

Usage of Estonian public e-Services amongst young people

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<p>The fast development of the Information and Communication Technology has changed everyday life. With the rapid growth of the Internet and digital devices the world is moving towards an online economy. Estonia has become a leader in using electronic solutions to create an innovative living environment for citizens. It has developed a working decentralized system that offers hundreds of public electronic services.</p> <p>The research aimed to look into the way a digital society works and to gain more knowledge in the field of public electronic services. Additional objectives of the study were to find out how aware young people are about the offered public e-Services in Estonia. The study also covered the user habits and attitudes towards the available services.</p> <p>The thesis consists of two parts: the theoretical background and the empirical part. Both quantitative and qualitative methods were used in this research. The primary information for the study was gathered by conducting an online survey. The focus group was citizens of Estonia in the age range 16-30. The collected results were analyzed and compared to the background information and the results of the earlier studies.</p> <p>The results of the study show that the young people are familiar with the electronic services offered by the state and local government. Overall, young people tend to think that electronic services have positively influenced their everyday life and the functioning of the Estonian state. The e-services have substantially reduced expenditures of the time and money expenditures. The attitudes towards offered public e-services are positive; young Estonian citizens are satisfied with the range and quality of the available services. However a few improvements can be made in the present public service sector: there are still some big technical and connectivity problems.</p> <p>This research is a useful analysis description of public e-Services and the offered services in Estonia. Also this study can be as base for a more comprehensive research about the topic.</p>	
Keywords Digital society, e-government, e-service, e-Estonia, public e-services	

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Abbreviations

CRM	Customer relationship management
DDoS	distributed denial-of-service
e-banking	electronic banking
e-cabinet	electronic cabinet, a tool Estonian government uses to held government sessions
e-ID	electronic identification
e-government	electronic government, usage of information and communication technologies to improve the work of public services.
e-mail	electronic mail
e-procurement	electronic procurement, automated procurement processes that are uses a web application.
e-service	electronic service
e-Estonia	term used, to describe Estonia as one of the most advanced country to using electronic solutions
e-voting	electronic voting
EU	European Union
ICT	Information and Communication Technology
ID card	identification card
m-Parking	mobile parking
SIM	subscriber identity module
SK	Certification Centre in Estonia, providing certifications for authentication and digital signing for national identity card
USB	Universal Serial Bus

1 Introduction

With the fast information technology development the Internet plays a major role in everyday life. The world is continuously building a society, where the technology and digitalization are changing the way we are communicating, doing business and spend free time. Also it has become a big part of social and political life.

Estonia is a good example how information technology is used as an instrument for increasing administrative capacity and ensuring innovate living environment for citizens. The digital infrastructure has enabled digital society to blossom with the transformation of the interactions between the government and its citizens. The country has developed a lot of public electronic services to serve the needs of its people and they have become a routine aspect for everyday life. This theses objective is to gain knowledge of the subject of e-Services and focuses on the Estonians success story of providing such extensive and high quality public services online. (Secure Identity Alliance 2014.)

There have been earlier researches about the satisfaction and the effectiveness and impact of the offered public e-Services in Estonia. Both are expansive topics with a broader target group. This study focuses on the young people's perspectives and feelings towards the available electronic services.

1.1 Research objectives & questions

The target of the research is to find out how aware young people are about the offered public e-services in Estonia. Also which are the habits of the usage of these e-services and study what are the attitudes towards e-services amongst young people in Estonia. The objective is to gain more knowledge in the field of public e-Services. In the theory background digital society and e-service concepts are introduced. In the study a deeper insight is given of Estonian's road to becoming a digital society and the e-services it offers to citizens.

The project will be answering following main research questions:

- What are the attitudes towards e-services amongst young people in Estonia?
- How aware are young people in Estonia about public e-services offered by the state and local governments.
- What are the using habits of e-services in Estonia?

And to sub questions:

- What is digital society?
- What are public e-Services and how they are used?
- How Estonia has become a digital society?

A survey is carried out to gain answers to the main research questions. A literature review is executed to find answers to the sub questions stated above. The result of the project is an analysis and discussion about the findings of the questionnaire. The research will provide the thoughts and feelings towards public e-Services offered in Estonia amongst young people.

1.2 Research method

The research method used in this study was a mix of quantitative and qualitative methods. Firstly a literature review was done to study the chosen topic and provide background theory for the research. Data for the background theory is collected from books, theses, articles and different media sources, to give general understanding and knowledge about the topic. The information is analyzed and a theoretical framework from the subject is provided.

The second part is the empiric part of the research. For collecting mainly quantitative data a survey was carried out amongst young people in Estonia. The answers were collected and analyzed, a conclusion based of the results was written.

1.3 Research scope

The research consists of two main parts: theory background and the empirical part. The theoretical part is divided into several chapters and sub-chapters. In the research terms like digital society and public e-services are explained and opened to the readers. A separate chapter is about the success story of Estonia and how it is become a leading digital society. It includes a section that introduces the most important components of e-Estonia. Last chapter in the first part is an overview of the earlier researches done in this subject. The two studies introduced acted also as a framework for the survey done in this research.

The second part is the empirical work. An overview of the questionnaire and from chosen method is given. Then the results of the survey are presented in the form of graphs. After

that an analyses and discussion is done based on the findings. A conclusion is drawn and recommendation for further research is given.

2 Digital society

Information and Communication technologies (ICTs) have changed the society. The development of ICT has introduced us new technologies and tools that have changed values in life. The relationship with technology is rapidly and continually changing and new behaviours are appearing. The way of people communicate think and work are changes with the emerging a phenomena called digital society. (Cornu 2011).

2.1 What is digital society?

Merging of Information and Communication technologies has made it possible of the fast and massive development of different kind of digital devices. The digital world has changed the way people live and interact (Turban, King & Lang 2011). With the fact that digital devices are now part in our everyday life a new concept “digital society” has arisen. Digital society is a technology society, where information and communication are part of the core concept. The term digital society is not so clear and cannot be described in one certain way. The correct term can be determined by its focus point. In a digital society information and communication are the core concepts; therefore also the phrases information society, network society and knowledge society are widely used. (Cornu 2011.)

Digital technology is substantially affecting our social life, political processed and economic activities. The free networking has made possible to bring together supply and demand of all sorts. It is impossible to imagine the life anymore without this kind of communication. The ensuring of access to Internet and broadband services are essential in a digital society. According to Middleton (2014) it is very important to monitor provision of broadband services, quality, reliability and affordability to understand if the provided infrastructure is meeting the citizen’s needs in connectivity. Another important factor in digital society is the concept of the digital literacy. It is essential to understand the literacy level, before designing and introduce new services to citizens. The digital society has changed the way people live and communicate; therefore a citizen of a digital society needs to know the tools, components and must be aware of the stakes and consequences it can hold. In digital society, digital citizenship is crucial – education must prepare the citizens for this kind of society. (Cornu 2011.)

