

Ministry of Economic Affairs and Communications

# DIGITAL AGENDA 2020 FOR ESTONIA

## FOREWORD

Information and communications technology (ICT) has become the main tool for increasing competitiveness in every field of the economy and life. Therefore, any national strategy or development plan should take into account the opportunities offered and challenges posed by ICT.

In light of the above, the Digital Agenda 2020 for Estonia (hereafter Digital Agenda 2020) does not cover the use of ICT in various areas of life and policy, such as ICT in health care or business. The focus for the future will instead be on **creating an environment that facilitates the use of ICT and the development of smart solutions** in Estonia in general. The ultimate goal is to increase the economic competitiveness, the well-being of people and the efficiency of public administration.

The strategy sets out various measures and actions to achieve these objectives. Listed below are some examples of the priority initiatives and projects of the next seven years.

- Completion of the **next generation broadband network**. To date, the construction of about one third of the total 6,500 km fibre-optical cable network has been finished. By 2020, the development of the network will be fully completed. This means that all residents of Estonia will have access to fast (30 Mbit/s or faster) internet with at least 60% of households will be using ultrafast (100 Mbit/s or faster) internet daily.
- In the future, e-services will be increasingly cross-border. To support this, it would be practical for countries to join forces and not develop necessary basic service infrastructure on their own. Therefore, Estonia will initiate the creation of a **Nordic Digital Infrastructure Institute** — an international development centre for the joint development of X-Road, e-identity, digital signature and other components of the basic service infrastructure.
- **20% of the active population of the European Union (EU) should be using digital signature by 2020** to expedite business operations and facilitate management of personal matters. The take-up of digital signatures in the EU will be one of the primary goals of Estonia's foreign policy in the field of ICT and one of the priorities of Estonia's EU presidency in 2018.
- In the context of growing data volumes and widespread cross-usage of data, **greater control over the use of their personal data** will help people cope with certain loss of privacy. Both technological and organisational conditions will be developed to ensure that people would always know and be able to decide, who, when and for what purpose is using their personal data in the public sector.

- Technology, user habits and legislation are in a constant state of change. Therefore, ability to anticipate these changes and flexibility to adapt to these will become increasingly vital. Flexibility, however, means that we cannot get stuck to obsolete technologies. The experience of many countries shows that unless information systems are constantly redesigned, their administration costs will soar and the created “spaghetti architecture” will become impossible to untangle. To avoid getting stuck to old technology, **a reform of public e-services and the supporting ICT solutions will be carried out**. Estonian public services must be up-to-date with emerging technical possibilities and correspond to common quality requirements. Moreover, the so-called “**no legacy principle**” **will be introduced**, i.e. the public sector should not have any important ICT solutions that are older than 13 years.
- The government has an abundance of data at its disposal through the existing information systems and services. This information, however, is not often used to make better policy decisions or to provide better services. The **public sector’s capacity to apply data analytics solutions will be increased significantly** over the coming years.
- Estonia will start offering its secure and convenient services to the citizens of other countries. **Virtual residence or e-residence will be launched, meaning that** Estonia will issue non-residents with electronic identity in the form of digital ID cards. The aspiration for Estonia is to become as re-known for its e-services as Switzerland is in the field of banking.
- To ensure the continuity of the Republic of Estonia and of the state information system, a **concept of ‘data embassy’** will be introduced. This means that digital copies of all data and information systems critical for the functioning of the state will be securely preserved in ‘virtual embassies’ located in other countries. This will enable Estonia to ensure the continuity of the state ‘in the cloud’, making us more resilient in times of natural or man-made crisis.
- A reputation of Estonia as a hub for innovation and development on information society will be promoted. This will be done by sharing our experience in e-governance and to promote the underpinning concepts of information society, such as internet freedom, protection of privacy, etc. For this purpose, a **global information society think tank will be established in Estonia**.
- The existence of a competent and innovative partner and service provider, i.e. a competitive ICT sector, is important for the development of public sector ICT solutions and economy in general. **By 2020, the number of people employed in the Estonian ICT sector will have doubled**. Activities set out in the Estonian Lifelong Learning Strategy 2020 will contribute most to this. However, these actions will be complemented by the current Digital Agenda by promoting ICT careers and studies, plus raising the quality of higher education in the field.



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## INTRODUCTION

The impact of information and communications technology (ICT) on economic competitiveness, well-being of people and the functioning of public administration cannot be overestimated. According to an analysis conducted by management consultancy McKinsey,<sup>1</sup> the use of Internet alone accounts for 21 percent of GDP growth, with 75 percent of benefits captured by companies in traditional industries.

According to an analysis conducted by Eesti Arengufond (Estonian Development Fund), the estimated economic growth generated by the ICT sector in Estonia over this decade will be between 0.9 and 1.3%<sup>2</sup>. The EU also considers ICT as a key sector<sup>3</sup> to help the union to achieve the objective of its competitiveness strategy — smart, sustainable and inclusive growth by 2020. ICT has become a key driving force behind changes in all areas of life, including the rise of personal well-being.

The uptake of ICT enables companies to both optimise the current business processes as well as to develop entirely new and innovative products and services. Individuals will benefit from access to infinite information resources, such as world cultural heritage and learning materials that open much wider possibilities for personal development. Using ICT to provide public services will allow redirecting taxpayers' money from administrative tasks to solving the substantial issues. In addition, the use of ICT in public administration will simplify communication between public agencies and individuals/companies. These are just some examples of the many benefits ICT can offer.

From the autumn of 2012 to the spring of 2013, experts from private, non-governmental and public sectors came together under the aegis of the Ministry of Economic Affairs and Communications and the Government Office in order to set goals for the Estonian ICT policy and prepare the Digital Agenda 2020 for Estonia. The work was based on the understanding that ICT can be an important tool for achieving economic growth and improved quality of life, as described above. Harnessing such potential in full requires coordinated efforts of different parties. The purpose of elaborating the strategy was to discuss and agree on **how to best meet the national socio-economic development challenges in Estonia by 2020 by the smart use of ICT.**

The discussions focused specifically on the instruments and opportunities of the ICT policy. Therefore, this strategy does not deal with the uptake of ICT in various policy areas, such as the use of ICT in health care or business. The Digital Agenda focuses on **creating overall conditions for the**

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<sup>1</sup> "Internet Matters: The Net's sweeping impact on growth, jobs, and prosperity".

[http://www.mckinsey.com/insights/high\\_tech\\_telecoms\\_internet/internet\\_matters](http://www.mckinsey.com/insights/high_tech_telecoms_internet/internet_matters)

<sup>2</sup> Analysis by Eesti Arengufond "Smart Specialization – Qualitative Analysis" (2013) (Only in Estonian).

<sup>3</sup> EU information society policy "Digital Agenda for Europe" is one of the seven flagships of the Europe 2020 strategy. <http://ec.europa.eu/digital-agenda>

**development of information society and take-up of ICT, with the only special focus theme being the improvement of public governance by using ICT.<sup>4</sup>**

The discussions were based on the two strategic objectives laid down in the Estonian competitiveness strategy “Estonia 2020”: to increase productivity and employment through higher value added products and services.

In addition to the competitiveness strategy, it was analysed, how smart ICT solutions could contribute to solving the challenges identified in the sustainable development strategy “Sustainable Estonia 21”: environmental protection, preservation of culture, greater cohesion, and improved well-being. Although the attainment of these objectives largely depends on the overall improvement of the economy (i.e. increased productivity and employment), ICT can help to better preserve culture and language or meet other goals.

To increase competitiveness and ensure sustainable development, we need a state that functions efficiently and effectively. Therefore, besides the two above-mentioned horizontal strategies, the Digital Agenda 2020 is built on the recommendations of the OECD report of 2011<sup>5</sup> for the improvement of public governance. These recommendations primarily concern the need to increase the efficiency of public service provision and to improve the co-operation between different parts and levels of government.

As a result of these analyses and discussions, an information society vision 2020 was developed in close co-operation between the representatives of the state and the Estonian Association of Information Technology and Telecommunications (ITL). The vision describes what will have changed in Estonia by 2020 with the help of ICT and how this can be achieved. This is an ambitious vision that will serve as a basis for various sectoral strategies as well as for the development plan of the ICT sector that the association puts forward. This means that the government and the ICT sector will co-operate in order to realize the vision.

Then the Digital Agenda 2020 was drafted to outline ICT policy measures (i.e. the relevant objectives and actions) required for the realisation of the information society vision 2020.

The strategy was elaborated and will be implemented in accordance with the Principles of Estonian Information Policy<sup>6</sup>, adopted by the Riigikogu in 1998 and updated in 2006, which establishes the principles for the functioning of the public sector in the development of information society. The document also takes into account the lessons learned in the course of implementing the Estonian Information Society Strategy 2013 (the

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<sup>4</sup> See Order of the Government of the Republic on the approval of the elaboration of the proposed Digital Agenda 2020 for Estonia and the related documents: <http://infoyhiskond.eesti.ee/eesti-infouhiskonna-arengukava-2020/dokumendid> (Only in Estonian).

<sup>5</sup> <http://valitsus.ee/et/riigikantselei/oced-raport>

<sup>6</sup> The Principles of Estonian Information Policy, adopted in 1998: <https://www.riigiteataja.ee/akt/75308>. (Only in Estonian).

predecessor of the current strategy), the outcomes of discussions between different stakeholders, the results of background studies and analyses of trends<sup>7</sup> as well as the objectives of the Digital Agenda for Europe<sup>8</sup>.

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<sup>7</sup> <http://infoyhiskond.eesti.ee/eesti-infouhiskonna-arengukava-2020>

<sup>8</sup> <http://ec.europa.eu/digital-agenda/>

# 1. CURRENT SITUATION

The following overview is based on statistical data and the findings of various surveys; the assessment of progress in implementing the Estonian Information Society Strategy 2013<sup>9</sup>; the outcomes of and experience gained in the implementation of ICT-projects; as well as the results of workshops, meetings and conferences organised in the course of drafting the strategy.

