</b>	
<b>Measures (actions)</b>	A1. Putting in place the legislative framework for effective authority action against cybercrime (crime against children, digital hacking, digital data and information theft, etc.)	regulation
	A2. Strengthening the Hungarian component of the fast response European network against cyber-attacks (CERT).	public policy

### VI.3 Correlation between the objectives and instruments (objective-instrument matrix)

The **objectives of the strategy** were defined on the basis of the weaknesses and inadequacies identified in the status analysis and in the SWOT analysis, and based on the differences between the current situation and the value-based vision: instruments are assigned to each pillar for achieving the objectives of the particular pillar, which break down the complex strategic objectives. Part of the objectives and instruments relate to horizontal factors, because they affect several pillars.

However, of the instruments not only the instruments assigned to horizontal factors support the implementation of other objectives outside the respective pillar: as it is shown in the following objective-instrument matrix, numerous sets of instruments were identified which contribute to the achievement of the objectives of several pillars to a smaller or greater extent.

**With the help of the table presenting the correlations between the strategic objectives and instruments**, it may also be checked whether instruments have been assigned to all strategic objectives and whether or not all identified instruments contribute to the achievement of one or more strategic objectives.







## VII. IMPLEMENTATION AND MONITORING

### VII.1 Action Plan

Following the approval of the Strategy a breakdown of the set of measures or actions identified in it will be prepared including the allocation of sources, responsibilities and deadlines to each action. The detailed action plans will be presented in a Green Book closely linked to the Strategy.

- **implementation** means the breakdown of the set of measures or actions identified to be presented in a Green Book closely linked to the Strategy. In addition to the detailed presentation of the actions, the Green Book will identify the sources, responsibilities and deadlines allocated to each action. Budgeting for the sources and allocating them to the measures is still in progress, since it is largely dependent on the source planning of the operational programmes of the period 2014-2020, therefore the figures in the indicative financial table are indicative.

The operational description of the action plans should be performed as soon as possible, so that the recommendations identified in the Strategy could serve as valuable base material for the development policy planning in 2014-20, and the proposed interventions could become organic parts of the different operational programmes.

For the breakdown of the action plans, a template with minimum the following details has been designed. It is important that each action should be presented as a single project (even if rather complex), identifying a single responsible institution/player as far as possible, and with an unambiguously identified budget. Code numbers are used in the table to visualise connections.

### Action plan template for the National Infocommunications Strategy

Pillar	Set of instruments		Related actions (code number)
	Measure/action		
Objective of the measure			
Related strategic objectives			
Content of the measure			
Operational tasks			Responsible
1.			
2.			
3.			
Estimated costs			
Expected result			
Monitoring/indicators			
Remarks			

## VII.2 Indicative Financing Plan

The indicative financial plan defines the estimated and aggregated funding demand for the strategic actions at the level of the sets of instruments. The designation of the exact limits allocated to the individual actions/measures will be an operational task in the action plan. The planning of resources and their allocation to measures are still in progress and will greatly depend on the resource plan of the operational programmes of the 2014-2020 planning period, and therefore the indicative financing plan contains budgets only on pillar level, the resources allocable to the particular actions can be estimated only after confirmation of operating programs.

## VII.3 Institutional and organisational background

No well-prepared strategy based on a solid analysis of the situation and identifying correct objectives and instruments is able to meet the expectations unless it is supported by a stable organisational/institutional background that is able to enforce its interests, to stand up for the objectives identified and operate effectively.

The main responsibility for the implementation of the strategy lies with the Info-communications State Secretariat of the Ministry of National Development (MND) jointly with the Ministry of Public Administration and Justice (Deputy State Secretariat in charge of E-administration). Within the pillar 'Infrastructure' the National Media and Infocommunications Authority (NMIA) is responsible for the implementation of the regulatory measures (such as, e.g. E1. 'Promoting the development of NGA networks' including 'A3 Further development of market regulations to encourage investments and competition').

Institution/organisation	Responsibilities of the institution/organisation by the pillars of the Strategy				
	Digital infrastructure	Digital competences	Digital economy	Digital state	Horizontal components
MND, PMO, MI	Identification of strategic objectives				
MND	Implementation of the actions identified in the strategy				
	X	X	X	X	X
MNE			X		X
MHR		X		X	X
MI	X			X	X
MD				X	X
MRD			X	X	
Intermediate bodies	X	X	X	X	X
National Info-communications Service Provider (NISZ Ltd.)	X			X	X
Government Information Technology Development Agency (GITDA)	X	X	X	X	X

National Information Technology Infrastructure Development Institute (NITIDI)	X	X		X	X
National Media and Infocommunications Authority (NMIA)	X	X	(X)		X
Relevant universities and colleges		X	X		X
Central Office for Administration and Electronic Public Services (COAEPS)				X	X
Office for Administration Justice (OAI)		X		X	X
Other organisations (e.g. Hungarian Chamber of Industry and Commerce)	...	X	X	...	...
National Office of Innovations			X	...	X
'Educatio' Social Service Provider Non-profit Ltd.		X	X	X	X
National Office of Intellectual Property			X		X
MND, PMO, MI	Monitoring tasks, review of strategic objectives				

## VII.4 Partnership

Both MND and MPAJ considered it important to have continuous (written and oral) consultations with trade organisations and NGOs, the players of the industry, responsible executives of the areas impacted and their officers in each phase of designing and preparing the document. In order to present the interests of all government agencies impacted in the document, there have been continuous negotiations with the ministries that have prepared their own documents and contributed with their remarks and written proposals to describe the current situation as fully as possible, to identify the objectives and instruments correctly and to identify the human, financial and other resources required for their implementation.