2.1.1 Digital natives

The digital native concept was first introduced by Mark Prensky in year 2001. Digital natives are those persons who are born in the late 1980s (also referred as the generation Y

or first generation of digital natives) and after 1990 (the second generation of digital natives). Digital natives represent the first generation that have grown up with the new technology: digital tools as a part of their everyday life. They are usually always surrounded by the new technology and interact with it actively. They are called the “native speakers” of the digital language – using computers, mobiles, Internet and other digital devices. (Tustin, Goetz & Basson 2012). Also digital natives think and process information differently than the previous generation. They understand the value of digital technology and practice it spontaneously (Cornu 2011).

According to Cornu (2011) there are arising some conflicts between the different generations. The generations before the digital natives do not share the same values and face difficulties when communicating, collaborating and educating them. This kind of differential is called the “digital immigrants” a concept introduced by Mark Prensky. Digital immigrants are people who are not born in the digital world but have adopted some of the features of the digital natives. Different from digital natives, whose knowledge came with birth, they had to learn all the concepts and usage of the new technology.

Digital natives have also a different approach in learning concentrating and being attentive than the previous generations. They prefer learning visually rather than reading text, also they are used to learn through different games and interactivities. Teaching must be take account these changes and new ways of thinking. The human relationship is still an essential component in the learning process, but the connection between students and teachers need to take new innovative forms. Distance education, blended learning and electronic learning are good ways to make education more interesting and appealing to the digital natives. (Cornu 2011.)

2.1.2 Digital citizenship

The structural changes of the society, and the fact that the Internet is becoming a technical and social platform for everyone, has changed the way citizens act. Citizen is a person who works against injustice for the benefit of all people. Digital citizen therefore can be described as person utilizing information technology to participating interactively and collaboratively in the social and cultural development processes. With the wide use of technology there are developed some rules, how individuals should use the new digital technologies for the good of all people – this is called Digital Citizenship. This concept can defined as the norms of appropriate, responsible behaviour with regard to technology use. Digital Citizenship is consisting of nine elements that provide the understanding of the appropriate use of digital technology. The nine areas are:

- digital access
- digital commerce
- digital communication
- digital literacy
- digital etiquette
- digital law
- digital rights & responsibilities
- digital health & wellness
- digital security & self-protection

These elements were created to give understanding with the issues that arise with the digitalization. These guidelines give a clear knowledge of the technology and the suitable use of it. When gaining understanding in these fields, people can become productive digital citizens. (Kansas State University 2015).

2.2 The digital divide

While many countries are improving their infrastructure, broadband speed and develop their digital world, there are those that don't have the same resources. This is called the digital divide. (De Kare-Silver 2011, 125.) Media started to focus on the subject of unequal access and use of the new media in the second half of the 1990s; before that general concepts like information inequality and knowledge gap were used (Van Dijk 2006).

Digital divide is a very complex and dynamic concept. Various researches define it often very differently. Early researches on the phenomena focused only on a binary classification of physical access, but more and more researchers have recognized limitation and point out that more attention should be paid to social, psychological and culture backgrounds (Van Dijk 2010). Norris (2001) has stated that the term can be shared in to three dimensions: global, social and democratic divide. Where global divide is the gap between the use of Internet access in the industrialized and non-industrialized countries; the social divide is the gap without the access of information and democratic divide is the difference between those who use Internet resources to engage the public life and those who are not. The figure (Figure 1) below presents a global digital divide, it shows the gap between the most connected and the least connected countries. In the figure can be clearly seen that the gap of digital readiness is very wide. The least connected country Myanmar is only 0,2% connected; therefore Iceland is 90,6% online.

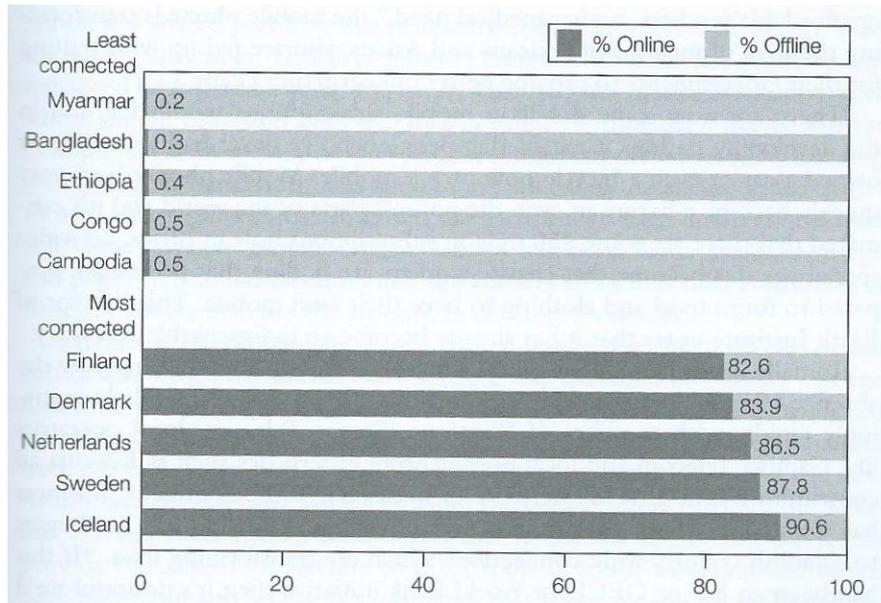


Figure 1. The most and least connected countries in the world (De Kare-Silver 2011, 125)

The scale of the country's digitalization state reflects of its economy. ICT has become increasing economic and social importance to the majority in advanced and developing economies. (De Kare-Silver 2011, 125.) The main arguments behind the global digital divide is the worry about the fact that the developed industrialised nations are in the position to take the full advantage of the information age, while the developing countries are not. With the ICT the industrialized countries can further enhance their elevated positions even more over the developing nations. The current trends show that internet access is growing much faster in the developing countries; however the number of persons getting access to the Internet is still very small in these countries and is far overweighed by the real number growth in the advanced economies. (Miller 2011, 101-104.)

3 Public E-services

With the emerging of ICT also developing different public electronic services is rapidly growing. The states and governments see a need to serve the citizens in a more faster and innovative way. Electronic government (e-Government) is a growing framework, for countries all over the world, for adopting the benefits of ICT and deliver government services via Internet. Also it aim is to make the work of government more accessible and transparent to its citizens.