## PROGRESS MADE SO FAR

The fundamental pillars of development of Estonian information society so far have been the following: public sector's active role in the uptake and procurement of innovative solutions and shaping the overall conditions for development; investments in new technologies by the banking and telecommunications sectors; and the readiness of our population to use new ICT-solutions.

The development and use of e-services requires **access to the internet**. In principle, the internet is accessible nearly everywhere in Estonia — in 2011, fixed broadband coverage in Estonia was 93.9%<sup>10</sup>. The construction of the Estonian Broadband Infrastructure Network (EstWIN)<sup>11</sup> in recent years has made also fast broadband available in many regions where it was absent until then. In addition, these investments ensure necessary conditions for future applications which will require huge data volumes, such as telemedicine or real-time virtual learning.

**Internet usage is rather high in Estonia:** In 2013, the internet was used by 80% of individuals aged 16 to 74 years.<sup>12</sup> Nearly 100% of young people use it and the number of users is growing steadily also among older generations. While in 2007 the internet was used by 32% of individuals aged 55 to 64 years, in 2013 the share of internet users in this age group was 63%. This means that the majority of Estonians are motivated to use the internet (i.e. the volume of interesting and useful content is sufficient) and have necessary skills for that. 95% of Estonian residents file their tax returns through the internet<sup>13</sup> and 90% of the working age population use internet banking<sup>14</sup>.

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<sup>9</sup> <http://www.riso.ee/et/infopoliitika>

<sup>10</sup> Coverage is a supply indicator meaning that in 2011, 93.9% of Estonian population had access to the internet. See Digital Agenda Scoreboard, <http://ec.europa.eu/digital-agenda/en/scoreboard>

<sup>11</sup> <http://ela12.elasa.ee/elakaart>

<sup>12</sup> These and the rest of the figures in this paragraph come from the “Information technology in households 2013” survey, carried out by Statistics Estonia.

<sup>13</sup> <http://www.emta.ee/index.php?id=34149&tpl=1026>

<sup>14</sup> According to Statistics Estonia, 90% of individuals aged 16 to 74 years used internet banking in 2013.

The acquisition of **basic ICT skills** has been a priority both for individuals and the government as well as for the private sector. Various campaigns and training courses aimed at improving digital literacy, such as the computer and internet training programme “Come Along!”, have been organised on the initiative of the private sector and with the participation of the public sector<sup>15</sup>. People’s awareness of the possibilities and threats of information society has been raised with the information society awareness programme<sup>16</sup>. Particular emphasis has been placed on safe online behaviour.

Several steps have been taken to **reduce labour shortage in the ICT sector** by increasing the number of students enrolled in ICT studies in universities. The Estonian IT Academy was established in 2012 in order to improve the quality of ICT training and increase its international competitiveness. The revised Aliens Act, approved in the summer of 2013, makes it easier to employ highly-qualified foreign ICT specialists in Estonia.<sup>17</sup> To ensure a new generation of ICT specialists, various campaigns promoting technological professions have been organised, often in cooperation between the public and private sectors. A SmartLabs initiative was launched by several ICT sector companies in 2012 to support ICT related hobbies among children and teenagers aged 6 to 19.<sup>18</sup>

The **development of e-governance**, in particular **the development of public e-services and the take-up of these by individuals and companies, has been significant**. Estonia leads the way in the take-up of electronic identity (eID) and the use of e-voting.<sup>19</sup> Electronic authentication and digital signatures enable paperless interactions and administration, which makes everyday business faster and more flexible for everybody. In Estonia you can establish a company within less than 20 minutes and without leaving your home. In 2011, 98.2% of businesses submitted their annual accounts electronically. Both individuals and companies find that public e-services help them to save time and money, and are largely satisfied with the provision of public services. In 2012, the satisfaction rates were 76% and 67% among businesses and individuals respectively.<sup>20</sup>

A significant volume of cultural heritage has been digitized and made available to individuals, e.g. the National Archives (including the Film Archive)<sup>21</sup> and the museums information system MUIS<sup>22</sup>. Various participation tools and platforms together with relevant guidance materials to promote their take-up<sup>23</sup> have been developed to help people make their voice heard.

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<sup>15</sup> <http://www.olekaasas.ee>

<sup>16</sup> <https://www.ria.ee/programme/>

<sup>17</sup> <https://www.riigiteataja.ee/akt/VMS>

<sup>18</sup> <http://www.nutilabor.ee>

<sup>19</sup> At the general elections of 2011, 24.3% of voters cast their votes electronically.

<sup>20</sup> “Green Paper on the Organisation of Public Services” (2013). (Only in Estonian).

<sup>21</sup> <http://www.ra.ee/vau/>

<sup>22</sup> <http://www.muis.ee>

The major strength of the national ICT policy so far has been the systematic development of the **state information system** and ensuring its security. The following principles of Estonian information policy have been built up and followed in the process: distributed service-oriented architecture, appropriate security of data and data exchange, web-based solutions, orientation towards e-services, and use of strong authentication tools. The basic infrastructure of the Estonian state information system or, in other words, the service infrastructure (X-Road, public key infrastructure and eID, the document exchange centre, state portal eesti.ee) has allowed us to improve public services with **ICT solutions fast and flexibly**. The distributed and interoperable state information system has created a good potential for Estonia to seize and benefit from the trend towards more and more devices and machines being connected to the computer network.

The existence of competent and innovative vendors, i.e. a **competitive ICT sector**, is vital for the development of public sector ICT solutions and the economy in general. Unlike many other industries that suffered during the recent economic slowdown, the ICT sector was able to increase exports significantly.<sup>24</sup> In 2012, the export of ICT services and products accounted for 12.5% of total exports.<sup>25</sup> Despite the sector representing only 4% of total employment, its productivity is considerably higher than that of other sectors. A proof of the good reputation of our ICT sector is the fact that several international ICT centres, such as TeliaSonera's development centre and the EU Agency for large-scale IT-systems have been set up in Tallinn.

Estonia's progress has additionally been driven by promoting the free and open internet at both national and international levels. According to reports issued by Freedom House<sup>26</sup>, Estonia is at the forefront of the freedom and openness of the internet: in 2010–2012 Estonia ranked first in terms of internet freedom and in 2013 the country came second after (new entrant) Iceland.

The digital solutions of both the public and private sectors have captured international attention and created a reputation for Estonia as a leading **e-country**. This is an important reference for our ICT companies when entering foreign markets. In addition, Estonia has achieved the status of a reliable partner and esteemed opinion leader on matters concerning information society and ICT development in various international forums, including the EU and the Open Government Partnership<sup>27</sup>.

## CHALLENGES

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<sup>23</sup> E.g. The Good Practices of e-Involvement prepared by the e-Government Academy, <http://www.ega.ee/files/e-Kaasamise%20soovitused.pdf>

<sup>24</sup> A survey conducted by Statistics Estonia on the information and communications sector.

<sup>25</sup> The information and communications technology sector's vision of information society in Estonia in 2020.

<sup>26</sup> "Freedom on the Net". <http://www.freedomhouse.org/report/freedom-net/freedom-net-2012>

<sup>27</sup> <http://www.vm.ee/?q=node/17953>

Although the communications network is available in most regions of Estonia, there are still **various locations** (in particular in low density rural areas) that **do not yet have access to the (fast) internet**. Looking ahead, it is worrying that there is no incentive for private market service providers to develop broadband networks in such areas in order to provide services to end users. In 2012, the European Commission noted in its Digital Agenda Scoreboard that fixed broadband coverage in Estonia is lower than the EU average and investments in broadband networks should be continued.<sup>28</sup>

Access to the internet depends not only on the availability of high quality infrastructure but also on **internet freedom and net neutrality**. In the information society, it is important that users have access to the internet and its content irrespective of communication channel, hardware, platform, etc. used. Signs of willingness to limit these options for the sake of security, copyright protection, censorship and greater privacy can be noted in some countries of the world. Such restrictions may violate the fundamental rights by limiting the freedom of expression, freedom to conduct business as well as the potential of productive use of ICT.

Modern communications infrastructure is a prerequisite not only for developing services targeted at businesses and individuals, but also for the functioning of numerous back-office services within government. Thus, public sector organisations also need better communications networks, including modern efficient radio communications.

Another infrastructure component required for the development of information society is a common (i.e. share between the public and the private sector) service space, the core of which is the **state information system**. Although the basic service infrastructure (X-Road, eID, state portal, etc.) has been systematically developed, rapid technological change forces us to **continue updating the infrastructure or replace its components, if necessary**. This is the only way to ensure continuous integrity and availability of infrastructure components as well as their compliance to confidentiality requirements. There is a need to assess the impact of the most important current technology trends (cloud technology, social media, mobility and increased volume of information) and future innovations (Internet of Things, advanced analytics, big data)<sup>29</sup> on the development of the state information system. Particular attention should be paid to **proper preservation of data and other digital content**. As a member state of the EU, we must ensure that businesses and citizens would be able to use services on a cross-border basis. This requires cross-border interoperability of the basic infrastructure. Options for developing basic service infrastructure jointly with other countries should also be analysed and piloted.

In order for public sector ICT solutions to function as a whole **interoperability** is a must. The principles of interoperability of the state information system have been agreed on, but their implementation is often a challenge. As ensuring interoperability is costly and benefits arising from it are not always in line with the needs and resources of a particular organisation, the organisations' own needs frequently tend to overshadow the wider aims

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<sup>28</sup> 87.7% of Estonian households have access to fixed broadband while the EU average coverage is 95.5%.

<sup>29</sup> The trends in brackets are explained in detail in the paragraph "Trends" in Chapter 1.

of interoperability. While in the public sector, technical interoperability has been largely achieved. At the same time, main challenges remain at legal, organisational and semantic levels, and the interoperability between the private and public sectors is inadequate at all levels. In other words, the common service space is not functioning as a whole in Estonia yet and this is hindering, for instance, economic productivity.