A social discussion of the document took place on the website [www.kormany.hu](http://www.kormany.hu) from 26 July to 31 August 2013, where all trade organisations and NGOs impacted could present their opinion on the document. The following organisations have submitted remarks:

Organisation	Status of the organisation (state, market, NGO)	It has submitted written remark or proposal (yes/no)	Its recommendations and remarks have been incorporated (yes, partly yes, no)
--------------	--	--	--

Hungarian Telecom	Market	Yes	Partly yes
E-administration Association 'Magyary Zoltán', National Council of Infocommunications and Information Technology, eGov Ltd	NGO, market	Yes	Partly yes
Google	Market	Yes	Partly yes
EuroCloud Hungary Association	NGO	Yes	Partly yes
Association of Telecommunication and Information Technology	NGO	Yes	Partly yes
Budapest Chamber of Commerce and Trade	NGO	Yes	Partly yes
Invitel Telecommunications Ltd.	Market	Yes	Partly yes
Inforum (Information Social Interest Advocacy Forum)	NGO	Yes	Partly yes
Hungarian Post Ltd.	State	Yes	Partly yes
Microsoft Hungary Ltd.	Market	Yes	Partly yes
Association 'Information Technology for the Society'	NGO	Yes	Partly yes
Vitályos Consulting	Market	Yes	Partly yes
Federation of IT Enterprises	NGO	Yes	Partly yes
Foundation Programme Office for Dissemination of Network Skills	NGO	Yes	Partly yes
UPC Hungary Telecommunications Ltd.	Market	Yes	Partly yes
National Széchenyi Library	State	Yes	Partly yes
Neumann János Computer Science Association	NGO	Yes	Partly yes

## VII.5 Monitoring system

The objective of the monitoring system is to measure whether or not the strategic objectives identified in connection with the problems, the deficiencies and delays identified in the situational analysis of the strategy are implemented, and to present the changes resulting from the actions taken to manage each problem from year to year. Even in short-term, the monitoring system allows for state intervention in areas where the specified objectives are not achieved in accordance with the schedule identified in the strategy, or where processes contrary to the initial objectives can be perceived.

With respect to the methodology of the monitoring system, it is particularly important 1) to provide an opportunity to present if the strategic objectives are implemented in terms of figures; 2) if possible, it should ensure international comparison (e.g. EU, OECD); 3) the statistical data employed should be generated in accordance with a uniform methodology, therefore, wherever possible, the monitoring system relies on European Union (and/or OECD) statistics. In the case of other typically country-specific and/or internationally not measured areas (e.g. backhaul network coverage), the monitoring report relies on surveys made by the Central Statistical Office and other primary research findings.

The monitoring report covers all (vertical and horizontal) pillars identified in the Chapter 'Situational analysis of the strategy', it is in a uniform structure with them (but it can be expanded with other indicators in some cases), so it allows for the presentation of chronological changes, it can determine whether or not the objectives are reached and in that way it can justify the necessity of government intervention.

Pillars	Indicators	Source / measurement of indicators
Digital infrastructure	Demand and supply data in the backbone network, backhaul network and last mile segments	Eurostat, OECD, DAE reports, Eurobarometer Primary research in the backhaul network segment Infrastructure Registry and Monitoring System
Digital competences	Coverage and use or non-use indicators and their reasons	Eurostat, OECD, DAE reports, Eurobarometer
Digital economy	The ICT sector, indicators of the digital economy	Eurostat, OECD, DAE reports, Eurobarometer Primary research on the performance of the ICT sector
Digital state	Demand and supply indicators on coverage, use or non-use and its reasons	Eurostat, OECD, DAE reports, Eurobarometer Primary research on ICT coverage of and use by institutions
Horizontal components	Key indicators related to e-inclusion, the R+D+I activity of the Hungarian economy and to security	Eurostat, OECD, DAE reports, Eurobarometer Primary research on security related indicators

A monitoring report will be compiled and published on the website of the Government by September each year in accordance with the provisions of the Government on strategy presentation.

## VIII. THE CONSISTENCE AND COHERENCE OF THE STRATEGY

### VIII.1 The internal consistence of the strategy

The National Infocommunications Strategy is a document targeting the development of the whole digital ecosystem, which, on the other hand, cannot cover every partial area in its entirety; it mainly covers the components where some kind of deficiency, market problem or bottlenecks can be unambiguously identified.