3.1 E-Services

Over the past decade Internet has changed the way business could and would be done. The new technology has changed the way firms can interact with the customers. The role of customer service evolved from transactional approach to a relationship approach and with the technology, there is a new segment called electronic service (e-service). E-service can be defined as a service which is mediated trough any technology application, for example the Internet. (Fisk, Russel-Bennett & Harris 2013, 166.) According to Rust and Kannan (2002, 4) this kind of e-Services include the service provider and also goods manufacturers whose success vitally depends on the quality of the service organization work – this is a customer-centric concept. The figure (Figure 2) below demonstrates the scope of e-Service. The organization interacts with its customers in the downstream channels and with suppliers in upstream channels. In downstream channels essential concepts are for example customer relationship management (CRM), customer care, customer marketing, therefore upstream routes can include supply chain functionalities, just-in-time inventory and e-procurement.

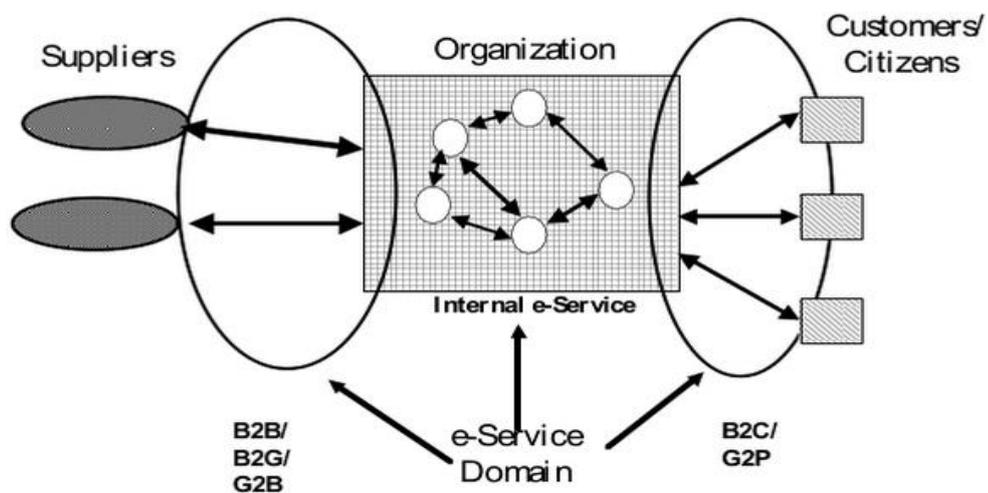


Figure 2. Upstream and downstream of an organization (Rust and Kannan 2002, 5)

E-Services main idea is to focus on the customer and meeting their needs. When traditional service meets the customer needs by face-to face meeting, telephone or e-mail, but e-services usually use the Internet or a kiosk to meet the demands electronically. Traditional services are available only when the service representative is available, but e-services are usable whenever the customer has a demand, so based on the fact e-services are efficient and effective to serve more customers. (Fisk, Russel-Bennett & Harris 2013, 167.)

3.2 Public e-service

Due the fast growing of ICT and Internet, the private sector has driven business into the digital world – with applying e-business and e-Services. Significant reform has been the revolutionizing the supply chain management and value change management through application of e-Technologies. Cause of the fact that public sector work with complex networks and supply chain systems; they have recognized also a need of improvement of business processes, citizens' access to information and productive relationship with the private sector and agencies. (Asgarkhani 2005, 157.) Therefore many public sector agencies and local, state and even federal governments all over the world are using e-service in innovation way as a solution to meet the change (Fisk, Russel-Bennett & Harris 2013, 171).

3.2.1 E-government

This new area of e-services is also known as e-government where governments act like businesses and want to serve the needs of their stakeholders and citizens in an effective manner (Fisk, Russel-Bennett & Harris 2013, 171). E-government can be defined as a use of ICT in public administrations that combine the organizational change and new skills for improve public services and democratic processes (EGOC Community 2010). Through the thoughtful use of technology governments have been able to remove superfluous bureaucracy. Customers are now able to interact and use the services whenever the desire and a need arise. (Fisk, Russel-Bennett & Harris 2013, 171.)

In broader view e-government offers the improvement of the overall services of the government and making the work more transparent for the citizens and to the private sector, by offering a wider access to information and facilitating transactions with and within the government. When using this kind of description e-government can be divided into five major categories:

- government-to-citizens (G2C)

- government-to-business (G2B)
- government-to-government (G2G)
- internal efficiency and effectiveness (IEE)
- government-to-employees (G2E)

The government-to-citizens category includes the interactions done electronically that involve the government and citizens. The purpose is that the citizens are able to connect with the government whenever they are or want. G2C e-government objectives also are to meet the high public demand of information, improve the value of government to citizens and make obtaining financial assistance from the government easier, cheaper, quicker and more comprehensible. Government services are provided to the citizens via citizen portal and typical services include: payment of taxes, receiving different payments and documents. G2B usually includes interaction between the government and businesses; where government is selling to businesses and provides them with services and businesses are selling their products and services to the government. This categories performance objective is to make transactions to business quicker and easier. For example companies can find fast needed rules and regulations, online tax and export form filling. G2G consist of activities between units of the government; its objectives include among others cutting the operating costs, automation the internal processes, share information more quickly and convenient between different units. G2E an e-government category that includes activities and services provided by the government to their employees. These kinds of applications are useful in enabling communication, for example with those workers who are situated in a different geographical location. Internal Efficiency and Effectiveness initiatives provide tools to improve the government operations and the processes implanted in government units. The purpose of this category is to reduce time with processing clearance forms, increase availability of training programs for government employees and reduce time for citizens to find a federal job. For example improving homeland security can be considered as an IEE activity. (Turban, King & Lang 2011, 259-265.)

3.3 Public E-service offering & quality

E-services and e-businesses have transformed the way of logistic and supply chain processes are managed with the public sector. But providing quality e-services remains a challenge to the public sector agencies. Governments must maximize the benefits that are offered but at the same time avoid the pitfalls that can come with the new technology. Still a lot of studies have shown that the governmental organizations are putting too much emphasis only to the technological aspect of electronic services. The electronic technologies can be beneficial when they are a part of and supported by the social, cultural and political environment. Also some performances measures are needed in order to assess the pro-

gress and check if the developed e-services are matching with the reality. (Asgarkhani 2005.)