We should bear in mind that people can only benefit from the infrastructure and services if they have **skills and motivation** to use them. Although internet penetration in Estonia is slightly above the EU average, we should not overlook the fact that there are **about 300,000 individuals in Estonia who do not still use it**<sup>30</sup>. Non-users are predominantly older people or people with lower income and educational levels, who lack the necessary knowledge and skills. As the majority of future jobs and services (including those in the fields of social welfare and health care the users of which are mainly the elderly) will be ICT-based, being not able to use the internet may jeopardise these people's access to services, participation in society and opportunities to find or maintain a job. Considering the limited resources of the public administration, it will at some point soon become too costly to maintain the so-called traditional services requiring face-to-face interaction for internet non-users. Furthermore, basic ICT skills are a prerequisite for acquiring higher ICT skills necessary for achieving the objectives of growth and more jobs.

While at the beginning of 2000s there was a divide between internet users and non-users, today digital stratification can be noted also among internet users.<sup>31</sup> This means that not all people in Estonia benefit equally from ICT solutions. **Computer and internet usage in Estonia is slightly one-sided**: according to a diversification index, Estonia is close to the EU average, but lagging behind the Scandinavian countries.<sup>32</sup> The internet is mainly used for communication, information search and entertainment.<sup>33</sup> It is used less to improve personal competitiveness and well-being (e.g. through smarter consumption or internet-based learning opportunities).

At the same time, the digitally literate also need to improve their skills and knowledge to keep pace with the development of technology. For example, due to the increased use of social media and location-based services as well as growth in the number of devices constantly connected to the internet, people need to improve their skills to protect their personal data.

So far, Estonia has primarily focused on improving the ICT skills of people who have lost their jobs or who are disadvantaged in the labour market due to low or obsolete qualifications. However, **too little attention has been paid to options for using higher ICT skills to create jobs with higher added value**, especially in sectors other than ICT. More emphasis needs to be put on those ICT competencies (interdisciplinarity, data mining and data analysis, cybersecurity, etc.) that will be increasingly sought after in the future.

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<sup>30</sup> Survey "Information technology in households 2012", Statistics Estonia.

<sup>31</sup> <http://www.praxis.ee/index.php?id=186>

<sup>32</sup> Digital Agenda Scoreboard. <http://ec.europa.eu/digital-agenda/en>

<sup>33</sup> Survey "Information technology in households 2012", Statistics Estonia.

On the one hand, higher ICT skills enable to achieve greater productivity in areas with less added value. On the other hand, improved ICT skills and knowledge may contribute to increasing the competitiveness of professionals of various domains and achieving economic growth.

One of the major challenges for the public sector is its limited capability to **take full advantage of the potential of ICT**. There are still many e-services that are inconvenient to use and some organisations still prefer the “paper world”, i.e. they take up new technology without redesigning the processes and services as technology allows. This negatively impacts the satisfaction of users, the availability of services as well as the efficiency and effectiveness of the public sector. The impact of e-services is not analysed in the context of the overall objectives of organisations and, thus, it is difficult for them to assess the impact of ICT investments – leading to potential misuse of (limited) resources.

Another challenge is to make the public administration function as a whole, i.e. across different government areas and agencies. Too often the best solution to reduce fragmentation and save resources is considered to be the **consolidation of ICT solutions and centralisation of functions**. In the case of standardised functions, centralisation may improve the quality of development work and standardise usage practices. However, in case of complex IT solutions (e.g. tailor-made solutions) consolidation may increase the vulnerability of ICT systems and increase their security risks; raise, in the long term, operation costs; and reduce the flexibility of ICT-solutions. To date, the public sector’s capability to assess the actual impact of resource saving has been inadequate, making it difficult to decide whether to opt for consolidation or prefer interoperability of information systems.

The possibilities of ICT have not been used sufficiently to **make policy-making smarter**, including that in the field of information society. The impact of ICT on the Estonian economy and society has not been studied systematically. Inadequacy of information society statistics is another factor making knowledge-based policy formulation difficult both for the public and private sector.

Opportunities offered by ICT for meaningful participation and co-production of services have not been fully used.

Despite the availability of communications infrastructure and extensive use of ICT by the public sector, the **use of ICT by Estonian companies** is still insufficient. According to an e-business survey carried out by PwC in 2013,<sup>34</sup> Estonian companies use ICT actively — 86% of companies use ICT solutions in at least one of their business processes. However, the use of technology is rather simplistic: ICT is used mainly in accounting and considerably less in product development, production planning or operation of machines. According to Eurostat, Estonian companies use ICT for optimisation of their business processes and placing/receiving electronic orders less than the EU average.<sup>35</sup> This means that Estonia has not been able to use ICT sufficiently to increase the competitiveness of the country. According to the above-mentioned e-business survey, one of the main

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<sup>34</sup> <http://www.mkm.ee/public/Lopparuanne - E-ari ja e-kaubandus 1 6 avalik 2013.pdf> (Only in Estonian).

<sup>35</sup> See Estonia’s profile in *Digital Agenda Scoreboard 2008–2012*, <http://ec.europa.eu/digital-agenda/en/scoreboard>.

obstacles to using ICT is inadequate ICT competence among owners and managers, including inability to assess the cost-effectiveness of ICT investments.<sup>36</sup>

Another field of action in need of more concentrated effort is the **co-ordination** of the development of information society. The scope of the Estonian Information Society Strategy 2013 was wide and the document included activities with ICT dimension in nearly all policy areas. The experience gained from its implementation shows that ICT policy objectives in some other policy areas were not achieved primarily due to insufficient focussing, ambiguous division of work and weak links with other relevant sectoral strategies. For example, the National Audit Office of Estonia stressed in its audit report that the take-up of ICT in businesses has not been developed systematically and links between the Digital Agenda and other sectoral strategies for increasing the competitiveness of businesses (e.g. business policy) have been weak.<sup>37</sup> Future coordination must ensure that take-up of relevant ICT solutions would be promoted in all policy areas, respecting at the same time the principles of the development of the state information system. In addition, cooperation and information exchange between stakeholders should be improved to ensure the appropriate implementation of this strategy.

## TRENDS

This overview is based on relevant trend reports and on the outcomes of a trend workshop carried out in the course of drafting this development plan<sup>38</sup>, which focused on the significance of key technology trends of Estonia. The list of trends is not exhaustive and serves as a starting point for further analysis.

Already today we are influenced by megatrends, such as **growth of mobility**, ever-increasing spread of **social media**, use of **cloud computing** and **increasing volumes of information and data**. These trends are disruptive on their own, but, in Gartner's view<sup>39</sup>, their greatest value lies in their synergy: which is revolutionising business, the functioning of the state, business models and management. In other words, these trends give rise to many other important technology trends.

One of trends arising from the above forces is the **pervasiveness of computer and communication technologies**. Due to the rapid development of sensors, data processing and wireless communications, more and more physical items and abstract definitions are linked to the internet. It is forecast that in the future each object (fridge, lamp, TV, etc.) and concept will have its own uniform resource identifier (URI). Examples of such connected world are the Internet of Things, near-field technology that enables contact free communication between devices, augmented reality, etc.

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<sup>36</sup> [http://www.mkm.ee/public/Lopparuanne - E-ari ja e-kaubandus 1 6 avalik 2013.pdf](http://www.mkm.ee/public/Lopparuanne_-_E-ari_ja_e-kaubandus_1_6_avalik_2013.pdf)

<sup>37</sup> National Audit Office report „Use of European Union funds in promoting information society“ (2012).  
<http://www.riigikontroll.ee/tabid/206/Audit/2236/Area/4/language/en-US/Default.aspx>

<sup>38</sup> <http://infoyhiskond.eesti.ee/eesti-infouhiskonna-arengukava-2020/tootoad/tehnoloogiatrendid-18102012>

<sup>39</sup> <http://www.gartner.com/technology/research/nexus-of-forces/>

The **Internet of Things** enables, for example, remote diagnostics, smarter energy consumption (the so-called smart homes<sup>40</sup>) as well as safer traffic and transport management. **Augmented reality** refers to making services and applications smarter by adding a digital information layer. Users can obtain relevant information about the surrounding world in real time (e.g. smartphone users can obtain detailed information about objects of sightseeing and get recommendations for cafes, museums etc.). Augmented reality has a great potential to bring additional value in education and culture; it also allows creating new services in law enforcement and other areas.

**Advanced analytics** and **big data** are also important trends. Considering the always-on lifestyle and growing volumes of information, it is important to find new methods and technological solutions to manage complex and voluminous data and benefit from their use. This is all the more important as data is not only growing more voluminous but also comes in greater variety and is often unstructured (e.g. audio and video). Greater volumes of data will bring along the necessity to change the nature of ICT solutions: while to date *data* have been directed to programmes for processing, in the future *programmes* will be moving to the data.

Advanced analytics and big data enable real-time analysis of data. This will be a huge step forward from the existing model, where data processing has mainly been used to analyse past events. In the future, even predictive analytics will become increasingly important. It will make decision-making both in the public and the private sector smarter and more future-oriented, and allow for more intuitive and preventive service development.

Big data is linked to several other trends, such as **open data**. This refers to making non-personal public sector data available to everyone in a machine-readable format to enable automatic processing. The purpose of opening up data is for businesses to create new innovative products and services, for individuals to develop community services, analyse social trends or use the data for other individual or joint activities. Open data is, in turn, related to **linked open data** — a trend that enables different applications to use and analyse open data faster and in greater volumes, improving thus potentially the quality of management decisions. The use of big data, open data and linked open data requires more efficient privacy protection as well as increased analysis and take-up of privacy-enhancing technologies.

Revolutionary changes can also be predicted in the field of **user interfaces**, allowing for increasingly natural user interaction. Touch screens have already become the norm. In the future, an increasing number of interfaces will be based on sign, face and speech recognition technologies. The use of speech technologies, including speech synthesis, will increase. All these interfaces will make technology use more convenient and intuitive.

In the field of e-governance, the main current and future trends are the following: digitisation of processes and interoperability of back-end systems, take-up of eID, personalisation of services, use of social media, open data and open platforms, and cloud computing. Moreover, ICT related challenges in the public sector in the coming decade will be influenced by other factors like open, inclusive and cooperative provision of services,

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<sup>40</sup> Smart home refers to the use of the internet to control home appliances and features for the purpose of saving energy, more efficient heating and lighting, security, etc. Besides saving resources, ease of use is another important aspect related to smart home.

commoditisation of ICT, which means that new ICT solutions are first used by consumers and after that by companies and the public sector; focusing on employees; information continuum and the combining of different devices and data sources. Another important factor to be brought out here is the spread of voluntarism. This is expressed, for example, in the increasing willingness of people to have a say in societal affairs and to participate in or even initiate the co-production of services.