In the course of compiling the document, the deficiencies and areas to be developed have been identified accordingly (and in compliance with the provisions of Government Decree No. 38/2012. (III. 12.) on the strategic control of the Government). The consistent use of the pillar structure, the concordance of the situational analysis and SWOT, setting the objectives matching the deficiencies identified in the situation analysis and the allocation of the instruments to the achievement of the specified objectives all strengthen the internal coherence of the document. The objectives and the instruments are not confused; the importance of the actions is in proportion to the weight of the problem identified.

### VIII.2 The external coherence of the strategy

#### VIII.2.1 Concordance with the relevant Hungarian strategies

##### The Programme of National Cooperation

The **Programme of National Cooperation** is a document fundamentally identifying the formal and content framework of the **government cycle from 2010 till 2014**. The objectives identified in the government programme can be implemented by the effective use of the set of instruments of infocommunications and information technology.

The Programme of National Cooperation **intends to rely on the creative industry, the high-tech, high added value industries in an open economy** in order to recover the Hungarian economy: it intends to utilise Hungarian creativity in alliance with the global and European companies investing into the Hungarian economy.

##### National Development and Territorial Development Concept (NDTDC)

**Starting out from the social, economic, industrial and territorial development demands of the country**, the NDTDC identifies a long-term vision, **development policy objectives and principles. Those will be used to identify the national and policy centre-points** of the 2014-2020 development period.

The NDTDC categorises **infocommunication as one of the services developing at the highest pace over the past 10 years**. The expansion of infocommunication availability is considered to be a part of knowledge improvement, the development of infocommunications and service relationships are deemed part of renewed communications, etc.

**The infocommunications technologies are in the limelight of policy efforts** aimed to achieve a creative knowledge society, up-to-date practical knowledge and R+D+I. According to the document, the R+D+I performance of the sector as a whole lags behind its competitors in the region; the same can be perceived in the ICT coverage and knowledge of SMEs, and in e-commerce and e-administration as well.

**Objective:** the digital ecosystem should not be in a state of imbalance for a long time: there should be a sufficient number of users, the necessary infrastructure should be built, the services should be available and finally, **there should be a strong infocommunications sector** promoting the development of other areas as well.

### New Széchenyi Plan

The Hungarian Government published a strategic document identifying the principles of utilising European Union funds in January 2011. The New Széchenyi Plan identified seven breakout points taking into consideration the characteristics of the Hungarian economy:

1. Healing Potential - Health Industry Programme
2. Renewal Hungary – Green Economy Development
3. Programme of Home Creation
4. Enterprise Development Programme
5. Science, Innovation, Growth
6. Employment Programme
7. Transport Development Programme

The **infocommunications technologies and services** support the seven programmes of the New Széchenyi Plan in different ways and to a different extent; they play a major part in their implementation. The following figure illustrates the added value of ICT to the different measures.



Translation of the above chart

Seven breakout points of the Hungarian economy

Improvement of competitiveness	of	New Széchenyi Plan	Objective: Breakthrough in employment
--------------------------------	----	--------------------	---------------------------------------

		<b>1 million new jobs</b>
	<i>Key participation</i>	
	<i>Development policy programme of revival</i>	
<i>Breakout points of the sectors</i>	<i>Breakout points and the programmes of the New Széchenyi Plan</i>	<i>Horizontal breakout points</i>

<i>Health industry</i>	<i>Green economy</i>	<i>Network economy</i>	<i>Knowledge economy</i>	<i>Home creation</i>	<i>Labour economy</i>	<i>Transit economy</i>
<i>Healing Hungary</i>	<i>Hungary renewed</i>	<i>Enterprise development</i>	<i>Science, innovation and growth</i>	<i>Home creation and housing programme</i>	<i>Employment</i>	<i>Transit economy</i>
<i>Health industry</i>	<i>Renewable energy and green economy</i>	<i>and business environment development programme</i>				

<i>Key components of improving competitiveness</i>	<i>Principles</i>			
<i>Supporting role</i>	<i>Integration</i>	<i>Global or European competitiveness</i>	<i>Market creation</i>	<i>High added value</i>
	<i>Dedicated instruments</i>			

### Growth Plan

To maintain the long term balance of the state budget and to achieve the objectives of economic policy, it is of key importance to **launch the engines of the Hungarian economy** (including ICT) **and to transform the country into an economic hub**. To achieve stable and sustainable growth it is indispensable that in line with the changed global environment our opportunities should be revisited and surveyed, our objectives should be reviewed and the relevant set of instruments should be developed. **In the Growth Plan the future image of the country is identified**, as well as the **set of instruments required** to achieve it.

The long-term growth prospects of the Hungarian economy can be primarily improved in two ways:

- the more efficient use of the sources of the New Széchenyi Plan
- the maximisation of the net export of the Hungarian economy (difference between exports and imports)

The document **unambiguously identifies the ICT industry as a driving force**, which must be improved due to its high added value with particular attention to the areas of 3D imaging - health industry, entertainment industry, technical designs; mobile telecommunications applications, surveillance and security software – cryptography and bio-information technology. Within the sector particular attention is expected to be given to data-centres, developers of game software and the IT centres of financial enterprises.