Asgarkhani (2005) has reviewed different case studies about e-services and e-government and suggest that local governments when introducing electronic services should concentrate on:

- Prompt, accurate service
- Improved quality of service
- Removing barriers and tackling social exclusions
- Local access points

The service quality can be represented in two dimensions: technical and functional quality. Technical quality refers how the service is delivered and functional quality to what the customer are receiving. There are no generally accepted theoretical concepts yet for the consumer evaluation of e-services, with that a major concern is that the quality of the medium is confused with the quality of the content that the application or website is offering. When defining the quality of electronic services both of these factors should be considered. In public sector the services evaluation is even more complicated because it interacts with direct, indirect and other stakeholders (such as different firms, agencies and organizations).(Ancarani 2005.) When focusing on the functionality aspect in public electronic services usability is a main characteristic to evaluate the quality of a service. According to International Organization for Standardization usability can be defined as a measurement of the effectiveness, efficiency and satisfaction the users can achieve when using the needed services. Parameters which can be used when assessing the quality of e-services can be classified into three different categories: usability, service and implementation related aspects. When evaluating the level of usability four components are taken into consideration: understandability, learnability, compliance and attractiveness. These factors are very important to notice to get the positive feedback from the users. In the service aspect some features that should be considered by the government are: multicannality, trustworthiness, internationalization, originality, accessibility and adaptability. In the implementation aspect the parameters can be divided roughly into two: behavioural and infrastructural criterions. In the first group should be noticed the interoperability, integrity, security and flexibility of the services. Infrastructural parameters are availability, performance, scalability, scheduling and reliability. All these parameters are linked with the offering of information and interacting with the users. These above mentioned features should be taken into notice when developing or measuring the quality of a public electronic service. They help to strengthen the whole e-government field and push it toward maturity. (Corradin, Polzonetti, Re & Tesei 2008.)

3.4 Security of public e-services

Security is a major concern in electronic government, there are numerous risk that can be threaten this technology depended system. Trust is a crucial aspect in achieving a high level performance, when offering public e-services. The government needs to provide secure access of the system and all the application provided. Security issues, especially different kind of threats can have an effect of the information, on the application or on the whole system. According to Coelho (2007) threat is an event that can cause damage to a system and create a loss of confidentiality, availability or integrity. (Zu'bi & AL-Onizat 2012, 370) From a technical viewpoint there can be at least 20 different risks that involve the security of data. These risks can be classified into three basic groups:

- Loss of confidence or credit
- Loss of integrity
- Loss of availability

In detail these risks can be further categorized into: inter-communication, intra-communicaton and system threats. Inter-communication threats can be passive or active. Passive threats are manipulation that can not be proved and are so called "leaking" of the information. Active threats therefore are caused by manipulation of objects and can be recognized. Intra-communication threats are caused by the communication participants and include examples like computer fraud and computer forgery. The third group of the risks refers to the manipulating of whole system. This threats include viruses, trojan horses, spooling and misuse of access rights. In electronic government all data is more or less security-sensitive. Therefor also additional security issues arise in a non-technical viewpoint. Citizens feel uncertain and afraid when using e-Government system. There is no possibility of the citizen to proof the validity of the security. (Wimmer & Bredow 2002.) E-government has a responsibility to provide leadership in developing a culture of privacy and security. Therefore the state is responsible to gain trust from citizens and ensure the secure usage of the system and network.

4 Insight of Estonian's road to becoming a digital society

“We are convinced that a public sector ICT approach that is citizen-centered, secure and transparent is the future of good governance in the 21st century.”

T.H. Ilves President of the Republic of Estonia

With only 1,3 million people living in Estonia, the country has managed to be one of the most wired societies in the world. In the early 1990s, with the emerging of the World Wide Web, the small post-Soviet nation made a conscious decision to build an open electronic society - what would involve the government, business and citizens. (Petersoo 2012.) The most important feature in Estonia's digital society is the developed infrastructure. The system is an open, decentralized system linking together various services, this set-up allowed to develop and add new components of digital society through the years. This kind of power has made Estonia into one of the success stories in the digital society. (CCDCOE 2012.)

4.1 The story of e-Estonia

e-Estonia has changed the interaction among the government agencies and between the government and its citizens. In e-Estonia bureaucracy is the thing of the past. Citizens are able to fill out their tax returns in five minutes at their home, or sign a legally-binding contact via Internet anywhere in the world. Entrepreneurs can register their business only within 20 minutes, check companies and legal records online and also are able to integrate their own secure service, offered by the state. (CCDCOE 2012.)

With the arrival of the Internet, Estonian leaders made a decision to use it, and started to build an open electronic society – a project what involved the government, businesses and the citizens. In the year 1996 an innovative Information and Communication Technology (ICT) project called Tiger Leap began. The Tiger Leap Foundations task was to increase the Estonian's education system. The early focus of the foundation was to provide schools with the hardware and physical infrastructure, so they could learn and interact. Nowadays the organisation focuses more on educational initiatives. (e-Estonia 2015b.) For example koolielu.ee, is an online portal for educational materials. It has quite a success: 33 % of the teachers in Estonia regularly using the site (Cléirigh 2012). Also the private sector got interested in going online. In 1993 Hansapank started its first electronic banking solution. In year 1996 the first banks Eesti Foreksbank and Eesti Hoiupank introduced Internet banking services. By the end of the year in the world were only about 20 such kind of services and three of them were used in Estonia. (Kalvet 2012, 17.) In the

same decade the Personal Data Protection Act was passed, its purpose is to protect the fundamental rights and freedoms of a person when processing personal information. This enabled Estonia to start developing a digital society infrastructure, like the ID card project and the X-Road framework. (e-Estonia 2015b.)

Arriving of the millennium, Estonia started rapidly move towards becoming a digital society, new e-services were added every year. In March 2000 the Estonian government approved the Digital Signature Act. This act provides the needed conditions, permissions and procedures for using digital signature. Digital signature holds the same value as a handwritten signature. In the same year Estonian Tax and Custom Board set up a new system that enabled people to fill their tax returns online. This system has lowered administrative costs and has made tax collection more transparent and effective. By the year 2013, 95% of the tax declarations were filled electronically. Also mobile parking (m-Parking) was introduced, a system that allows to pay for parking using a mobile phone. In Tallinn this method is becoming the most popular way of paying for parking. In the same year Estonian government started using a tool called The Information System of Government Sessions, shortly known as e-Cabinet. This innovative structure helps Estonian government streamline its decision-making process. Ministers can prepare for meetings, create and review the minutes without using and paperwork. Before using the e-Cabinet system the cabinet meetings were about 4 -5 hours long, now they are reduced to only 30-90 minutes, also it helps save money and the environment, cause the fact that there is no need for printing anymore. In the year 2001 The Population Register was introduced, it is the state's database that holds the basic information of the citizens of Estonia. Every person can review and add data in the register. The register is connected to other systems via the X-Road. For example when applying for discounted public transportation tickets – the data is fetched from the Population Register automatically. It helps to save time and keep the statistics up-to-date. In the next year electronic ID card were taken in use, nowadays there are over 1.1 million e-ID cards in use in Estonia. Also one of the widely used web application e-School was launched, what gives opportunity of different education stakeholders to work and organize learning together. In 2005 e-Voting, a system that allows citizens all over the world take part in Estonian elections Thanks to the convenience of the system i-voting is highly popular with the Estonian electorate. (e-Estonia 2015b.)