## 2. VISION OF ESTONIAN INFORMATION SOCIETY 2020

**In Estonia, the possibilities of information and communications technology (ICT) are used to full extent in cooperation between the public, private and third sectors: in order to improve the quality of life for people, increase the employment rate, ensure the viability of Estonian cultural space, increase productivity in the economy, and make the public sector more efficient.**

### 1. Better life for people

- Estonia **continues to be a free and open (digital) society**. Despite increased security risks, Estonia has not introduced significant restrictions on freedom of expression and other freedoms in the internet, compared to other countries. The reason is that we are able to use technology to protect ourselves without restrictions on our rights. For example, we have used smart solutions to **ensure that people have control over the privacy of their lives and data**.
- ICT has been used to help people become the so-called **smart consumers**. They save money or receive more value for their hard-earned money by living in smart houses or buying from online stores.
- All **most commonly used services**, whether provided by the public or private sector, are **easy and convenient to use**. They are easy to find and efficiently provided. Such services are **available everywhere and to everybody in Estonia**. People have their data always “with them”, i.e. it is ensured that the data can be safely and seamlessly used in all devices.
- **Health care and social services** (social welfare in particular) have been taken to a new quality level with the help of ICT. These services are **personal and preventive** and based on **well-functioning back-end systems together with remote provision of services**.
- **Participation in public decision-making and in the development of services has been growing year by year**; voluntary work and social initiatives are also on the rise. ICT has offered many good opportunities for this, including for creating communities, cooperation and novel experiments in the field of digital democracy.
- Estonia has become a **well-known think tank**, a place of active and multifaceted discussions about the **essence and future of information society** as well as its impact on everyday life and the various fields. Estonia is **valued as a global champion of digital living**, standing to make sure that the three important pillars of information society - free movement of information, security and privacy - are all concurrently ensured.

## 2. Viable Estonian cultural space

- **Estonian cultural heritage is easily accessible and spreading actively all over the world**, including through re-use (e.g. mash-up). The most valuable part of the **cultural heritage has been digitised**. The future heritage still to be created, including web content, is saved immediately. Long-term preservation of digital heritage is ensured.
- **The Estonian language is alive and developing in the digital world**. Estonian language technology allows us to operate devices and use e-services.

## 3. Higher employment

- Smart use of ICT has created many **new highly value-adding jobs** in both the ICT sector and other industries – people can do work that pays better. **At least 50,000 professionals** work at such jobs in different sectors of the economy.
- **Continuous improvement of ICT skills** helps people to **maintain their jobs** and, if they lose their work, **to accept new challenges in other sectors of the economy**. This is all the more important in the light of the fact that jobs not require ICT skills are disappearing. Wide-scale introduction of ICT has accelerated structural changes in the labour market.
- Diversified use of ICT has helped to make **education more personalised and flexible, including in retraining and up-skilling**. Knowledge and skills are continuously acquired and improved over lifetime.
- **Workplaces in all government agencies and companies have become networked**, which has made working both within Estonia as well as internationally more flexible. This facilitates remote and part-time working, enabling a return to employment for the people who have had to remain outside the labour market so far. For companies, this means a possibility to share labour force and manage human resources more flexibly.

## 4. Increased productivity

- **Widespread use of ICT in the majority of industries** has raised the productivity of Estonian enterprises to the target level set out in the Estonian competitiveness strategy, i.e. at least 80% of the EU average. Productivity has increased as a result of using ICT for the development of smarter (i.e. with higher added value) products and services. In addition, application of ICT for reengineering and increasing the efficiency of business processes has contributed to the growth. Increase in productivity is particularly evident in manufacturing, energy and health care.

- The **security** of the Estonian ICT environment and solutions in this hazardous world provides a **competitive advantage to the local economy and enterprises**. This has been achieved by being aware of and skilfully managing technology-related risks. This has emerged from widely shared appreciation of the importance of security.
- Smart manufacturing solutions, houses and transport have **led to a more sustainable use of resources**, which constitutes a saving both for businesses and individuals. This has reduced resource intensity - **in Estonia, more is done with fewer resources**.
- **ICT products and services constitute 20% of total exports**. The **ICT sector has become a leading industry** in Estonia, significantly contributing to the growth of productivity.
- **Estonia has become the place to be for developing, testing and bringing to market innovative digital solutions**. International development centres, foreign start-up companies, professionals and researchers from all over the world come to Estonia to create new smart solutions in the fields of health care, industry, energy, education, etc.
- To support these activities and to spread the word about Estonia as a developed information society, **we are the first country in the world to offer virtual residence** to those who want to use our e-services and possibilities of secure data exchange. With its e-services, Estonia has become as re-known in the world as Switzerland is in the field of banking.
- **The public sector has contributed to the growth of productivity** by continuing to be a leader in the smart use of (new) technology and by using ICT to work more efficiently and make better decisions.

### 3. GENERAL OBJECTIVE

The general objective of the Estonian Digital Agenda 2020 derives from the information society vision 2020, according to which the introduction of ICT will help Estonia achieve the strategic objectives set out in the competitiveness strategy “Estonia 2020” and the sustainable development strategy “Sustainable Estonia 21”.

In other words, the general objective of the strategy is to contribute to achieving higher growth, more jobs and increased welfare by creating an environment supporting the use and development of ICT solutions.

**Estonia will have a well-functioning environment for the widespread use and development of smart ICT solutions. This will have resulted in increased competitiveness of our economy, well-being of people and the efficiency of public administration.**

Progress will be measured with the following indicators:

- 1. Take-up of 100 Mbit/s or faster internet connections<sup>41</sup>**  
Starting point: 3.6% (2012) → target level: 60% (2020)
- 2. Share of internet non-users<sup>42</sup> among 16 to 74 year olds in Estonia**  
Starting point: 18% (2013) → target level: 5% (2020)
- 3. Satisfaction with the quality of public services:**
  - a. among adult population aged in Estonia**  
Starting point: 67% (2012) → target level: 85% (2020)
  - b. among entrepreneurs**  
Starting level: 76% (2012) → target level: 90% (2020)
- 4. Share of ICT professionals in total employment**  
Starting point: 3% → target level: 4.5% (2020)

Because the environment supporting the use and development of ICT solutions comprises many interrelated components, the fulfilment of all targets under the four sub-objectives needs to be taken into account to get a complete overview of progress made towards achieving the general objective.

All actions foreseen in the strategy will be implemented based on the principles of the development of information society (see Chapter 4).

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<sup>41</sup> Share of fixed broadband subscriptions of 100 Mbit/s or faster.

<sup>42</sup> Internet non-users are people aged between 16 and 74 who have not used the internet in the last 12 months or have never used the internet.

## 4. PRINCIPLES FOR THE DEVELOPMENT OF INFORMATION SOCIETY

The principles for the development of information society in Estonia were first set out in the Principles of Information Policy approved by the Riigikogu (the Estonian parliament) in 1998. These principles were reviewed and updated in 2006 in the course of preparing the Estonian Information Society Strategy 2013. Although most of these principles remain relevant today, the development of technology as well as resulting changes and possibilities call for some changes of emphasis.

The principles of the development of information society in Estonia are the following:

- The development of information society in Estonia is a strategic choice to improve the competitiveness of the state and to increase the overall well-being of people. The public sector leads the way in pursuing the principles for the development of information society.
- Information society will be developed in cooperation between the public, private and third sector as well as all with other parties, including the users of ICT solutions.
- Public sector will be a smart customer, ensuring that in public procurements as much freedom as possible is left for offering innovative solutions, thereby contributing to the development of the ICT sector.
- Information society will be created for all residents of Estonia, while particular attention will be paid to the integration of social groups with special needs, to regional development and to the strengthening of local initiative. Everybody should have access to the internet and the content made available through it, irrespective of the device used.
- When developing information society, the continuity of the Estonian language and culture will be ensured.
- When developing information society, the interests of both the creators and the users of intellectual property will be taken into account.
- The development of information society will not undermine the users' sense of security. The mitigation of non-acceptable risks in information and communication systems will be guaranteed and security requirements will be taken into account when designing the systems and throughout their life cycle.
- The protection of fundamental freedoms and rights, personal data and identity will be ensured. Individuals are the owners of their personal data and will have an opportunity to control how their personal data are used.
- The development of information society is not an end in itself. ICT solutions will be developed to achieve greater efficiency and effectiveness in both the public and the private sector.
- Opportunities offered by information society will be taken into account in the shaping of all sectoral policies, bearing in mind that the adoption of ICT improves the competitiveness of all branches of economy.
- The development of information society will be supported by the research and development (R&D) efforts in Estonia.
- When developing information society, developments in the EU and elsewhere in the world will be taken into consideration. Estonia will share its experience and learn from others.
- The public sector will deploy the already existing technological solutions (i.e. ID card, X-Road).

- The public sector will organise its processes so as to ensure that citizens, entrepreneurs and public bodies will have to provide any information only once.
- The public sector will treat different hardware and software platforms equally and ensure the interoperability of information systems by using open standards.
- When developing information society, data will be collected and ICT solutions developed based on the principle of reusability.
- When developing information society, appropriate attention will be paid to preserving necessary information, including the data of lasting value of proof and cultural historical value.

## 5. SUB-OBJECTIVES AND MEASURES

The general objective of the strategy will be achieved through specific measures and actions proposed within four sub-objectives that correspond to key prerequisites of information society development. These support the development of information society both independently and in combination.

A government's ICT policy can support the competitiveness of businesses and the overall development of the country by **creating an enabling environment** in which ICT solutions are smartly used and developed. One key part for such an environment is access to **fast internet**. Another prerequisite for operating in a knowledge-based society is fast and secure **access to information and data**, i.e. **the functioning of a relevant basic (service) infrastructure**. This enables businesses and the public sector to develop services faster and in a more personalised manner, to improve the quality of management decisions and to respond to changes in demand. To date, the Estonian digital service space has been primarily used for the fast and cost-effective provision of public services. In the future, it is important to develop the basic infrastructure so that it could be used both by the public and private sector and that it would support the development of cross-border services.