### ‘Magyary Zoltán’ Programme

The **Magyary Programme targets the development of the whole public administration**, with central administration and state administration in its focus, but certain of its measures contribute to the development of the institutions of justice and municipalities as well as EE.



- Initiating effective processes of knowledge use, particularly: promoting the operation of innovative small companies, increasing the dynamism of medium sized enterprises on the basis of R+D and technology, integrating large companies on the basis of R+D and the systematic increase of the dynamism of innovations in the public sphere;
- Generation of intensive knowledge transfer, particularly: building innovation services and increasing the dynamism of their collaboration and networks.

**The implementation is supplemented with the following horizontal objectives:**

- Promotion of intelligent specialisation in the regions;
- Operating sustainable set of instruments generating equal opportunities;
- Ensure stable financing conditions;
- Dissemination of knowledge and technology in the society and promoting its acknowledgement;
- Meeting the challenges of a global society;
- Stable and innovation-friendly economic and regulatory environment.

The main objective of the RDI Strategy is to achieve that research-development spending in Hungary should reach 1.8% of the GDP by the end of the decade; in addition, an environment should be established in which the enterprises, companies and agencies of the public sphere dealing with research-development and implementing innovative ideas could all develop and expand fulfilling the expectations of the society.

A major part of research-development-innovation **cannot be imagined today without the use of infocommunications technologies**. It is clearly stated in the RDI Strategy, and the opportunities provided by ICT are used both in basic research, applied research and innovation.

### **National Cyber Security Strategy**

The strategy indicates that Hungary takes responsibility for performing the task related to the protection of the cyber space and intends to transform the Hungarian cyber space as a major factor in the economic and social life into a free, secure and innovative environment. Applying efficient security measures relying on prevention, it is a key objective to manage the threats and relevant risks appearing in, or originating from the cyber space, and to strengthen the necessary government cooperation and set of tools.

The country already possesses a significant part of the instruments both in terms of competences and potential resources to reach its strategic objectives. They include, for instance, the listing and coordination of the government agencies responsible for the security of the Hungarian cyber space, establishing efficient cooperation, listing the NGOs, economic and academic organisations responsible for the security of the Hungarian cyber space and establishing their collaboration within an institutionalised framework; listing the vital IT infrastructures and asset components as well as the national data assets and ensuring their protection; enforcing cyber security points in the course of fulfilling technical development tasks of the state and tasks related to the development and operation of government IT systems.

In addition, the strategy states the necessity of establishing and operating a coherent government and non-governmental collaboration system to strengthen the available instruments, to use them more effectively and implement the results in practice in accordance with the requirements of national security.

### **'Jedlik' Plan - National Strategy for the Protection of Intellectual Property**

In the age of a global economy built on knowledge and of the information society, the protection of intellectual property has become a key component of an enterprise-friendly business environment promoting innovation, and it has become a principal issue of competitiveness.

There is agreement all over the world that promoting innovation and creativity provides the best chances to break out of the crisis and to boost economic growth. In that regard, intellectual property providing the legal protection of intellectual products plays a major part. The effective protection of the national knowledge base and cultural assets can only be guaranteed by a set of modern instruments of intellectual property. Intellectual property ensures the recovery of spending on research and development, of investments into top technological industries and the cultural industry, as well as of expenses required for marketing and to maintain the trust of consumers. That is the way it contributes to economic growth, to the improvement of competitiveness and to the creation of jobs.

The Strategy sets the following objectives to promote the above:

- a) protection of industrial property rights for the development of the national economy;
- b) copyright for the growth of creative industries;
- c) protection of intellectual property in the service of national politics and specific government policies;
- d) expansion of the institutional capacity of the protection of intellectual property alongside national interests, including particularly launching a national development programme to protect intellectual property.

## VIII.2.2 Concordance with the Relevant EU Strategies

### European Digital Agenda

#### Main objectives:

- By 2013 minimum broadband should be made available for everybody (100 % coverage). By 2020 networks of 30 Mbps or larger bandwidth should be available in the whole territory of the EU; 50% of European households should have 100 Mbps or faster access.
- By 2015 50 % of the population should make their purchases online, 33 % of the SMEs should make purchases or sales online and 20 of e-commerce should be cross-border.
- By 2015 the difference between domestic and roaming tariffs should be eliminated.
- By 2015 the indicator of regular internet use should reach 75% (from the present 60%), or 60% in the case of people at a disadvantage.
- By 2015 the number of people that have never used the internet should be halved.
- By 2015 50% of the population should use government services of the Member States and all cross-border services should also be accessible online.
- The value of government investments into ICT research and development must be doubled.
- Easier access to contents must be ensured.

### E-Government Action Plan

The **European Commission published** the document e-Government Action Plan **in 2010**. If it is implemented, **the operation of the state** becomes more effective and cheaper, while **public services** will be more flexible, open and transparent.

#### 4 key priorities:

- **Involvement of users:** services adjusted to users' needs, improved transparency, involvement of the citizens and enterprises in policy making;

- **Internal market:** accessible services for the enterprises, mobility, cross-border services established;
- **The efficiency and effectiveness of the public sphere:** electronic procurements, faster assessment of tenders, reduction of administrative burdens, 'green' government;
- **Establishing the preconditions of the development of e-government:** promotion of open specifications and interoperability, review of the guideline on electronic signature, mutual recognition of electronic personal identification and electronic attestation.

