



REPUBLIC OF SLOVENIA

DIGITAL SLOVENIA 2020 – DEVELOPMENT STRATEGY FOR THE INFORMATION SOCIETY UNTIL 2020

**DIGITALISATION OF SLOVENIA BY INTENSE AND
INNOVATIVE USE OF ICT AND INTERNET IN ALL
SEGMENTS OF SOCIETY**



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1 Introduction

In 2010, the European Commission (EC) adopted the **Europe 2020**¹ strategy designed to help the economy of the European Union (EU) escape the crisis and prepare for the challenges of the next decade. The baseline is that the EU needs thorough changes to preserve its competitiveness and standard of living. The strategy's principal objective is to turn the EU's economy into one that is smart, sustainable and inclusive. It sets measurable overall objectives that the Member States (MS), in tailoring the strategy to their particular situation, should translate into their national targets and trajectories.

The Europe 2020 Strategy contains seven flagship initiatives to catalyse progress under priority topics. These initiatives include the **Digital Agenda for Europe**² (DAE³), which concerns the key role of information and communication technologies (ICT) in the efforts to achieve strategic objectives. The general objective of the DAE is to ensure that the uniform digital market based on fast and ultrafast internet connections and interoperable applications results in lasting economic and social advantages.

The DAE foresees that the Member States will adopt their own strategic frameworks to achieve the DAE objectives. This framework can be set up by a single comprehensive strategic document or by several coordinated strategies. Due to the adverse economic conditions and rapidly changing development factors since the implementation of the DAE, Slovenia has not yet fully taken up the development opportunities offered by ICT. The efforts to place the development of an information society among development priorities have been unsuccessful, so promotional activities are weak, incoherent, and lacking development resources and the necessary support. The delays in this area unavoidably cause negative consequences in several other development fields; above all, Slovenia loses competitiveness in terms of several standards compared to other EU Member States.

The implementation of DAE showed weaknesses and the need for the renewal of strategic orientations at the EU level. The current fragmentation of digital markets across the Member States and their small size in comparison with domestic markets prevents European economies from creating the economy of scale, increases the costs of appearance in these markets, prolongs the time for market entry, hinders business cooperation, the flow of ideas and innovation. At the same time these limits make the EU as a business environment less and less attractive for global multinational enterprises. In view of the prominent horizontal effect of digitisation, negative consequences refer to most industrial sectors and not only to the ICT sector, as well as to European society as a whole, of course. In order to eliminate system deficiencies and accelerate development in this field, the EC published the **Digital Single Market Strategy**⁴ for Europe in 2015 as a sequel to DAE; the document drafts the measures for a more efficient use of digital technologies to help the population and enterprises use the opportunities enabled by these technologies. In the context of digital space - regardless of whether we mean the private or business aspect - the key strategic task is to abolish restrictions that prevent the creation of a uniform European digital market. Since the development of the digital society has not proved equally successful in all EU countries and since geographic and national borders remain an obstacle to the creation of a fully functioning digital market, measures for a more balanced

¹Europe 2020 - A strategy for smart, sustainable and inclusive growth - COM(2010)2020.

²Digital Agenda for Europe – COM(2010)245.

³ <http://ec.europa.eu/digital-agenda/>

⁴ http://europa.eu/rapid/press-release_IP-15-4653_sl.htm

development of the digital society (infrastructure, digital services and content, digital knowledge and skills) will have to be implemented and legislation will have to be aligned. This will create a single European digital space (market), which will help enterprises simplify operations, lower their costs for participating in the single market, improve the opportunities for research, development and innovation, and provide equal opportunities for citizens' access to digital services, content and products on the part of users. Uniform rules of operation, security and protection are also expected to increase users' trust in digital technologies and services.

The creation of the future European digital single market and single European digital space, respectively, is expected to bring a number of advantages and opportunities to the economy and society, but will also raise issues of the readiness of Slovenian stakeholders for the new European digital environment without borders. At the beginning of a new development period that coincides with the next multiannual financial period of the allocation of funds from the European Structural Funds (2014-2020), it is also high time for Slovenia to adopt a strategic framework for the development of the information society that will outline the direction of development, stimulate development activities, and envisage the provision of development resources. The overall objectives are equal inclusion in the European digital space and the creation of digital growth. Resources should be earmarked for measures consistent with the overall strategic objectives that will boost cross-sectoral synergies, enjoy broad support, be feasible and yield long-term results as soon as possible. The adoption of a new strategic framework is also a condition for the allocation and use of structural resources of ERDF in the multiannual financial period 2014-2020. In order to co-finance measures for the information society, the EC requires the adoption of the National strategic framework for digital growth and investment in the construction of broadband networks, and the adoption of the Plan for developing next-generation networks.

Within these frameworks, Slovenia adopts the **DIGITAL SLOVENIA 2020 - Development strategy for the information society until 2020** as well as the associated strategic documents **Cyber Security Strategy** and **Plan for Developing Next-Generation Networks by 2020**. DIGITAL SLOVENIA 2020 - Development strategy for the information society until 2020 is an umbrella strategy determining the key strategic development orientations and uniting the mentioned strategies in a uniform strategic development framework. At the same time, the strategy is one of three key strategies in this area (in addition to the RISS - Research and Innovation Strategy of Slovenia, and SIP - Slovenian Industrial Policy), which provide guidelines for the creation of innovative knowledge-based society and which are united in the Strategy of Smart Specialisation (SSS) as a platform for focused investment in priority areas. Since the scope of the information society and ICT is horizontally included in the SSS across vertical content areas, the Development Strategy for the Information Society until 2020 specifies strategic directions of the digitisation of society and business, which will form the foundations of development projects by priority areas of the SSS. It foresees measures for harnessing the social and economic potential of ICT and the internet for digital growth, focusing on digital infrastructure, intense use of ICT and the internet, cyber security and an inclusive information society.

Strategy implementation will be organised systematically, with strategic and operational links to other strategies and with the integration of stakeholders through the Slovenian Digital Coalition. In developing area-specific strategies, Slovenia will ensure compliance with the DIGITAL SLOVENIA 2020 strategy and other associated strategies.

2 Abstract

Slovenia adopts the DIGITAL SLOVENIA 2020 - Development strategy for the information society until 2020 as well as associated strategic documents Cyber Security Strategy and Plan for Developing Next-Generation Networks by 2020. DIGITAL SLOVENIA 2020 - Development strategy for the information society until 2020 is an umbrella strategy determining the key strategic development orientations and uniting the strategies in a uniform strategic development framework.

The DIGITAL SLOVENIA strategy is a commitment for a faster development of the digital society and the use of opportunities enabled by information and communication technologies and the internet for general economic and social benefits. Along with the strategies from its scope, it envisages measures to tackle the major development gaps in the field of digital society: faster development of digital entrepreneurship, increased competitiveness of the ICT industry, overall digitisation, development of digital infrastructure, construction of broadband infrastructure, strengthened cybersecurity and the development of an inclusive information society. It foresees priority investment in the digitisation of entrepreneurship, innovative data-driven economy and development, and the use of the internet and, in these frameworks, in the research and development of technologies of the internet of things, cloud computing, big data and mobile technologies. A new system of electronic identities should be established in good time; basically intended for the public sector, it enables easy cross-border operation and equal participation of Slovenian enterprises in the European single digital market. There is a need for the systemic regulation of providing a high level of cyber security and improving financial, human and technical resources for key stakeholders. A series of measures must be implemented to eliminate the largest development lags in the digital society and set up appropriate digital infrastructure for the equal participation of Slovenian stakeholders in the single European digital space. The strategy envisages the establishment of the Slovenian Digital Coalition to unite stakeholders developing the digital economy and establishing digital jobs, as well as other stakeholders of the digitisation of Slovenia. Working with the private sector, NGOs and other stakeholders, measures will be put into place for the digitisation of entrepreneurship and society, for increased overall awareness of the developmental importance of ICT and the internet, improved digital literacy, improved e-skills of active population, and the increased number of trained ICT professionals. Formal and informal education should be opened up to new ideas and adapted to new generations, the needs of educating for new digital jobs, and the equal participation of all generations in the European digital society. Measures for a better internet for children and the elderly are foreseen. In the digital society of the omnipresent internet and ICT, we must provide a high level of personal data protection and privacy of communication in order to create confidence in the digitisation and cyberspace.

In view of the current shortcomings in promoting the development of an information society, Slovenia accepts the commitment to devoting all the necessary attention to these tasks and the provision of development resources in the state administration. A good and timely implementation of measures from DIGITAL SLOVENIA 2020 is necessary for the equal participation of Slovenian stakeholders in the new digital Europe.

Through the accelerated development of a digital society, Slovenia will use the development opportunities of ICT and the internet and become an advanced digital society. It strives to become a reference environment for introducing innovative approaches in the use of digital technologies.

3 Analysis of the National Context

3.1 General Awareness of the Importance of the Information Society

Compared with other EU member states, Slovenia has been recording about a fifteen-year long downward trend in its information society development level, which has reflected negatively in other development areas. This situation is a result of significantly too low investments in the development of information society, and insufficient general awareness of the importance of ICT and the internet for the development of the economy, state and the society in general. European competitors have made higher and more systematic investments all this time, which reflects in faster development progress than Slovenia was able to implement. By inappropriate placement of ICT and the internet in its development efforts, Slovenia as a society forgoes the development potentials enabled by ICT and the internet. If such practice does not stop, the development lag behind the countries that place the highest priorities on these areas will continue.

The latest data on the indicators of development and comparisons in the EU framework are alarming. The development lag grows from year to year, so Slovenia needs to change the social attitude towards ICT and the internet at the threshold of the new development period until 2020 and create a more stimulating environment for the faster and more harmonised development of an information society and the ICT sector. To this end, Slovenia needs to provide considerably higher development funds in order to reduce the development gap with the most developed countries in the following development period until 2020 as much as possible. The progress in higher competitiveness of the ICT sector, development of digital society, digital economy and, last but not least, digital growth will not be possible without thorough changes in the awareness of the importance of ICT and the internet in Slovenia.

In view of highly limited development funds from the core budget, the funding of the implementation of measures under the DIGITAL SLOVENIA 2020 initiative will require funding from EU structural funds. Measures must be implemented to eliminate the largest development lags in the information society and set up an appropriate infrastructure for the equal participation of Slovenian stakeholders in the single European and global digital space.

Above all, promoting the importance of ICT and the internet in public requires the implementation of measures for the promotion and stimulation of demand for ICT and use of the internet, and a stronger dialogue with the broader public. Positive effects of these measures are a precondition for changing the general attitude towards digitisation and the use of development opportunities of ICT and the internet, and for the development of a contemporary digital society.

3.2 Indicators of Development of Information and Digital Society

To monitor progress in achieving the objectives of the DAE and the development of the information society, a conceptual framework was adopted for the collection of statistical data on the information society as a benchmarking framework for the period 2011-2015⁵, including a list of core indicators monitored by national statistical offices in unified surveys on the extent of the use of ICT in households, by individuals and enterprises. These are especially quantitative indicators divided in three main

⁵ Benchmarking Digital Europe 2011-2015.

groups: infrastructural indicators, indicators on the use of ICT in enterprises, and indicators on the access and use of ICT in households and by individuals. The list of indicators for measuring the success of the DAE strategy is provided in Annex 4.

In Slovenia, the data methodologically comparable at the European level are collected by the Statistical Office of the Republic of Slovenia (SORS), who then communicates the data to Eurostat. Statistically processed, methodologically harmonised and internationally comparable data for the Member States are published at the Eurostat website⁶. The data arranged by DAE chapters are also publicly available at the EC website "Digital Agenda Scoreboard"⁷.

To assess the development of EU Member States in the digital economy and society, the EC developed the composite Digital Economy and Society Index – DESI. The index summarises a series of indicators based on five characteristics: connectivity, human capital, use of the internet, integration of digital technology, and digital public services. According to the digital economy and society index that the EC published for 2015, Slovenia ranks 19th among 28 EU Member States. Detailed information is available at the DAE scoreboard website.

Another important indicator for the development of the information society is a broader political awareness of the importance of ICT and the opportunities of the digital economy, which is reflected in the importance of this area for the government, clearly defined strategic guidelines and measures for accelerated development of the digital economy in the overarching national strategic documents and budgetary resources earmarked for the measures in the field.

A more detailed report on the state of development of the information society in Slovenia in 2014, which is presented in Annex 2, is based primarily on statistics, reports and analyses published on the DAE Scoreboard and on the SORS data. A detailed description of the situation in the EU and in Slovenia is provided in Annex 3.

⁶ <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>

⁷ http://ec.europa.eu/information_society/digital-agenda/scoreboard/index_en.htm

3.3 SWOT Analysis of the National Context

ADVANTAGES	DISADVANTAGES
<p>Digital Economy and Digital Society</p> <ul style="list-style-type: none"> • Good bases for the development and implementation of data-driven economy and innovation, development of cloud computing, the internet of things and mobile technologies. • Proximity of yet undeveloped markets. • Examples of globally successful ICT enterprises in niche areas (good practices, integration). • Participation in international projects and integration in the joint European education and research network. • Established network of NGOs for an inclusive information society. • Examples of good practices in internet start-ups and application of new internet-based business models (peer-to-peer, sharing economy, cryptocurrencies...). • Established network for the inclusion of broader public in discussions about the internet - Slovenian internet Forum. <p>Electronic Communications Infrastructure</p> <ul style="list-style-type: none"> • Competitive market of electronic communications. • Good basis and readiness for transition to IPv6. <p>Digital Literacy and ICT Skills</p> <ul style="list-style-type: none"> • Examples of good practices of intergenerational cooperation and e-literacy development (Simbioza). • Broad possibilities for formal and informal education. • School children have a basic degree of digital literacy. • Good results of the preventive measures for the safe use of the internet (awareness raising programmes) implemented so far. • Experience in the advanced application of ICT in education. <p>E-government and Public Sector</p> <ul style="list-style-type: none"> • High level of development of e-government solutions. • Existing national ICT infrastructure: national HKOM network, data centre, SIGOV-CA and other issuers of qualified digital certificates, Arnes infrastructure. • Experience in interoperability of cross-border e-services. • High-quality and connectible central databases in state administration, effective identifiers. • Established national open data portal NIO. • Good legislative framework of access to information of public character - ZDIJZ. • Important role and practice of the Information Commissioner. • Guidelines for capturing, long-term conservation and access to cultural heritage in digital form. <p>ICT Sector in Slovenia</p> <ul style="list-style-type: none"> • ICT industry with the full spectrum of skills for the digitisation of Slovenia (digital entrepreneurship, development and introduction of e-services and e-business). 	<p>Digital Economy and Digital Society</p> <ul style="list-style-type: none"> • Significant lag in the development of the information society over the past ten years. • Significantly insufficient investments in the development of information society. • Lack of development resources (financial, human, material and technical). • Insufficient awareness of the importance and potential of ICT for social development at all levels. • Insufficient political support for the efforts to develop the digital society: general digitisation, digital economy, introduction of e-business and digitisation of the public sector (e.g. e-health). • Declarative support is not reflected in operational support. • Unstable political, organisational and development environment and subsequent delay in drafting development documents. • Strategic documents do not sufficiently recognise ICT as a promoter of general development and economic growth. • Insufficient participation of stakeholders in drawing up and implementation of measures for promoting the development of digital society. • Insufficient range of e-content and e-services in Slovenian in certain fields. • Existence of provisions that constitute a hindrance in capturing, keeping and accessing digital content. <p>Electronic Communications Infrastructure</p> <ul style="list-style-type: none"> • High costs of construction of capable broadband infrastructure in white areas. <p>Digital Literacy and ICT Skills</p> <ul style="list-style-type: none"> • Geographic, age-related and other digital divides in the provision and use of communication and information services. • Low digital literacy, lack of e-skills and deficient use of available advanced e-services and ICT solutions in certain population segments. <p>E-government and Public Sector</p> <ul style="list-style-type: none"> • Inappropriate organisation and placement of competencies for the digitisation of the public sector and for the development of the information society. • Problems with the implementation of a complementary approach and the implementation of synergistic effects at the inter-departmental and cross-sectoral levels. • Decentralised computerisation of the state (and partially broader public) administration and healthcare has brought about dispersed and unconnected IT systems and high costs of development and maintenance.

<ul style="list-style-type: none"> • Number of experts from the ICT field. • Concentration of know-how in competence centres from the ICT field. <p>Cyber Security</p> <ul style="list-style-type: none"> • Functioning operational level of cyber security provision with well-qualified although insufficient human resources. • Good experience with participation in common international exercises in cyber security. 	<ul style="list-style-type: none"> • Poor awareness of the advantages and poor legal basis for the implementation of the interoperability principle and broader application of the national interoperability framework (IOF). • Insufficient awareness of public authorities of the importance of transparent action and publication of data in open formats. <p>The ICT Sector in Slovenia</p> <ul style="list-style-type: none"> • A small number of high-tech enterprises and insufficient orientation toward global markets. • A low level of early entrepreneurial activity and failure to adapt to incentive measures to the specifics of ICT and the internet. <p>Cyber Security</p> <ul style="list-style-type: none"> • Lack of specific cyber security provision regulations at the strategic level, without appropriate sources (central coordination facility, point of single contact for international cooperation).
OPPORTUNITIES	THREATS
<p>Digital Economy and Digital Society</p> <ul style="list-style-type: none"> • Significantly higher investments in the development of information society and the ICT sector. • Clear political support for development efforts and high level of awareness of the importance and development opportunities of ICT and the internet. • Higher technological orientation of the society in steering development. • Increased efficiency as a result of innovative and intense use of ICT and the internet as horizontal strategic orientation in all development documents and activities. • Inter-departmental and cross-sectoral cooperation for complementary development approaches and seeking synergies. • Classification of Slovenia as an advanced reference environment for introducing new technologies (data centres, open public and research big data, internet of things, cloud computing, IPv6, etc.). • Research, development and establishment of open platforms based on interoperability and standards for easier and quicker development of high-quality, innovative, safe and trustworthy solutions, as well as recognition in foreign markets. • Development of new ways of electronic social communication. • Inclusion of stakeholders of the development of digital society in the preparation of development and legislative documents via the Slovenian digital coalition. • Development of creative content and creation of new or enriched offer of digitised cultural heritage. <p>Electronic Communications Infrastructure</p> <ul style="list-style-type: none"> • Potential synergies in constructing smart and broadband networks and other measures for lowering the costs of constructing broadband infrastructure. <p>Digital Literacy and ICT Skills</p>	<p>Digital Economy and Digital Society</p> <ul style="list-style-type: none"> • Organisational and political instability and insufficient sources of funding the development of society's digitisation. • Lack of understanding of development opportunities for the digital society and lack of political support in earmarking funds for the implementation of proposed measures. • The influence of partial interests and unwillingness to cooperate. • Lack of stakeholders' interest in the implementation of foreseen measures and use of advantages of digitisation. • Lagging behind DAE objectives, which means failure to implement common European commitments adopted. • Further negative impact of development lag in the field of information society on all other development areas of society. • Risk of violating copyright and related rights because of unsuitable or deficient regulations. • Shifting the burden of the higher costs of trust service management to final user. • Decrease in the competitiveness of the economy. <p>Electronic Communications Infrastructure</p> <ul style="list-style-type: none"> • The developmental lag of rural and suburban areas because of insufficient digital infrastructure. <p>Digital Literacy and ICT Skills</p> <ul style="list-style-type: none"> • Disregarding the specificities of individual target groups in increasing digital literacy. • Negative impacts of various types of digital divides. • Drop in the use of Slovenian among native speakers of Slovenian in digital environments. • Drop in the amount of digital content created in Slovenian. <p>E-government and Public Sector</p> <ul style="list-style-type: none"> • Short-term and sectorally partial operation of public sector institutions.

<ul style="list-style-type: none"> • Digitisation of education and research, culture, and media. Increased production of digital media content. <p>E-government and the Public Sector</p> <ul style="list-style-type: none"> • Consolidation and centralisation of the digitisation of state administration with the use of cloud computing technology and big data in order to achieve synergistic effects. • Development of new e-services of state administration (including healthcare, the public sector, partly local self-government services) within the common service IT-infrastructure. • Pre-commercial procurement of computerisation and development of advanced innovative e-services of public sector. • Introduction of an electronic identity card (eID). • Development by the 'digital by default' principle, and priority or mandatory use of public e-services. • Possibility to use IOF, infrastructure of electronic identities and services of trust and other e-infrastructure for cross-border public e-services also for the private sector. • Introduction of new services for protection, salvage and assistance to persons, especially relating to services of emergency call on 112. <p>ICT Sector in Slovenia</p> <ul style="list-style-type: none"> • Digitisation of entrepreneurship and production, promotion of internet entrepreneurship and internet start-ups. • Intensive opening of public and research data. • A test cloud for easier and faster development of innovative e-services based on open public research data and spatial data. • New and refashioned business models based on the development opportunities of ICT and the internet (industry 4.0, e-business, peer-to-peer, sharing economy). <p>Cyber Security</p> <ul style="list-style-type: none"> • Systemic regulation of cyber security provision and protection of critical IT infrastructure, raising trust in cyberspace. • Protection of human rights in the digital society. 	<ul style="list-style-type: none"> • Increased risk for deficient public e-services because of poor quality and availability of data. • Loss of cultural heritage, less legal certainty, and difficulties in the re-use of data because of the unsuitable system for archiving and storing digital objects. • Unsuitable and badly thought-out replacements for traditional technologies with IP technologies. <p>ICT Sector in Slovenia</p> <ul style="list-style-type: none"> • Degradation of research and development capacities in ICT because of the globalisation of research and development and global competition. <p>Cyber Security</p> <ul style="list-style-type: none"> • Lack of trust in cyberspace, safety and privacy and thus in the use of e-services - weakening of the commercial potential of digitisation and lower level of trust of citizens in the state. • Insufficient awareness of the importance of ensuring a high level of cyber security.
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4 Objectives

Facing adverse economic conditions and global, increasingly competitive rivals, Europe sees the speedy development of a digital society and the ICT sector as one of the key opportunities for escaping the crisis and preserving competitiveness and the standard of living. The indicators for Slovenia show, on the contrary, that numerous structural changes related to exploiting development opportunities, including the potential of ICT and the internet, are insufficiently radical and fast; thus Slovenia is losing touch with the average of the European Union in terms of the digital society, which also means that it is losing its competitive advantages. This situation is a result of significantly insufficient investments in the development of a digital society, the unsuitable positioning of development and a lack of coordination among stakeholders. The awareness of the importance of ICT for the development of a contemporary digital society is much too low among the broader public in Slovenia.

According to DAE, long-term sustainable changes in Europe will be based on the digitisation of the society and economy with the innovative and intense use of information and communication technologies. The Digital Single Market Strategy for Europe additionally stresses the importance of eliminating the barriers for a prompt establishment of a single digital market that will give a new impetus to the European economy. In order to eliminate the lag in the development of a digital society, Slovenia will radically alter development approaches, accelerate development activities, set up the coordination of stakeholders in the development of the digital society, and earmark development funds for the area in order to reduce the development gap behind the most developed countries. In accordance with the mentioned guidelines and in order to enable Slovenian stakeholders to equally participate in the single European digital environment, Slovenia will invest in the digitisation of society and entrepreneurship, in digital growth, and education on digital societies, as well as implement the strategic orientation of the innovative and intensive use of ICT and the internet in all fields of development.

Slovenia's vision is to use, through the accelerated development of a digital society, the development opportunities of ICT and the internet and thus become an advanced digital society and a reference environment for introducing innovative approaches in the use of digital technologies.

The objectives of the strategy to achieve the development vision are the following:

- raising of general awareness as to the importance of ICT and the internet for society's development,
- sustainable, systematic and focused investments in the development of the digital society,
- general digitisation according to the 'digital by default' principle,
- competitive digital entrepreneurship and digitised private sector for digital growth,
- intense and innovative use of ICT and the internet in all social segments,
- high-speed access to the open internet for all,
- inclusive digital society,
- safe cyberspace,
- trust in cyber space and protection of human rights,

- Slovenia – a reference environment for introducing innovative approaches in the use of digital technologies.