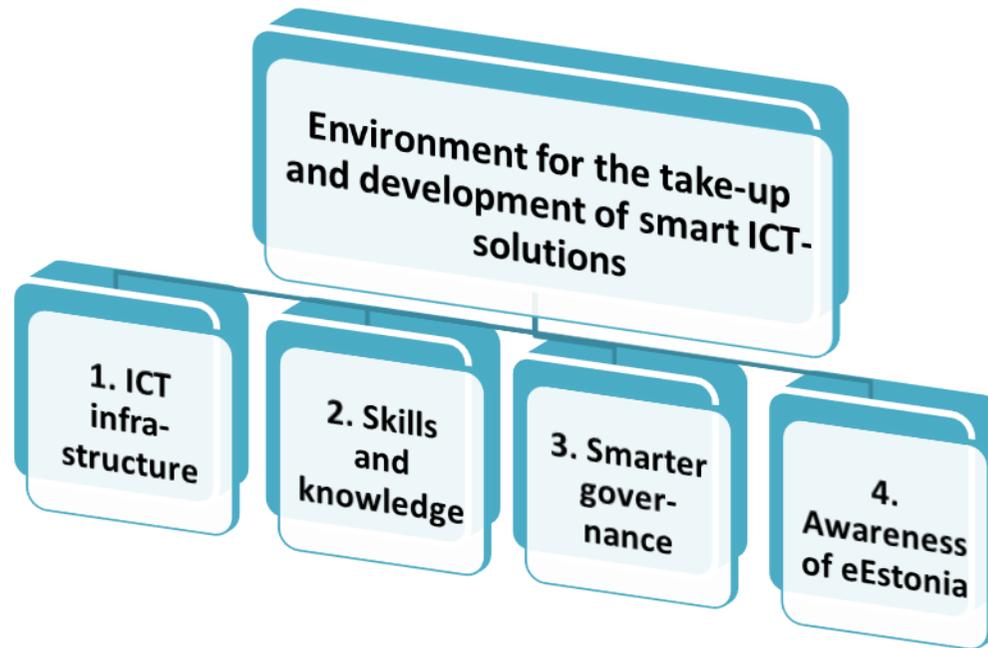
The existing and future ICT-solutions will only yield benefits if people have the **necessary skills** to use them. Promotion of ICT skills is important not only for preventing the widening of the digital divide. Skilful use of ICT has significant potential for creating jobs with higher added value and improving the quality of life on personal level. Another precondition for using digital solutions is the awareness of people about the possibilities and threats of information society, including the ability to protect themselves against the latter.

The competitiveness of the economy and the development of the society require good public governance. Governments throughout the world are looking for solutions to improve public administration and management, especially in the light of the recent economic crisis and demographic changes (aging of the population). Governments must function better with less money while still meeting the growing expectations of citizens and the needs of society. **ICT has significant potential to improve public governance and administration**. Centralised actions in this field are needed for ensuring the adoption of ICT in different policy areas.

Although our ICT companies have developed public e-services that have proven to be successful in Estonia, the export of such solutions to other countries has often worked out. **Estonia's reputation as an e-state** gives all Estonian companies a competitive advantage when exporting their products and services or attracting foreign investments, while also contributing to the achievement of the country's foreign policy objectives. Maintaining this image primarily depends on the further progress of information society in Estonia, including the attainment of the objectives of this strategy. However, considering the importance that this reputation holds for the overall development of information society in Estonia, special efforts should be made to maintain it. This will make it easier, among other things, to attract top ICT-professionals, who would contribute to the development and implementation of new solutions.

For these reasons, the sub-objectives of the strategy are as follows:

1. ICT infrastructure for economic growth, smarter governance and the well-being of individuals;
2. Better ICT skills for more jobs with higher added value, increased international competitiveness and higher quality of life;
3. Smarter governance and public administration;
4. Greater awareness of e-Estonia in the world.



*Figure 1. Digital Agenda 2020 for Estonia: general objective and sub-objectives*

The following chapters give an overview of measures and action lines planned to be implemented in order to achieve the general objective of the strategy. The content and implementation of action lines will be specified annually in action plans.

The responsibility for the implementation of all measures lies with the Ministry of Economic Affairs and Communications (MEAC). The implementation of specific actions under each measure is the responsibility of different ministries or organisations, including agencies and boards under the jurisdiction of the MEAC. Relevant tasks and division of work will be specified in the action plans.

## 5.1. ICT INFRASTRUCTURE FOR ECONOMIC GROWTH, DEVELOPMENT OF STATE AND WELL-BEING OF INDIVIDUALS

The aim is to establish infrastructure that corresponds well to technology trends and the needs of the population; serves the interests of public and private sectors, enabling productivity rise in both; and ensures access to fast internet for all residents of Estonia.

Such an ICT infrastructure comprises physical communication networks as well as a common service space. The latter refers to a digital environment and co-operation between the public and private sectors: the state information system needs to be developed in a way that facilitates the use of information resources also by the private sector.

### Measure 1: Improving access to the internet

**Target:**  
**Everybody has access to fast and free internet**

#### Indicators

##### 5. Availability of 30 Mbit/s internet<sup>43</sup> for all residents of Estonia

###### a. Fixed internet access for all households

Starting point: 61% (2012) → target level: 100% (2020)

[Source: Estonian Competition Authority]

###### b. Access to mobile internet throughout Estonia

Starting point: 34% (2013) → target level: 80% (2020)

[Source: Estonian Technical Surveillance Authority]

##### 6. Take-up of 100 Mbit/s or faster internet subscriptions<sup>44\*</sup>

Starting point: 3.6% (2012) → target level: 60% (2020)

[Source: Estonian Competition Authority]

<sup>43</sup> Access refers to internet coverage, i.e. there is the possibility of connecting to fast internet (at least 30 Mbit/s).

<sup>44</sup> Share of fixed broadband subscriptions of 100 Mbit/s or faster .

## 7. Estonia is among the top five countries in terms of internet freedom

Starting point: Ranking 2nd (2013) → target level: ranking 1st to 5th (2020)

[Source: Freedom House' survey "Freedom on the Net"]

*\* Indicators marked with asterisk (\*) are also used to assess the progress towards the achievement of the general objective of the strategy.*

### Action lines

1. **The basic network of the next-generation internet** will be completed.
2. **Build-out of retail broadband network will be supported** in regions of market failure. This will be done by:
  - a. **reducing administrative burden** related to the construction of the communications network by simplifying the relevant legal framework. A principle will be introduced according to which "last mile" connections will have to be built into any new government-funded construction objects;
  - b. **promoting community initiatives** aimed at the development of "last mile" connections;
  - c. **supporting the development of "last mile" connections** as needed in areas of market failure, including in rural areas.
3. Need for improving Estonia's **external internet connections** will be analysed and relevant development projects implemented as necessary.
4. **Availability of spectrum** meeting the requirements of information society will be ensured, allowing to guarantee internet access for end-users in areas, where fixed networks are not available and are not ever likely to become available.
5. **Transition to IPv6** will be promoted. Move to IPv6 will be launched in the public sector and private sector service providers will be encouraged to follow suit.
6. The **principle of network neutrality**, meaning that electronic communications operators may not

restrict end-users' access to legal content, websites or platforms, will be promoted.

7. Estonia will advocate for **free and open internet (including social media channels) as well as related human rights**, and contribute to relevant international cooperation.
8. The **secure upkeep of public WiFi networks**, mainly provided by public sector organisations (e.g. local authorities), will be enhanced. For example, principles for the development and administration of WiFi coverage areas will be established, and their implementation will be monitored and supervised.

## Measure 2: Development of a common service space for the public and the private sector

### Target:

**Basic (service) infrastructure supports the management of personal and business matters both nationally and cross-border**

### Indicators

#### 1. Use of secure electronic identity

- a. **Share of people using the secure electronic identity (ID card, mobile ID, digital ID, etc.) among all the people holding any eID<sup>45</sup>**

Starting point: 37% (2013) → target level: 65% (2020)

[Source: AS Sertifitseerimiskeskus]

- b. **Number of valid eIDs issued to non-residents**

Starting point: 15<sup>46</sup> (2013) → target level: 5000 (2020)

[Source: Police and Border Guard Board]

- c. **Share of economically active population in the EU using digital signatures**

Starting point: NA → target level 20% of EU residents (2020)

<sup>45</sup> The number of people who have used eID in the last 12 months at least once.

<sup>46</sup> Number of issued identification cards and residence permit cards.