In compiling the above, the objectives identified in the **Europe 2020 Strategy have been taken into consideration** and the document has been adjusted to the initiatives of the **Digital Agenda**. In addition, the action plan is closely connected to other legislative activities (guidelines) of the European Union.

### VIII.2.3 Concordance with the ex-ante conditionality guidelines

The European Commission published its draft 7-year budget for the period 2014-2020 in October 2011. In accordance with the recommendation of the Commission subsidies need to be concentrated to achieve relevant and perceivable impact. Accordingly, the Commission identified 11 thematic objectives that are fully adjusted to the EU2020 strategy or can be concluded from it. Of the 11 thematic objectives set out in the relevant regulation objective No. 2 on the improvement of access to, use and quality of information and communications technologies, and objective No. 11 on the development of institutional capacity are related. The Commission intends to allocate the sources available for the different Member States in the next 7 years matching those thematic objectives.

In accordance with the regulation relating to the structural and cohesion politics of the period 2014-2020, the Member States must fulfil pre-defined success conditions, so-termed ex-ante conditions matching the thematic objectives so that the individual development programmes could be approved and that the Commission could disburse the relevant sources. The European Commission has compiled such conditions related to each of the 11 thematic objectives; and it expects the governments to make use of the resources in a more targeted and more integrated way in the next funding period.

The Commission identified two conditions in the area of infocommunications:

1. *Digital growth:* The presence of a separate chapter promoting digital growth within the national or regional innovation strategy relating to intelligent specialisation, promoting the demand for affordable, high quality and transferable private and community information and communications services; increasing their use by the citizens including among others the groups of citizens in a deprived position, enterprises and public administration agencies, including cross-border initiatives.
2. *Infrastructure of new generation access networks (NGA):* availability of national NGA plans that take into consideration the regional measures taken to implement the European Union's targets of access to high speed Internet<sup>45</sup> focusing on areas where the *market* cannot provide open infrastructure at affordable prices and in the proper quality in accordance with the EU regulations relating to competition and state subsidies, and can ensure the availability of services for the deprived groups of the society.

---

<sup>45</sup> Communication from the Commission to the European Parliament, the Council, the European Economy and Social Commission and to the Commission of Regions: The European Digital Agenda (COM(2010)245 final/2 (26.08.2010)); Commission working document: Indicators of the Results of the Digital Agenda (SEC(2011) 708 (31.05.2011)).

Ex-ante condition	Provisions
Policy framework of the strategy relating to digital growth	<ol style="list-style-type: none"> <li>1. <b>Relevant operational programme should make reference to the strategy and should indicate which elements have been published.</b></li> <li>2. <b>The policy strategy must include the following:</b> <ul style="list-style-type: none"> <li>• SWOT or similar analyses to identify the priorities for the investments,</li> <li>• description of the methodology of the analysis,</li> <li>• description of the process of priorities/selection, including the involvement of the stakeholders and stating the results.</li> </ul> </li> <li>3. <b>An analysis aimed at adjusting the demand and supply for ICT must be performed</b> <ul style="list-style-type: none"> <li>• there should be a description of the methodology on how the demand and supply for ICT products are identified and how subsidies for them are balanced,</li> <li>• the analysis must cover the relevant ICT related social-economic issues (e.g. age structure, education, income, levels of ICT training/abilities, employment, the affordability of the service, productivity, internet penetration and the evolution of demand for ICT services and applications in households, increase of e-skills at the enterprises and public administration agencies, etc.), the extent of coverage (instruments, infrastructure, services, applications and ICT professionals available),</li> <li>• in certain cases the analysis must cover the ICT as a sector (production of ICT hardware and tools, IT services and application service providers, R+D in ICT, living laboratories, etc.),</li> <li>• finally, a summary of the results.</li> </ul> </li> <li>4. <b>It must include the indicators for the measurement of the process</b> in areas such as digital literacy, e-inclusion, e-availability and e-health care as identified in Article 168 of TFEU, which are in accordance with the existing relevant industrial, national or regional strategies: <ul style="list-style-type: none"> <li>• A monitoring mechanism must be in place to measure the ICT use achieved and its impact (e.g., on the increase of productability) at national and regional levels</li> <li>- the monitoring mechanism must include all areas of ICT interventions that originate from existing relevant industrial, national or regional strategies of the European Union</li> <li>- the monitoring mechanism must use the same indicators as the Digital Agenda Scoreboard, but further indicators may also be involved to follow up on implementation.</li> </ul> </li> <li>5. <b>Needs assessment to promote the expansion of ICT capacities</b> <ul style="list-style-type: none"> <li>• analysis of weaknesses to identify ICT interventions, stating where necessary a proper description of planned or already existing measures to ensure the capacities of collaborating organisations and beneficiaries in order to identify and deliver the necessary interventions.</li> </ul> </li> </ol>
Infrastructure of the New Generation Access Networks (NGA) (high speed Internet service)	<p>The plan relating to the establishment of the New Generation Access Network must include the following:</p> <ul style="list-style-type: none"> <li>• the planned investments into infrastructure, relying on the economic analysis of the existing infrastructure and planned private investments</li> <li>• sustainable investment models that can promote competition and provide open and affordable infrastructure and services</li> <li>• measures to encourage private investments.</li> </ul>