5 Development Principles of Operation

5.1 The Internet as a Strategic Development Opportunity of the Digital Society

5.1.1 Focus on the internet in Drafting Development Measures

The internet is an omnipresent communication network of information sources that fundamentally changes the way in which our modern society functions by providing an easy access to a wide range of topics and services. In a globalised world, it is an extremely effective means of communication for the free flow of information, which has markedly changed the channels the modern world uses to communicate, so internet access and the use of its services are generally understood as a human right in the 21st century.

As the basic element of the digital or information society the internet is continuously developing and offers immense development opportunities in broader social frameworks. It increasingly shapes individuals' opportunities in all fields of private and public life; from education, employment, access to information, contemporary financial and public services, and freedom of expression, to participation and relationships in public and private life. It has the same far-reaching impacts in the private sector, public sector and civil society. In terms of directing development, the internet is a strategic tool for increasing productivity, to create innovative business models, products and services, to improve communication as well as the overall efficiency of the society. Cloud computing is turning the internet into a comprehensive service system that blends new technologies of the future internet (the internet of things), cloud computing services and internet e-services. The internet of things is an increasingly efficient uniform environment, offering extraordinary development opportunities and an extensive range of services that are useful, functional, reliable, safe and flexible. In steering development activities we must take into account the fact that economic and general development in contemporary digital society is closely connected with the development and use of the internet and digital literacy. The internet offers exceptional opportunities for tackling economic, social and environmental challenges, so it is a key factor for future economic and social development; thus its deployment strongly in the public's interest.

The internet is of vital importance for development, so Slovenia made its development and use a strategic focus and a national priority in the development of digital economy and digital society. Slovenia will use development measures to seize the potentials of the internet for promoting innovation, openness and access to knowledge, creation of employment opportunities, improvement of productivity and competitiveness of all sectors of the economy and improvement of quality and efficiency of public services. By reducing the impact of economic and social activities on the environment, it will support sustainably-oriented economic growth. Slovenia will promote discussions about the internet in cooperation with the Slovenian internet Forum, whose operation it will actively support.

Slovenia aims to rank among the leading digital societies, so it will harmonise the activities of all development stakeholders to optimise the use of the internet for the economic (digital) growth, education, social development and reduction of environmental impact.

In cooperation with the Slovenian internet Forum and other stakeholders, Slovenia will propose the adoption of a joint declaration about the internet that will be a driver of development, use, importance and role of the internet in the society in the national environment.

In order to seize development opportunities enabled by the internet, Slovenia will invest and operate in three fields in the future development period.

- **internet as technological platform:**

- increased investments in RDI in the ICT field,
- development of internet technologies (internet of things - future internet, cloud computing, industrial internet, industry 4.0, etc.),
- support for the development and higher competitiveness of the internet industry,
- establishment of enabling supportive environment for internet start-ups,
- introduction of contemporary models of cloud computing in public administration,
- promotion of the development of national and European interoperability for more efficient operation of the public sector,
- introduction of uniform and user-friendly services of e-identification and other services of trust for safe and private e-business,
- quick identification of upcoming ICT trends and technologies and responsive establishment of regulatory frameworks that will enable and promote the introduction of innovative approaches in the use of digital technologies,
- establishing enabling environment for reference projects of introducing innovative approaches in the use of digital internet technologies,
- promotion of the use of open-source technological solutions with a view to strengthening information independence and competitiveness.

- **internet as communication network:**

- development of high-capacity communication optic-fibre infrastructure (lowest target level being 100 Mb/s),
- provision of an appropriate level of network and service quality,
- fast and well thought-out transition to IPv6 (this transition is necessary for the stability of the internet and its further growth, including the possibility of user access to services and content of their own choice),
- development of mobile internet (mobile communications networks 4G and 5G, digital dividend II – the 700 MHz frequency band),
- provision of free, open and neutral internet,
- ensuring a high level of cyber security,
- ensuring privacy.

- **internet for the development of society and economy:**

- improving the population's digital literacy (improving their ability to use the internet and digital media at school, at the workplace and in everyday life, inclusion of digital content in general education, teaching of programming, informal education for younger and older generations),

- promotion of the use of the internet,
- awareness raising and training the population for safe and responsible use of the internet,
- measures for a better internet for children and the elderly,
- encouraging discussions about the development and use of the internet, shaping public interest in managing development policies, regulation and adoption of decisions in the society and economy, promotion of multi-stakeholder approach to addressing internet issues, cooperation at the international level,
- cooperation with Slovenian internet Forum and support for its activities,
- adoption of the national declaration about the internet,
- development of new models and manners of performing social and political activities,
- development of new cooperative models of online transactions (collaborative, peer-to-peer, sharing economy, cryptocurrencies, etc.),
- stimulation of the ICT sector to develop innovative IT solutions of e-business,
- use of the internet in developing efficient digital public administration, e-health, e-justice etc.,
- investments in higher use of the internet in the economy and e-business,
- use of services enabling telework or work from home,
- computerisation of polling stations and gradual introduction of e-elections,
- promotion of opening and re-use of data of the public and research sectors, development of e-services targeting user needs,
- use and development of the internet for contemporary financial services with stress on open standards and protocols.

5.1.2 Protection of Openness and Neutrality of the internet

The internet has developed organically, with minimum interventions of official institutions. But as the importance of the internet for society and the economy grows, its operation, management and access are becoming a matter of public interest that is mostly implemented by the self-regulation of markets. But when market mechanisms fail to fulfil society's expectations, state intervention is necessary to protect public interest. The public interest concerns particularly the provision of the availability, accessibility and openness of the internet, quality of services and privacy, safety and protection on the internet.

Different stakeholders in development, management and use of the internet create the future internet according to their respective roles, the general consensus being that the internet should remain a free and open public place of communication and services, which means unlimited access, non-discrimination and neutrality of content and technology from the aspect of exchanging communication. Without doubt, the internet is a communication medium that has fundamentally changed our contemporary society for the better. In order to retain the positive effect, the future internet needs to remain free, open, uniform, pro-democratic and safe; it needs to ensure privacy and be managed transparently and by the multi-stakeholder principle. These are the values that have developed the internet into an omnipresent network that connects the globalised world in digital society more than anything else. It has to be kept in mind, though, that the internet is open and free

in its technical concept but not necessarily in legislative, regulatory, management, user and other aspects. Thus legislators currently face the issues of restricting its use, overregulating or influencing the internet, which is contrary to its basic characteristics and may easily produce undesirable side effects. The sensitivity of the internet values makes it even more important to treat them cautiously in national frameworks.

In dealing with online content, the state plays a role in protecting children, fighting racism and hate speech, cybercrime and efforts for ensuring a high level of cyber security; the measures taken, however, must be proportionate to the objective. In contemporary society, an increasing share of real life unfolds through or by using the internet, so the question of whether countries should regulate the internet or not is moot. The only question is what and how extensive should such regulation be, so that it will not unduly restrict the development and use of the internet. In principle, restricting the use of the internet is legitimate only if it is in accordance with international norms and standards necessary for the functioning of a democratic society and ensuring human rights, and if it is regulated by legislation. In this spirit, the accepted view is that a general requirement for filtering, blocking, or any discriminatory treatment of the internet traffic is excessive and unacceptable, unless it complies with precise and narrowly defined legal reasons set out above and with the highest legal standards.

The fundamental motive for protecting net neutrality is the fact that the driving force of its development is a low entry threshold for new providers of content and services. The global internet network and all its potential users are readily and simply available to them. As a rule, the success of a new business model and new internet content, including the related services, depends only on their innovation and quality. Electronic communication networks that do not treat internet traffic neutrally threaten democracy, non-discrimination, transparency, openness and the freedom of the internet. Considering the influence of the internet on the globalised society, the risk of eliminating the neutrality of the internet is simply too great, which has to be borne in mind when steering its development.

Slovenia underlines the importance of preserving open net neutrality for innovation, development of entrepreneurship and digital society and functioning of single digital market. This is why Slovenia advocates strong and clear protection of net neutrality.

Slovenia particularly stresses the role of online platforms in the provision of net neutrality. Some online platforms have practically become a part of the internet infrastructure because of their monopoly positions, while their business models include discriminatory treatment of internet content and services. Online platforms can thus eliminate content-related net neutrality ensured at the level of transmission. Therefore Slovenia expressly supports the EC activities in the analysis of online platforms and potential regulation of internet platforms at the level of services and content.

Preserving the openness and neutrality of internet content is in the interest of the internet's development and, with respect to its remarkable impact, also in the interest of society's development at the national level, so Slovenia will continue to strive for its protection.

5.2 Seeking Synergies

As development resources are limited, achieving strategic goals requires the establishment of stakeholder integration at the interdepartmental and cross-sectoral levels that should include enterprises, ministries, public sector, service and content providers, users, education and research

institutions and non-governmental organisations. Cross-sectoral integration and joint projects will harmonise development activities as well as produce synergistic effects.

Following the EC initiative, Slovenia will form a national strategic partnership for digital employment and establish the Slovenian Digital Coalition. The main objective of the Coalition will be partnering various stakeholders in an effective and coordinated implementation of the strategy DIGITAL SLOVENIA 2020 - A Strategy for the Development of Information Society by 2020 and other sectoral strategic documents, in seeking synergistic effects, and particularly in improving the digital skills of the population, stimulating young people to choose ICT careers and connecting them with the needs and training of the private sector for new digital jobs. Joint projects with the private sector and non-governmental organisations will be designed. The Slovenian Digital Coalition will be established for the period until 2020; an interim review of the implemented activities and achieved effects will be made in 2017.

Through the Slovenian Digital Coalition, Slovenia will accelerate the development activities of contemporary digital society and thus make the most of the opportunities provided by ICT.

In education, the entire school system will work towards adapting curricula to the needs of new generations, for their integration in the digital society, with Slovenia as a reference environment for new practices. It will encourage various stakeholders to participate in the opening of education at all levels, from kindergartens to universities, as well as in later phases of lifelong learning. Seeking synergies will be based on interdepartmental cooperation and development and use of new approaches to education and new content based on the use of ICT and the internet, which will require the following:

- development and provision of open innovative learning environments (open and innovative schools, innovative teachers, creative students ready for comprehensive development, life and work in society),
- development and provision of open education sources (educational e-materials, services),
- integration of public and private education and non-profit sectors in the development of new educational approaches and services, and provision of equal approach to them,
- shaping joint and complementary projects with the private sector and non-governmental organisations for synergistic effects and harmonious development.

In order to ensure projects' complementarity and synergistic effects, harmonisation of development of the digital society and promotion of competitiveness of the ICT sector will take place at the interdepartmental level and through the Slovenian Digital Coalition. The guiding principle will be to achieve cross-sectoral multiplicative development effects and develop advanced services with lower investment costs for state authorities or public sector. Slovenia will devote particular attention to achieving synergistic effects of development projects by integrating infrastructural capacities of public authorities, institutions and enterprises, sharing the available capacities, joint investments and simultaneous implementation of activities. It will strive for minimum interventions with the space, sustainably-oriented solutions and efficiency of public development resources. To this end, it will promote the establishment of open standard technological platforms that will encourage the integration of stakeholders.

5.3 Management of Copyright in Digital Environment

Revolutionary innovations in the development of ICT, especially the emergence of technologies and the internet, digitisation of information and computers and individuals connected in global networks offer extraordinary opportunities for access to a large quantity of information. Digitisation in general fundamentally changes the economy of reproducing and distributing copyrighted works. The conditions of digital technology make the traditional protection and exercise of copyright less and less efficient. The reproduction of digital e-content and its distribution have never been easier. Traditional limitations cannot be automatically transferred to the digital environment. The authors should decide between two models of exercising copyright: between the model of limited contribution in closed systems that enables strict control of respecting their rights (by the so-called technological measures, e.g. DRM), and the model of mass distribution through open networks where control over their works is smaller or non-existent, or creators consciously renounce them under certain conditions (an example of this practice being CC - Creative Commons licences).

Slovenia supports the modernisation of the field of copyright so as to preserve the balance between ownership interests of holders of copyrights to works, public interest of access to these works, and the market, while taking account of the specificity of the cyber space.

Similar is true for distribution and reproduction of software, where misunderstandings and disputes are common when the state acts as customer. The most sensible thing in this case is to use open licences (AGPL 3.0 or newer, in some cases also LGPL), which allows re-use (both commercial and non-commercial) because of possible further upgrades of software. Thus material copyrights to software remain with the software maker, but the software maker publishes the source code, including all related documentation, under the agreed free licence that determines the conditions of re-use to distributed system for control over versions. In cases where the use of open licenses is not possible for reasons of security and preservation of privacy, the non-exclusive transfer of material rights to the state as a customer should be promoted, thereby ensuring a reduction of dependence of the state as a customer on the suppliers of IT solutions and giving the latter the opportunity to continue marketing developed solutions.

The EC is aware of the importance of copyright protection in the digital world and is drafting a directive intending to consolidate the copyrights clearance, management and cross-border licensing, thus contributing to the establishment of a single European digital market. Slovenia, too, must establish solutions that will not hamper the development and implementation of lawful services and business models for the distribution and use of copyrighted works, and especially solutions that will consider the extraordinary importance of copyright law as a regime for promoting creativity for the development of culture, education and access to information, and Slovenian copyrighted works as an important cornerstone for preserving Slovenian cultural roots.

Therefore steps should be taken for a more permissive copyright regime of the re-use of informal copyrighted material created in the public sector that will suit the needs of online publication and further dissemination and re-use of published copyrighted works in the digital form by other, private entities. This can be achieved through the adoption and publication of a small number of general licenses for open content available online and allowing the use of copyrighted works of Slovenia free of charge under certain conditions, such as proper use of documents, guaranteed non-alteration and acknowledgment of sources. Already in the Development Strategy for the Information Society

"si2010", Slovenia advocated a broader use of CC licences whose advantage is that their conditions are known and compatible, which increases transparency and users' legal protection. Efficient re-use with regard to copyrighted works originating in the public sector is impossible to implement without an appropriate arrangement of transfer of copyright to the material whose re-use is to be guaranteed by public authorities. This is why it warrants a particular attention of the authorities. In relation to authors employed in state administration, the state should, as a rule, also keep the permanent option of management and disposal of copyrighted works that these authors created in the course of employment. Along with such arrangements, a central state authority should be appointed competent for managing the copyrights of the state, which would ensure a uniform licencing policy and eliminate the need for each state authority to address these issues separately.

With respect to copyright and arrangements in intellectual property, an efficient implementation of the Directive no. 2012/28/EU of the European Parliament and Council on certain permitted uses of orphan works⁸ and the Directive (EU) 2014/26/EU on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online uses in the internal market⁹ is important for the development of cultural creativity (music, audio-visual culture) and accessibility of cultural heritage.

5.4 Trust in Cyberspace

In the process of digitising society, which is characterised by the remarkable boom of the internet, mobile technologies, social networks, cloud computing, location-based services, big data and the collection and processing of personal data, the protection of human rights, particularly the right to privacy of communication and information, is a particular challenge. Another risk in this respect is found in innovative business models that exploit online opportunities for business without intermediaries and new technologies of big data, as these are often based on comprehensive gathering and processing of personal data. The challenges will grow even further with the development of the omnipresent internet of things and cloud computing.

With a view to reducing and controlling the above-mentioned risks, Slovenia will digitise respecting the principles of ensuring privacy and trust, as this is of key importance for the development of an inclusive digital society. Only users who trust in digital technologies and cyber space will intensively participate in the digital society, use e-services and contribute to the development of e-business and the digitisation of the economy.

The principle behind development is to provide a high level of personal data protection and communication privacy, taking account of proportionality to the objective.

More than ever, the following individual's rights should be protected in the digital society:

- the right to privacy of communication and information,
- the right to be informed of how personal data are gathered and processed,
- the right to know whether personal data have been interfered with,

⁸ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012L0028>

⁹ <http://eur-lex.europa.eu/legal-content/SL/TXT/?uri=CELEX:32014L0026>

- the right to be forgotten.

The right to be forgotten is justified when it relates to illegally published, outdated or irrelevant information about individuals that cause significant damage, and when the interest in protecting the integrity of the individual prevails over the public interest to be informed.

The following shall be observed and implemented with the aim of promoting trust in cyberspace and protecting the privacy of communication and information:

- assessment of impacts on privacy in the development of ICT solutions,
- data protection by design and by default,
- use of personal data anonymization techniques,
- use of encoding methods.

5.5 Interoperability and Standards

Creating a digital society requires an effective interoperability among products and e-services. Ensuring interoperability in the EU is determined by the European interoperability framework (EIF) that incorporates several aspects: political context (compatible visions of cooperating partners), legal interoperability (aligned legislation), organisational interoperability (organisation and process alignment), semantic interoperability (semantic alignment), and technical interoperability (syntax, interaction and data transmission).

A new legal framework has been valid in ICT standardisation since 2012: this is Regulation (EU) no. 1025/2012¹⁰, which is a horizontal regulation on the system of European standardisation. The new legal framework enables the application of standards in legislation (harmonised standards) and public procurement. Since standardisation is a junction of private and public interests, ICT standards are a particular problem because of the interests of multinational enterprises that are the vehicles of standardisation and that use standards to consolidate and broaden their business position. The designation of ICT standards at the EU level is thus of key importance for preserving the competitiveness of European industry. The efficiency of standards and standardisation as EU policy tools requires a standardisation system that will provide a flexible and transparent platform for achieving consensus among all participants. To this end, the multi-stakeholder platform¹¹ has been established on the basis of the Regulation; Slovenia will efficiently participate in it when the national coordination has been established.

Interoperability based on open standards brings significant positive effects both for users of ICT products and services and their providers (the ICT sector) - particularly for small and medium-sized enterprises (SMEs) that are prevalent in Slovenia and the EU. It enables a faster development and implementation of innovations (technological, organisational, process), thus promoting faster

¹⁰ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:316:0012:0033:SL:PDF>

¹¹ Multi-Stakeholder Platform on ICT Standardisation, <http://ec.europa.eu/digital-agenda/en/european-multi-stakeholder-platform-ict-standardisation>

dissemination of knowledge, inclusion, innovation and the competitiveness of society as a whole. The definition of open standards in the EU is related especially to the justification provided by EIF¹².

The cooperation of a broad spectrum of stakeholders is of key importance in ensuring interoperability. Slovenia demonstrated the need for stakeholders' active involvement in the formulation of agreements relating to the standards applied at the national level and the promotion and implementation of the agreed solutions in the preparations for the mandatory use of e-invoicing in public administration. The role of the National e-invoicing forum in this process is an example of good practice to be applied elsewhere in standardising e-business and digitisation of entrepreneurship by reorganising the National e-invoicing forum into the **National forum for e-business and digitisation of entrepreneurship**. In this process, a model will have to be designed so as to enable the inclusion of all stakeholders (including representatives of competent authorities of public administration), consideration of the already included elements and the prompt integration of results of agreements in the national interoperability framework (NIF)¹³.

Slovenia will support the establishment of interoperability in the development of products and services of the information society in compliance with EIF and in accordance with IOF, including the establishment of national coordination for inclusion in the platform for the integration of stakeholders. It will support the establishment and operation of the National Forum for e-business and digitisation of entrepreneurship.

5.6 Use of Slovenian and the Preservation of Cultural Identity

English is the prevalent language of communication on the internet because of its global nature. This makes it a special challenge to ensure and preserve cultural characteristics and identity in this respect. This is particularly relevant from the aspects of e-content and e-services whose development involves a commercial aspect. Economies of scale require the reduction of costs achieved by the maximum number of users, which places minor language groups in a subordinate position. Slovenia is tackling this challenge, too. The Slovenian internet community should be provided such conditions as to allow access to the maximum amount of online information in Slovenian, which is either in original Slovenian texts or good translations.

In culture, too, digitisation, digital content and e-services as well as public accessibility are of crucial importance for generating added value within culture itself and within related cultural industries. They constitute the basis for the use of digital cultural content in the processes of education, training, research, lifelong learning and acquisition of knowledge. They contribute to the development of creative content for making new or enriched offer and promotion of cultural heritage and the country. Digital cultural content is one of the most effective instruments for improving Slovenia's recognisability and competitiveness in Europe and globally. Slovenian cultural institutions have recently digitised a lot of content and successfully participated in international projects from digitisation; the interoperable framework, integration of digital cultural content, re-use of digital cultural content and e-services at

¹²An open standard is one adopted and maintained by a non-profit organisation, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties; it has been published and the standard specification document is available either freely or at a nominal charge; it must be permissible to all to copy, distribute and use it for no fee or at a nominal fee; the intellectual property (patents) is made irrevocably available on a royalty-free basis; there are no constraints on the re-use of the standard.

¹³ IOF portal – portal of national interoperability framework, <https://nio.gov.si/nio/>.

the national level are, however, still underdeveloped at the national level. The analysis of the situation in the digitisation of cultural heritage in Slovenia is detailed in Annex 3.

The provision of long-term preservation of digital cultural content in Slovenia is not systemically regulated. Strategic documents for long-term preservation have not been adopted at the national level; they exist only for Slovenian public archive service and the National and University Library. Both have adopted the strategy of the long-term preservation of e-materials; the strategy for the Archives has been confirmed by the Government of the Republic of Slovenia and is now implemented (in 2010, the Government adopted the Strategy for Developing the Slovenian Public Digital Archives (e-ARH.si) and confirmed its implementation plan and project organisation). Cultural institutions need a long-term common strategy of keeping digital cultural heritage, better interaction (coordination), exchange of experience and, if possible, a common information infrastructure. Slovenia will support and promote the development and use of high-quality digital content and e-services in Slovenian, the digitisation of cultural heritage, long-term preservation of digital materials as well as the general development of digital language technologies and resources, which will allow the population to use them and encourage it to use the internet.

6 Priority Areas of Measures

The measures in the following priority fields are foreseen in order to promote the development of the information society in Slovenia until 2020:

- broadband and other electronic communications infrastructure,
- innovative data-driven services,
- digital entrepreneurship,
- cyber security,
- inclusive information society.

Development projects by priority fields will contribute in the international environment to Slovenia's classification as a reference environment for the innovative use of new digital technologies and services.

Priority fields of actions and priorities in terms of technology and content were determined after comprehensive consultations with the private sector. They took into account the assessment of the current situation of the Slovenian ICT industry, its competitive opportunities in foreign markets and general development guidelines of the ICT sector. In all priority areas of measures implemented, which are broadband and other infrastructure of electronic communications, innovative data-driven services, digital entrepreneurship, cyber security and inclusive information society, particular attention in terms of technological aspects will be devoted to the following horizontal priorities:

- future internet - the internet of things,
- cloud computing,
- big data, and
- mobile technologies.

In terms of content, the measures will focus on the following fields:

- digitisation of entrepreneurship and the private sector, and
- smart communities, towns and homes.

Individual measures will be finalised and detailed after the end of public consultations with the private sector as well as with final users of services and ICT solutions.

In accordance with the results of the consultations with the private sector, a series of other areas that lie within the information and communication sector have been excluded from priority actions under this strategy. Priority areas thus do not include the following: embedded systems, intelligent transport and logistics systems, smart grids, digital TV, geo-services and elastic computing in the context of distributed systems, artificial intelligence systems, ICT components, ICT systems of physical protection, solutions for smart offices, process control, automation and robotics. Given the complexity and interdependence of ICT solutions, this does not entirely exclude potential support for projects that

include the above-mentioned areas, if they are strongly and innovatively related to areas that are given priority in terms of technology and content.