[Source: the exact methodology and sources to be identified in 2014]

**2. Number of Nordic (or other) countries with whom Estonia has jointly developed basic infrastructure components**

Starting level: 0 → target level 3 (2020)

[Source: Estonian Information System's Authority]

**3. Number of countries with whom Estonia has developed cross-border public services based on the Estonian basic infrastructure (e.g. X-Road or eID)**

Starting point: 0 (2013) → target level: 7 (2020)

[Source: Estonian Information System's Authority]

**4. Number of enterprises having joined the X-Road**

Starting point: 179 (2013) → target level: 240 (2020)

[Source: RIHA statistics]

## Action lines

**1. The interoperability solutions of the common service space will be further developed to make sure they are up-to-date with technological development and function both nationally and cross-border in a secure manner.** This will be done by:

- a. Further development of **central technological solutions in the field of eID and digital trust services** (digital signature, digital seal). eID support will be ensured for most widely used open source software platforms. The eID use will be promoted among foreign nationals to enable them to use Estonian e-services and become, thus, "virtual residents" of Estonia;
- b. further development of the secure data exchange layer **X-Road** to ensure that it will be up-to-date with advancements in technology, to simplify the development of services and to facilitate the use of X-Road by different parties (including the private sector);
- c. promoting the use and opening up of information **gateways** (i.e. state portal eesti.ee, open data portal, etc.) for third parties, including internationally, for easy and secure access to data and information;
- d. creating conditions for the **secure digital storage of critical applications and registries abroad** (for example in "digital embassies") to ensure the continuity of the state information

system;

- e. improving the availability of public sector **spatial data**, updating the system of **address details, the classification system and other support systems**, and fostering and simplifying their use by the private and non-governmental sectors.
2. **Interoperability between agencies, different sectors and also cross-border will be improved to ensure that the state information system would function as an interoperable whole.** This will be achieved, inter alia, by:
    - a. Ensuring that common principles are followed when developing the state information system. The **documents concerning all levels of interoperability**<sup>47</sup> will be continuously updated and supervision over the implementation of the Estonian interoperability framework will be strengthened.
    - b. Participating actively in ICT **standardisation work** with particular focus on areas that support domestic innovation or help to ensure sustainability of investments already made by Estonia;
    - c. Developing **co-operation models and methods supporting the common service space**. For example, legal and organisational problems related to the common use of the service space will be analysed, and relevant (pilot) projects will be initiated;
    - d. Increasing the **awareness** of businesses about the state information system and their **skills** to use it.
  3. **Preconditions will be developed and co-operation opportunities actively sought for joint development of basic infrastructure with other countries as well as for cross-border provision of services.** The following actions will be carried out:
    - a. A **Nordic Digital Infrastructure Institute** will be established to implement joint infrastructure projects.
    - b. **Estonian information systems will be connected to pan-European service infrastructure platforms and, if necessary, bilaterally to other countries' basic infrastructure**, using and promoting the possibilities of the X-Road.
    - c. Central components ensuring the **cross-border functioning of eID and digital trust services** with EU member states and third countries (if possible) will be developed and deployed.
    - d. **The benefits of digital signature and electronic authentication**, in particular in cross-border business will be promoted.

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<sup>47</sup> The five levels of interoperability include political context, technical, organisational, semantic and legal interoperability.

- e. **The most important services for Estonian citizens and businesses** will be identified and relevant development projects at bilateral, regional and EU levels will be supported.
  - f. **Estonia will actively participate in the elaboration of the legal framework concerning the EU digital single market and implementation of relevant pan-European or regional projects**, in particular in the context of the Estonian presidency of the Council of the European Union in 2018.
4. **Innovative technologies will constantly be analysed and their uptake will be piloted.** Actions in this area include:
- a. Analysis of technology trends and carrying out pilot projects to keep the state information system and common service space up-to-date. This would include, for instance, Internet of Things, advanced analytics, big data, linked open data, augmented reality and privacy enhancing technologies.
  - b. Development of **Estonian language technology** software to make it available and deploy it in the public sector, as Estonian language support is a prerequisite for the wider adoption of many new technologies in Estonia.
5. **To avoid duplication and increase cost-effectiveness, joint use and reuse of data and technologies will be promoted.** For instance:
- a. **Joint use of ICT infrastructure** in the public sector will be promoted, including by using the possibilities of **cloud computing** technology.
  - b. **Principles and guidelines for the safe use of cloud infrastructure** by the public and private sectors will be developed.
  - c. **Public sector information** will be made available to businesses, individuals and public sector bodies in a **machine-readable format that enables automatic processing**.
  - d. **Public data collected through international networks and cooperation platforms** (e.g. weather and geographical data, earth observation data) will be made available.
  - e. Use of **open standards and open specifications** will be enhanced with public sector leading the way.
  - f. Reusable software and relevant information (e.g. training materials) will be made more available through **repositories**.
  - g. **Digitisation of Estonian cultural heritage**, its **preservation** and **dissemination** in a digitised format (including as open data) will be supported.
  - h. **Principles of data preservation** will be developed and implemented.

6. Information society related **legislation will be revised and updated** to make sure that regulation supports innovation instead of hindering it by unnecessary restrictions. Efforts will be made to ensure that legislation concerning **data protection** and **intellectual property** will be in line with the possibilities and needs of information society, while ensuring that freedom of speech and access to information would not be sacrificed for the sake of privacy protection.

## 5.2. BETTER ICT SKILLS: FOR MORE JOBS WITH HIGHER ADDED VALUE, INCREASED INTERNATIONAL COMPETITIVENESS AND HIGHER QUALITY OF LIFE

We wish to achieve a situation whereby all people in Estonia have sufficient ICT skills and knowledge (including awareness) to improve their well-being and quality of life.

On the other hand, we seek to achieve higher employment, in particular jobs with higher added value and increased international competitiveness. This requires the promotion and advancement of higher ICT skills. The main target is to improve ICT skills and knowledge in non-ICT sectors and active population who needs retraining.

### Measure 1: Increasing digital literacy for improving personal well-being

#### Target:

**People know how to use the internet to improve their quality of life and have the necessary skills**

#### Indicators

**1. Share of internet non-users<sup>48</sup> among 16 to 74 year olds in Estonia\***

Starting point: 18% (2013) → target level: 5% (2020)

[Source: Statistics Estonia]

**2. Share of people considering their computer skills sufficient to protect their personal data on the internet**

Starting point: 68% (2013) → target level: 10 percentage points higher than the EU average in 2020 (2020)

[Source: Statistics Estonia]

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<sup>48</sup> Internet non-users are people aged between 16 and 74 who have not used the internet in the last 12 months or have never used the internet.

**3. Share of people having used e-commerce, including cross-border e-commerce:**

- a. e-commerce ( % of all people aged 16 to 74)

Starting point: 23% (2013; EU average 45%) → target level: EU average in 2020 (2020)

- b. cross-border e-commerce (% of all users of e-commerce)

Starting point: 57% (2013) → target level: 75% (2020)

[Source: *Statistics Estonia*]

## Action lines<sup>49</sup>

1. **Acquisition of basic ICT skills in schools, in particular in basic schools, will be enhanced.** The following actions will be carried out:
  - a. **ICT training projects** will be carried out both in formal and informal education.
  - b. An **evaluation system of students' ICT skills** (e.g. tests, participation in international comparative surveys, thematic external assessments) will be established and the results of the assessments will serve as a basis for planning development activities.
  - c. **Use of ICT in subject area teaching**, i.e. in all classes, will be promoted. Activities to be carried out include teacher and professor training and improving the ICT infrastructure of schools;
  - d. **Curricula will be developed** to include and update coverage of information society and ICT topics.
2. **Acquisition of basic ICT skills by internet non-users among the adult population will be supported.** Actions to achieve this include, for instance:
  - a. supporting regional **community initiatives** aimed at the acquisition of ICT skills;
  - b. providing **basic ICT training** and the **training of trainers**;
  - c. development and distribution of innovative **ICT-based solutions**, including for independent learning.
3. **Awareness of the general population will be raised about the possibilities and threats of information society.**
  - a. Acquisition of information society related **knowledge and skills will be supported to improve personal competitiveness and well-being**. Focus will be placed, for example, on increasing awareness of smart consumption (including the benefits of e-commerce), internet-based personal development (online courses at e-universities), flexible forms of working, etc. In addition, awareness will be raised of the good practices of online behaviour, including topics related to copyright.
  - b. In order to increase trust in information society, awareness and skills of the **safe use of computers and the internet** of the population (including businesses) will be raised. Particular emphasis will be placed on skills related to the protection of personal data and safer use of mobile devices.
4. **ICT competences will be defined and relevant frameworks will be developed at all levels of education as well as in professional standards.**

## Measure 2: Development of higher ICT skills

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<sup>49</sup> Several actions under this measure will be implemented within the Estonian Lifelong Learning Strategy 2020 (under elaboration) in which ICT skills constitute a part of lifelong learning as a whole. The specific division of work and resources will be agreed in the implementing stage (e.g. in action plans, relevant regulations, etc.).

**Target:**

**More higher value-adding jobs through higher ICT skills**

**Indicators**

**8. Share of 16 to 74 year old residents considering their computer skills sufficient for looking for or changing a job over the following year**

Starting point: 76% (2013) → target level: 90% (2020)

[Source: Statistics Estonia]

**9. Employers' satisfaction with the ICT skills of employees available in the labour market**

Starting point: NA → target level: increased level (2020)

[Source: Methodology to be developed in 2014]

**10. Share of ICT professionals in total employment\***

Starting point: 3% → target level: 4.5% (2020)

[Source for starting point: "Mapping the status of and need for the Estonian labour with ICT competences", Praxis 2013]

**11. Share of ICT products and services in total export**

Starting point: 14.2% (2011) → target level: 20% (2020)

[Source: Statistics Estonia]

**12. Share of ICT professionals in total employment**

Starting point: 9.3% (2012) → target level: 12% (2020)

[Source: Statistics Estonia]

**Action lines<sup>50</sup>**

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<sup>50</sup> Several actions under this measure will be implemented under the Estonian Lifelong Learning Strategy, in which activities related to ICT skills constitute a part of lifelong learning as a whole. Specific division of labour and resources will be agreed in the implementing stage (e.g. through action plans, relevant regulations, etc.).

1. **Acquisition of ICT skills of individuals with low or obsolete qualifications will be supported** (e.g. professional development or retraining of people who have lost a job or are in danger of losing a job). The awareness of ICT career options will be raised among students and workers through information programmes and career advisory development.
2. **Conditions will be created for increasing the share of ICT professionals in total employment.** The following actions will be implemented:
  - a. supporting the follow-up initiatives of the **Estonian IT Academy**;
  - b. improving conditions for pursuing an **academic career** in the field of ICT;
  - c. improving **internship arrangements** and promoting international cooperation between universities in order to improve the quality of ICT training;
  - d. popularizing ICT professions.
3. **Acquisition of higher ICT skills will be promoted within other professional and higher education study programmes and in other sectors of the economy, in particular in the fields of smart specialisation.** The following actions will be carried out:
  - a. Professional and higher education **curricula** will be updated in order to allow for the acquisition of ICT skills specific to different professions and sectors.
  - b. **Research** in the field of ICT (including in professions other than ICT) will be supported more.
  - c. **Training programmes** to facilitate the acquisition of ICT skills will be launched. Special retraining and professional training programmes will be initiated in the areas of smart specialisation<sup>51</sup>.
  - d. Awareness and training programmes will be carried out **to increase the awareness and skills of entrepreneurs, managers and top specialists in non ICT-sectors.**
4. To ensure high quality of ICT-education, relevant **theoretical and methodological capacity will be improved at all levels of education** (e.g. by conducting surveys and analyses).