By 2007 Estonia was highlighted more by the international media. Becoming the first nation in the history, that had successfully defended itself against a large-scaled cyber-attack. The attacks take place during the tension between ethnic Estonians and the countries Russian minority population. Distributed denial-of-service (DDoS) cyber-attacks targeted the county's infrastructure: all websites of government ministries, major banks,

newspapers and some political parties' websites were shut down; also parliamentary e-mail server was disabled. Because of the fact that Estonia's had built a strong electronic infrastructure, it had quite a huge impact of the work in the governmental agencies, in an economic sense it had only a mild impact. (Herzog 2011, 51.) With the chain of these attacks Estonian raised the global awareness of the cyber-attacks (Rehman 2013).

Estonian model is studied by many countries, who want to know how to build a safe and working national cyber security capability system. Estonia has become a good example for countries who also want to adapt and develop powerful e-services. (Rehman 2013.) Already over 40 countries in the world are using Estonia's e-solutions (e-Estonia 2015b). Estonia's road of becoming a successful digital society is not stopped and the country is constantly developing new systems and improving old e-services.

4.2 Components of e-Estonia

The most powerful tools in building e-Estonia, are Estonia's integrated e-services. The e-Estonia's component system is very flexible and allows easily add e-services in the future, for growing the government system ever more. The essential elements in e-Estonia are the Estonian electronic ID card, X-Road and the Estonian state portal. ID card enables to authenticate and use the secured e-services, X-Road what is the backbone of e-state hold the various e-Service databases in one system, State portal what binds all the e-services available in one site.

4.2.1 Estonian electronic ID Card

In Estonia identification card (ID) is the most highly-developed national ID card system in the world. In February 1999 Estonia launched its electronic ID card program when the Estonian Parliament reached an agreement of the Identity Documents Act. It defined the guidelines for creating a mandatory national identification card (Identity Document Act 2000.)The first electronic card was introduced in the year 2002 and by 2011 almost 90 % of the residents are carrying it. The national card, what is mandatory from age 15, acts as a digital access card for every e-service in Estonia that is secured. (CCDCOE 2012.) The chip on the smart card contains two certificates: one for authentication and one for electronic signature. The certificate hold such information like: cardholder's name, personal ID number and official e-mail address. The official e-mail address is provided from Estonia to its each citizen, for official government communications. On the ID card are embedded files that are encrypted with a 2048-bit public key, what enables it to use as a proof in an electronic environment (CCDCOE 2012).

Both public and private sectors are involved in the Estonian e-ID project. The national ID card is officially administered by a government agency Estonian Citizenship and Migration Board. Certification Center, AS Sertifitseerimiskeskus (SK) is responsible for the maintaining of the electronic infrastructure and distribution of the ID cards. SK has developed numerous systems for encouraging the usage of electronic identification cards. The most important implementation is DigiDoc which is a framework that enables to give and verify digital signatures. (Castro 2011, 15.) To use the ID-card for authentication ID-card software is needed that can be downloaded free from the Internet. Pin codes and valid certificates that can be issued with the identification card, computer and a smart card reader.

The government uses ID's to improve services and eliminate waste. For example there is no separate health care card, also in Tallinn, Tartu and Harjumaa you are able to use your e-ID as a ticket. The usage of electronic identification is been a big success. In the picture below can be seen the usage of e-ID for authentications and giving signatures in the year 2007 to 2011, as can be seen the usage is growing steadily with every year. The most innovational use of the e-ID was introduces in year 2005: e-voting. What enables citizen to vote via Internet. In the parliamentary elections May 2011, almost one quarter of Estonians voted online. (Vabariigi Valimiskomisjon 2011.)

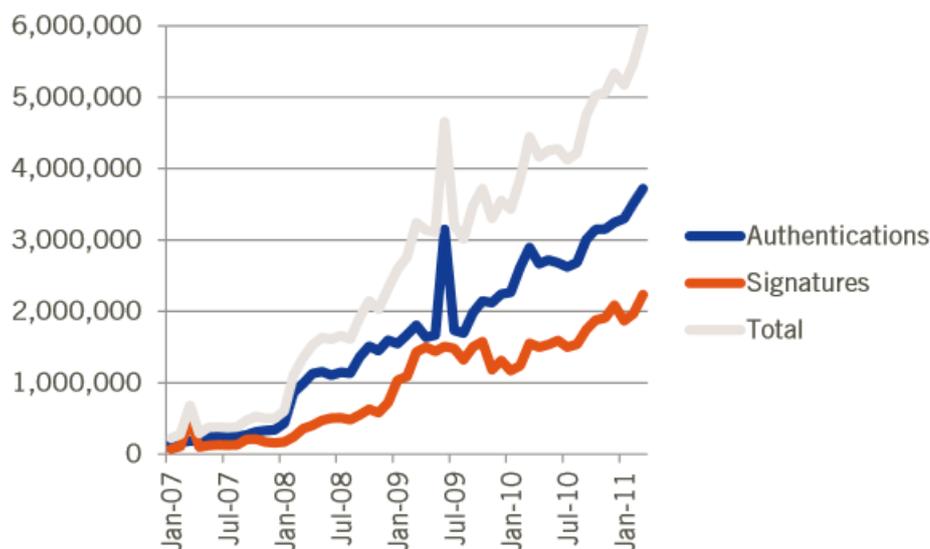


Figure 3. Usage of authentication and electronic signature in year 2007-2011 (Castro 2011, 15.)

The electronic ID is also available for mobile phones. “Mobiil-ID” contains also certificates that are stored on a subscriber identity module (SIM) card used in a mobile phone. “Mo-

biil-ID” can be used in the same way like the electronic identification card – for identifying and sign documents digitally. (Castro 2011, 16.)

4.2.2 X-Road

The technology of X-Road was developed in 2001 and the national deployment of the environment started from 1 January 2002. At first it was only developed as a usage to the public sector and for making queries to the different databases. (X-Road Europe 2015.) Nowadays it is an important tool what can be used to write to the different databases, transmit huge data sets and also carry out searches from several databases at the same time. It’s an environment that combines all the nation’s e-services and databases together in one system. It allows operating fully in the public and private sector with any platform used. (e-Estonia 2015c.) X-Road solution is the key element in Estonian infrastructure and the backbone of Estonia’s e-state, what is being constantly developed (X-Road Europe 2015). In the figure (Figure 4) below is the framework of X-Road:

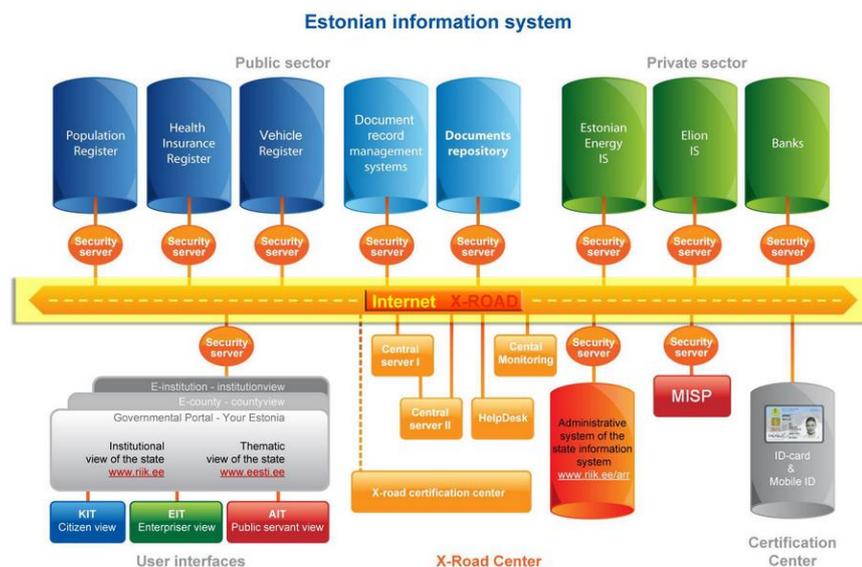


Figure 4. Estonian Information system X-Road (e-Estonia 2015a)

The most important element in X-Road is, that the databases are decentralized, that means that there are now single owner, new e-services can be constantly added and every government agency and business can choose their own needed e-services from the databases (e-Estonia 2015c).

As Estonian’s X-Road being successful, the systems core technology concepts act now as a base of a new project called X-Road EU. X-Road EU is an environment what is being

developed for the public sector information systems of EU countries. It is an environment that provides simple infrastructure for cross-border domains, what allow to trade information safely and according to the standards within the public Internet network. (X-Road EU 2015.)

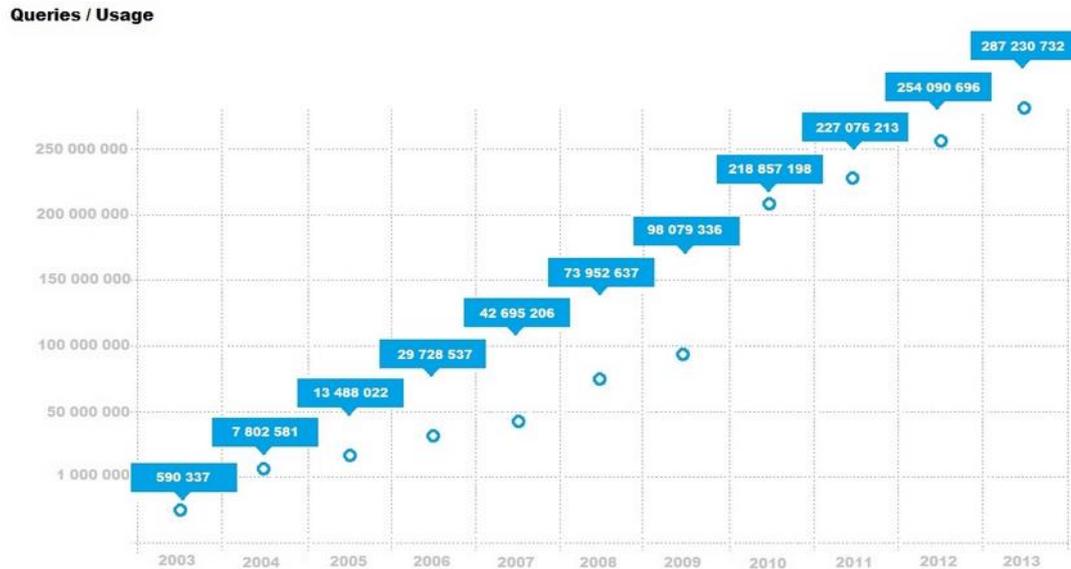


Figure 5. Usage of X-Road in Estonia (X-Road EU 2015)

As seen on the Figure 5, the quires made by using X-Road are growing significantly every year. The usage made a huge jump in the year 2010, when “Digi-ID” was launched and people had opportunity to use ID card for using e-services and give digital signatures. After that over 200 million quires are created yearly.

4.2.3 State portal eesti.ee

The state portal eesti.ee was introduced in the year 2003 and is a website that can be used for finding public information and all the e-Services provided by various government institutions. The gateway is easy and secure. Users have to log themselves in by using their ID cards, which is the most secure form of identification, once logged in, the user does not have log in when accessing different services. On the site consumers are able to create documents, sign them digitally, order public sector information services and send e-mails. The services provided by the portal are drawn from different a database that means that there is no need to enter multiple registers. The portal is divided into three main sections: for citizens, entrepreneurs and for officials like seen in the Figure 6. This makes the site easier to the user to find the needed services faster. (Republic of Estonia. Information System Authority 2012.)

Services

Descriptions of e-services are available in English, all official forms are in Estonian.

 For a citizen  Help <ul style="list-style-type: none">▶ Applying for admission to a preschool in Tallinn▶ Prescriptions▶ Benefits for incapacity for work▶ Ordering the European Health Insurance Card View all	 For an entrepreneur  Help <ul style="list-style-type: none">▶ Adding data on the certificate of temporary incapacity for work▶ Traffic insurance history▶ Notarised documents▶ Economic Activities of Estonia (EMTAK) View all
 For an official  Help <ul style="list-style-type: none">▶ Adding data on the certificate of temporary incapacity for work▶ Notarised documents▶ Economic Activities of Estonia (EMTAK)▶ Query about identity documents View all	 Services A-Z View all

Figure 6. State Portal services (Estonian State Portal 2015)

Individuals can find fast information about their rights and obligation in communicating with the authorities in Estonia. Also find answers to problematic issues and get direct answers by the relevant department. In year 2013 a new service was launched, where the citizens are able to personalize their site according to their preferences and most used services. (Republic of Estonia. Ministry of Economic Affairs and Communications 2012.) Entrepreneurs are able to obtain information about launching and running an enterprise. The portal provides a step-by-step instruction what to exactly do. Public sector agencies can add information and instructions to the portal, the more comprehensive data the site contains, the fewer enquires the public departments receive. (Republic of Estonia. Information System Authority 2012.)

4.3 e-Residency

In the year 2014 Estonia announced a new innovative programme called e-residency, and became the first country to offer this kind of opportunity. The idea started in spring 2014, when the Estonian Development Fund and Sten Tamkivi, the former head of Skype released a business idea contest to find new big concepts for develop Estonia even more. Three government officials: Taavi Kotka, Ruth Annus and Siim Sikkut presented their idea called: “10 million ‘e-Estonians’ by 2025”. The aim of the purpose was, that by the year

2025 there will be 10 million people in the world who are associating with Estonia via e-identities. This idea won the contest and is the base of the current e-residency project. (e-Estonia 2015a.).