6.1 Broadband and Other Electronic Communications Infrastructure

6.1.1 Importance of the Field

The development of an information society or knowledge-based society is based on the general use of ICT and the internet in all fields of social life and creativity. A precondition for this is an omnipresent high-capacity electronic communications infrastructure and accessible electronic communication services. Economic and general development in contemporary digital society is closely connected with the development of high-quality broadband infrastructure that is the basis for the development and use of the internet. Strategic planning shall therefore follow the development of omnipresent high-capacity broadband infrastructure (fixed and mobile) that will be open and accessible to all end users; otherwise unequal possibilities of inclusion in the information society could occur. Accessible broadband infrastructure throughout the state territory enables a balanced development, reduces the digital divide and increases the involvement of individuals in contemporary social movements. In terms of directing development, the internet is a strategic tool for increasing productivity, creating innovative business models, products and services, making communication more efficient, and increasing the overall efficiency of the society.

Studies have established a strong correlation between broadband penetration and economic growth, as well as a positive impact on employment and productivity. According to the OECD study, there is a direct correlation between the penetration of broadband services and GDP growth – a 10% increase in broadband connectivity can be expected to raise per-capita GDP growth by 0.9 to 1.5 percentage points¹⁴. Another study demonstrates that the use of broadband connections influences the growth of productivity and innovation in enterprises¹⁵. Broadband networks in rural areas enable a balanced development of the countryside and create a favourable environment for the development of SMEs.

The development of broadband infrastructure in rural areas is hampered by scattered settlement patterns and low population density, so private investors generally do not manage to carry out sustainable investment projects. Slovenia will therefore use public funds to co-finance projects of private and public partnerships for constructing infrastructure in white areas where appropriate infrastructure is not available and where there is no commercial interest in its construction, either.

Infrastructure development and electronic communications services are largely dependent on the efficiency of the electronic communications market, so Slovenia will promote competitiveness, transparent regulation and stable legislation - regulatory framework. By establishing a stable and predictable business environment, Slovenia will encourage electronic communications operators to make private investments in the development of electronic communications infrastructure and services.

¹⁴ http://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf

¹⁵ Franklin, M., P. Stam, and T. Clayton (2009), "ICT Impact Assessment by Linking Data," *Economic and Labour Market Review*, 3(10), 18-27

An important role in the provision of the omnipresent internet access is played by mobile communication networks that are complementary to fixed broadband access. In cases where the construction of fixed access is not justified in terms of costs or otherwise, even when using public funds, substitute mobile broadband internet access with target access rates from the DAE will be made available to users. Increasing demand of users for higher transfer speeds increases the need for providing additional bands of the radio spectrum. Slovenia will follow the release of spectrum at the international level and allocate it to operators of mobile communications networks depending on their needs. The underlying principle of managing radio frequency area is to offer all available radio frequencies for use by interested stakeholders without unjustified delays.

Even in a digital society, television and radio terrestrial digital broadcasting continues to play an important role for the plurality of media and creation of digital content in Slovenian. This is why Slovenia will continue to promote the development of the television terrestrial broadcasting, especially the transition to the transfer of TV signals of higher quality (HDTV and UDH TV, use of DVB-T2 technology) and phasing out of the transmission of TV signals of SD resolution. It will also promote the introduction of digital terrestrial radio by stipulating in 2018 a legal obligation of the integration of DAB receivers in radio receivers in the market, including car radios. Slovenia will promote the development and introduction of advanced services by integrating the capacities of digital broadcasting, IP TV and the internet (Hbb TV, themed radio programmes, etc.).

6.1.2 Strategic Objectives

- Provision of stable and predictable legislation - regulatory framework for the work of electronic communications operators.
- Provision of broadband internet access at a minimum speed of 100 Mb/s to as many households in Slovenia as possible, and at a minimum speed of 30 Mb/s to other households by 2020.
- Provision of mobile communication network coverage to 98 % households; the network will serve as complementary supplement to the fixed broadband internet access.
- Provision and allocation of additional radio spectrum for mobile communications.
- Ensuring internet access at a minimum speed of 1 Gb/s to all public educational and research establishments.
- Encouraging development of television terrestrial digital broadcasting (DVB-T2).
- Introducing advanced services by integrating the capacities of digital broadcasting, IP TV and the internet.
- Promoting introduction of radio terrestrial digital broadcasting (DAB+).
- Promoting the use of LTE in the 700 MHz frequency band also for the needs of public security and services for protection and relief.

6.1.3 Measures Envisaged

- Drafting of the Next-Generation Broadband Network Development Plan until 2020 with the objective to provide by the end of 2020 broadband internet access of the minimum speed of 100 Mb/s to 96 % of households in Slovenia, and of the minimum speed of 30 Mb/s to other households. The market interests will be tested and white areas will be identified within five

months of the approval of the Plan. Within six months of the approval, the plan will be amended if appropriate (in view of public resources available) and forwarded to the European Commission for approval, which means that the preliminary condition will be met by November 2016 at the latest.

- To provide at least a 1 Gb/s internet connection to all public education and research institutions and other eligible users of the Arnes public institute.
- Mapping of infrastructure to establish market interest of operators and precisely define the areas where access to broadband electronic communication services is not provided by operators and also where no market interest in their provision in the next three years has been shown - identification of white areas.
- The market interest will be tested in areas whose population density is under 500 inhabitants/km²; areas that have already received structural funds will be excluded. The population density will serve as the basis for determining the geographic segment of high density with approximately 96 % of households and the geographic segment of low density with approximately 4 % of households. The target speed in the segment of high population density is 100 Mb/s, while the target speed in the segment of low population density is 30 Mb/s.
- The number of white areas will be known after the testing of market interest and data analysis. In the event of a lack of market interest in the construction of broadband infrastructure and the resulting financial gap for the necessary co-financing from public funds, the state will attempt to provide the lacking public resources. If these resources cannot be provided, the plans shall be adapted by shifting the boundary between the geographic segments further to the urban areas with higher population density. This will broaden the geographical segment of low population density and narrow the segment of high population density. Testing of market interest for speeds of 30 Mb/s shall be repeated in the areas that were moved.
- Co-financing public and private partnership for the construction of broadband infrastructure in areas where access to broadband electronic communications services is not provided by operators and where no market interest for their provision has been shown.
- Realisation of the expressed market interest controlled by the Agency for Communication Networks and Services of the Republic of Slovenia (AKOS).
- Promoting investments in broadband infrastructure in accordance with the provisions of the Electronic Communications Acts concerning the reduction of costs of broadband infrastructure construction.
- Provision of additional segments in the radio spectrum for mobile communication networks to provide mobile access to the internet as a complementary communication service to fixed broadband infrastructure.
- Promotion of the introduction of transmission of TV signals of higher definition (HDTV and UHD TV) in the terrestrial digital broadcasting network by introducing the DVB-T2 technology.
- Preparations for compulsory integration of DAB receivers in radio receivers available on the market in 2018.
- Promotion of development and introduction of advanced services by integrating the capacities of digital broadcasting, IP TV and the internet (Hbb TV, themed radio programmes, etc.).

Measure/project	Amount of funding	Period	Target indicator
Construction, management and maintenance of open broadband electronic communications networks.	EUR 62.5 million	2016-2020	Number of newly connected households in newly constructed broadband networks with a minimum speed of 100 Mb/s. 60,000 connections
Promotion of access to information and communication technologies (ICT) in rural areas, and of their use and quality.	EUR 10 million	2016-2020	Number of newly connected households in newly constructed broadband networks with a minimum speed of 30 Mb/s. 30,000 connections
Upgrading the information system of infrastructure mapping.	EUR 1 million	2016-2020	Upgraded system for analytics, monitoring of public resource utilisation, realisation of market interest and implementation of measures to reduce the costs of constructing broadband infrastructure.
Incentive measures for introducing new technologies of terrestrial broadcasting of images and sound and the use of LTE technology for delivering digital content.	EUR 0.7 million	2016-2020	HDTV and UHD TV technologies introduced DAB+ technology introduced Offer of Hbb TV services and themed radio programmes Range of digital media content in LTE networks

6.2 Innovative data-driven services

6.2.1 Importance of the Field

The globalised digital society is increasingly based on the capacity to utilise large quantities of data (big data) for new products and services, for changing the existing and making new business models, for increasing efficiency and achieving economic benefits. Exceptional growth of scale, variability and diversity of big data offer development opportunities and challenges, which requires awareness of their economic and social value. The use of this digital potential can improve the competitiveness of the ICT and other industries, the quality of public services and the life of citizens. Analysing and processing of large volumes of data bring business opportunities for small and new businesses, while public administrations may, by opening up public data to all interested parties, allow for the development of new innovative services to improve public administration. In the digital society, big data are the fuel of the ICT sector, which can only be utilised by appropriate new skills, the opening up of public information, and the promotion of innovation and entrepreneurship, while bearing in mind a higher sensitivity in the treatment and protection of personal data.

The role of technology related to big data will grow with the development of the future internet or the internet of things, faster communications and new information technologies. The release of big data's digital potential for economic growth and social advantages accordingly requires the adoption of measures that will prepare Slovenian society and economy for new challenges and enable them to seize opportunities. This is particularly important because Slovenian and European economies lag

behind in the development of new business models and technologies in this field, which means that the opening of public data could benefit only more competitive global competitors.

In education, open learning environments should be designated so as to employ innovative pedagogical approaches to fully use the opportunities the use of ICT in learning and teaching processes provides. Slovenia will invest in the development of an open platform for digital content and services, the introduction of new teaching concepts, models of added value and motivation mechanisms for open education. It will establish an enabling research and development environment for the effective use of ICT in education and pursue synergistic effects.

The process of developing the national computer cloud follows the centralised approach to the establishment of the necessary information and communication infrastructure for various information systems. Consolidation of digitizing individual areas will take into account the search for synergies in terms of infrastructure between different sub-sectors of the public sector and take part in broader efforts of the state for the development of interoperable solutions based on open standards and data that will open up the opportunities of the ICT sector in foreign markets. There is a continued development of the national high-capacity computer group for research institutions - Slovenian initiative for the national grid (SLING) coordinated by Arnes. In the context of Arnes' computer cloud, a development-innovation cloud will be established in collaboration with the national computer cloud, which will facilitate the public and private sectors' development of innovative data-driven services based on open public and research data, and will also be available for educational and research purposes. The purpose of integrating the national, Arnes and development and innovation computer clouds, including cloud computing services available on the market, is to achieve synergistic effects. Pre-commercial public procurement for the development of innovative solutions is being encouraged by using open public and research data, industrial open development platforms and the national development and innovation computer cloud for the faster transfer of solutions to the market.

In order to develop a data-driven economy and innovative services, Slovenia shall:

- develop its own enabling technologies, digital infrastructures and knowledge,
- systematically develop its sources of public data, infrastructure for their exchange and use, and infrastructure for facilitating development,
- continue the development of national computer cloud,
- continue the development of the Arnes computer cloud and high-capacity computer group for research institutions - SLING,
- develop digital infrastructure for open research and public data,
- develop national research and development computer cloud,
- steer public research and innovations towards technological, legal and other bottlenecks,
- establish a stimulating development environment for data-driven economy (interoperability, data protection, consumer protection, network safety, intellectual property, regulative stability, establishment of trust of consumers in data technologies) by adapting the legal framework and development policies,
- carry out a coordinated digitisation of the private sector, entrepreneurship, enterprises and factories (industry 4.0),

- carry out the digitisation of enterprises, public administration and the non-governmental sector in order to increase their effectiveness, competitiveness, accessibility and transparency,
- use pre-commercial public procurement to promote a prompt transition of results of data technologies to the market,
- encourage data-driven innovations, use open standards and treat personal data protection in a balanced manner in the public sector and economy.

6.2.2 Strategic Objectives

- Increased competitiveness of the economy and better conditions for digital business.
- Improved quality of life of citizens, including by improved communication and harmonisation with public administration with the help of digital channels.
- Digitisation and optimisation of internal operations for a flexible, rational, efficient, transparent and open public administration.
- Provision of high-quality supply and efficient demand as well as the highest possible re-use of the open data of the public sector.
- Further development of the national computer cloud, the Arnes computer cloud, high-capacity computer group SLING and establishment of the computer cloud for research and innovation.
- Definition of the open data of the public sector as a national treasure and strategic resource of the digital society.
- Establishment of the national infrastructure for spatial information as a part of the European infrastructure in accordance with the INSPIRE directive.
- Provision of long-term preservation of digital content.
- Increasing the level of interoperability.
- Consolidation of e-identity management in state administration.
- Development of new e-services and increased use of e-services of public administration and cross-border e-services.
- Further development of the eHealth information system.
- Improved quality of the education system with open learning environments, rational use of ICT in learning processes and efficient digital learning content.
- Optimisation of steering and management of educational institutions by digitisation of operation.
- Provision of suitable network and service digital infrastructure for the needs of education, research and culture.

6.2.3 Measures Envisaged

- Information systemic support of the country's integration in the single European digital space (interoperable service platform for pan-European integrations and electronic identity management services).

- Update of the Arnes network and service infrastructure: upgrade of the computer cloud, service and data storage infrastructure, further development of the national high-capacity computer group for research institutions - SLING, and the development of e-services for eligible users of Arnes services.
- Further development of national computer cloud.
- Establishment of the national development and innovation computer cloud for easier and faster development of new innovative e-services based on open public and research data.
- Survey of all public sector databases and publication of databases within the competence of ministries in machine-readable and open formats on the open data portal. These are bases that contain freely accessible data.
- Content-related improvement of semantic interoperability in published data and placement of data in the global network of open data (Linked Open Data).
- Technical improvement of reliability, currency and automated publication of data from original data records.
- Accelerated opening of data of the public and research sectors.
- Establishment of open standards and interoperability rules of the publication of data in machine-readable form.
- Provision of e-infrastructure for the publication of open data.
- Establishment of a sign of quality of digital data.
- Establishment of a spatial information system in the framework of uniform information infrastructure for spatial and real estate data.
- Establishment of a network of services linked to spatial data by providing uninterrupted flow of spatial data between public authority bodies in Slovenia, with EC authorities and among the Member States.
- Promotion of RDI projects of developing innovative services based on open public and research data.
- Promoting the export of solutions developed in this way.
- Establishment of ICT structures for open learning environments with wireless networks and ICT clients at educational institutions.
- Further development of digital content (e-textbooks, e-materials, Slovenian education portal).
- Further development of e-services for the digitisation of educational institutions.
- Further development of the infrastructure, e-services and applications of the eHealth information system.
- Co-financing the digitisation of Slovenian cultural heritage with the aim of accessibility and application for cultural, educational and commercial purposes.
- Co-financing the development of e-services with the aim of providing better public accessibility and re-use of digital cultural content.
- establishment of effective and contemporary multi-purpose documenting and digitisation of movable, immovable and living (immaterial) heritage and archival and library material by optimising business processes and using contemporary ICT tools.

- Establishment of efficient modern information support for processes of preservation of immovable cultural heritage, including spatial planning.
- Ensuring further development of Slovenian public electronic archive (e-ARH.si), including the establishment of the digital archive for the film and other audio/video archive materials and the centre for the digitisation of archive materials.
- Further development of Slovenia's Digital Library.
- Further development of the Cultural Heritage Register.
- Co-financing a pilot project for permanent storage of digital cultural content of cultural establishments.
- Establishing a network for permanent storage of digital cultural content and providing permanent storage of digital content for key content in culture.
- Co-financing cooperation projects in international networks on digital cultural content to ensure connectivity and integration in the European environment. Co-financing repositories of contemporary copyrighted works.
- Establishing the network for permanent storage of digital cultural content and providing permanent storage of digital content for key content in culture.
- Financial incentives for distribution models (e.g. video-on-demand) on condition that beneficiaries reciprocally invest the funds back in the film and audio-visual production.
- Establishing an institutional framework for the planned and systematic long-term development of linguistic technologies, resources and tools for the Slovenian language, and their production.

Measure/project	Amount of funding	Period	Target indicator
ePlačevanje (ePayment) programme Online shop programme (shop of payable e-services of public administration) E-plačam (e-lpay) portal Mobile online bank for budget users	EUR 1.12 million	2017-2020	Number of building blocks of the Plačevanje programme 3
ePPD - project of upgrading the information system of the Office of the Republic of Slovenia for Money Laundering Prevention.	EUR 0.35 million	216-2018	Number of building blocks of ePPD 1
Programme of eProstor (eSpace) projects Establishment and overhaul of the information system in spatial planning, construction and the registration of real estate.	EUR 20 million	2016-2020	Established system for the implementation of obligations according to the INSPIRE directive.
Further development, extension of use and maintenance of the eZdravje (eHealth) system.	EUR 17.5 million	2016-2020	Functioning services of the eHealth information system New innovative e-health services 5 services
Establishment of efficient modern information support for processes of preservation of immovable cultural heritage, including spatial planning.	EUR 2 million	2016-2020	3

Wireless networks at educational institutions (EI)	EUR 11.3 million	2016-2020	100%
ICT clients for EI	EUR 11.1 million	2016-2020	5 students/ICT client 1.5 teachers/ICT client
Development of digital content (e-textbooks, e-materials, Slovenian education portal).	EUR 1.5 million	2016-2020	15
Further development of e-services for digitisation of learning and teaching.	EUR 1 million	2016-2020	7
Further development of e-services for digitisation of educational institutions.	EUR 4 million	2016-2020	100%
Further development of Slovenian public electronic archive (e-ARH.si), including the establishment of the digital archive for the film and other audio/video archive materials and the centre for the digitisation of archive materials.	EUR 4 million	2016-2020	Established digital archive for the film and other audio/video archive materials.
development and use of high-quality digital content and services in Slovenia and development of digital linguistic technologies and sources in Slovenian.	EUR 2 million	2016-2020	30 new digital content
Establishing a network for permanent storage of digital cultural content and providing permanent storage of digital content for key cultural content.	EUR 3 million	2016-2020	An established network for permanent storage of digital cultural content.

6.3 Digital Entrepreneurship

6.3.1 Importance of the Field

Advanced digital technologies allow changes in the existing and the creation of new business models, and the development of new products and services, and they also increase the efficiency and competitiveness of the economy. Digitisation has a great potential of growth since it is estimated that the operation of digitally proactive enterprises can be as much as ten times more successful than the operation of enterprises of the same type that do not use digital technologies yet. The digitisation of business processes can significantly improve their adaptability, and increase effectiveness, innovation and thus competitiveness in the new digital business and social environment.

Slovenia has not yet seized its digital potential. In view of the plans of some of the most important economic partners, Slovenia does not have a choice but to adopt measures for the digitisation of the private sector, thus keeping or improving its competitive position on the EU and international markets. The transformation or digitisation of the existing economy, enterprises and factories is the most important digital opportunity for Slovenia in the period until 2020. Slovenia must fully exploit the development opportunities digitisation provides to increase its competitiveness and become more attractive for investments and business. The digitisation of the private sector is therefore also a condition for digital growth and new digital jobs.

Transitioning to a digital society requires the country's clear strategic orientation in every field, from the provision of digital infrastructure and promotion of research, development and innovation, to

support in the form of financial incentives and promotion of digitisation. Measures for counselling and supportive services have to be implemented in order to fully utilise the advantages of digital technologies. Access to financial resources must be facilitated, digital knowledge and skills must be improved, entrepreneurial culture must be strengthened, enterprises, researchers and education institutions must be integrated, the number of ICT experts must be increased and an enabling legislative and regulatory environment for the development of digital entrepreneurship and business in cyberspace must be established.

By investing in research and technology development, Slovenia will increase the share of innovatively active enterprises and the number of high-technology ICT patents, which will contribute to the establishment of innovative environment and improve the competitiveness of the ICT sector. Resources of the Obzorje 2020 programme can importantly contribute to supporting the RDI activities of enterprises and research organisations; they are a potential for broadening partnerships, business networks and markets. By means of pre-commercial public procurement in cloud computing, the future internet and big data, and by financial incentives to RDI projects for making open standardised platforms and development of new technologies, products and services, Slovenia will encourage the private sector to develop innovative products and services and make a prompt transition to the market. Open standardised technological platforms are a condition for development cooperation among enterprises, for the development of convergent ICT solutions and appearance on foreign markets. At the same time, they will enable the achievement of synergistic effects in investments in the economic infrastructure. Besides direct investments, a suitable business environment must be provided to enable and encourage successful ICT enterprises to stay in Slovenia. The internet is becoming a key economic infrastructure that thoroughly changes enterprises and business and serves as an innovation platform. Slovenia must establish an enabling business environment for newly established or start-up ICT enterprises and a suitable supportive environment for their development and internationalisation of business.

Support for internet start-ups shall be based on a comprehensive stimulating development environment that includes a set of special purpose supportive services (education, mentorship, ICT and other infrastructural support), and on direct financial support for individual projects. Effective support for the development of internet start-ups requires an integration of key stakeholders (national institutions, economy, sectoral associations, research and education institutions). Because the needs of internet start-ups are specific, the mechanisms of the general supportive environment for start-ups shall be accompanied by specifically adapted enabling measures (integration, motivation, promotion, etc.). Particular attention shall be focused on integration with internet-based entrepreneurship abroad, attracting foreign investors and entering foreign markets.

6.3.2 Strategic Objectives

- Enhanced competitiveness of the Slovenian ICT industry.
- Digitisation of entrepreneurship and the private sector (industry 4.0).
- Development of the internet of things, smart cities and smart homes.
- ICT as enabling technology for the improved competitiveness of other sectors.

- Increase of the share of ICT in Slovenia's GDP to at least 7 % and the share of investments in ICT to more than 1 % by the end of 2010.
- Transition from the provision of computer infrastructure and applications to a service-based digital economy.
- Release of knowledge and innovations for the provision of digital jobs and welfare and application of achievements for efficient marketing.
- Quicker adoption of standards of e-business and their implementation in practice.
- Ensuring conditions for a quicker and faster penetration of Slovenian ICT enterprises on global markets.

6.3.3 Measures Envisaged

- Support for RDI-projects of e-services, mobile applications and ICT-solutions based on modern development concepts (future internet, cloud computing, massive data, smart cities, smart homes, industry 4.0, etc.) that show the greatest potential for penetration in global markets.
- Establishment of enabling development environment for internet entrepreneurship and support for internet start-ups.
- Promotion of the digitisation of entrepreneurship and the private sector by focused RDI measures and promotion of e-business.
- Establishment of open standardised technological platforms.
- Support for the establishment and operation of the National Forum for e-business and digitisation of entrepreneurship.
- Measures for the digitisation of public administration and development of innovative data-driven services as defined in the chapter Innovative Data-Driven Services.