## IX. SOURCE LITERATURE

- *Hungarian response to the challenges of the Information Society* ('Magyar válasz', 1999)
- *Theses on the Information Society* (2000)
- *National Information Society Strategy* (NIST, 2001)
- *Hungarian Information Society Strategy* (HITS, 2003)
- *Documents of the eHungary Programme*
- *E-Government Strategy and Programme Plan* (2005)
- *National Information Technology Strategy* (2005)
- *National Broadband Strategy* (NBS, 2004)
- *eEconomy Action Plan* (eGAT, 2009)
- *Digital Literacy Action Plan* (DLAP, 2009)
- *Broadband Action Plan* (BBAP, 2007)
- *E-administration Programme 2008-2010*
- *E-administration 2010 strategy* (2008)
- *The industry policy action plan of the ICT sector* (2009)
- *Digital Renewal Action Plan* (DRAP, 2011)
- The ICT 0-1 competence list recommended by the Ministry of National Development
- Reinhard Wieck, Miguel Vidal: *Investment in telecommunications infrastructure, growth, and employment – recent research*, 21st European Regional ITS Conference Copenhagen, 13-15 September 2010
- Micus: *The Impact of Broadband on Growth and Productivity*, 2008, expert report for the European Commission
- Internet matters: *The Net's sweeping impact on growth, jobs and prosperity*, 2011, Mckinsey
- Qiang et al. (2009) *Economic Impacts of Broadband*, World Bank
- *Getting the most out of the digital dividend*, Value Partners, March 2008
- eNET: *Impact of the improvement of digital literacy on the macro economy*, 2012
- Analysys Mason, Tech4i2 Limited: *The socio-economic impact of bandwidth*, final report: a study prepared for the EC, 2010
- *The ICT impact report*, European Schoolnet, 2006
- *Broadband coverage in Europe in 2011*, European Commission
- *Broadband Internet Access Cost* (BIAC), final report 2012, Van Dijk, European Commission
- *E-COMMUNICATIONS HOUSEHOLD SURVEY*, Special Eurobarometer 381, 2012
- *Digital Agenda scoreboard*, 2012
- Communications Committee Working Document Subject: *Broadband lines in the EU: situation at 1 July 2012*, European Commission
- Eurostat, NMHH, Airosz Ltd., Bellresearch Ltd. (*Hungarian Infocommunications Report*, 2012)
- McKinsey: *Online and upcoming: The Internet's impact on aspiring countries*, January 2012
- *OECD Internet Economy Outlook*, 2012
- *Internet Economy Outlook*, 2012, OECD
- *eGovernment Benchmark 2012* background report
- *Innovation Union Scoreboard 2013*, European Commission
- *Cisco Visual Networking Index: Forecast and Methodology*, 2012–2017
- *Broadband development concept* (MND, 2011)
- *The Programme of National Cooperation*, 2010
- *National Development and Regional Development Concept* (NDRDC/OFTK), 2012
- *New Széchenyi Plan*, 2010
- *Growth Plan*, 2011
- *'Magyary Zoltán' Programme*, 2011
- *European Digital Agenda*, 2010
- *E-Government Action Plan*, 2011

## X. ANNEXES

### Annex No. 1

#### Overview of earlier strategic initiatives

##### **Hungarian response to the challenges of the Information Society ('Magyar válasz', 1999)**

The earliest government document of a strategic vista is the 'Hungarian response to the challenges of the Information Society' published by the Prime Minister's Office in 1999, which **mainly reviewed the different possibilities to spread internet use**, and looked into almost all policies (environmental protection, health care and culture) that have some relevance to the ICT sector, the use of ICT tools and applications. The document identified six priority areas with respect to the tasks related to the development of an information society:

- **Development of the information infrastructure:** regulations to encourage competition and investments;
- **Electronic content provision:** ensuring access to information for the population by using public service and commercial data and contents, and generating the possibility of managing administrative affairs online;
- **Educating the citizens of an information society - 'new literate people':** providing the ability to participate in an information society for the largest possible group of people;
- **Competitive economy:** utilisation of the competitive edge, growth and employment advantages of infocommunications;
- **Effective, service provider public administration:** ensuring equal opportunities of access to information, 'establishing a new level of democracy'
- **Improving quality of life:** ensuring the possibility of 'liveable life' for the majority of society.