When becoming an e-resident, the person will receive a special e-resident's digital identification card (smart ID-card). It is not a physical ID-card and it is not valid when travelling. Like seen on the picture below (Figure 7) the card does not have a photo on it, but it has a microchip with security features. With this card legal residency, citizenship or entry to Estonia is not granted. Instead it gives you opportunity to securely access and use Estonian provided digital services. As an e-resident it is possible give digital signatures, verify authenticity of signed documents, establish an Estonian company online and administrate it, conduct e-banking and declare Estonian taxes. The card can be used with a small piece of software and a reader attached via USB to a computer. (e-Estonia 2015a.)



Figure 7. Estonia's electronic residency card (e-Estonia. 2015)

The digital signature and authentication are legally equal to handwritten signatures and face-to-face identification and are working anywhere in the world. The microchip in the card is provided with security certificates PIN1 and PIN2. PIN1 is used as authorization and is a 4-digital number. PIN2 is a minimum 5-digit number and used for giving digital signatures. (e-Estonia 2015d.)

On 1 December 2015 the world got its first e-resident: a British journalist, senior editor at The Economist, Edward Lucas, a friend and advocate of Estonia (Tambur 2014). He has been interested in Estonian "digital society" in a long time and saw now benefits in the e-residency. He said to the ABC news that is running a small family company in the United Kingdom and is now interested to move the company in Estonia and start to pay the taxes in there. (Drysdale 2014.)

The purpose of the e-Residency program is to attract Estonia as a place of residence and for doing business. The registration of businesses will bring investments, create jobs and accelerate the economic growth. (Republic of Estonia. Ministry of Economic Affairs and Communications.) Estonia has e-Residents all over the world. In the time-being there is 1186 submitted applications. Majority of the applicants are from Finland, however one applicant is even from Tanzania. Estonia has refused to grant e-Residency 12 times: to one Japanese, Latvian, Sweden and German, Belarus citizens. Also two Finnish and three Russians did not become e-Residents. The map below (Figure 8) shows in which countries, there are most Estonian e-residents with the stand of March 2015.

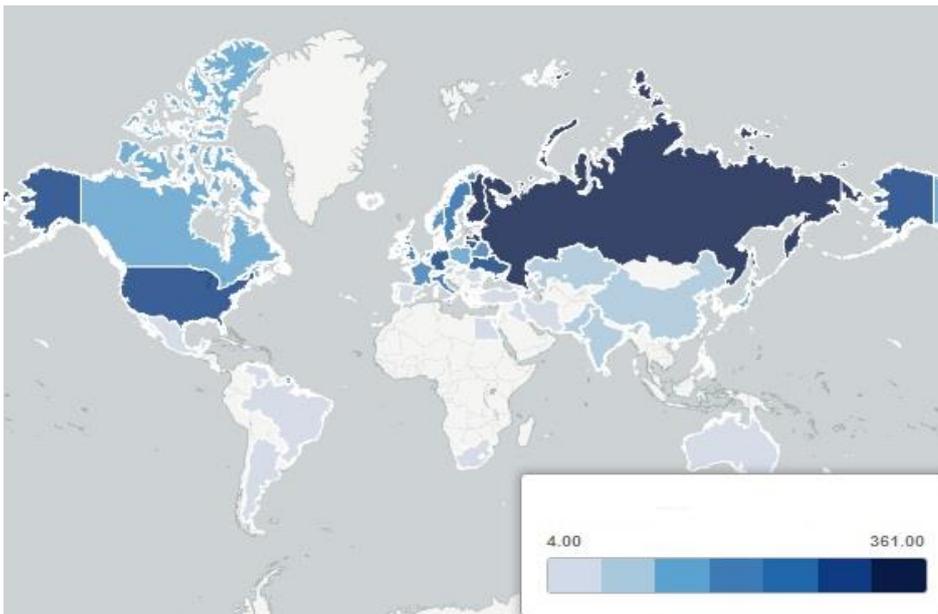


Figure 8. E-Residents in the world (Postimees. 2015.)

The darker the blue color, the more e-residence. In Russia and Finland there are the most e-Residents, followed by Ukraine, United States and Germany.

5 Previous researches

Earlier research about the usage of public e-services amongst young people in Estonia has not done. There are two similar studies about the usage of e-services, with a broader scope and target group. In creating this research the two studies "*Citizen's satisfaction with provided public e-services in year 2014*" and "*Effectiveness and impact of the usage of e-services*" were taken as a framework and for benchmarking the results.

In February 2015 the Economic Affairs and Communications presented the results for the satisfaction survey "*Citizen's satisfaction with provided public e-services in year 2014*". The research was conducted by the TNS Emor, which is the on leading marketing research and consulting agency in Estonia. Since the year 2001 it belongs to the group of Group Holdings LTD, what is the world's second largest marketing research and communication group. (TNS EMOR.) In the study 1010 people were interviewed in the age 16-74. The survey's objective was to identify the Estonian Internet user use and satisfaction of public sector e-services in an electronic environment. The research was a part of European Union structural fund program for rising Information Society awareness and was funded by the European Regional Development Fund. TNS Emor has conducted similar studies in years 2007, 2008, 2010 and 2012.

The results of the study focus on the Internet users, those people who have used the Internet in the past two years. Also the conclusions are compared with the results in the year 2012. The research showed that 71 % of the Internet users are overall satisfied with the available public e-services, that is 4% more than in the year 2012. Participants of the survey think that public e-services provided and developed by the state and local governments have helped to save time and money, but also give more valuable information and lower bureaucracy. In the study was discovered, that people focus on the comfortable use of the services that means that a good e-service according to the respondents should be fast, not too hard to use and should provide enough guidance and support information. (TNS Emor 2014.)

The second research "*Effectiveness and impact of the usage of e-services*" is conducted by the cooperation of Institute of Baltic Studies and Praxis Centre for Policy Studies. The study was commissioned by the department of Information System of Estonian Economy and Communication ministry.

The objectives of the study are to identify the social and economic impact achieved of the development and implementation of public e-services in Estonia. Also it identifies the

technological, legal and organisational prerequisite that must be completed to have a successful impact. The research set out to develop indicators that could be used for planning the future development of the e-services and of marketing them. There were three target groups asked: users, service providers and ICT enterprises as developers of e-services.

The results showed that the e-services have a positive impact for the users. The services have become more accessible and easier to use. However the study presented the fact that there is need for making the available services even more intuitive and simpler to use. In the service provider point of view was found out that Estonia has saved a lot of money and time when developing services. Still updating the usage of e-services and the full utilisation of information technology requires major changes in the work of the government agencies and between them. Also that they don not have analysed the amount of time and resources spent on the different transactions within the e-services and off-line services. When the answers of e-service developers analysed was discovered that the export potential of the information and communication technology solutions is rather limited. (Kalvet, Tiits & Hinsberg 2013.)