Measure/project	Amount of funding	Period	Target indicator
Support for the establishment and operation of the National Forum for e-business and digitisation of entrepreneurship.	EUR 0.5 million	2016-2020	Functioning National Forum for e-business and digitisation of entrepreneurship. Further development, implementation and application of e-business standards. Accelerated digitisation of entrepreneurship and the private sector.
Co-financing RDI projects of e-services, mobile applications and ICT solutions in the field of the internet of things . In terms of content, priorities are smart communities, towns and homes, as well as digitisation of the private sector. The purpose is also to encourage the development of joint open technological platforms for the internet of things and for other technological priorities, and to encourage synergistic effects in investments in ICT solutions and infrastructure. Linking with users and development and establishment of solutions according to the needs from the local environment will be encouraged.	EUR 7 million	2016-2018	Number of co-financed projects 25
Co-financing RDI projects of e-services, mobile applications and ICT solutions in big data and cloud computing . In terms of content, the priority is the digitisation of entrepreneurship. The purpose is to encourage the development of innovative services and innovative use of open public and research data, support for and use of joint open technological platforms by priorities, and to encourage synergistic effects in investments in ICT solutions and ICT infrastructure. Linking with users and development of solutions according to the needs from the local environment will be encouraged.	EUR 7 million	2017-2019	Number of co-financed projects 25
Co-financing RDI projects of e-services, mobile applications and ICT solutions in the priority field of mobile technologies and the internet of things . The priority in terms of content is the digitisation of the private sector and entrepreneurship, as well as smart cities and homes. The purpose is to encourage the development of innovative mobile services in the context of the internet of things. The purpose is also to support and use joint open technological platforms by technological priorities, and to encourage synergistic effects in investments in ICT solutions and ICT infrastructure. Linking with users and the development of solutions according to local needs will be encouraged.	EUR 6 million	2018-2019	Number of co-financed projects 25
Co-financing RDI projects of e-services, mobile applications and ICT solutions in the priority field of the internet of things and big data . The priority in terms of content is the digitisation of the private sector and entrepreneurship, and smart cities and homes. The purpose is to support the	EUR 6 million	2019-2020	Number of co-financed projects 25

projects of innovative services that utilise the potentials of the internet of things and big data. The purpose is also to support and use joint open technological platforms by technological priorities, and to encourage synergistic effects in investments in ICT solutions and ICT infrastructure. Linking with users and development of solutions according to local needs will be encouraged.			
Development and establishment of innovative ICT solutions in the public interest in the field of cloud computing, future internet - the internet of things, mobile technologies and big data with the potential of a prompt transition to the market. The projects selected with the application of innovative public procurement will exploit the results of RDI projects and open standardised technological platforms. The purpose is the development of new innovative integrated, fully functional, user-friendly e-services, ICT solutions and service platforms that will utilise and integrate the future internet, cloud computing, open public and research data, big data and mobile technologies. The contents of e-services, ICT solutions and service platforms in the public interest will focus on smart communities, towns and homes and on the digitisation of entrepreneurship, with the focus on the integration in the single European digital space.	EUR 2 million	2017-2019	Number of implemented projects 2
Development and establishment of innovative ICT solutions in the public interest in the field of cloud computing, future internet - the internet of things, mobile technologies and big data with the potential of a prompt transition to the market. The projects selected with the application of innovative public procurement will exploit the results of RDI projects and open standardised technological platforms. The purpose is the development of new innovative integrated, fully functional, user-friendly e-services, ICT solutions and service platforms that will utilise and integrate the future internet, cloud computing, open public and research data, big data and mobile technologies. The contents of e-services, ICT solutions and service platforms in the public interest will focus on smart communities, towns and homes and on the digitisation of entrepreneurship, with the focus on the integration in the single European digital space.	EUR 2 million	2018-2020	Number of implemented projects 2

6.4 Cyber Security

6.4.1 Importance of the Field

In the modern world, the use of information systems and networks is constantly increasing, and therefore the importance of these systems for the successful development of economic and non-commercial activities, as well as the life and welfare of society as a whole, is also increasing. Network and information security contributes to strengthening important societal values and objectives society, such as human rights and fundamental freedoms, democracy, the rule of law, and economic and political stability. On the one hand, the increasingly rapid development of information and communication technologies brings benefits to modern society, while on the other it gives rise to ever new and technologically more sophisticated cyber threats. The trend in the use of ICT for political, economic and military supremacy is becoming more and more pronounced. Cyber threats can negatively influence the security of the information and communication infrastructure, high costs of enterprises and individuals resulting from cybercrime and, subsequently, lower trust of users in the internet. Implementation of measures to protect the internet as a global all-encompassing network and, subsequently, for the preservation of users' trust in it is therefore extremely important for society as a whole.

DAE and related decisions of the European Council pointed out the trust and safety as the basic conditions for a broad use of ICT and therefore the achievement of the objectives of "smart growth" in the framework of the Europe 2020 strategy. DAE stresses that all interested parties should work together towards safety and resilience of ICT infrastructures by focusing on prevention, readiness and awareness-raising and for the development of efficient and coordinated mechanisms for reactions to new and increasingly complex forms of cyberattacks and cybercrime.

6.4.2 Strategic Objective

Establishing a comprehensive cyber security system as an important integral factor of national security will contribute to ensuring an open, safe and secure cyberspace, which will make the basis for smooth functioning of infrastructure, important for state bodies' operations as well as for the life of each individual. By 2020, Slovenia will establish an effective cyber security assurance system, which will prevent and also eliminate the consequences of security incidents.

6.4.3 Measures Envisaged

- Setting up central coordination of the national system of assuring a high level of cyber security and providing conditions for its operation.
- Human resource and technological strengthening of bodies at the operative level of cyber security assurance system along with the implementation of SIGOV-CERT.
- Regular participation in international exercises on cyber security and organisation of national exercises.
- Gradual upgrade of state bodies' HKOM networks with equipment that is appropriately approved by the Slovenian authorities as being safe and suitable for use.

- Implementation of competent checks of safety and functionality of IT equipment within the existing and newly established bodies.
- Regular implementation of awareness raising programmes on cyber security.
- Introducing content in the area of cyber security in the education and training programmes.
- Promotion of development and introduction of new technologies in cyber security.
- Regular implementation of awareness raising programmes on cyber security for business entities.
- Regular assessment of risks to the operation of the critical infrastructure of the ICT support sector, planning appropriate protection measures, and updating risk assessment in this field.
- Implementation of appropriate cyber capacities to protect ICT systems of the police.
- Regular training on cyber security for law enforcement authorities participating in the development of cyber capacities for public security and in combating cybercrime.
- Regular updating of the laws and procedures in line with the development of ICT.
- Development of appropriate cyber capacities to protect ICT systems of the defence department.
- Ensuring conditions for smooth operation of key ICT systems in the event of major natural and other disasters.
- Ensuring conditions for the participation of Slovenian experts in the relevant international cyber security working bodies and associations.

Measure/project	Amount of funding	Period	Target indicator
Co-financing the Centre for Safer internet (safe.si, Web Eye and Tom Telephone) - raising awareness of the safe use of the internet for children, teenagers, parents and teachers.	EUR 1.5 million	2016-2020	Operation of all functions of the centre, implementation of annual work programmes.
Co-financing the Safe on the internet programme - raising awareness of the safe use of the internet for the general public and SME's.	EUR 0.5 million	2016-2020	Implementation of annual work programmes.
European project I Heero. - co-financing the development and introduction of the eCall - system for automatic calls from vehicles.	EUR 0.5 million	2015-2017	Introduction of eCall in the entire country including the solution of the problem of roaming on mobile networks in border areas.
Establishment of a central coordination of the national cyber security assurance system.	EUR 1.5 million	2016-2020	Established system of ensuring a high level of cyber security.

6.5 Inclusive Digital Society

6.5.1 Importance of the Field

Current guidelines of development of the information society bring a challenge for the EU and individual member states. Harmonious and coordinated development namely requires a number of measures to accelerate the development while eliminating the identified development gaps. One of

the greatest deficits in Slovenia is in the population's competencies for inclusion in an information society, which requires the preparation and implementation of measures for improving conditions in this field. It is only by eliminating the gaps identified in the fields of digital literacy, e-skills, number and qualifications of ICT experts, accessibility and awareness of the importance of ICT and the internet that we can ensure that all citizens have a full access to services enabled by the digital community and thus become co-creators of the development of the digital society. The broadest inclusion of all stakeholders is of key importance for achieving general economic and social benefits.

The upcoming generations are digital natives; they are included in the digital society from day one and possess at least basic digital skills. A pressing problem is posed by middle-aged, still economically active, and older generations of population, whose skills are highly inadequate for inclusion in the information society. Since there were almost no investments in the measures for digital literacy in the recent development period, the gap has been growing steadily. In the modern digital society, these generations increasingly lack competencies for the improvement of their employability and for the development of entrepreneurship and creativity; all this significantly hinders further economic and social development of Slovenia. The development of new, ICT-based solutions and services, namely, thoroughly influences the competence profile required for the inclusion in the labour market. At the same time, it intervenes with the living patterns of the population, changing and reshaping them. Full integration in the processes within the digital society thus requires that individuals master a variety of new competencies and skills based on the knowledge of contemporary ICT. Slovenia will therefore carry out measures to improve the population's digital literacy, the e-skills of the active working population, and access to ICT and the internet, which is directly linked to individuals' right to access information in the digital society and thus to participate in political, economic and broader social life.

Online accessibility has become of key importance for the provision of equal access and equal opportunities to all persons with different abilities. The provision of online accessibility and acquiring e-skills for the efficient use of ICT are therefore important elements of the development of an inclusive digital society. This has to be followed by the adoption of necessary measures to provide the accessibility of websites, which should be done in accordance with the already adopted international guidelines (Web Content Accessibility Guidelines - recommendations of the World Wide Web Consortium, Web Accessibility Initiative – WAI).

In order to establish an inclusive digital society, activities should be directed towards all those who are in the most unprivileged position in the field of ICT skills and competencies in terms of acquiring and preserving e-competencies. These are especially groups with lower education, elderly or groups with any other form of handicaps for equal inclusion (unemployed, persons with special needs, minorities, immigrants etc.). Measures for overcoming unequal possibilities for using ICT should be implemented particularly for these groups, enabling them to become included in the digital society.

Digital literacy is a general precondition for inclusion and participation in the digital society and reduction of digital stratification. Only digitally literate or e-competent citizens can fully communicate digitally, use modern ICT, develop new skills in different life circumstances, be innovative and creative in the use of ICT, while in-depth understanding of ICT allows them to modify and create new technologies, solutions and ideas for use. There is, therefore, a demand for users with e-skills who cannot only use ICT efficiently but also create new digital practices on this basis. These findings imply the need for advanced skills and competencies that an individual is expected to master in a digital

society. In-depth e-skills should be defined as well as possible and incorporated in the official (compulsory) education system. This is why conditions for obtaining suitable computer and information knowledge and skills should be established at all levels of the education system. Slovenia will adjust the school system to the new generations and needs dictated by the new reality of the digitised society by completing and updating curricula and introducing innovative digital learning environments, methods and teaching practices, as well as by the general intensive and innovative use of ICT and the internet in teaching processes, which must become a fixture of any amendment or renewal of the education system.

Development of an inclusive digital society is therefore a precondition for the use of the opportunities offered by ICT and the internet to achieve general social and economic benefits, and consequently to improve Slovenia's competitiveness in a global environment.

6.5.2 Strategic Objectives

- Improved digital literacy of population.
- Improved e-competencies and e-skills of the population.
- Opening and adaptation of the education system to new generations and needs of the digital society.
- More digital content and better digital literacy at all levels of the education system.
- Better e-inclusion and enabling the access to e-services to all groups of population, especially less educated, elderly, disabled and inactive.
- Improved online accessibility in accordance with international guidelines.
- Improved e-skills for the use of ICT for new digital jobs.

6.5.3 Measures Envisaged

- Establishment of the Slovenian Digital coalition as a national strategic partnerships for a more efficient achievement of the objectives of DIGITAL SLOVENIA 2020 and other regional strategic documents, for achieving synergistic effects and in particular for improving the digital skills of the population, orientation of youth in ICT careers and their link with the requirements and private sector training for new digital jobs.
- Adaptation of the entire school system to the needs of new, digitally native generations for their integration in digital society, with Slovenia as a reference environment for new practices. Support and encouragement of different stakeholders to participate to the opening of education at all levels, from kindergartens to universities, as well as in later periods of lifelong learning.
- Support for the operation of the Slovenian internet Forum as a key point for the integration of stakeholders interested in resolving internet-related issues.
- Support for activities of non-governmental organisations for the development of an inclusive digital society.
- Support for projects of digital literacy for the purposes of increasing the population's e- (in the framework of education at all levels of the education system, individual education workshops for groups with different capacities, stimulation of demand for ICT solutions and services, etc.).

- Improved online accessibility in accordance with international guidelines (preparation of an analysis of the situation in Slovenia, preparation and adoption of a legislative framework, follow-up and ensuring the availability of public sector websites in cooperation with the representatives of people experiencing disability, etc.).
- Promotion of and support to the participation of Slovenian stakeholders in European awareness-raising projects (e.g. e-Skills for Jobs week, Get online week, Code week ...).
- Supporting projects for the development and strengthening of services supported by modern technologies for ageing gracefully, provision of comprehensive care and promotion of living in domestic environments.
- Information support projects in the implementation of the system and programmes of social activation (computerisation of the working process in social activation programmes).
- Development of information tools for supporting provider organisations and citizens in exercising the rights to public funds.
- Uniform development and upgrade of information support in policy making (evaluation, analysis, forecasts, simulations) in the labour market and social security.

Measure/project	Amount of funding	Period	Target indicator
Establishment of the Slovenian Digital Coalition and support for its operation.	EUR 0.5 million	2016-2020	Implementation of the plan of work of the Slovenian digital coalition.
Support for the projects of digital literacy and e-inclusion.	EUR 1 million	2016-2020	Activities in the week of programming Activities marking the International Information Community Day Activities of digital literacy Activities of stimulating demand
Support for the operation of the Slovenian internet forum.	EUR 0.15 million	2016-2020	Implementation of the activities of the Slovenian internet forum
Co-financing research and development projects from ambient assisted living (EU programme AAL)	EUR 1 million	2016-2020	12 projects
Co-financing projects for the development and strengthening of services supported by modern technologies for ageing gracefully, provision of comprehensive care and promotion of living in domestic environments.	EUR 1 million	2016-2018	1 pilot project
Information support projects in the implementation of the system and programmes of social activation (computerisation of the working process in social activation programmes).	EUR 1 million	2016-2017	Established information system
Development of information tools for supporting provider organisations and citizens in exercising the rights to public funds - informative calculation.	EUR 1 million	2016-2017	Developed information tool for calculation
Uniform development and upgrade of information support in policy making (evaluation, analysis,	EUR 1.5 million	2016-2023	Microsimulation model 3 models

forecasts, simulations) in the labour market and social security.			
Establishment of the system for monitoring the employability of higher education graduates in Slovenia and an update to eVŠ.	EUR 0.5 million	2016-2020	1 established analytical module
Support for projects modernising didactic methods in higher education by the prudent use of ICT and by transitioning to digital education for the establishment of innovative and flexible forms of teaching.	EUR 9.75 million	2017-2020	50% of public higher education institutions included in the project with implemented activities.

7 Strategy Implementation Management

The vision of the development of an information society in Slovenia is to use, by accelerated development of digital society, the development opportunities of ICT and the internet and to become an advanced digital society and a reference environment for introducing innovative approaches in the use of digital technologies. The vision is the basis for general objectives that ensure the implementation of the vision, and priority areas of measures determined in accordance with objectives.

OBJECTIVES / MEASURES	Broadband and Other Electronic Communications Infrastructure	Innovative Data- driven Services	Digital Entrepreneurship	Cyber Security	Inclusive Digital Society
Raising of General Awareness of the Importance of ICT and the internet for the Development of the Society					
Sustainable, Systematic and Focused Investments in the Development of the Digital Society					
General Digitisation by the 'digital by default' Principle					
Competitive Digital Entrepreneurship and Digitised Industry for Digital Growth					
Intense and Innovative Use of ICT and the internet in all Social Segments					
High-speed Access to the internet for All					
Inclusive Digital Society					
Safe Cyberspace					
Slovenia - Reference Environment for Introducing					

Innovative Approaches in the Use of Digital Technologies					
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Figure SEQ Slika * ARABIC 1: Matrix of objectives and measures

7.1 Monitoring Strategy Implementation Indicators

In Slovenia, the system of monitoring the development of information society is already in place and based on the research of SORS, harmonised methodologies and Eurostat indicators. The results of statistic surveys of the development of information society are also published on the DAE Scoreboard. In addition, SORS carries out additional statistical surveys of indicators of an information society, which will be considered in monitoring the implementation of the strategy and its potential updates.

The strategy's preparation included the renewal of indicators for monitoring the development of the information society at the European level, because the monitoring of some has become unnecessary, some have proven methodologically inappropriate, and the need for new ones has become manifest. The set of indicators determined for the monitoring of the success of the implementation of the strategy is expected to be preserved. The key indicator of the success of the implementation of the strategy will be, however, the Digital Economy and Society Index (DESI)¹⁶.

Indicators for monitoring the achievement of general objectives of the strategy:

INDICATOR	SI 2014	EU28 2014	SI 2020
Digital growth - general			
Effectiveness of digital growth in terms of the Digital Economy and Society Index (DESI)	Low effectiveness		Medium or high effectiveness
Classification in terms of DESI (position on EU28)	19		12
Broadband and Other Electronic Communications Infrastructure			
Share of households with the possibility of broadband access	75 %	78	100%
Share of households accessing the internet from home	77 %	81%	100%
Share of households with the possibility of broadband access at a minimum speed of 100 Mb/s	-	-	96 %

¹⁶The Digital Economy and Society Index – DESI is a composite index developed by the European Commission (GD CNECT) to assess the development of the EU Member States in the field of digital economy and society. It is structured around five principal dimensions: connectivity, human capital, use of internet, integration of digital technology and digital public services. More information on DESI available at: <http://ec.europa.eu/digital-agenda/en/digital-agenda-scoreboard>.

Share of households with the access at a minimum speed of 100 Mb/s	5 %	9%	60 %
Innovative Data-driven Services			
Share of individuals aged 16-74 who used public institutions websites within the last 12 months	53 %	47 %	> 60 %
Share of enterprises (with 10 or more employees and excluding enterprises from financial sector) that rent cloud computing services	15 %	18 %	> 20 %
Share of individuals aged 16-74 who used online banking services within the last three months	32 %	44 %	≥ 44 %
Digital Entrepreneurship			
Share of the ICT sector in the economy as a share of GDP	3.1 %	-	> 7 %
Annual growth of the ICT sector in the economy in terms of share of GDP	0.6 %	0.5%	0.6 %
Share of individuals aged 16–74 who purchased goods or services online within the last 12 months	37 %	50 %	> 60 %
Share of individuals aged 16–74 who purchased goods or services online from sellers from other EU states within the last 12 months	18 %	15 %	≥ 20 %
Share of enterprises (with 10 or more employees and excluding enterprises from the financial sector) that have received orders through websites or through computer exchange of data in the agreed format concerning the sale among enterprises	18 %	18 %	≥ 20 %
Share of enterprises (with 10 or more employees and excluding enterprises from financial sector) that have sold products or services or received orders for them through websites	14 %	14 %	≥ 20 %
Share of enterprises (with at least 10 employees) that have websites	84 %	74 %	≥ 90 %
Share of enterprises (with at least 10 employees) that use social media	39 %	36 %	≥ 50 %
Share of enterprises (with at least 10 employees) that pay for advertising on the internet	22 %	25%	≥ 30 %

Cyber Security			
Share of regular users of the internet aged 16 to 74 that have made backup copies of private data from their computers within the last 12 months	49 %	55 %	70 %
Share of enterprises (with at least 10 employees) with a formally determined strategy for the safe use of information and communication equipment (ICT)	35 %	32 %	50 %
Share of enterprises (with at least 10 employees) with a formally determined strategy for the safe use of information and communication equipment (ICT) that was determined or reviewed within the last 12 months.	27 %	22 %	45 %
Inclusive Digital Society			
Share of individuals aged 16–74 who have used the internet at least once a week within the last 3 months (regular internet users)	68 %	75 %	> 75 %
Share of individuals aged 16–74 who have used the internet almost every day within the last 3 months (frequent internet users)	58 %	65 %	> 70 %
Share of individuals aged 16-74 who have never used the internet	24 %	18 %	< 15 %
Share of individuals aged 16-74 with at least basic computer skills	56 %	59 %	≥ 60 %
Share of individuals aged 16-74 with medium or high computer skills	52 %	51 %	≥ 55 %
Share of enterprises (more than 10 employees) who employ ICT experts	20 %	20 %	> 20 %

Figure 1: Indicators for monitoring the achievement of general objectives of the strategy

Since direct indicators in e-inclusion do not exist, the analysis will be based on indicators about the incongruity between the scope of use of the internet and skills; these indicators will be aggregated by sex, age, employment status, education level, household income, area of residence, and migrant status.

Indicators about the scope of use of ICT in households and individuals will be aggregated by sex, age, employment status, education level, country of birth, country of citizenship, region, household structure, and household income.

The indicators of the scope of use of ICT in enterprises will be aggregated by enterprises' activities and their size classes in terms of number of employees.

The general objectives of the Development Strategy for the Information Society will be achieved if:

- the average EU values are achieved or exceeded in the indicators where Slovenia lags behind the EU average,
- the dynamic of growth is in line with that of the EU in indicators where Slovenia has reached or exceeded the EU average,
- specific objectives that Slovenia has set in individual fields of action are achieved, and Slovenia ranks among the countries with medium or high effectiveness according to DESI by 2020.

7.2 Strategy Implementation Management

DIGITAL SLOVENIA 2020 – The development strategy for the information society until 2020 is an umbrella strategy in the field of information society development determining the key strategic development orientations and forming a uniform strategic development framework together with incorporated strategies (Plan for the Development of Next Generation Networks to 2020 and the Cyber Security Strategy). The strong horizontal impact of ICT and information society in virtually all areas of social engagement requires a coordinated implementation of strategies, because it involves mutual contextually related strategic policies, measures and projects that have been designed and will be implemented in different areas with different specific features. Strategies will achieve their objectives if they are implemented in accordance with the plan for their achievement, available resources and broad inclusion of stakeholders in joint efforts for a faster development of the information society. Uncoordinated implementation would threaten the achievement of strategic objectives and undermine the strategies.

Since it is necessary to include as many external stakeholders, i.e. those that do not come from state administration in a narrow sense, the management and implementation structure of the DIGITAL SLOVENIA 2020 strategy will be based on the Slovenian Digital Coalition, which is a suitable multi-stakeholder environment by its primary purpose. The Strategic Council DSI2020 will be established: its narrow structure will include representatives of institutions or the state or public administration, while its broader structure will include representatives of the private sector, NGOs, and the general and online public. The Strategic Council DSI2020 will lead, manage and coordinate the implementation of the DIGITAL SLOVENIA 2020 strategy and incorporated strategies. Representatives of the Slovenian internet Forum, Council for Electronic Communications, Broadcasting Council and others will be invited to participate, too. Particular attention will be devoted to seeking synergistic effects of cooperation with the private sector and NGOs.

The Strategic Council DSI2020 shall meet at least twice a year. Management and administrative support shall be provided by the ministry competent for the information society. Before the end of each year, the Strategic Council DSI2020 shall adopt a plan of key projects for the following year and submit annual reports on the implementation of the DIGITAL SLOVENIA 2020 strategy to the government by March.

An interim review of the progress achieved in implementation of the Strategy objectives shall be made in 2018. In accordance with the findings, the ministry competent for the information society may

propose the renewal of the Strategy, its strategic orientations, objectives, measures and method of implementation.

Being a strategic document, the Development strategy for the information society until 2020 has no direct financial implications; it is a guiding principle of development activities in the field of information society. Financial implications will arise with the implementation of the Strategy, which, at the request of the European Commission (the Strategy being a precondition for the disbursement of structural funds), also includes key priority projects and financial resources that are guaranteed in principle. In preparing the Strategy, particular attention has been devoted to its feasibility, so only projects and resources provided by the ministries involved have been considered. Notwithstanding the above, the implementation of the strategy will be limited by the resources available within the respective applicable state budget, thus having regard to Article 23 of the Budget Implementation Act, which provides that the amount earmarked for specific expenditure can only be in the amount specified by the budget. The strategy's implementation will also be limited by the resources available within the Operational Programme 2014 – 2020.

7.3 Competencies of Implementing Structure

Public administration employees providing technical assistance acquired work experience in the 2007-2013 financial perspective and are, on average, well trained to implement measures, especially from the aspect of implementation of public tenders, public procurement and administrative monitoring of projects financed from structural funds. Nevertheless, additional training will be necessary as a result of changed rules of the use of structural fund assets and changes in public procurement and public tenders. A novelty is a planned use of pre-commercial public procurement, which requires additional training. Employees in technical assistance should also receive additional training on state aid rules.

Projects of constructing broadband infrastructure and research and development projects in ICT are, as a rule, demanding investment projects, which require additional training for organisers of public tenders and contract administrators.