##### **National Information Society Strategy (NISS, 2001)**

The National Information Society Strategy was published by the Information Technology Commission of the Prime Minister's Office in May 2011. The NISS was practically the first complex strategic document summarising the Government's development intentions of the Hungarian information society in line with the Széchenyi Plan. The clear vision of the document (*'According to the vision of the National Information Society Strategy, Hungary will be a forerunner in the Central- Eastern-European region in building an information society'*) was intended to be implemented according to seven sets of objectives and instruments or programmes:

- **Infrastructure development programme:** regulations and standardisation;
- **Economic policy programme:** regulations, R+D support to telework, and to innovative and niche enterprises;
- **Cultural programme:** regulations, digitisation of the Hungarian cultural heritage and creation of digital content.
- **Educational programme:** information literacy and the use of ICT tools in education;
- **Social policy programme:** generation of demand, access and training;
- **Electronic government programme:** electronisation of central administration and establishment of a service provider government.
- **Municipalities' programme:** electronisation of the municipalities' administration and establishment of service provider municipalities.

### **Hungarian Information Society Strategy (HISS, 2003)**

The new Government taking office in 2002 expressed the significance of the information communications area in terms of institutionalisation, because a **separate ministry** was established to control the area. The transparency and efficiency of the system, however, was hindered by the fact that the development of **government IT and electronic government services** continued to remain under the **control of the Prime Minister's Office**.

The Hungarian Information Society Strategy completed in 2003 identified the two basic pillars of modernisation in **modernising the processes and services**. The Strategy divided the measures required to improve the processes to the following areas with respect to both pillars:

- **Content and services** (economy, public administration, culture, education, health and environmental protection)
- **Infrastructure**
- **Knowledge and skills**
- **Legal and social environment**

and two horizontal components:

- **Research and development**
- **Equal opportunities.**

### **E-Government Strategy and Programme Plan 2005**

The objective of preparing the E-Government Strategy and Programme Plan - a little late - was to describe in details the e-government objectives of HISS, as well as the clarification of the role of the Government Agency Electronic Government Centre, and the identification of reliable basic messages on e-governance to the population. The strategy identified two key areas of integration:

- establishment of a **uniform concept of public utilities;**
- **taking the service end points closer** to society.

### **National Broadband Strategy (NBBS, 2004)**

The main objective of the National Broadband Strategy focusing basically on the development of broadband infrastructure and services was the following: *'Neutralise the factors limiting the spread of broadband electronic communications by the coordinated employment of regulatory, public policy and support measures, and to promote increased improvement in the areas of access, content, motivation, literacy or qualifications and security to strengthen economic competitiveness and social cohesion.'* The NBBS analysed the major problems and the measures required to achieve the vision identified related to the development of broadband (or in a wider sense, information communications services) by five pillars:

- **access**
- **content**
- **skills or qualifications**
- **security**
- **motivation**

Following the review and upgrading of the NBBS in 2007, separate documents were prepared in the following years following the logic of the strategy to break down into action plans the measures proposed for the development of broadband infrastructure (Broadband Action Plan, BBAP), improvement of digital literacy (Digital Literacy Action Plan, DLAP) and development of the e-economy (eGAT).

### **eEconomy Action Plan (eGAT, 2009)**

The eEconomy Action Plan identified the main directions of government interventions required in the area of electronic economy alongside three pillars:

- **use of ICT in enterprises:** the use of IT in the operation of enterprises
- **B2B, B2C:** development of e-commerce, content industry, e-banking and e-payments: websites, corporate market places, e-commerce, e-banking, e-payments, etc.;

- **e-government, e-public administration, e-content:** interoperability, open source code software

### **Digital Literacy Action Plan (DLAP, 2009)**

The opening assumption of the document was that Hungary was significantly lagging behind even the European medium range **in terms of internet access, use and skills of the population**. The action plan stated objectives to change the above according to two pillars:

- **motivation:** mitigation of the **motivational hindrances** limiting the spread of digital literacy;
- **skills:** mitigation of the bottlenecks in skills and digital competences;

### **Broadband Action Plan (BBAP, 2007)**

The most important objective of the Broadband Action Plan was that the population, the enterprises and the institutions should achieve full coverage by the end of 2010. That meant reaching about 94% coverage in accordance with the expectations identified earlier (minimum 256 kbps downloading and minimum 64 kbps uploading speed). On the other hand, a network infrastructure should be able to meet the demands of the population, the enterprises and institutions (primarily of health care institutions lagging behind the most) in the event of stricter broadband expectations (minimum 1 Mbps downloading speed) and an increasing number of users in the period 2007-2010.

### **E-administration Programme 2008-2010**

The strategic document on the development of the electronic processes of public administration described the tasks according to seven so-termed overall programmes:

- Overall programme for **interoperability**
- Overall programme for **client focused services**
- Overall programme for **online infrastructure**
- Overall programme for **integrated customer service**
- Overall programme for **integrated government functions**
- Overall programme for **shared e-administration services**
- Overall programme for **knowledge management**.

### **E-administration 2010 strategy (2008)**

The new strategic document compiled by the relevant section of the Prime Minister's Office in charge of government IT identified two major pillars:

- establishment of **client focused services for the citizens and enterprises:** meeting users' demands, simplification of service processes, development of the electronisation of services, etc.;
- **development of integrated and shared government services** (e.g., the Electronic Government Backbone Network).