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<sup>51</sup> According to the report "Smart specialisation – qualitative analysis", these areas are the following:

1) ICT horizontally in other sectors; 2) healthcare technology and services; 3) more efficient use of resources.

[http://www.arengufond.ee/upload/Editor/Publikatsioonid/Nutikas%20spetsialiseerumine%2020\\_02\\_2013.pdf](http://www.arengufond.ee/upload/Editor/Publikatsioonid/Nutikas%20spetsialiseerumine%2020_02_2013.pdf)

### 5.3. SMARTER GOVERNANCE AND PUBLIC ADMINISTRATION

We aim to make the management and functioning of the public sector smarter, more efficient, more “whole-of-government”, more sustainable and more open as a result of using ICT.

For individuals and businesses, it means easy-to-use and non-burdening services that are increasingly co-designed with different parties. For the public sector, achieving the goal means increased cost-effectiveness, better horizontal coordination and more openness. We also seek to increase the quality of policy decisions by making them more knowledge-based.

#### Measure 1: Development of better public services<sup>52</sup> by using ICT

**Target:**

**Public services are easy to use and cost-effective**

**Indicators**

- 1. Share of public services corresponding to common quality requirements, % of all public services**  
Starting point: no quality requirements (2013) → target level: 100% (2020)  
*[Source: Methodology to be developed in 2014]*
- 2. Awareness of public e-services**
  - a. among adult population aged 16 to 74**  
Starting point: 29% (2012) → target level: 90% (2020)

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<sup>52</sup> The strategy uses the definition of public service laid down in the „Green Paper – Organisation of Public Services“ approved by the Government of Republic on May 16, 2013. In the document, public service was defined as a service that the state offers to citizens or entrepreneurs on their initiative (incl. probable initiative) for enabling them to fulfil their legal obligations or exercise their rights – i.e. transactional services.

**b. among entrepreneurs**

Starting point: 34% (2012) → target level: 90% (2020)

*[Source: Survey commissioned by the Ministry of Economic Affairs and Communications]*

**3. Satisfaction with public services\***

**c. among adult population aged 16 to 74**

Starting point: 67% (2012) → target level: 85% (2020)

**d. among entrepreneurs**

Starting point: 76% (2012) → target level: 90% (2020)

*[Source: Survey commissioned by the Ministry of Economic Affairs and Communications]*

**4. Share of paperless interaction<sup>53</sup> in total official communication**

Starting point: NA → target level: 95% (2020)

*[Source: Methodology to be developed in 2014]*

**5. Share of machine-processable e-invoices exchanged between the public and private sector**

Starting point: NA<sup>54</sup> → target level: 100% (2020)

*[Source: Methodology to be developed in 2014]*

**6. Services life-cycle cost index<sup>55</sup>**

Starting point: NA → target level: improved index

*[Source: Methodology to be developed in 2014]*

## Action lines

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<sup>53</sup> The share of paperless communication will be determined on the basis of the communication registered in accordance with the records management procedures.

<sup>54</sup> In its survey "ICT in Estonian companies", Statistics Estonia explores to which extent businesses have used the internet to send the public sector invoices in a format that enables automatic processing. In 2013, the share of such invoices was 4.5%.

<sup>55</sup> We aim at establishing rules of public services administration, which look at the administration of services from the perspective of costs and lay down the index of the development, administration and "rebuilding" of services.

**1. The quality of public services will be harmonised and cooperation between public bodies providing these services will be improved.**

The following actions will be taken:

- a. **Common quality requirements for public services will be developed and implemented.** In addition, development principles and cooperation models for comprehensive cross-sectoral solutions will be created. Compliance with the guidelines will be monitored and relevant advisory services provided.
- b. **Legislation and work processes** related to the provision of public services **will be analysed and revised in order to take into account the possibilities of ICT** (e.g. in order to reduce the number of applications/forms to be submitted by citizens and businesses to the public sector).
- c. Processes behind the provision of public services and the supporting ICT solutions (e.g. the Population Register) will be developed in order to **ensure once-only submission of data**: public bodies will have to reuse and cross-use data within the purpose the data were submitted, provided that the persons concerned have not prohibited it.

**2. User-friendliness of public services will be improved by taking into account the interests and needs of users.** The following actions will be taken:

- a. Availability of services **through different channels** will be enhanced. Relevant development and pilot projects will be carried out (e.g. for piloting the suitability of mobile devices, digital TV, etc. for the provision of public services).
- b. Possibilities will be created for users to receive **information about the status of service delivery**. People will also be able to see, when, by whom and for what purpose their personal data have been used in the public sector.
- c. **Possibilities to provide feedback** about services will be improved. In addition, **support to the users of public services**, including over the phone, will be provided more efficiently.
- d. User-friendliness and accessibility of **user interfaces** of public sector ICT-solutions and service channels will be improved, including by the uptake of **Estonian language applications** to provide services based on voice-recognition. At the same time, Estonian public services will be made available for users from other countries by promoting the use and development of **multilingual ICT-solutions**.

**3. The impact and cost-effectiveness of public service provision will be increased.** The following actions will be implemented:

- a. Interaction both within and with the public sector will be made completely **paperless**. For example, machine-processable **e-invoices** will be made mandatory in the interaction between the public and the private sector.
- b. The concept of **holistic information governance** will be introduced and implemented in the public sector. This will help the agencies to cope with different information flows from different channels (e.g. service bureau, social media, mail, information system, information portal, records management system). Conditions will be created for the quick use of information regardless of the form it is presented in (e.g. through personalised use of information portals).

- c. A methodology will be developed for assessing the **cost of public service provision throughout the life cycle of services**, while the impact of services both on administrative burden for customers and on the workload of agencies<sup>56</sup> will be taken into account.
- 4. The development of public services will be made more efficient:**
- a. A **catalogue of public services** will be developed in order to get an overview of where, which, how many and at which level the local authorities and state agencies provide public services.
  - b. **Portfolio management** principles will be established for the management of public services (i.e. public services will be grouped by type).
  - c. A **responsible owner will be assigned for each service and service channel**. In addition, the rights and obligations of service providers and service channel providers will be determined. Interoperability of service channels will be ensured so that users could use any service through any channel (the no-wrong-door principle).
  - d. To improve the quality of ICT projects, the **quality of development project management** will be improved. For instance, the monitoring and evaluation of priority projects (e.g. large-scale projects) will be enhanced. In addition, the role of the state as a smart customer will be strengthened and guidelines for **good practices in public sector ICT development** will be implemented.
  - e. **Sectoral ICT strategies** will be elaborated and updated in all areas of government. These strategies will serve as a basis for planning ICT development projects.
- 5. The development and implementation of sectoral ICT projects** will be supported. In particular:
- a. **joint projects between different sectors and government levels** (e.g. for comprehensive provision of services or delegation of services; in order to create central ICT solutions that support the capacity of local authorities);
  - b. **pilot projects to test and implement innovative solutions and technologies**, including in the private sector in the case of services of general interest;
  - c. **projects designed to make cultural heritage available to the public** while ensuring the protection of copyright in a way that takes into account the technological possibilities;
  - d. new **software development or reengineering projects** which help to improve the quality of public services and reduce the costs of service provision in the long term (e.g. by reducing the need for over-the-counter customer service and IT administration costs).

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<sup>56</sup> Good Legislative Drafting and Technical Rules for Drafts of Legislative Acts defines work load of an agency as an impact on the organisation of work at state agencies and local authorities. Clause 46 (1) 6) of Government of the Republic Regulation No 180, 22/12/2011, <https://www.riigiteataja.ee/akt/129122011228>.

## Measure 2: Higher inclusion and participation with ICT

### Target:

**Services are developed and policies are formulated in co-operation between the public sector and the citizens**

### Indicators

**1. Share of internet users having used the possibilities of e-inclusion<sup>57</sup>**

Starting point: 25% (2012) → target level: 45% (2020)

*[Source: Survey commissioned by the Ministry of Economic Affairs and Communications]*

**2. Share of ministries publishing feedback on their websites about the results of public consultations**

Starting point: 0 (2011) → target level: 100% (2020)

*[Source: Survey commissioned by the Ministry of Economic Affairs and Communications]*

**3. Number of sustainable services co-designed by the public and the private/third sector<sup>58</sup>**

Starting point: 0 (2013) → target level: 15 (2020)

*[Source: Ministry of Economic Affairs and Communications]*

### Action lines

**1. Motivation of individuals and non-governmental organisations to have their say in public life will be increased.** For example:

- a. **User-friendliness, accessibility and interoperability of public sector websites will be improved.** The information layout on websites will be standardised and data search simplified.
- b. **Giving feedback** about the results of public consultations will be enhanced so that people could have a clear overview of what happens with their proposals.

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<sup>57</sup> Possibilities of inclusion include: participation portal osale.ee, draft information system EIS, petitions.ee, e-elections, participating in discussions with state or government agencies through forums, social media or e-mail.

<sup>58</sup> Services developed in the course of public and private and/or non-governmental sector co-operation projects, which are still functioning at least a year after the launch.

- c. **Platforms for inclusion and participation will be further developed** together with raising the **awareness** of civil society, public servants and the general public about the existing solutions. Any new solution must be built to be coherent with the existing environments and user-friendly.
  - d. The **i-voting platform** will be developed further and uses for i-voting will be widened.
2. **Conditions will be created for the co-design of services and for other joint activities.** For example:
- a. **Public sector information** will be made more easily **available in the machine-processable format**.
  - b. **Initiatives and pilot projects promoting joint action and co-design** between different sectors (e.g. events dedicated to the design of public services, so-called hackathons etc.) will be carried out.