The implementation of measures financed from structural funds has shown that the biggest shortcoming is in the knowledge of information and communication technologies and their use in subject areas such as digitisation of entrepreneurship and the private sector, smart cities and homes, as well as e-inclusion.

In accordance with the above, efficient implementation of measures under this strategy requires education and training in the following fields:

- administrative monitoring of structural projects,
- implementation of public calls, public procurement and rules of state aid,
- investment projects and research and development projects,
- digitisation of entrepreneurship and the private sector,
- smart cities and homes,
- information and communication technologies: the internet of things, cloud computing, big data and mobile technologies,
- resolution of the issues of e-inclusion, digital literacy and stimulation of demand.

The private sector and non-governmental organizations that submit their projects to public tenders under this Strategy may use the services of several businesses that are focused on consulting services for the preparation and implementation of projects financed from the structural funds. Although special training for their participation in the implementation of this strategy is not necessary, suitable attention will be devoted to preliminary public consultations and the timely notification of applicants interested in public tenders.

8 Process of Preparation of Strategy and Inclusion of Stakeholders

Within the framework of the preparation of the strategy DIGITAL SLOVENIA 2020 - Development strategy for the information society until 2020, the ministry competent for the information society and electronic communications (hereinafter: the Ministry) also prepared the Cyber Security Strategy and Plan for Developing Next-Generation Broadband Networks by 2020.

The Ministry started accelerated preparations of the Development strategy for the information society until 2020 in the context of development planning for the financial period 2014-2020. The countries planning the use of ERDF funds to construct broadband infrastructure shall also make a next-generation network development plan.

The drafting of the Next-Generation Broadband Network Development Plan to 2020 was initiated in 2013 and intensified in 2014. The coordination of substantive solutions with key stakeholders in the electronic communications market took longer than planned, so the drafting took place from November 2014 to February 2015.

Although different proposals had been made for the Cyber Security Strategy, they were not adopted. This is why an interministerial working group was established in April 2014 to draft a strategy acceptable to the broadest possible circle of stakeholders. The difference in opinions was most prevalent as regards the establishment of the national authority for cyber security. This was also the time of political changes, which resulted in constant changes of development guidelines.

After a preliminary discussion of the starting points with stakeholders (civil society, non-governmental organizations, representative associations of the ICT sector, general public administration) on public consultations, conferences and direct meetings, the Ministry submitted on 29 August 2014 the starting points of all three papers for public discussion and invited all interested parties to communicate their observations by 3 October 2014.

In the course of public discussion, 26 stakeholders submitted their remarks or proposals to the starting points for the Development strategy for the information society until 2020. To address these comments and prepare the text of the draft strategy, the Minister for Education, Science and Sport issued a decision on 18 December 2014 establishing an interministerial working group, to which representatives of ministries and the Government Office for Development and European cohesion policy were appointed. On 31 January 2015, the Ministry received subsequent remarks of the Association of Informatics and Telecommunications at the Chamber of Commerce and Industry of Slovenia, which the interministerial working group examined and submitted its observations. In the course of public discussion, 12 stakeholders submitted remarks or proposals to the starting points for the Cyber Security Strategy, while the remarks or proposed amendments to the Next-generation broadband network development plan to 2020 were submitted by 15 stakeholders. The bases of all three documents as well as remarks and proposed amendments are available online.¹⁷

The public discussion of the drafts of all three strategic documents of DIGITAL SLOVENIA 2020 took place from 6 to 31 March 2015. The final deadline for comments was originally set for 23 March 2015, but was later extended. Draft documents included sectoral contributions agreed upon in the interministerial working group, while any additional proposals or remarks were to be submitted by sectors

¹⁷ http://www.mizs.gov.si/si/delovna_podrocja/direktorat_za_informacijsko_druzbo/digitalna_slovenija_2020/

in the process of inter-ministerial harmonisation of draft documents before sending them to the government for consideration. Remarks or proposals were submitted on time by nine stakeholders. Most remarks referred to the Next-generation broadband network development plan to 2020, where the divergences in the interests of stakeholders were greatest. The bases of all three documents as well as remarks and proposed amendments are available online. On the basis of the remarks received, the ministry prepared reviewed drafts of all three strategic documents and submitted them for inter-ministerial coordination in September 2015.

Along with the inter-ministerial coordination, informal coordination with the European Commission took place until December 2015.

9 Annexes

9.1 Annex 1: List of abbreviations

Abbreviation	Short description of abbreviation
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AGPL	Affero General Public Licence
AKOS	Agency for Communication Networks and Services of the Republic of Slovenia
ARSO	Slovenian Environment Agency
B2B	Business-to-Business electronic commerce
B2C	Business-to-Customers electronic commerce
GDP	gross domestic product
CC	Creative Commons licence
CRM	Customer Relation Management
DAB	Digital Audio Broadcasting
MS	EU Member State
VAT	value added tax
DESI	Digital Economy and Society Index
ISD	Information Society Directorate
DoS	Denial-of-service
DRM	Digital Restrictions Management
NCC	national computer cloud
DSL	Digital Subscriber Line
DAE	Digital Agenda for Europe
EDGE	Enhanced Data Rates for GSM Evolution
e-IDAS	Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC (eIDAS Regulation)
EIF	European Interoperability Framework
EC	European Commission
EPSI	European Public Sector Information platform
ERA	European Research Area
EU	European Union
FTTH	Fiber to the Home
GEM	Global Entrepreneurship Monitor
GRID	network; a group of interconnected, spatially separated computers that are available to users as a homogenous whole
GPRS	General Packet Radio Service

Hbb TV	Hybrid Broadcast Broadband TV
HDTV	High Definition TV
HKOM	wide area network of state authorities
HPC	High Performance Computing
HCC	hybrid computer cloud
HSDPA	High Speed Downlink Packet Access
HSPA	High Speed Packet Access
HW	hardware
ICT	information and communication technologies
IP	Internet Protocol
CEF	Connecting Europe Facility
IP TV	Internet Protocol Television
IPv6	Internet Protocol version 6
IDC	Innovative development cloud platform
IT	Information technology
LGPL	Lesser General Public Licence
LTE	standard in mobile communications that constitutes the upgrade of UMTS and HSPA technologies - Long Term Evolution
SME	Small and medium-sized enterprises
NIF	National Interoperability Framework
OECD	Organisation for Economic Co-operation and Development
RDI	Research, development and innovation
SCM	Supply Chain Management
SD	Standard Definition TV signal
si2010	Development strategy for the information society in the Republic of Slovenia
SI-CERT	Slovenian Computer Emergency Response Team
SLA	Service-Level Agreement
SSS	Smart Specialisation Strategy of the Republic of Slovenia
SORS	Statistical Office of the Republic of Slovenia
SW	Software
SWOT	Strengths, Weaknesses, Opportunities and Threats
UHD TV	Ultra High Definition TV
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial Bus
WCAG	Web Content Accessibility Guidelines
Wi-Fi	Wireless Fidelity

WiMAX Worldwide Interoperability for Microwave Access

ZEKom-1 Electronic Communications Act (Uradni list RS, no. 109/2012 of 31 December 2012)

USA United States of America

9.2 Annex 2: Statistics of Development of the Information Society in Slovenia

9.2.1 Digital Economy and Society Index

According to the Digital Economy and Society Index (DESI), Slovenia has an overall score of 0.41¹⁸ and ranks 19th among 28 EU Member States. Denmark ranks first and Romania ranks last. Although Slovenia ranks among countries with lower performance¹⁹, it is still above average.

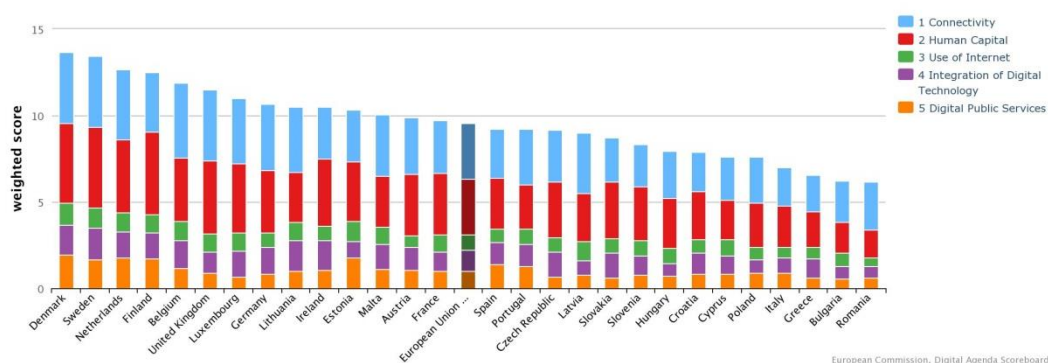


Figure 2: Digital Economy and Society Index 2015, EU28 (source: EC)

Slovenia has a high rate of qualified population: 56% have basic digital skills, while 1.9% of Slovenians aged 20-29 years hold a STEM (Science, Technology and Mathematics) degree (7th rank among the EU member states). However, Slovenia's weakest ranking is in the Internet Connectivity field – fixed broadband connections are available only to 89 % of households. Although the take-up of fixed broadband is relatively good (71%) only 6.6% of subscriptions are to fast broadband, and only 45% of households subscribe to mobile broadband. Progress should also be made in Digital Public Services – only 29% of Slovenian internet users have returned filled-in forms to public administration²⁰; in the field of Open Data, the country ranks 23rd. Only 5.4% of general practitioners exchange medical data electronically (36% in the EU, which makes Slovenia last among the EU Member States), while almost no general practitioners transfer prescriptions to pharmacists electronically (0.6% against 27% in the EU²¹).

¹⁸ DESI scores range from 0 to 1, the higher the score the better the country performance.

¹⁹ According to DESI 2015, low-performance countries include Bulgaria, Croatia, Cyprus, Greece, Hungary, Italy, Poland and Slovenia.

²⁰ The data for Slovenia shows that 49 % of users who did not return an electronic form to public administration did so because they were not obliged to submit official forms. Only 3 % of users could not submit it because no suitable online service was available (Source: SORS).

²¹ The data on the exchange of health information and prescriptions refer to 2013 (source: SORS).

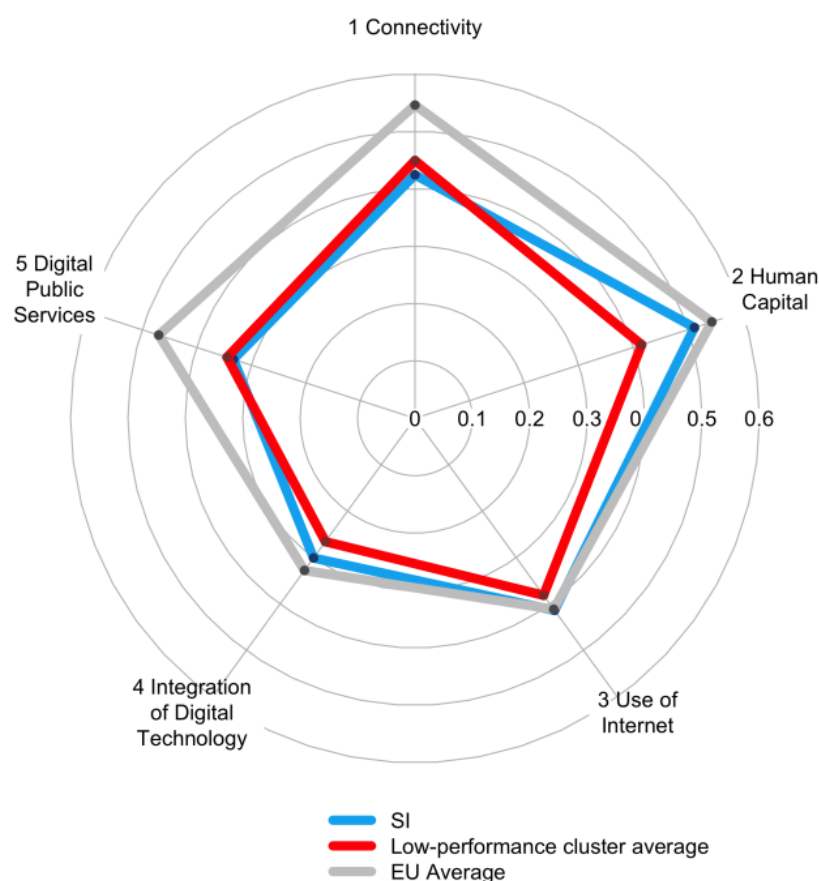


Figure 3: Digital Economy and Society Index 2015, Slovenia (source: EC)

9.2.2 Infrastructure

The key objectives of DAE concerning access to broadband internet connections:

- the whole population provided with broadband access at a minimum speed of 30Mb/s by 2020;
- at least 50% of households subscribed to broadband services with a bandwidth of the minimum speed of 100 Mb/s by 2020.

At the end of 2013, the coverage of households by fixed broadband access in Slovenia was 89%, while the average coverage in the EU countries was 97%. The coverage was lowest in Slovakia, Estonia, Poland and Slovenia. At the same time, only 74 % of households in the rural areas in Slovenia had fixed broadband access available (EU 90%); the availability was lower only in Bulgaria, Latvia and Finland.

Coverage of households with next-generation networks providing data transfer speeds of at least 30 Mbit/s was 74% at the end of 2013 (EU 62 %), which is higher than the EU average, but it should be noted that in rural areas, despite co-financing the construction of open broadband networks in the area of the so-called white areas from European Development Funds in the financial perspective 2007-2013, the access to next-generation networks is still very limited.

At the end of 2013, 74 % of households had a fixed broadband connection to access the internet, which is lower than the EU average (76 %) and higher than in 2012 by 1 percentage point.

The market share of the broadband connections of Telekom Slovenije d.d. as the leading provider of these services in Slovenia is decreasing. The share of the leading provider was 36 % (EU 42 %) in July 2014 and 35 % at the end of the third quarter of 2014.

The most commonly used technology for the provision of broadband connections in 2014 was still DSL. Although the share of connections of broadband access through DSL technology has decreased (2013: 48 %; third quarter of 2014: 45 %), its market share is still significant.

The basic indicator that shows the level of development of infrastructure for an information society is fixed broadband penetration (number of broadband connections per 100 inhabitants). In July 2014, the number of broadband access connections per 100 inhabitants in Slovenia was 27, which is still below the EU average despite the growth in comparison to July 2013 (31 in the EU). The share of connections of broadband internet access with high speed (at least 30 Mbit/s) in Slovenia was 7 % in July 2014 (2013: 6 %; third quarter of 2014: 7 %), therefore still considerably below the EU average (2013: 21 %; July 2014: 22 %); also below the EU average is the share of connections of ultrafast broadband internet access (at least 100 Mbit/s), which amounts to 4 % of all connections of broadband internet access in July 2014 (EU 7 %). An increase in the speed of transfer is generally observed in the EU, as 23 % of fixed broadband networks provides a transfer rate of at least 30 Mbit/s in July 2014 (July 2013: 18 %). The share is still very low (less than 7 %) in Italy, Greece and Slovenia. In the area of mobile connections, the coverage of the third generation of HSPS mobile broadband access HSPA in Slovenia was 96 % in 2012 and 99 % in 2013 (97 % in the EU). The availability of fourth-generation networks (LTE) remained at the same level (2013: SI 63 %, EU 59 %; July 2014: SI 13 %, EU 26 %). Slovenia also lags behind the EU average in the penetration of mobile broadband access (number of users of mobile broadband access per 100 inhabitants - 2013: SI 42 %, EU 62 %).

9.2.3 General Use of the Internet

In 2014, 77% of households in Slovenia had access to the internet (2013: 76 %), which is below the EU average of 81 % (2013: 79 %). 69 % of households without the internet access stated as a reason that they do not need it, which was followed by the lack of computer or internet usage skills (62%), high costs of equipment, e.g. computer (47%) and high cost of the internet access (45 %).

A detailed inspection of the information shows that almost all households with children (97 %) and 70% of households without children had internet access in 2014. Reasons for not having an internet access vary across households, too. Households with children were without the access because of high costs of equipment (47 %) and high costs of access (39 %). At the same time 39 % of them have access to the Internet elsewhere. The highest percentage (70 %) of households without children that do not have the internet access stated as a reason that they do not need the access, while 63 % of these households did not have the internet access because of the lack of computer or internet usage skills.

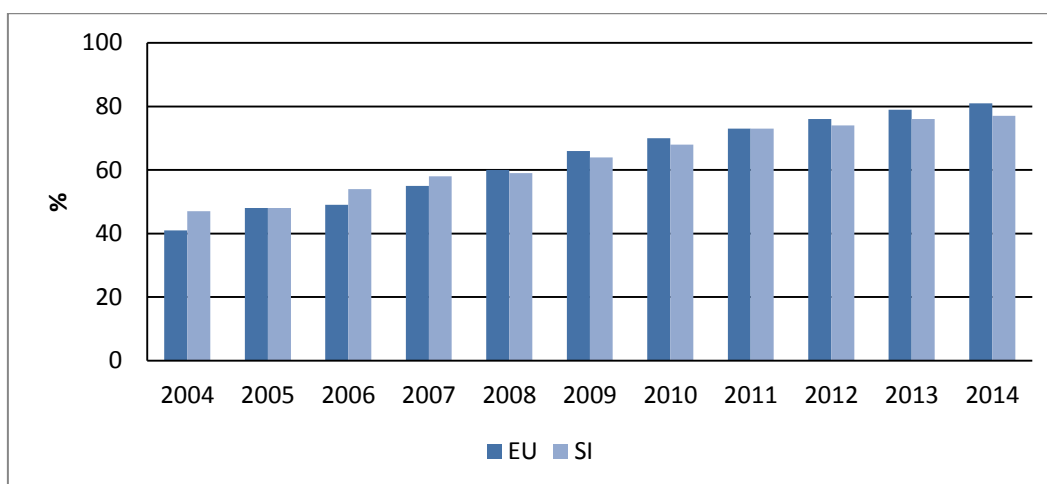


Figure 4: Internet access by households, Slovenia (Source: Eurostat)

In terms of regular use of the internet by individuals, the EU is gradually catching up with the developed world. An objective of the DAE is to increase the share of persons who use the internet at least once a week (regular internet users) to 75% by 2015. Slovenia was under the EU average in 2014. In Slovenia, 68 % of individuals aged 16 to 74 used the internet at least once a week in 2014, which is almost the same as in the previous year (2013: 69 %) and under the EU average (75 %). In the leading EU Member States that are already close to saturation (Luxembourg, Denmark, Sweden and the Netherlands), this share is already over 90 %.

The promotion of a more frequent use of the internet aimed at reducing the share of persons who have never used the internet (i.e. the non-users of the internet) to 15 % in 2015. In Slovenia, the share of individuals aged 16 to 74 who have never used the internet was 24% in 2014 (18 % in the EU), which is the same as in 2013 (23 %). In terms of age, the biggest groups of individuals who have never used the internet were persons aged 65-74 (67 %) and persons aged 55-64 (47 %). In terms of education, the share was highest among persons with elementary education or less (58 %).

The share of persons aged 16–74 who access the internet every day or almost every day was 58% in 2014 (65 % in the EU). The almost daily use of the internet was most common in the 16-24 age group (92 %) and the least common in the 65-74 age group (18 %). In 2014, the computer was regularly used (in the previous three months) by 29 % of elderly persons (aged 65-74). Most of them (or 27 % of all) regularly used the internet, too. Although Slovenia is still considerably below the EU average in terms of regular use of the internet, the data for 2014 are encouraging. Six years earlier, in 2008, computer was daily or almost daily used by 4 % and the internet was used by 2 % of the elderly. In 2014, the share of elderly persons who had used a computer was 40 %, while the share of those who had used the internet was 33 %. Six years earlier, the share of persons in this age group who had used a computer was 23 %, while the share of those who had used the internet was 6 %.

In 2014, 58 % of persons aged 16-74 in Slovenia used the internet to read magazines and papers (2013: 57 %); 62 % sought information about goods and services (2013: 55 %); 42 % participated in social networks (2013: 38 %). In 2014, Slovenia lagged behind the EU average in the use of online banking (2014: SI 32 %, EU 44 %), although the share of users increased in comparison with 2012 (28 %). 29 % of persons in Slovenia used the internet in 2014 for telephone and video calls (EU 29 %).

9.2.4 Use of Mobile Internet

In 2014, 37 % of individuals aged 16 to 74 used a mobile telephone to connect to the internet away from home or work. 27 % of individuals used a mobile telephone to access the internet through mobile network (GPRS, UMTS, HSDPA). 25 % of individuals used laptops or tablet computers to connect to the internet away from home or work. 7 % of individuals used laptops or tablet computers to access the internet through mobile network (by USB modem or SIM card).

The use of the mobile internet is increasingly important in enterprises for the reasons of mobility and constant accessibility. In 2014, 66 % of enterprises in the EU provided their employees with devices with the mobile internet access. The share in Slovenia is 71 %, which is considerably higher than the EU average and places Slovenia as 13th in the EU; the situation is even better in large enterprises (250 or more employees) where Slovenia ranks 12th in the EU with the share of 96 % (94 % in the EU).

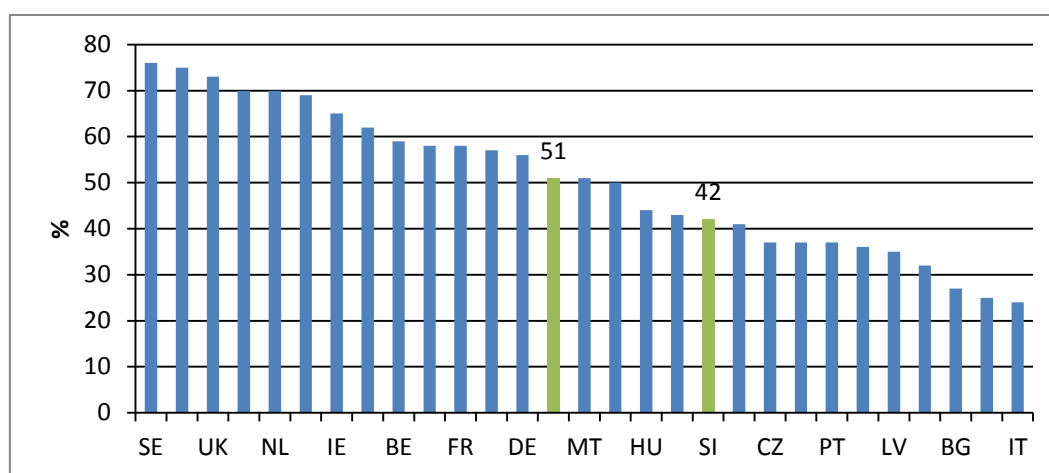


Figure 5: Persons aged 16–74 who accessed the internet through a portable device away from home or work, EU, 2014
(Source: Eurostat)

9.2.5 Digital Literacy and ICT Skills

In 2012, as many as 82 % of Slovenia's citizens had a certain level of computer skills or knowledge, which is above the EU average (67 %). From the aspect of classification of these skills in high, medium and low, Slovenia was still above the EU average in terms of the share of population with high or medium computer skill levels (51 %), which, however, did not place it among the best qualified countries in the EU as the share of individuals with high or medium skills exceeded 70 % in some countries (Luxembourg, Denmark). In 2012, Slovenia ranked at the very top of the EU countries as regards the share of schools with their own website (100 %) and the number of computers per 100 secondary school students (73 %), while the values of indicators were much lower as regards the use of computers in primary schools. The data for 2013 were not yet available at the time of drafting this document.

The data about the new digital skills indicator show that 50 % persons aged 16-74 in Slovenia had low or no digital skills in 2012, the EU average being 47 %.