### **The industry policy action plan of the ICT sector (2009)**

The Ministry of National Development and Economy (MNDE) **named the ICT sector as one of the priority sectors** in terms of growth, employment and competitiveness (next to the pharmaceutical industry and bio-technology, logistics and motor industry). The largest professional body of the sector, the Federation of IT Enterprises (FITE) was involved in the preparation of the action plan identifying development proposals according to **three pillars (human resources, R+D, investment)**, and also identified some so-termed 'cross-pillar actions'.

### **Digital Renewal Action Plan (DRAP, 2011)**

The action plan compiled by the Ministry of National Development rejected the earlier approach and identified **four directions of measures** (pillars) according to the providers and users of infocommunications services:

- **Man in Focus:** improvement of equal opportunities for, and the quality of life of citizens, promoting competitiveness, increasing social welfare;
- **Flourishing enterprises in the service of job creation:** increasing the competitive edge and adjustability of enterprises;
- **Service provider state operating efficiently and securely:** the simpler, more transparent, more secure, cheaper and more efficient operation of the state;
- **High-tech and secure infrastructure for everybody:** up-to-date and secure multi-functional infrastructure that is a precondition of the implementation of the above 3 objectives.

## Annex No. 2

### Definitions

In the formal terminology of the European Union, infocommunications means the convergence and integration of information technology and electronic communications. In this strategy, **info-communications** means all the instruments, technologies and applications of information technology and electronic communications as well as their use, that result in improved quality, efficiency and effectiveness both for individuals, enterprises and the state.

133

The strategy has made efforts to use an easy language and avoid the use of technical terms; however, a few terms may need interpretation. They are as follows.

### Digital competences

This strategy considers citizens to be **digitally literate** if they fulfil minimum the basic criteria of the ICT 0-1 competence list recommended by the Ministry of National Development<sup>46</sup>.

A person is **digitally illiterate** if he uses neither a computer (nor other devices suitable to access the Internet), nor the internet.

**Primary digital division** means the 'gap' that separates internet users and non-users.

**Secondary digital division** is the gap separating the users of basic level online services from users of more transactive services requiring a higher level of ICT knowledge.

### Digital economy

In this document, the **ICT sector** means both the producer (ICT industry) and the user (infrastructure, coverage, use, etc.) side of the ICT.

**ICT industry** means the producers of hardware and software, enterprises providing IT services and the telecommunications sector.

### Digital infrastructure

**Backbone network** is a high capacity central optical network connecting large towns.

**Area or backhaul network** is the network connecting settlements into the backbone network.

**Local network** is the network reaching households<sup>47</sup>.

**Basic level (traditional) broadband** in the EU terminology is access providing minimum 144 Kbps download access.

**New generation (NGA) broadband** access – in accordance with the definition of the European Digital Agenda - means access of minimum 30 Mbps download capacity. The new generation access networks are fibre-based or modern upgraded cable networks that are able to provide higher standard services (such as, e.g. greater transmissivity) than those ensured via the existing copper networks.

**ADSL (Asymmetric Digital Subscriber Line):** is an xDSL technology, where the download and upload speed of internet is different, the digital connection is provided alongside the telephone connection by the same pair/line.

---

<sup>46</sup>Source: [http://www.kormany.hu/download/5/56/d0000/IKT\\_0-1\\_kompetencia\\_lista\\_modulrendeletez\\_honlapra\\_130312\\_final.pdf](http://www.kormany.hu/download/5/56/d0000/IKT_0-1_kompetencia_lista_modulrendeletez_honlapra_130312_final.pdf) competence list for module decree to website

<sup>47</sup> The European Union traditional broadband statistics also include NGA access.

**Electronic telecommunication services:** services provided for others usually against payment that consists fully or mostly of the transmission of signals via electronic telecommunications networks and - where it makes sense - control, but it does not include services controlling or editing such contents with respect to the services provided by the use of electronic telecommunications network, which do not primarily consist of the transmission of signals via electronic telecommunications networks.

**Frequency management:** the totality of government activities that serve the regulated national and international use of the radio spectrum ; its objective is to use the radio spectrum efficiently and free of damaging interference, to provide the frequencies for radio telecommunication, radio astrology and other non-radio telecommunication applications operating within the framework of radio services.

**Innovation cluster (EU definition):** groups of independent enterprises in a certain region and sector in order to promote innovation by efficient technology transfer and the transfer of information, intensive cooperation, exchange of knowledge and experiences, sharing capacities.

**IT services:** the market of IT services includes the sales of different information technology advisory, installation, support, operating and training services related to different software and hardware products, as well as sales revenues from maintenance and follow-up fees, and sales revenues from full information technology outsourcing, IT services not linked to products and organisational development consultancy.

**ICT applications:** The Information and Communications Technologies are the totality of tools, technologies, organisational activities and innovative processes that promote information and communication, processing, flow and coding, making them faster, easier and more efficient.

**SME:** Category of small- and medium-sized enterprises that employ fewer than 250 people and their annual net sales is below EUR 50 million.

Competence centre:

**NGN (Next Generation Network):** the future generation of networks that is able to transfer contents (telephone, video, data) along the same network that are transferred via different networks today.