### Measure 3: Better decision-making with ICT

**Target:**

**Policy decisions are of higher quality and more knowledge-based**

**Indicator**

**1. Number of training and pilot projects designed to improve the quality of policy-making by using ICT**

Starting point: NA (2013) → target level: two projects per year in the period from 2014 to 2020

*[Source: Ministry of Economic Affairs and Communications]*

**Action lines**

1. Public sector officials' **awareness of the benefits of data analytics** will be raised and **relevant skills** both in the public and private sector will be developed.
2. **ICT solutions that advance data analytics capacity in the public sector** will be developed and taken into use. For example, the potential use of **advanced analytics** and **big data** for real-time monitoring of data and making predictive policy decisions will be researched and relevant pilot projects carried out.
3. **ICT skills of public sector employees and their awareness about information society topics** will be raised, taking also into account the future trends and needs.
4. Possibilities will be explored for **involving citizens in the collection of data of general interest** (e.g. via crowdsourcing).

## 5.4. GREATER AWARENESS OF E-ESTONIA IN THE WORLD

The goal for Estonia is to maintain its image as a technologically advanced country and well-developed information society. This would support the efforts of our businesses in foreign markets, contribute to attracting foreign investments and help Estonia to achieve its general foreign policy goals. Estonia's reputation in this regard largely depends on the successful implementation of other actions set out in this strategy. However, specific activities to spread our knowledge and share our experience with others can also make a great contribution to raise awareness in wider world.

In addition, the aim is that Estonian policy-makers would have the required knowledge and information to lead the development of information society as otherwise it will be hard to maintain the good reputation – if we do not keep developing further. To ensure a good basis for smart decision-making, both domestic and global trends related to information society need to be monitored and the knowledge disseminated.

### Measure 1: Monitoring, analysis and promotion of the development of information society

**Target:**

**The development of information society in Estonia is knowledge-based and takes into account worldwide trends**

**Indicators**

**1. Number of public and private sector key figures having participated in information society events**

Starting point: NA (2013) → ~200 unique visits at agreed high-impact information society events per year

*[Source: Ministry of Economic Affairs and Communications; Estonian Information System Authority]*

**2. Availability of national information society statistics and its relevance to policy-making needs**

Starting point: the level of satisfaction will be specified in 2014 → target level: increased level (2020)

*[Source: Survey among policy-makers to be conducted by the Ministry of Economic Affairs and*

*Communications]*

### Action lines

1. **International trends in the field of ICT, e-government, internet freedom and other areas of information society** will be monitored, analysed and introduced to decision-makers.
2. **Research on the development of information society in Estonia** will be commissioned and published. The main focus will be to induce more **interdisciplinary scientific work** on information society topics.
3. **Sectoral statistics will be improved.** The accessibility to existing data will be improved; new indicators and methodologies will be developed upon need; Estonia's participation in relevant international statistical projects (including development of global indices) will be enhanced.

### Measure 2: Sharing Estonia's ICT experience internationally

**Target:**

**Estonia is a world-renowned e-state**

#### Indicator

**1. Coverage of e-Estonia in international media**

Starting point: to be specified in 2014 → target level: increased level (2020)

## Action lines

1. **Estonia's experience in digital governance and information society will be codified and distributed.** To this end, the following actions will be carried out:
  - a. organising **international information society events** in Estonia;
  - b. participating in international competitions, conferences and other events in the field of information society;
  - c. promoting Estonia's experience in **foreign media**, including **social media**;
  - d. conducting and disseminating **analyses about the development of information society both in Estonia and internationally**, as well as increasing Estonia's capacity and reputation as a place for **information society think tank work**;
  - e. participating actively in international **standardisation and policy-making processes** in the key areas of information society;
  - f. supporting with entrepreneurship policy instruments the establishment and relocation of **international ICT development centres** in Estonia, which would develop and bring to market new digital products and services.
2. **To increase the effectiveness and efficiency of spreading Estonia's e-experience, collaboration between the public and private sector will be enhanced.** This will include:
  - a. The responsibility for co-ordination in the field of spreading Estonia's ICT experience will be assigned to a **specific public body** and its administration and collaboration mechanisms will be improved.
  - b. ICT Demo Centre will be further developed and interactive presentation material (including the relevant web content and demos) about e-Estonia will regularly be updated.
  - c. New possibilities for spreading Estonia's experience will be mapped and regularly monitored; relevant information sharing will be organised.
  - d. **High-level information society experts from Estonia will carry out information society and governance related trainings in other countries** in order to support the efforts of Estonian entrepreneurs there.
  - e. **Public sector will support via governmental interaction the Estonian companies that provide advisory services and carry out IT development projects in the field of information society.** Target countries will be selected based on the internationalisation interests of the Estonian ICT sector, the foreign policy objectives of the Government as well as potentially emerging possibilities.

## 6. IMPLEMENTATION OF THE STRATEGY

### ACTION PLANS AND EVALUATION

The strategy is implemented through action plans, which specify activities for at least the next two years and set out measures for the state budget strategy periods. Action plans determine the activities to be carried out under each measure (including responsible institutions and financial resources) in order to achieve the objectives of the strategy in specific years.

Reporting on the implementation of the strategy is organised in the form of annual reports, which feature progress made in executing the action plans. The action plans are carried out as project-based development projects and initiatives in accordance with the national ICT architecture and interoperability framework. They are funded from the state budget and EU structural funds. Government of the Republic additionally approves the investment plan for the development of information systems co-financed by the EU in the form of annexes to action plans.

Mid-term evaluation of the implementation will be carried out in 2017. If necessary, the strategy will be updated to take into account the changed environment and the results achieved so far.

### GOVERNANCE STRUCTURE FOR THE DEVELOPMENT PLAN

Based on the experience of implementing previous strategies and on the development needs identified in the course of discussions and analyses, the **governance structure of the strategy has to:**

- ensure efficient coordination, including exchange of information and ideas and cooperation, at all levels and stages from vision setting to everyday work activities;
- ensure the creation and execution of a long-term perspective (vision) in order to develop conditions and e-solutions for the sustainable development of information society;
- ensure that the implementation of the strategy is focused and consistent; clear links should be developed with the planning and implementation of the work programme of the Government of the Republic. In addition, clear agreements should be reached at the level of action plans;
- ensure flexibility in order to take into account the changing environment and conditions, upon need adjusting the plans or launching new initiatives;

- enable joint efforts of different sectors and organisations, which requires better cooperation and execution of agreements as well as more possibilities for strategic discussions;
- improve ongoing communication and exchange of ideas.

The **main steering body** for the implementation of the strategy is the **Information Society Council** led by the Prime Minister. The members of the Council are the Minister of Economic Affairs and Communications, other ministers responsible for the development of information society and key non-governmental experts, incl. representatives of the ICT sector. The tasks of the Information Society Council are:

- to discuss and approve draft action plans and reports on their execution before submission to the Government of the Republic;
- to discuss and approve amendments to the strategy (incl information society vision 2020) before submission to the Government of the Republic;
- to discuss and approve terms of reference for evaluations on the implementation of the strategy and to discuss the results of evaluations;
- to guide the co-operation between sectors and institutions in order to achieve the objectives of the strategy;
- to form opinion on matters of strategic importance for the development of information society in Estonia;
- to make proposals for drafting new policy documents for the development of information society in Estonia, reviewing and forming opinions on their drafts – including especially other national sectoral strategies and their action plans, legislative acts, Estonian positions in the EU and other international organisations;
- to fulfil the role of sectoral monitoring committee for EU Structural Funds in the areas of ICT policy (monitoring execution of programmes, discussing amendments to strategic documents, etc).

The **day-to-day co-ordination** of the implementation of the Digital Agenda (i.e. its action plans) is done through **thematic or task-based working groups and networks** (e.g. records management council, expert group on interoperability, etc.). The launch of working groups and networks will be decided either by the Information Society Council, the Minister for Economic Affairs and Communications or the Government of the Republic on the proposal of the Council or the Minister – depending on the topic or task at hand.

In addition, the **network of CIOs of government agencies** has an important role in organising everyday cooperation for executing the activities laid down in the action plans. The network is led by the Department of State Information Systems of the Ministry of Economic Affairs and Communications. The members of the network are the officials responsible for the ICT development in all ministerial areas, as well as the representatives of local authorities and the ICT sector. The tasks of the network are:

- to form opinions about the action plans of the Digital Agenda and reports on the execution of these plans;
- to ensure relevant exchange of information, agree on the co-operation mechanism and division of work between agencies in order to execute the specific activities in the action plans;
- to establish thematic or task-based working groups and networks as required and to discuss the results of their work;

- to form opinions about the development of interoperability solutions of the state information system;
- to discuss matters concerning the development of governmental ICT management, prepare relevant proposals and agreements.

Table 1. Coordination of the development of information society

	Co-ordination of the implementation of strategy	Wider co-ordination of the development of information society
<b>Vision</b>		Vision network
<b>Strategy</b>		
<b>Implementation (action plans)</b>	Information Society Council	Discussions between ministries
<b>Everyday work</b>	Network of CIOS of government agencies Thematic networks/working groups	

In addition to the implementation of the Digital Agenda, coordination must be ensured between the ICT policy and other policies that are key to the development of information society (including the Estonian information society vision 2020). For this purpose, **bilateral or multilateral meetings of ministries** are held under the leadership of the Ministry of Economic Affairs and Communications and/or the Government Office, e.g. to harmonise the execution of different sectoral strategies and to agree or report on actions laid down in the work programme of the Government of the Republic.

Besides cooperation on the execution of sectoral strategies, attention should be paid to the level of vision and overall strategy - to monitor the progress towards realisation of the Estonian information society vision 2020 and the trends of information society and ICT in the world. For this purpose, a **vision network** will be established under the leadership of the Strategy Unit of the Government Office in collaboration with the Ministry of Economic Affairs and Communications. The network will not be an official body; it will be a (mostly virtually working) community of cooperation and a platform for exchanging ideas.

Members of the network will be key figures and opinion leaders in the area of information society from private, non-governmental and public sectors. The tasks of the network will be:

- to monitor progress towards the vision of the Estonian information society 2020;
- to develop ideas and make proposals for amending the vision based on international trends and national developments;
- to propose and advise on strategic initiatives (e.g. intersectoral or interinstitutional activities, pilot projects, international cooperation projects, etc.) designed to boost the realisation of the vision; and to make relevant proposals for improving the Digital Agenda as well as other sectoral strategies and relevant action plans.