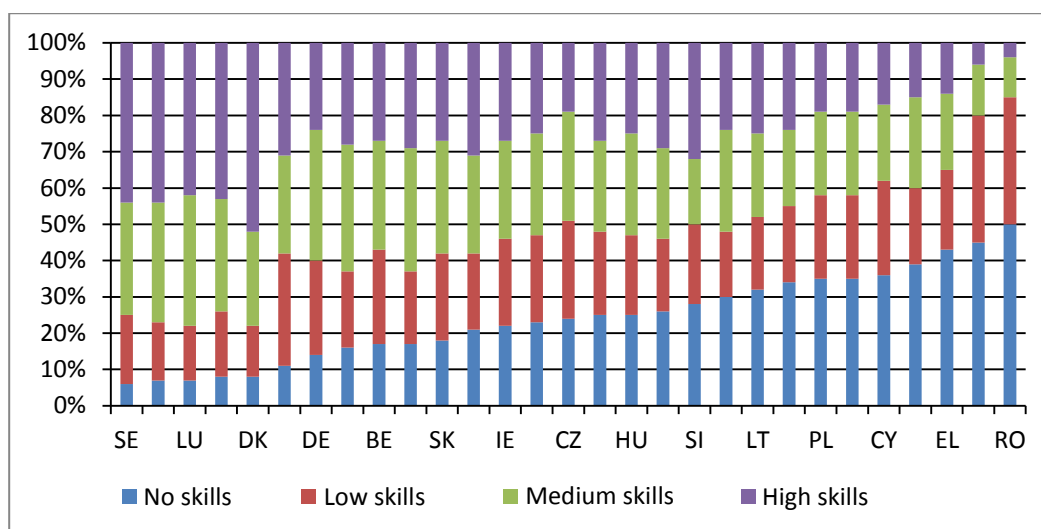


Figure 6: Distribution of ICT skills in persons aged 16 to 74, EU, 2012 (Source: EC – Digital Agenda Scoreboard)

The data for 2012 also show that 52% persons in the 16-74 age group had medium or high level of computer skills (monitored by the number of individual activities that individuals have carried out on computer), which places Slovenia in the EU average (51 %). Slovenia also ranks in the EU average in the area of the internet usage skills. The share of persons with medium or high internet usage skills in 2013 was 46% (47 % in EU). While Slovenia stagnates in this field, the average share of persons with medium or high internet usage skills in the EU is growing, amounting to 43% in 2011.

The data for 2014 show that 12% persons in the 16–74 age group had a low level of computer skills (15 % in the EU), 21 % had a medium level of skills (26 % in the EU) and 31 % had a high level of skills (29 % in the EU). Computer skills were classified on the basis of numerous activities for which individuals use a computer.

The latest available data for 2013 about the development level of the internet skills show that 28% persons in the 16–74 age group had a low level of internet skills (30 % in the EU), 31 % had a medium level of skills (35 % in the EU) and 15 % had a high level of skills (12 % in the EU). The classification of internet skills was made on the basis of numerous activities individuals did using the internet.

In 2014, Slovenia was above the EU average in terms of the share of employees (in enterprises with at least 10 employees and excluding enterprises from the financial sector) who use computer at work (2014: SI 55 %, EU 52 %), which is at the same level as in 2013 (SI 56 %, EU 54 %). In 2014, 47 % employed persons used computers connected to the internet at work (48 % in the EU). The comparison with 2013 shows that the share in Slovenia has remained unchanged, while the EU average has grown.

The EU is experiencing a lack of ICT experts. Up to as many as 900,000 jobs in this field are expected to be unoccupied by 2015. In 2014, 20 % enterprises (with at least 10 employees and excluding enterprises from financial sector) in Slovenia employed ICT experts, which equals the EU average (20 %). In 2014, 6 % of enterprises reported that they had employed or tried to employ ICT experts in the previous year (8 %). 3 % of enterprises reported that they had trouble filling the job vacancies that required ICT experts, which is the same as the EU average (3 %) and indicates that this general EU problem is not very critical yet in Slovenia, and that the number of job vacancies in Slovenia is smaller, respectively.

In 2014, 20 % of enterprises reported that they had enabled their employees to acquire or advance their ICT skills in the previous year, which was equal to the EU average (21 %). 13 % of enterprises (10 % in the EU) enabled their ICT experts to acquire or advance their ICT skills and 16 % enabled it to other employees, which was within the EU average (18 %).

In the survey of the implementation of the DAE for 2013, the EC estimates that some EU Member States successfully pursue the DAE objectives from the aspect of the development of the use of the internet and digital skills. Nevertheless, there are still some "average players" that have made little progress and that risk the aggravation of their relative position (Austria, Belgium, Slovenia, Poland and Malta).

9.2.6 E-trade

Three key objectives set by Europe in the DAE by 2015 in the field of e-trade are the following: 50% persons purchasing products or services over the internet, 20 % persons purchasing products and services from online suppliers from foreign countries, and 33% small and medium-sized enterprises selling products or services online. The EU member states are, on average, gradually achieving the objective of the DAE that foresees 50% persons purchasing products or services over the internet by 2015. In Slovenia, 37 % of persons aged 16-74 purchased goods or services online in the last 12 months (from the 2nd quarter of 2013 to the 1st quarter of 2014), which is below the EU average (50 %). Slovenia is, however, above the EU average as regards online orders from sellers from other EU member states. Thus 18 % of persons (15 % in the EU) purchased goods or services online from sellers from other EU member states in the last 12 months (from the 2nd quarter of 2013 to the 1st quarter of 2014).

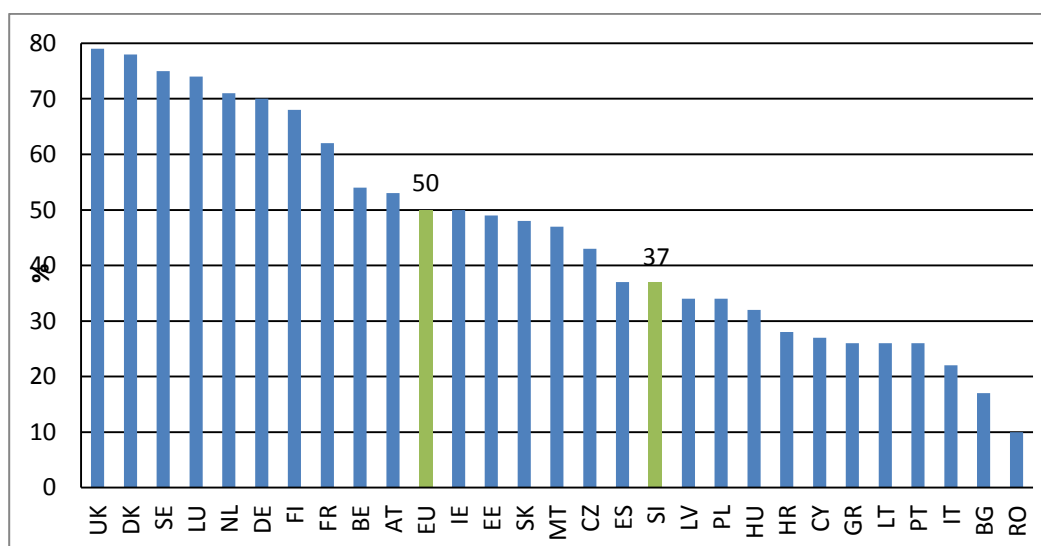


Figure 7: Persons aged 16–74 who made online purchases within the last 12 months, EU, 2014 (Source: Eurostat)

In 2013, 18 % of Slovenian enterprises (18 % in the EU) with at least 10 employees and excluding enterprises from financial sector received orders via websites or via automated data exchange in the agreed format, which involves the sales among enterprises. 14 % of enterprises with 10 or more employees and excluding enterprises from financial sector have sold products or services or received orders for them through websites in 2013 (14 % in the EU). In 2013, Slovenian enterprises generated 7.9 % of their turnover (excluding VAT) from web sales. The majority of the total value of online sales

income (excluding VAT) was generated from online sales to other enterprises or national organisations. 97 %. 3 % of this income (excluding VAT), or about 170 million EUR, was generated from the sales to end consumers. Almost all enterprises with online sales (95 %) received orders through websites from buyers from Slovenia, while 42 % of these enterprises also received orders from other EU member states and 20 % from other countries.

84 % of all enterprises in Slovenia had a website in 2014 (74 % in the EU); almost all enterprises with websites used their websites to present products or services they offer (82 % enterprises).

The data from 2013 show that the most common barrier limiting or preventing online sale to enterprises in Slovenia is that their products or services are unsuitable for online sale; this applies to 57 % of enterprises. For 29 % of enterprises, web sales were limited by problems related to logistics (shipping of goods or delivery of services); for 27 % of enterprises, web sales were limited by costs of introducing web sales; for 20 % of enterprises, web sales were limited or prevented by problems related to web payments; for 18% of enterprises web sales were limited by problems related to ICT security or data protection and for 15% by problems related to legal framework.

The internet is also an important means of communication for marketing and advertising, and enables interaction with end consumers and partners. In 2014, 39% of enterprises in Slovenia used social media (e.g. social networks, blogs or microblogs, multimedia content sharing websites or Wiki based knowledge sharing tools, which was above the EU average (36 %). 22% of enterprises paid for advertisements on the Internet e.g. adverts on search engines, in social media (e.g. Facebook, Google, YouTube, etc.) or on other websites (25 % in the EU).

9.2.7 E-Government

One of the DAE objectives is to increase the take-up of eGovernment services to 50% of citizens by 2015, with more than a half of these persons submitting the forms electronically.

The use of e-government services in Slovenia equals the EU average. Thus 53 % of persons aged 16–74 used websites of public institutions (e-government services) in the last 12 months (from the 2nd quarter of 2013 to the 1st quarter of 2014), which is above the EU average (47 %); a lower use of websites of public institutions than in the EU, however, is recorded in older persons. 21 % of persons sent completed forms via websites of public institutions (26 % in the EU).

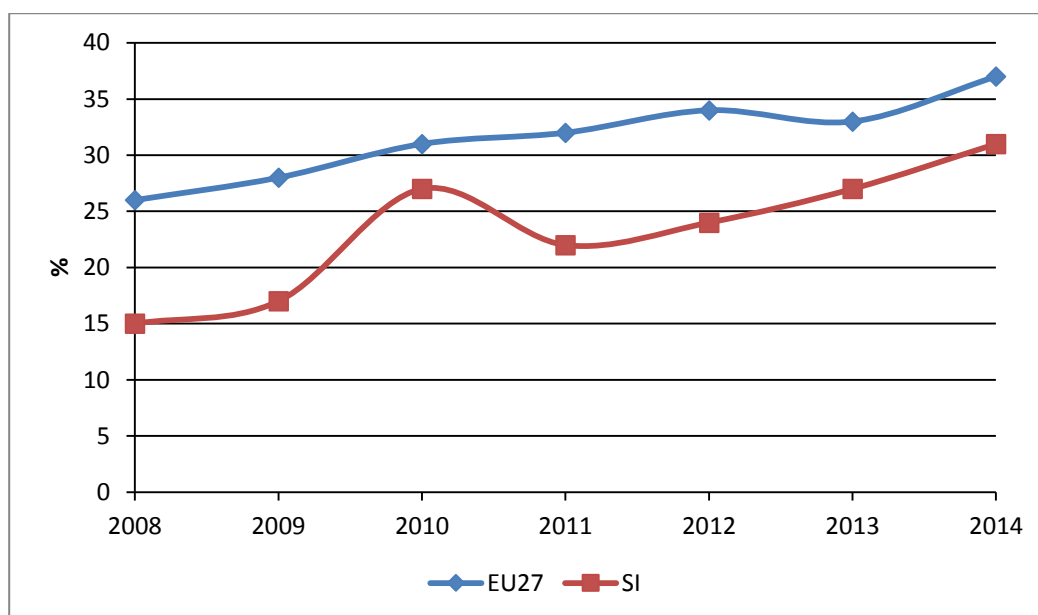


Figure 8: Persons aged 55–64 who used websites of public institutions within the last 12 months (Source: Eurostat)

9.2.8 Purchase of Cloud Computing Services

Enterprises first started posing questions surrounding the purchase of cloud computing services in 2014. The gathered statistical data will be the basis for analysing the use of these services and identifying factors that limit or prevent their use by enterprises in the EU. This will enable the EC to adopt appropriate measures for releasing the potential of cloud computing in Europe²².

In 2014, 15 % of enterprises in Slovenia with 10 or more persons (excluding enterprises from financial sector) employed purchase cloud computing services, e.g. e-mail, computer software, storage space for files, computing power, etc. (18 % in the EU). Enterprises that purchased cloud computing services in 2014 most often purchased e-mail as a cloud computing service (67 %). 44 % of enterprises purchased services for storage of files (all kinds of files, storage of enterprises backup files) and 39 % of enterprises purchased the services for hosting the enterprise's database (data, their description and software for storing, searching, maintaining data in the database, etc.). Computing power for running the enterprise's own software (e.g. virtual processor or computer memory) was purchased by 29 % of enterprises, while 16 % of enterprises purchased other cloud computing services.

The majority of enterprises (79 %) purchased cloud computing services that are delivered from public cloud, where the services are delivered from shared servers of service providers, while 33 % of enterprises purchased services delivered from private cloud, from servers of service providers exclusively reserved for enterprises.

Lack or insufficient knowledge about the cloud computing services prevented 31 % of enterprises the usage of these services. The share of these enterprises was the highest among small enterprises (33 %) and the lowest among large enterprises (17 %). Risks of security breach and high costs of buying cloud computing services prevent the usage of cloud services to 29 % of non-users of these services. Uncertainty about the location of the data in the cloud (27 %) and uncertainty about applicable law,

²² http://europa.eu/rapid/press-release_IP-12-1025_sl.htm

jurisdiction, and dispute resolution mechanism (24 %) follow. Large and medium-sized enterprises that have better knowledge about cloud computing services are to a large extent prevented from using cloud services by security concerns and uncertainty about the location of the data, applicable law, jurisdiction and dispute resolution mechanisms.

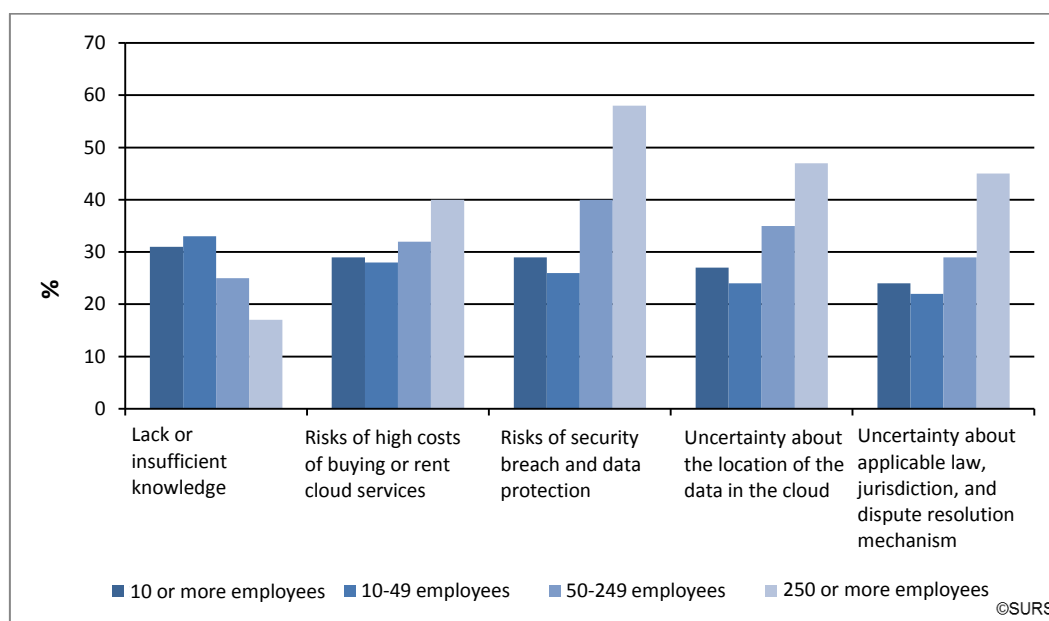


Figure 9: Why enterprises with at least 10 employees do not purchase cloud computing services, by type of factors, Slovenia, 2014 (Source: SORS)

9.2.9 ICT Sector in Slovenia

In 2013, the ICT sector in Slovenia consisted of 6,091 enterprises, which is 7 % more than in 2012. 96 % of enterprises in the ICT sector were enterprises that offered ICT services - also called enterprises of the ICT service sector, while the other 4 % of the enterprises in the ICT sector were enterprises of the ICT manufacturing sector (the numeric proportion of both groups was the same in 2012).

The ICT sector employed about 23,300 persons in 2013²³, which is 3 % more than in 2012. In 2013, most of these persons (86 %) were employed in the ICT service sector, while 14 % were employed in the ICT manufacturing sector.

In 2013, the greatest number of persons worked in computer programming, counselling and other related activities (about 11,600), followed by the telecommunications sector with about 5,000 persons. The sector of data processing, hosting and related activities, and web portals employed about 1,600 persons, while the sector of repair of computers and communication devices employed about 600 persons.

In the ICT manufacturing sector, the greatest number of people were employed in the manufacture of electronic components and boards (about 1,900 persons).

²³ Employed persons are all persons who perform work for an enterprise (paid or unpaid), as well as persons who work outside the unit that they belong to and get paid (e.g. sales agents). This also includes part-time workers, seasonal workers and workers from home who are on the payroll of the enterprise observed.

The ICT sector employed 4 % of all persons employed by enterprises mostly involved in market activities.

The ICT sector in Slovenia employs 2.6 % of all persons (in 2013, 923,000 persons were employed in Slovenia, which included employed and self-employed persons), which places it among good employers at the EU level, too.

The ICT Sector in Slovenia generates 3.1 % GDP (the GDP of Slovenia in 2013 being 36.144 billion EUR). The foreseen annual growth at the EU level is 0.5 %, the most optimistic forecasts being about 0.75 %. The ICT sector in Slovenia foresees the 0.6 % annual growth of GDP, which means that the threshold of 7 % of GDP may be exceeded in Slovenia at the end of 2020.

In terms of the national budget, investments in ICT amount to 0.8 % of the integral budget. The ICT sector in Slovenia expects the growth of investments by 0.3 %, which means that the threshold of 1 % investments in ICT from the integral budget would be reached at the end of 2020, which is in accordance with the minimum expectations of OECD (investments in ICT should be between 1 % and 2 % of the integral budget).

9.3 Annex 3 Analysis of the National Context

9.3.1 Broadband Infrastructure

The data of the DAE Scoreboard for 2014 show that the level of broadband penetration (share of households with broadband connection in Slovenia) is below the EU average (SI 74 %, EU 76 %). In July 2014, Slovenia had 27.3 broadband connections per 100 inhabitants, which is also below the EU average (30.9). The coverage of households by standard fixed broadband networks is over 99 % in ten EU member states, while Slovenia, which has 89 per-cent coverage, is among the four member states with the lowest coverage and among the last in terms of coverage of rural areas, which is 74 %²⁴. The situation is undesirable also in access rates. In July 2014, the share of broadband connections with the speed of 10 Mb/s or more in Slovenia is 45 % (70 % in the EU), while the share of connections with the speed of 30 Mb/s or more is only 6.6 % (22.48 % in the EU)²⁵.

The process of planning the further development of broadband infrastructure in Slovenia should take into account the dispersed settlement of rural areas. This is a key barrier for potential private investors - operators of electronic communications in designating sustainable business models in these areas. Slovenia utilised ERDF funds in the 2007-2013 financial perspective to co-finance the construction of broadband infrastructure in white areas in rural regions where this infrastructure is not available and there is a lack of interest from private investors in individual investments. In Slovenia, basic broadband infrastructure is not available to about a third of the population or 236,000 households, practically all located in rural areas. It is therefore necessary to earmark public funds from the integrated budget as well as European funds for regional development, agriculture and rural development in order to improve the viability of business models of private investors for future investments in these areas. Different models of public-private partnership (e.g. cooperatives, cooperative model with local self-government) should be considered in the process. In the opposite case, Slovenia will worsen its development potential as well as threaten the polycentric development of the country.

In order to achieve the DAE objectives, Slovenia needs a competitively priced, broadly accessible fast and ultrafast internet access in its entire territory. In view of global developments, the objectives set at the EU level and the increasingly ambitious objectives of individual Member States, Slovenia must set ambitious objectives for the multiannual financial framework 2014-2020 that equal or exceed those set in the DAE.

9.3.2 Innovative Data-driven Services

The modern digital society is based primarily on effective obtaining, processing and use of extensive databases. We are entering a period where data will be used for innovating new solutions and services, for improving the efficiency of business processes and for achieving economic benefits. Data are the basis of the digital economy, of the innovations and services that stimulate digital growth and employment. Big data technologies whose development potential has been demonstrated in the internet environment are the driver of data-driven innovations or data-driven economy because of the use of cloud computing, internet of things and mobile technologies. These technologies will contribute to social progress in terms of new business opportunities and more innovative public services more

²⁴ <http://ec.europa.eu/digital-agenda/en/news/study-broadband-coverage-europe-2013>

²⁵ <https://ec.europa.eu/digital-agenda/en/pillar-4-fast-and-ultra-fast-internet-access>

than ever before. Opening public and research sectors' data will provide an additional incentive for developing new innovative services. The publication and public availability of these data in machine-readable form will open fresh development opportunities to enterprises and developers.

One of the important elements for ICT applications and services is the access to all types of data necessary for their functioning. An important aspect is the quality of these data, which should be high enough for these applications and services to have practical value. Since data are one of the foundations, they should be recognised as a strategic resource of the digital society. Especially important are spatial data that are the foundation for the development of all location-based services. Particular stress should be placed on the quality of data, so two-sided communication should be supported between data administrators and users who may communicate any potential data errors.

In order to prepare Slovenian ICT enterprises for the opening of new markets, the state must ensure the timely opening of the data of public and research sectors and development infrastructure that will facilitate and accelerate the development of new solutions. As in other ICT fields, the timely implementation of planned measures is a very important element, because those who enter markets first will be more competitive in comparison with those who enter late. Researchers and the private sector should be assisted in developing technologies and their implementation in the form of new innovative e-services. In these frameworks, an important factor is the establishment of a single European market for big data and cloud computing, which will require an efficient legal framework, adoption of standards and interoperability of rules.

Public Sector Services

Recent EU measurements in the use of e-services in 2012 have shown that Slovenia now - according to most indicators - ranks in the EU average, above average for services for businesses (e-VEM) and in the category of transparency (IPP system/e-democracy), but a lag is observed in cross-border services. Setbacks are also significant in e-participation (e-information, e-consulting and e-decision making), in which Slovenia ranks 82nd at the United Nations index²⁶. In the following years, Slovenia has to achieve the actual use of available e-services, increase the connectivity and interoperability of data records, their availability and reliability, promote the openness of fundamental databases for further processing of public sector business entities and reduce the risk of disruption and downtime and the associated risks for non-government services and the related costs. Promoting proactive opening up and re-use of data will also bring about new business opportunities in the economy, create new value and new jobs, and lead to the development of the digital economy, respectively.

Slovenia has extensive experience with the introduction of e-business in public administration. Although a large supply of e-services is now available to users, their use, unfortunately, does not reach the anticipated level, especially on the part of citizens. Various international comparisons of the level of development of e-government show that Slovenia increasingly lags behind the leading EU countries and is, by most indicators, currently around or below the EU average. With the development of new comprehensive solutions (computerisation of the entire process, one-stop-shop concept, uniform editorial policy, "only once principle"), public administration will also make possible simple e-participation in fields that are not yet satisfactorily developed. Thoroughly upgraded in the process will be the existing mechanisms of e-government in terms of active participation of users (co-creation, co-

²⁶ <http://unpan3.un.org/egovkb/Reports/UN-E-Government-Survey-2014>

production) in prioritizing, designing, testing and perfecting new e-services. Strategic objectives, actions and indicators of the effects in the development of services in public administration (e-government) are defined in the Public administration development strategy 2015–2020.

Systematic computerization of e-health can significantly reduce the cost of the health care system and enable the efficient management of a range of health and health-related information. Computerisation allows for smooth communication and secure and traceable exchange of data and electronic documents between health care providers. In the previous period, Slovenia had difficulty in implementing the programme of eHealth projects, which caused delays and lags on the comparative charts within the EU. At the end of 2015, the situation improved considerably because of the introduction of a range of services in regular operation. The introduction of services throughout healthcare system will continue in 2016. The following services have been developed in the context of eHealth projects:

- eNaročanje (eReferral) – Provision of information support in the referral of patients to health services from the primary health care level.
- eRecept (ePrescription) - The service enables general practitioners to issue electronic prescriptions that they sign electronically and send to the system, where pharmacies obtains them when issuing medicines at patients' request.
- TeleKap (TeleStroke) – Service that contributes to a more efficient treatment of stroke.
- Teleradiologija (Teleradiology) – Enables the transfer of radiological images and related data on patients.
- eTRIAŽa (e-Triage) – IT support for the triage process in health centres and hospitals.
- Reference clinics – Central IT support for management and monitoring of reference clinics.
- eKomunikacija (eCommunication) – Enables electronic exchange of forms between emergency clinics and police administration.
- Management of clinical knowledge OpenEHR UKZ – National collection of clinical data models and demographic data models that will be used in Slovenian health information system.
- SUVI - Information security management system.
- eRCO – Electronic register of vaccinations.
- zNet - Modern health communication network providing secure and reliable communication between health system actors.
- CRPP - Central Register of Patient Data that is the data core of the system of eZdravje services.

Services of e-operation of the Police with other organisations and e-services of the Police for citizens have been developed in the framework of the development of the e-Policija (ePolice) information system. The Police will continue the development of e-services to further improve their effectiveness and efficiency. They will not only optimise internal work processes but continue to spread electronic

cooperation with other organisations and introduce new e-services for citizens (e-police officer, e-service "propose traffic control", etc.).

In the broader public sector context, the future development period should devote particular attention to fields that are significantly behind in terms of development indicators. Development efforts should be coordinated with the new guidelines in the development of public sector services, and strict project management should be enforced in line with strategic plans of development, according to the rules of project management and independent of various partial external influences. The principle of a complementary approach to the digitisation of the public sector that should seek synergistic effects is considered.

In public sector services it is necessary to create conditions that will enable long-term development of services not caught in the technological traps of licensing IT solutions and their long-term financial sustainability. Particular attention should be devoted to ensuring the quality of key services, also at major natural and other disasters and emergency situations.

Digital Infrastructure Using Cloud Computing Model

As a EU member State, Slovenia is obliged to provide the conditions for the implementation of the common EU policy while observing the demands of EIF and implementing the integration of the existing solution in the most optimal manner possible. As numerous projects with e-content will be realised in the period 2014-2020, due diligence requires the drawing up of a common computing platform in a way that the latter quickly adapts to the needs of institutions that will develop these solutions and wish to use them promptly to achieve their business goals. Cloud computing is a promising computing model that enables a fast and standardised way of developing e-services (including open-source), connecting through uniform service platform (interoperability) and new public procurement models (framework agreements, PPP). Using the model of cloud computing, we can shift from investment models to cost models (pay for what you use) and provide significantly higher utilization rate of hardware and overall data infrastructure (we do not buy for stock but provide capacity where necessary). This will subsequently lower the costs of setting up and maintaining IT infrastructure. Cloud computing provides a high level of availability and access to services anywhere and anytime, and flexibility depends on needs for higher performance hardware. It offers an excellent opportunity for an innovative environment as a tool for opening new jobs with added value.

Slovenia will promote the development of innovative data-driven services by creating three different types of cloud computing, all of which use the same concepts of cloud computing and their advantages, but are distinguished in terms of different target groups of users and different business models and ways of financing. Cooperation shall be determined in the common agreement on the use of services (SLA).

The following clouds are foreseen:

- **national computer cloud** (NCC, which is computer infrastructure owned and managed by the state),
- **hybrid computer cloud** (HCC, which is computer infrastructure prepared in accordance with recommendations and standards drafted by the state),

- **innovative computer cloud** (ICC, which is computer technology using cloud computing concepts intended for the development of new applications and systems with the use of open data and open standards).

The key infrastructure for the public sector consists of the HKOM network and the computer infrastructure of larger ministries that is planned to be replaced by the NCC or combination of different computer clouds in 2015. The renovation of the state IT is based on consolidation of resources and the transition to a centralized management of the IT infrastructure in accordance with the guidelines of cloud computing. NCC is the code for the uniform computer infrastructure owned and managed by the state. Provided in this infrastructure are services that use sensitive, personal and other data and information that the state does not want to save outside its environment. NCC is based on reference architecture that enables systematic and consistent approach in introducing new information services.

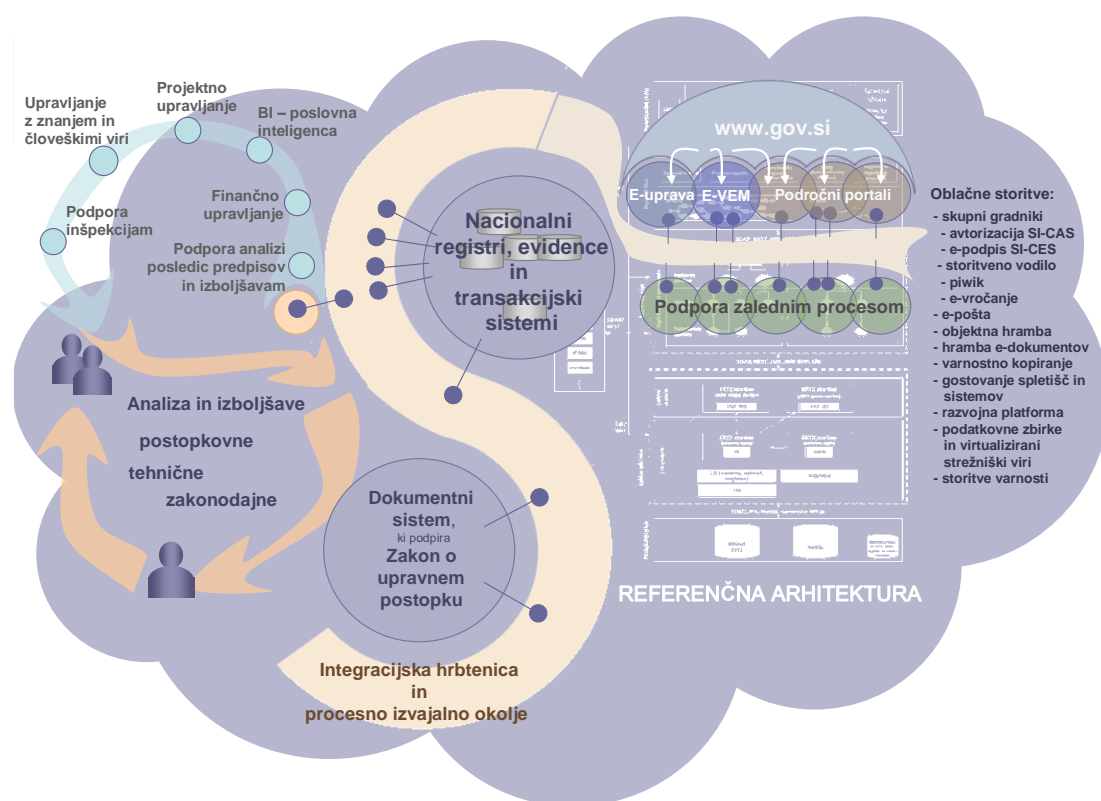


Figure 10: Design of national computer cloud - NCC (Source: MPA)

The Academic and Research Network of Slovenia (ARNES) is the key actor in service infrastructure for public institutes. The primary field of operation of the Arnes public institute is to provide ICT services to research, educational and cultural organizations. For these organizations, Arnes provides internet access, a variety of e-services, for example e-mail, video conferences, cloud computer services (disc fields, virtual servers), manages the Slovenian GRID network and oversees the operation of the Slovenian part of the Eduroam wireless network association. In addition, it provides technical support to connected organisations and oversees the safety of their networks.

The cooperation of research groups that are geographically dispersed is increasingly becoming the foundation for excellent achievements in science and research. Research groups can cooperate more efficiently through simply accessible and trustworthy services for scientific data, computing power and

network integration, which is enabled by scientific e-infrastructure. Thus ICT have lately altered the manner of research work, which shows in the implementation of new research approaches and methods in almost all fields of research, termed e-science. Thus the Resolution on Research and Innovation Strategy of Slovenia 2011-2020 defines the following two objectives in the field of IT infrastructure: strengthening the basis of scientific e-Infrastructure which supports Slovenian research community, and free access to raw research data from public funding.

The basic components of scientific e-infrastructure, without which there is no excellent and internationally comparable science, are reliable and fast networks that enable integration into the international research network GÉANT and e-science network GRID, which enable scientists to efficiently and quickly solve complex scientific problems, access all large-scale scientific databases and participate in international virtual multidisciplinary research groups or have an option to create new research environments. Ever since its establishment, Arnes has provided appropriate scientific e-infrastructure and support for all research organisations regardless of their areas of work. It is estimated that the needs for scientific e-infrastructure will rise dramatically, and it is expected that Arnes will duly keep up with the progress.

Slovenia is facing a lack of capacities for permanent data storage in e-education, cultural heritage and original scientific data. The principle of e-schoolbag is being introduced, and multimedia e-textbooks and educational TV are being developed. Production of comprehensive multimedia works is being intensely developed in the cultural field. Unlike traditional production stored in physical form, new cultural products are being produced electronically. Proper care for cultural heritage requires archives as well as the secure storage of copies at individual institutions. Similar is true for the storage and publication of original scientific works. One of the fundamental scientific assumptions is the verifiability of scientific findings. Such e-access to scientific works is foreseen also on the EU Horizon 2020 perspective. Modern research e-infrastructure should be established that will enable researchers competitive working conditions and equal inclusion in international cooperation.

Contemporary educational processes require further development of e-services supporting the introduction of new approaches in education. School children are digital natives and justifiably expect appropriate modern school environment, so further investments in Arnes' service infrastructure. Investments in the development of a modern, more powerful, more accessible and safer educational infrastructure and further development of e-services and e-content will improve the quality and efficiency of education and training and, consequently, the flexibility of the individual to the changing needs of the labour market and active participation in social processes which require ever-improving ICT skills. The learning process based on the greater use of the opportunities offered by ICT in the processes of education will contribute to the greater motivation and activation of users, i.e. pupils, college students and participants in adult education. At the same time, greater use of ICT by teachers will increase the accessibility of knowledge and skills as well as increase the competitiveness and qualifications of educators. A precondition for increased use of e-learning (e-services and e-content) is an advanced ICT infrastructure, while it is also important to integrate various stakeholders and develop new models of operation and of conducting different activities. Powerful fibre-optic connections of educational institutions, modern wireless networks, cloud computing for education, upgrade of service, storage, HPC and GRID infrastructure is a prerequisite for the development of e-services and e-content that will increase the use of modern approaches supported by the innovative and intensive use of information and communication technologies in education.

Pursuant to the provisions of the Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC (eIDAS Regulation)²⁷, there is a need to adapt national legal framework, establish appropriate organisation and infrastructural environment for managing electronic identities, which includes the planned supervision, recognition and adoption of notified elements for electronic identification of other member states, and reporting functions. The already established services of public sector that are foreseen and make sense for cross-border use will have to be adapted to these changes. In accordance with Regulation (EU) No. 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility (CEF Regulation)²⁸, the development, maintenance and operation of the common European interoperability infrastructure for cross-border management of electronic identities will be financed from the funds of the Connecting Europe Facility until 2020. CEF funds may also provide resources for certain activities for connecting national solutions to common infrastructure, while the rest will be the responsibility of member states themselves. For establishing the national infrastructure for cross-border e-services of e-government, Slovenia will primarily use European development funds 2014-2020 that are available. The implementation of the eIDAS regulation as a DAE measure for increasing trust in electronic transactions in the internal market will involve high costs, whose burden will be shared by different stakeholders. Providers of services of trust will most probably transfer the higher costs of these services to end users. To minimize these costs, Slovenia will offer the national infrastructure for cross-border e-government services, or the use of notified identification schemes, also to the private sector, which should further contribute to the development of new services and economic growth.

Investments in targeted infrastructure development and e-services will unify the access to services, realise the possibility of cross-border e-commerce and make public services more user-friendly, which in turn may mean an increased use of public administration services. The development of supportive e-infrastructure must apply the principle of cloud computing, with the need to seek synergistic effects between the information infrastructure of public administration and infrastructure of the Arnes public institute, and create the conditions for long-term preservation of digital objects (data, documents, audio-visual content). The development of new innovative services will be further supported by the use of the principle of pre-commercial public procurement.

Open Data of the Public Sector

The process of opening up public sector information and facilitating their widespread re-use through dedicated portals has become increasingly prevalent in many of the world's most developed countries over the past decade. The regular functioning of state institutions generates a huge amount of data, which may have broader practical value for other institutions as well as enterprises and research institutions, and may be an important raw material for modern services and products with high added value and represent a great potential for growth, innovation, competitiveness and prosperity. According to some estimates, the right approach could annually generate as much as 40 billion EUR at the EU level.

²⁷ <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1424705868473&uri=CELEX:32014R0910>

²⁸ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013R1316>

Positive effects of this process are also expected within the institutions of public administration, since opening, networking and data sharing can significantly improve the efficiency and connectivity of internal business processes in public administration, but also raise the digital competencies of civil servants and society as a whole. At the same time it also increases the transparency of public administration, which provides citizens and non-governmental organizations effective control and real-time notifications about possible errors, non-optimalities or irregularities, thus indirectly improving the efficiency of the institutions of public administration and optimal use of resources.

Individual EU member states have different approaches to opening public sector data, while an increasingly active role in promoting and standardising these processes has been also assumed by the EC. Within the EU, a major emphasis has been placed on online publication of the full data sets, i.e. open public sector information, which is information in open, machine-readable formats so as to allow for further re-use (analysis, processing) by citizens, non-governmental organizations, media and others. Good practices of the re-use of public sector data suggest that it is possible to create applications with significant added value on the basis of raw public data.²⁹ It is therefore necessary to ensure that authorities open their data for re-use, mainly through the Slovenian portal of open data.

In Slovenia, a central point for the publication of open data portal was established in the context of national interoperability framework, namely the NIO³⁰ portal, where some interesting data sets are already openly published; in addition, a lot of useful data have been separately published elsewhere across institutions. In the upcoming period, institutions will have to be encouraged to increase the quantity and applicability of the openly published data, and users will have to be encouraged to put these data to good use.

Directive 2003/98/EC on the re-use of public sector information³¹ provides the conditions on which public administration authorities should make data and documents available to users for re-use. According to the EPSI platform³², Slovenia has achieved 265 out of 570 points in the re-use of public sector information. These obligations can be realized only in the event that there is modern infrastructure for spatial information, in the context of which the information and the services are appropriately standardised. Infrastructure for the spatial information will be established as an integral part of the national information and communication infrastructure in Slovenia and will, by linking key registers of public administration on the basis of common identifiers, enable data sharing, interoperability and effective e-operation of the public sector, as well as offer opportunities for faster development of entrepreneurship and research. The established spatial information system will facilitate support for spatial management and real estate management throughout the country. By introducing e-business, established network services (search, view, download, transformation, etc.) for spatial and real estate data, and overhauling information on real estate records will help speed up the implementation of administrative procedures and more effective operation of the public sector.

Establishing an infrastructure for spatial information in the country includes the development, compliance and use of nationally and internationally recognized geospatial standards. The use of

²⁹ E.g. re-use of data on financial transactions of authorities in the Supervisor application, or re-use of data on deputies attending National Assembly sessions (www.virostatiq.com), or re-use of data on caves that enabled the production of the e-cadastral of caves (www.katasterjam.si).

³⁰ <https://nio.gov.si/nio/>

³¹ <http://eur-lex.europa.eu/legal-content/SL/TXT/PDF/?uri=CELEX:32003L0098&from=SL>

³² <http://www.epsiplatform.eu/>

standards will enable the effective and efficient creation, sharing, exchange and use of geospatial data, open data transfer between organizations, platforms and applications, and promotion of innovation, reduced transaction costs and increased transparency, which allows international compatibility and collaboration within the market. A guarantee of easy and open access to spatial data and services, as well as their interoperability and sharing, can enable the private sector and research organizations faster development of services with significant added value and eliminate a multitude of administrative burdens in this area.

the basic infrastructure for this access to spatial data is established by the INSPIRE Directive³³. This concerns only spatial data, while the infrastructure for the manner of communication is not envisaged for all other types of data. In Slovenia, the situation regarding spatial data communication is bad. The only state authorities that publish their services in machine-readable form are ARSO and GURS. The latter service is only available to users within HKOM, while that of ARSO is publicly available. Access to data has broadened. The establishment of the common infrastructure for spatial information will offer users a single spot for easily accessible and understandable as well as linked and standardised important information on the state of the physical environment. Processes in spatial planning, building construction and real estate management will be optimised. This will create conditions for eliminating structural deficiencies and administrative barriers in spatial planning and building construction, which will boost the performance of public administration. A faster investment cycle will be made possible, which will boost economic growth in Slovenia and contribute to long-term economic development and increase the welfare of the population. Simply accessible spatial data and services will stimulate enterprises to develop new, innovative services.

According to the amended Directive on the re-use of public sector information (2013)³⁴, liable entities include institutions working with cultural heritage (museums, galleries and other institutions), libraries and archives, which also brings additional challenges in the digitisation and online accessibility of cultural content on the level of harmonizing the law governing copyright and related rights, in particular between the competent ministry and the Ministry of Culture, because it is primarily an activity of public institutions in culture and public broadcasting.

Digitisation of Cultural Heritage

Slovenian cultural establishments have successfully digitised a number of digital content and successfully participated in international projects in the area of digitisation, whereby the array of content for Europeana (238,000 Slovenian digitised objects were submitted to Europeana by December 2014) provides for improved compatibility with international standards, connectivity and integration of Slovenian digital cultural content in the European environment. Since 2009, the National and University Library has functioned as the national aggregator of cultural e-content, where the central task is to enter metadata in the European digital library Europeana and other interested international portal. Cultural public institutions and non-governmental organisations underuse the services of the aggregator as a path to Europeana. Particularly lacking is the digitalisation of archive materials, especially in film or audio-visual heritage; but this is a burning issue of the entire European film heritage because of the complex issue of copyrights.

³³ <http://inspire.ec.europa.eu/>

³⁴ <http://eur-lex.europa.eu/legal-content/SL/ALL/?uri=CELEX:32003L0098>

In the context of implementing the DAE, the ministry competent for culture encouraged the drafting of the Guidelines for capturing, long-term conservation and access to cultural heritage in digital form³⁵. The document addressed the capturing and long-term conservation of and access to digital content in the form of guidelines that are of assistance to all involved in digital content in culture. The Guidelines were made to accelerate the development of digitisation, an effective use of digitised and originally digital content in culture and to create conditions for entrepreneurial, creative, educational and academic use of digital cultural content.

Interoperable framework, integration of digital cultural content and re-use of digital cultural content at the national level are underdeveloped in practice. The lag in the digitisation of some materials, especially audio-visual, is significant. According to the data on statistical measuring of digitisation (December 2013) in the framework of the European project Enumerate³⁶ where 57 (out of 170) institutions were involved (museums, archives, libraries, RTV archive and others), some 17 % of all material was digitised by participating cultural institutions, whereas only 52 % of material still needs to be digitised and less than 40 % of already digitised material is accessible online. Council conclusions of 10 May 2012 on the digitisation and online accessibility of cultural material and digital preservation (OJ C 169, 15 June 2012) set specific objectives with regard to digitisation, i.e. 30 million digital objects in Europeana by 2015 (digitisation and online accessibility of Europe's cultural heritage by 2025) - for Slovenia, the framework objective is 318,000 objects by the end of 2015 - and all public artwork accessible through Europeana by the end of 2015.

According to the amended Directive on the re-use of public sector information (2013), liable entities include institutions in cultural heritage (museums, galleries and other institutions), libraries and archives, which also brings additional challenges in the digitisation and online accessibility of cultural content at the level of harmonization of the law governing copyright and related rights, in particular between the competent ministry and the Ministry of Culture, because it is primarily an activity of public institutions in culture and public broadcasting.

With respect to copyright and legislation in intellectual property, an efficient implementation of the Directive no. 2014/26/EU collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online uses in the internal market is important for the development of cultural creativity (music, audio-visual culture) and accessibility of cultural heritage.

The provision of long-term preservation of digital cultural content in Slovenia is not systemically regulated. Although institutions try to ensure basic material protection, there is no systematic long-term preservation of digital materials in the sense of applicable recommendations and standards³⁷. Most institutions try to ensure the preservation of cultural heritage by its own infrastructure, but face

³⁵

http://www.mk.gov.si/fileadmin/mk.gov.si/pageuploads/Ministrstvo/Zakonodaja/2013/Smernice_za_zajem_dolgotrajno_ohranjanje_in_dostop_do_kulturne_dediscine_v_digitalni_obliki.pdf

³⁶ <http://www.enumerate.eu/>

³⁷ According to the data of statistical measurements of the state of digitisation (December 2013) in the framework of the European project Enumerate, only 26% of institutions (of 57 participants) stated that they had a written strategy for the preservation of digital resources (mainly libraries), while less than half (48%), however, keep digital databases in digital archives which were set by international standards for long-term preservation of digital resources.

its insufficiency (insufficient capacity) and high implementation and maintenance costs, so they often choose to store their materials with providers of storage services in Slovenia and abroad, even in computer clouds. Strategic documents for long-term preservation have not been adopted at the national level; they exist only for the Slovenian public archive service and the National and University Library. Both have adopted the strategy of long-term preservation of e-materials; the strategy for the Archives has been confirmed by the Government of the Republic of Slovenia and is now implemented (in 2010, the Government adopted the Strategy for Developing the Slovenian Public Digital Archives (e-ARH.si) and confirmed its implementation plan and project organisation). Cultural institutions need a long-term common strategy for preserving digital cultural heritage, better interaction (coordination), exchange of experience and, if possible, a common information infrastructure.

E-services in culture are underdeveloped. Administrative and professional processes of cultural heritage protection, of archives and library material and processes in the area of creativity and media lack information support. Processing of archives and library material does have full support, whereas in the area of non-movable cultural property only non-movable cultural property register is being held and partially a register on guidelines and spatial acts, systems for museum documentation are likewise incomplete. The existing systems do not meet the digitisation challenges and are in great need of updating. The optimization of business processes and the use of modern ICT tools can provide more efficient public services and the functioning of cultural public services, while ensuring other stakeholders the availability and connectivity of data and facilitating the development of related e-services.

9.3.3 Digital Entrepreneurship

Only a strong ICT sector can ensure economic growth and efficiently address the challenges of the modern society. Intense use and investments in ICT strongly affect GDP and productivity. In the USA and Europe, ICTs are responsible for 6-7 % of GDP and for 50 % of productivity growth after 1995. The industry of mobile applications in the EU constitutes 22% of the global production and generates more than €10 billion per annum; at the foreseen annual growth of 10 per cent it may generate €15 billion per annum in 2016. It directly employs about 530 thousand people - 800 thousand, if related jobs are considered³⁸. DAE sees efficient and innovative use of ICT and the internet as one of the key opportunities for the economic growth in Europe since ICT, as the key enabling technology at the horizontal level, improves the competitiveness of other sectors, too. Intense and innovative use of ICT brings a strong potential for reducing operation costs, increasing the efficiency of work, strengthening innovation capacities, improving the engagement of consumers and extending to new markets. DAE establishes that a smart use of ICT facilitates the tackling of other challenges of the contemporary society, such as climate change and ageing of the population, reduces the consumption of energy, increases traffic efficiency and mobility and the influence of the sick and disabled.

The outstanding potential of digital technologies is little exploited in Europe, as only 1.7 % of European enterprises fully exploits new digital opportunities.³⁹ The consequences are extraordinary. Slow introduction of ICT in Europe resulted in the 50-per cent difference in growth between the EU and the

³⁸ <http://www.visionmobile.com/product/the-european-app-economy/>

³⁹ International Data Corporation (IDC) 2013

USA from 1995 to 2007⁴⁰. While 47 % of EU citizens already shop online, only 14 % of small and medium-sized enterprises use the internet to sell products and services and less than 2 % of European businesses fully exploit the advantages of the new wave of advanced digital technologies, such as mobile communications, social networks, cloud computing, big data analytics and the internet of things. The fact is that European enterprises do not adapt to the new digital environment at a satisfactory pace.

In its 2014 Development Report, IMAD states that the share of investments in ICT among all investments in RDI in 2012 was only 12.5% and was well below that of most EU Member States. Slovenia's lagging behind in RDI investments in the ICT sector⁴¹ has a direct negative impact on economic growth and jobs, which is more strongly reflected in the time of economic crisis. Providing support to the private sector in promoting RDI in ICT is therefore a necessary measure for achieving the DAE objectives and harnessing the opportunities brought by ICT to ensure permanent economic and social benefits. Priority areas of use are identified by the Slovenian Smart Specialisation Strategy (SSS)⁴², which recognises the ICT field as a strongly developed area where Slovenia has several competitive advantages. Owing to the horizontal nature of the field, high synergistic effects and complementarity with other SPS domains are expected because of its high level of development.

Slovenia has a critical mass of school-goers and professionals from the ICT technical sector. A weakness perceived on the basis of experience from the previous financial perspective is a low level of commercialisation of knowledge and entrepreneurial ideas. The key reasons for such a situation include the absence of a suitable, stable, specific development environment that helps young and newly established internet entrepreneurs develop their ICT-related entrepreneurial ideas. Typical of such enterprises are a strong growth potential, small initial investments in equipment, and quick access to global markets. Although Slovenia has an active supporting environment, these lack in dynamics, do not follow global trends and are not enough adapted to the needs of internet start-ups.

According to the Digital Entrepreneurship Project⁴³, more than 41 % of enterprises still do not use any of technologies such as cloud computing, social networks, big data or mobile technology. Only 2 % of enterprises in Europe make a full use of the mentioned technologies. The smallest share among organisations that use digital technologies is that of micro-enterprises and SME's. The above presents a major opportunity for the Slovenian ICT the private sector and new digital jobs and is an orientation for further investments and development for other industries. Very important for the extension of markets is the promotion of standards and interoperability for the purposes of the single digital

⁴⁰ Van Welsum, Overmeer and Van Ark, Unlocking the ICT Growth Potential in Europe: Enabling People and Business (European Commission Digital Agenda for Europe, 2013)

⁴¹ According to the OECD definition that is also used by Eurostat, the ICT sector consists of enterprises carrying out the following activities from the Standard Classification of Activities:

- ICT production sector: 26.1 Manufacture of electronic components and boards, 26.2 Manufacture of computers and peripheral equipment, 26.3 Manufacture of communication equipment, 26.4 Manufacture of consumer electronics, 26.8 Manufacture of magnetic and fibre-optic media;
- ICT service sector: 46.5 Wholesale of information and communication equipment, 58.2 Software publishing, 61 Telecommunications, 62 Computer programming, consultancy and related activities, 63.1 Data processing, hosting and related activities; web portals, 95.1 Repair of computers and personal and household goods.

⁴² Slovenian Smart Specialisation Strategy S4, basis for the conclusion of harmonisation of 10 July 2015; http://www.svrk.gov.si/fileadmin/svrk.gov.si/pageuploads/Dokumenti_za_objavo_na_vstopni_strani/SPS_10_7_2015.pdf

⁴³ <https://ec.europa.eu/growth/tools-databases/dem/>

market. Besides direct investments, a suitable business environment has to be provided to enable and encourage successful ICT enterprises to stay in Slovenia. According to annual studies of GEM (Global Entrepreneurship Monitor⁴⁴), Slovenia has ranked at the very bottom of examined countries in terms of the situation of entrepreneurship and entrepreneurial dynamics in the recent years. The research also established that there was a lack of financial mechanisms for the set-up of new, growing and innovative enterprises in 2013. The weaknesses impeding the development of entrepreneurship in Slovenia include the lack of entrepreneurial culture, notably a negative climate for entrepreneurship, underestimation, attitude to success and entrepreneurial individuals, lower inclination to risk as well as a lack of an internal entrepreneurial culture of the existing enterprises. Slovenia needs to establish enabling legislative frameworks and a generally friendly business environment for ICT enterprises in their start-up period and at later stages of development. The development of the digitisation of entrepreneurship and introduction of new ICT and their full exploitation are hampered by irrational legislative restrictions that are not adapted to the digital environment. All amended and new legislation should pass the so-called digital test which would also examine the impact on digital technologies. A more important role in creating favourable environments for digital environments should be taken by regions and cities as actors coordinating various initiatives (e.g. in the framework of smart cities).

Re-use of information of a public nature is of particular importance. It represents a major challenge for both research institutions and economic operators; for the former, this is the space for making recommendations for systemic or organisational changes, for the latter it is a primary or additional source of income; open data may, in fact, serve as a basis for creating new e-services for citizens and businesses which, in turn, create new market opportunities. The NCC established in the framework of the public sector will also serve as an appropriate platform enabling the sending of open data and services, opening the possibilities for new innovative solutions and serving as the basis for future projects in different fields. Particularly important will be the development of the new innovative development cloud (IDC) as a key platform for an innovative development of applicable solutions using open data and open services systematically provided by projects for e-administrations. In addition to the overall agreement of professionals, the concepts set also open opportunities for SMEs and innovative individuals as the integration and sharing of information generated within public administration create a range of opportunities for innovative new e-services, mobile applications, and subsequently for creating new digital jobs by training and education of individuals and SMEs. They also open opportunities for the accessibility of ICT tools for developing and testing future commercial applications. Support provided to the new digital jobs will combine "knowledge", "information" and "tools", while successful implementation will create new jobs in ICT, speed up the retraining of redundant workers and self-employment without investments on the basis of the idea of the rapid reorientation of citizens (start-ups, young, hard-to-employ, disabled, unemployed persons, etc.) towards jobs with high added value and towards the production of marketable services.

9.3.4 Cyber Security

Important at the EU level are the boosting of cyber resilience, considerable reduction of cybercrime, development of policies and capacities of cyber defence related to the common security and defence

⁴⁴ <http://www.gemconsortium.org/docs/download/3344>

policy, development of industrial and technological sources for cyber security and determination of a harmonised international EU policy for cyberspace and promotion of the fundamental EU values.

The EU international policy for cyberspace promotes respect for the fundamental values of the EU, sets standards for responsible behaviour, calls for the use of already existing international laws in cyberspace, and simultaneously helps countries outside the EU and promotes international cooperation on cyber issues by developing cyber security capacities.

The EU has significantly improved protection of citizens against cybercrime since it created a European Cybercrime Centre, proposed legislation in relation to attacks on information systems and established a global alliance against child sexual abuse on the internet. The EU Cyber Security Strategy also constitutes a framework for developing and financing the network of national centres of excellence for cybercrime, which will facilitate access to training and increase capacities.

Slovenia has worked towards a systemic regulation of the area of cyber security for some time. There have already been a few proposals for systemic arrangement of cyber security, however, their implementation never took place. Nevertheless, it became clear that the country needs a cyber security strategy that would join and direct the efforts of all stakeholders toward strengthening and systematically regulating this important area.

Currently, the operational capacities to respond to cyber threats are distributed among SI-CERT⁴⁵ as the national response centre for network incidents, the Information Security Sector within the IT Directorate at the Ministry of Public Administration, the Ministry of Defence within the framework of the systems for defence and protection against natural and other disasters, SOVA in counter-intelligence activities, and the Police within its IT and telecommunications Office and the Criminal Police Directorate, mainly in the Centre for Computer Investigations with the capacities to combat cybercrime. Apart from the Police, which in the past five years has improved its capacities for investigating and preventing cybercrime, all other bodies lack personnel, material and technical resources, and organisation. Despite the shortcomings, the capacities at the operational level do exist though a coordination body that would link the concerned stakeholders at the strategic level is missing.

According to SI-CERT data⁴⁶, 2060 incidents were handled in Slovenia in 2014, which is almost a 6.4-fold increase with respect to 2008. The growing trend which raises concern according to the above-mentioned deficiencies in the system of ensuring cyber security is apparent from the presentation of incidents addressed over the years and from the table that classifies incidents by category, which

⁴⁵SI-CERT (Slovenian Computer Emergency Response Team) is the national response centre for addressing incidents from concerning the security of electronic networks and communications operating within the Arnes public institute since 1995. It coordinates the resolution of incidents, provides technical consultation in the events of hacking, computer infections and other abuses, and issues warnings about current threats in electronic networks for network administrations and broader public. It currently carries out the tasks of the governmental response centre (SIGOV-CERT) and assists in the establishment of an autonomous centre to protect the information infrastructure of the state administration. SI-CERT is a member of the global Forum of Incident Response and Security Teams (FIRST), a member of the group of national response centres at CERT/CC, member of the working group of European response centres TF-CSIRT and is accredited in the Trusted Introducer programme. SI-CERT is the Slovenian contact point for the security authority of the Secretariat-General of the Council of the European Union and the national information point for the IMPACT programme of the International Telecommunication Union (ITU).

⁴⁶ Data for 2014, which have not been made public yet. Reports for previous years available at <https://www.cert.si>.

showed an increase in comparison to the previous year from 23.82% in technical attacks to 59.43% in fraud and deception.

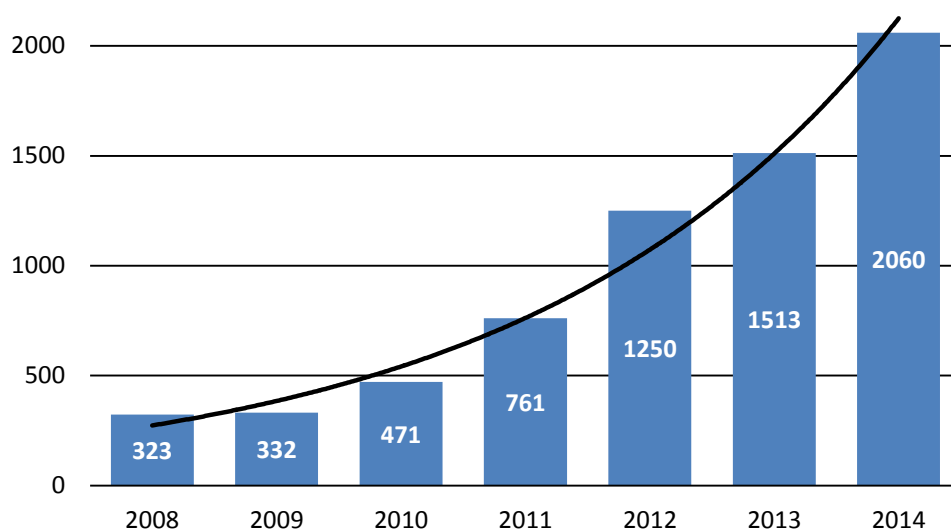


Figure 11: Number of incidents addressed per year (source: SI-CERT)

Type of incident	2008	2009	2010	2011	2012	2013	2014	Increase in 2014 in comparison to 2013
Technical attacks	183	145	209	350	604	760	941	23,82 %
Swindling and fraud	49	84	122	227	442	525	837	59,43 %
Questions and claims	86	88	121	174	189	193	239	23,83 %

Figure 12: Number of incidents by categories (Source: SI-CERT)

Stakeholders in cyber security assurance, rather than being formally regulated, participate on an informal basis mainly between response centres, unless there is a legal basis for it⁴⁷. This includes providing information about incidents and help in their resolution, the exchange of experience or the use of existing capacities. An opportunity to establish cooperation is found, inter alia, in conducting joint international cyber security exercises, organised by the European Network and Information Security Agency (ENISA)⁴⁸. Thus, such cooperation has already been established with some banks, telecommunication providers and electricity distributors.

There are two awareness-raising projects: since 2011, SI-CERT has worked to raise national awareness and holding the educational program "Safe on the Internet"⁴⁹. The project's key objective, which is targeted at the general Slovenian public, and with a specific set of content also at small enterprises, craftsmen and sole proprietors, is to raise the awareness on the safe use of the internet. The project,

⁴⁷E.g. Article 81 of the Electronic Communications Act determined the information exchange procedure between AKOS and SI-CERT upon breaches of security of networks and services and of breaches of network integrity. Electronic Communications Act. In: Uradni list RS [online], 2012, no. 109/2012, Article 81. Available at: <http://www.uradni-list.si/1/content?id=111442>.

⁴⁸ European Union Agency for Network and Information Security (ENISA)

⁴⁹ <https://www.varninainternetu.si/>

which is financed by the Ministry of Education, Science and Sport, is also participating in the campaigns of the European month of cyber security.

Within the framework of the Centre for Safer Internet, which is run by a consortium consisting of the Faculty of Social Sciences, Arnes, the Slovenian Association of Friends of Youth and the Youth Information and Counselling Centre of Slovenia - MISSS ⁵⁰ and funded by the Directorate-General Connect of the European Commission and the Ministry of Education, Science and Sport, SAFE.Si ⁵¹, TOM Telephone and the Web Eye projects are being carried out. SAFE.SI program operates as a national point for raising awareness among children and adolescents about the safe use of the internet and mobile devices. The TOM Telephone program also informs children and adolescents about the safe use of the internet and mobile devices. Web Eye is an online reporting point, which – in partnership with the police, prosecution, Ombudsman for Human Rights, internet service providers, public and other interested governmental and non-governmental organisations – allows anonymous reporting of material allegedly containing instances of the sexual abuse of a minor and hate speech on the internet, and raises awareness on the problem of illegal web content.

In the education sector, IT or cyber security is included in the higher school study programme at the Faculty for Security Studies of the University of Maribor, and in the curricula of study programmes at the Faculty of Computer and Information Science and the Faculty of Social Sciences of the University of Ljubljana, at the Faculty of Electrical Engineering and Computer Science of the University of Maribor, the Faculty of Health Sciences of the University of Primorska, the Faculty of Information Studies of Novo mesto, and the licensed independent higher education institution GEA College; as part of the corporate security subject it is also included in the study programs at some other higher education institutions. No subject in this area is taught at the primary and secondary school levels.

Slovenia participates in international cyber security exercises as its resources allow. In the Cyber Europe exercises organised by ENISA in 2010 Slovenia took part as an observer and in 2012 and 2014 as an active participant. Furthermore, from 2013 on, it actively participates in Cyber Coalition cyber defence exercises within NATO. Participation in these exercises proved to be a good opportunity to check the capacities for cyber security assurance at the national level, as well as to exchange experience and establish new connections between stakeholders. An exercise in national cyber security has not yet been carried out.

9.3.5 Inclusive Digital Society

Numerous studies have reported a low level of computer use in the population over 50, a low level of activities and policies for the introduction of e-skills, while the starting points in education are the lack of ICT skills among teachers and professors, insufficient public sector funds for adequate training, a general lack and obsolescence of ICT equipment and the education system that gives students too much theory and not enough practice.

The lack of digital skills in persons entering the labour market, including employees, is a major obstacle for the further technological modernization of enterprises and the economic development of the country. Digital illiteracy hampers economic growth and employment as well as personal development.

⁵⁰Youth Information and Counselling Centre of Slovenia.

⁵¹ <http://safe.si/>

It is accordingly important that the already established mechanisms for increasing the access to ICT are joined by further measures for their increased use and development of new services that will better suit the requirements of the digital age, which will also boost the competition in developing new employment opportunities in the labour market.

In March 2013, the EC launched the Grand Coalition for Digital Jobs⁵² (hereinafter: the Grand Coalition), whose aim is to not only slow down the decrease in the number of ICT experts by 2015 but also increase the number of experts to fulfil the needs for such labour by 2020. The Grand Coalition helps promote and boost the efforts for European development policies such as DAE, Employment Package, Opening up Education Initiative⁵³, Rethinking Education Strategy⁵⁴, Youth Opportunities Initiative⁵⁵ and EU Skills Panorama⁵⁶. As a part of further endeavours in the framework of the Grand Coalition, the EC encourages the Member States to establish local or national coalitions for digital jobs, i.e. strategic national partnerships for digital jobs in the EU Member States. The principal objective of these coalitions is to work with interested parties registered in the Member States in order to provide special digital skills to the young, stimulate them to choose ICT careers and connect them with the trainings of private sector for new jobs.

With the aim of drafting measures for providing web-accessibility, the EC ordered an analysis⁵⁷ in 2014; the aim of the analysis was to provide an up-to-date description of the situation of web-accessibility monitoring in the countries covered, validate the monitoring methodologies for verifying compliance with national provisions on web-accessibility and present a recommended monitoring methodology for the proposal for a Directive on the accessibility of public sector bodies' websites. The analysis also included Slovenia. Apart from this, no comprehensive analysis of the situation in the field of web accessibility has been made. The area is relatively poorly developed, with only some websites of public sector bodies being adapted for certain vulnerable groups. Also problematic is the fact that there is no established standard methodology of adaptation of web accessibility; this has led to a variety of practical solutions, most of which do not follow a comprehensive and inclusive adaptation of websites for all representatives of persons with disabilities.

⁵² <http://ec.europa.eu/digital-agenda/en/grand-coalition-digital-jobs-0>

⁵³ <http://www.openeducationeuropa.eu/sl/initiative>

⁵⁴ http://ec.europa.eu/languages/policy/strategic-framework/rethinking-education_en.htm

⁵⁵ <http://ec.europa.eu/social/main.jsp?catId=1006>

⁵⁶ <http://euskillspacepanorama.cedefop.europa.eu/>

⁵⁷ Monitoring methodologies for web-accessibility in EU: <http://monitor-wa.eu/>

9.4 Annex 4: List of indicators for measuring the success of DAE

A. ICT SECTOR	
A3	Scale of productivity level in the ICT sector in comparison with the total economy
A4	Growth of productivity in the ICT sector
A5	Size and nominal growth of ICT markets (IT and telecommunications)
A6	Expenditure for research and development activities of the ICT sector in terms of share of GDP
A6	Expenditure for research and development activities of the ICT sector in terms of share of all expenditure for research and development activity in the business sector (BERD)
A8	Expenditure for research and development activities of the ICT sector in terms of share of value added (in ICT sector)
A9	Imported and exported ICT products and services in terms of share of all imported and exported products and services
B. BROADBAND INTERNET ACCESS AND CONNECTIVITY	
B1	Broadband coverage: share of population with wired (e.g. DSL connection, cable or fibre-optic connection), wireless (e.g. WIFI, WIMAX, satellite connection) and mobile (e.g. EDGE, UMTS, HSPA) internet access (by regions).
B2	Number of subscribers in terms of nominal speed (256, 512, 1024 (Kb/s), 2, 4, 8, 16 (Mb/s))
B3	Price of broadband internet access
B4	Number of broadband subscribers per 100 inhabitants (in terms of type of access)
B5	Share of households who have internet access at home
B6	Share of household with broadband internet access
B7	Locations of internet access within the last three months
B8	Share of individuals accessing the internet through mobile internet connections
B9	Reasons for households not having internet access at home
B10	Share of employees who use a computer with internet connection in their regular work
B11	Share of enterprises with broadband internet access (fixed or mobile)
B12	Share of enterprises that provided their employees with portable devices for mobile internet access
B13	Share of employees that were provided portable devices for mobile internet access by their enterprises
C. SCALE OF USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN HOUSEHOLDS AND INDIVIDUALS	
C1	Share of individuals using the internet at least once a week
C2	Share of individuals using the internet daily or almost daily
	Personal communication:
C3	Sending or receiving e-mail
C4	Internet telephony or videotelephony
C5	Use of other means of communication (chatrooms, Messenger)
C6	Participation in social networks (Facebook, Twitter etc.)
	Use of entertainment content (internet radio, online games, music and videos):
C7	Listening to internet radio or watching internet TV
C8	Downloading games, images, films of music with the intention of sharing
C9	Transferring games, images, films and music (downloading)
C10	Internet gaming (online games)
	Access to information:

C11	Reading or transferring online papers or magazines (downloading)
C12	Subscription to news on services or products received regularly (including RSS, etc.) <i>(every second year)</i>
C13	Seeking information on health (injuries, diseases, nutrition)
C14	Seeking information on education, training, courses
C15	Seeking information on products or services
C16	Transferring other software (apart from computer games)
	Civil and political participation:
C17	Access to websites or posting opinions to websites (e.g. blogs, social networks etc.,) with the intention to discuss civil or political topics
C18	Participation in consultations, voting and online public opinion surveys on political topics
	Creativity (user-created content: images, music, blogs, Wikipedia):
C19	Designing a website or blog
C20	Uploading own content, i.e. content created by oneself (including software), on all websites with the intention of sharing
	Education:
C21	Participation in online course
C22	Use of wikis
	E-health:
C23	Arranging a doctor's appointment online
C24	Consulting a doctor online
	Management of personal financial or personal official affairs:
C25	E-banking
	E-trade:
C26	Sales of products or services
C27	Purchase of products or services
C28	Cross-border shopping
C29	Purchase of services related to travel and accommodation
	Professional life:
C30	Job seeking or sending job applications online
C31	Use of professional social networks
	E-skills:
C32	Share of individuals who can use computer (cannot, can to a limited extent, to a moderate extent, very well)
C33	Share of individuals who can use the internet (cannot, can to a limited extent, to a moderate extent, very well)
	E-inclusion:
	The analysis will be based on the indicators about the incongruity between the scope of the use of the internet and skills; these indicators will be aggregated by sex, age, employment status, education level, household income, area of residence, migrant status
Aggregated variables	Indicators about the scope of use of ICT in households and individuals will be aggregated by sex, age, employment status, education level, country of birth, country of citizenship, region, household structure, household income
D. SCALE OF USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN UNDERTAKINGS	
	Internal Procedures
D1	Integration of internal business procedures: share of enterprises whose internal business procedures are automatically integrated.

D2	Share of enterprises using user programmes for employees to access human resource services
	Integration with Customers or Providers and SCM
D3	Share of enterprises electronically exchanging business documents with providers and/or customers aggregated by type of document
D4	Share of enterprises electronically exchanging information on the management of supply chain aggregated by business function
D5	Share of enterprises sending or receiving e-invoices
	Key Technologies of the Internet of Things
D6	Share of enterprises using key technologies of the internet of things, by intention
	E-trade, customer relationship management (CRM) and security transactions
D7	Share of enterprises who have websites with e-trade functions
D8	Share of enterprises using software for customer information management, e.g. CRM
D9	Revenue of enterprises from e-trade in terms of share of total revenue
D10	Share of enterprises selling through e-trade
D11	Share of enterprises buying through e-trade
D12	Share of enterprises performing e-trade transactions; aggregated by destinations (within the country, EU, other countries)
Aggregated variables	The indicators of the scope of use of ICT in enterprises will be aggregated by activities of enterprises and by size classes of enterprises in terms of number of employees.
E. PUBLIC ADMINISTRATION SERVICES (E-GOVERNMENT)	
E1	Online accessibility and interactivity of 20 basic public administration services for citizens and enterprises
E2	Share of individuals using the internet for interacting with public authorities; aggregated by the level of sophistication of such cooperation

Source: Statistical Office of the Republic of Slovenia