6 Usage of public e-Services amongst young people in Estonia

In Estonia there are countless public services that are made to easier everyday life. Estonian public e-services are secure and accessible to every citizen. The government, civil society and private sector have worked firmly together to develop the offered e-services. The use of the Information and Communication Technology has helped to reduce corruption and have made the work of governments more transparent and also enables people follow and participate in the decision making processes. The objective of the research is to study what are the feelings amongst young people towards the offered services. Also to find out about the e-service usage habits: how often they are used and which are the most popular electronic services.

6.1 The research –survey

The target group of the survey were young people. The settled requirement for the sample was that the respondent is in the age 16 to 30 and a citizen of Estonia. The questionnaire was conducted in the timeframe 1.4 – 20.4.2015 in which 149 answers were collected. The responses were analysed and eliminated those answers that did not fit to the stated requirements above. 105 answers were used to analyse and find answers to the research questions and find out the usage habits of public services amongst young people.

The questionnaire was conducted via Internet, for collecting fast and a sufficient amount of answers. The survey was composed by using Google forms, this option were chosen because of the ease usage. The system offers a large variety of options for questions and themes for the questionnaire. All the answers are gathered into one Excel sheet and the system offers the possibility to display a summary of all the responses in a form of easily readable graphs. This feature got a lot of positive feedback from the respondents. The answers were then transferred to Microsoft Excel 2010 and analyzed. Results of the survey were mainly represented as graphs, what can be seen in the Chapter 7. The link to the survey was shared mainly in social media (Facebook) and in different discussion forums, what included school discussion groups and forums that had the purpose of entertainment.

The predetermined goal was to collect at least 80 answers to get a more reliable outcome from the survey. The objective was completed, and 105 suitable replies were gathered. All the questions were conducted so that they would give answers for the stated research questions. Also the questionnaire was build up as simple as possible, so that all the respondents could understand the questions and statements in the same way. The reliability

of the research can measure in several ways: the amount of respondents, area covered reliability of the answers. Because of the fact that over 100 answers were collected the reliability is high, while the responses are uneven the reliability of the survey decreases. To get more trustworthy results, the different groups like age, gender and residence must be more even.

The final survey consists of 19 questions (Appendix 1). The purpose of the first five questions was to collect some background information and deliver possible correlations between the answers. Next group of questions was to find out the awareness of the public e-services. First was asked the knowledge about the offered electronic services offered by the state and local governments also the awareness of the state portal eesti.ee was asked. Then the usage habits of the public e-services were studied: how often young people use e-services. Next the respondents had to give a rating how satisfied they are with the range and quality of the offered electronic services. After that the most used e-services based on the TNS EMOR 2014 survey were listed and the participants had to choose which one they use the most. Because the fact that e-Voting is arising in Estonia, the next question was to find out how often have respondents used the opportunity to vote in elections electronically. Then the participants had the free option to give their opinion if there are any missing e-services that would be crucial or they would like to have. Assessment how the offering of electronic services have influenced the functioning of the Estonian state was asked. After that the respondents had to evaluate how much the usage of public e-services has influenced their everyday life, also an optional question was asked to bring an example how it has influenced. The penultimate sets of questions were about the problems and security of the public e-services. From the participants were asked if they have had any problems with the electronic services, if yes, what issues they have faced and how secure the offered e-services are in their opinion. The last question was to find out if young people have heard about the new phenomena e-residency. When assembling the questions for the survey, earlier researches were taken as a framework, to get the answers for the research questions.

6.1.1 Research methodology

The primary information for the research is a mix of quantitative and qualitative data and collected by conducting a survey. Quantitative data can be measured and contains some magnitude, usually expressed in numbers. Survey is a good tool for collecting both quantitative and qualitative data. Questionnaire is the best and faster option to retrieve the information needed for answering the stated research questions. Surveys are a cheap and flexible tool, which has the advantage to get the answers really fast. Also it is possible to

accumulate large amount of responses covering large geographical area. However the construction of a good questionnaire takes a lot of time; it should be short and simple to follow. It is common to practice a pre-test with a small group of people before applying the final version of the survey (Walliman 2011, 97-98.) The questionnaire applied in the research was tested on a group of 4 people. After the pre-test some improvements were done, that had been recommended by the testers.

Mainly closed format question were used to collect quantitative data. The respondents had to choose from a set of given answers. They are simple and fast to answer and do not need any special requirements from the respondent. In the conducted survey for this study different kind of closed format questions were used. (Wallimann 2011, 97-98.) For example respondents had the opportunity to choose from different options. Also in many questions a Likert scale system was used, where the respondent had to give an evaluation from 1-5. Because of the main target of the research is to study the feeling towards public e-services amongst young people this kind of system is best to use. The scale is used to obtain participant's preferences of the degree of agreements with a statement. Mainly a 5-point scale is used, ranging from "strongly disagree" and in the other end "strongly agree" (Bertram.) The questions asked from the participants can be seen in the Appendix 1. Also some open format questions were used in the survey to provide qualitative information for the research. Open format questions give the opportunity to the respondents to freely express their feeling with their own content and style. These kind of questions are more demanding and time consuming to analyze. (Wallimann 2011, 97-98.)

The acquired answers were observed and analyzed. About every question a table or a graph was constructed to give a better overview of the collected answer. The responses were analyzed, compared with background theory and findings of earlier research. Based on the acquired data a conclusion was written with new findings.

7 Results of the research

To the survey Usage of public e-Services amongst young people gathered all together 149 answers. The target group was young people from the age 16 to 30. The respondents replies, which did not fit in this criteria, were eliminated and all together answers that fitted the requirements were 105. The first questions in the survey were to get some background data about the respondents. The information asked included: gender, age, residence, level of education and current status in the labor market. From Table 1 can be seen the summary of all the asked background questions.

Table 1. Summary of respondents background information (N= 105)

Type of question	Answers	%
Age		
16-19	9	8,6%
20-24	39	37,1%
25-30	57	54,3%
Gender		
Male	62	59%
Female	43	41%
Residence		
big city (Tallinn, Tartu, Pärnu, Narva, Kohtla-Järve)	66	62,9%
small city	7	6,7%
village /town	18	17,1%
outside of Estonia	14	13,3%
Level of education		
primary education	12	11,5%
secondary education	27	25,7%
vocational education	18	17,1%
higher education	48	45,7%
Status on the labor market		
working	55	52,4%
unemployed	9	8,6%
student	37	35,2%
other	4	3,8%

The most popular age group was 25-30 years with 54,3% and over half of the respondents were males 59%. The average respondent lives in a big city, is working and has secondary or higher level education.

The main objective of the research was to find out how much young people in Estonia know about public e-services and how much to they use the available e-Services. Figure 9 shows how aware the respondents are about the e-Services offered by their state and local government. Respondents had to choose from the scale 1-5, where 1 was “not aware at all” and 5 “very aware”. 38,1% of the answered that they know something about the services, 29,5 % are aware and 12,4% think they are very aware of the offering. All together 20% of the respondents are not aware of public e-services.

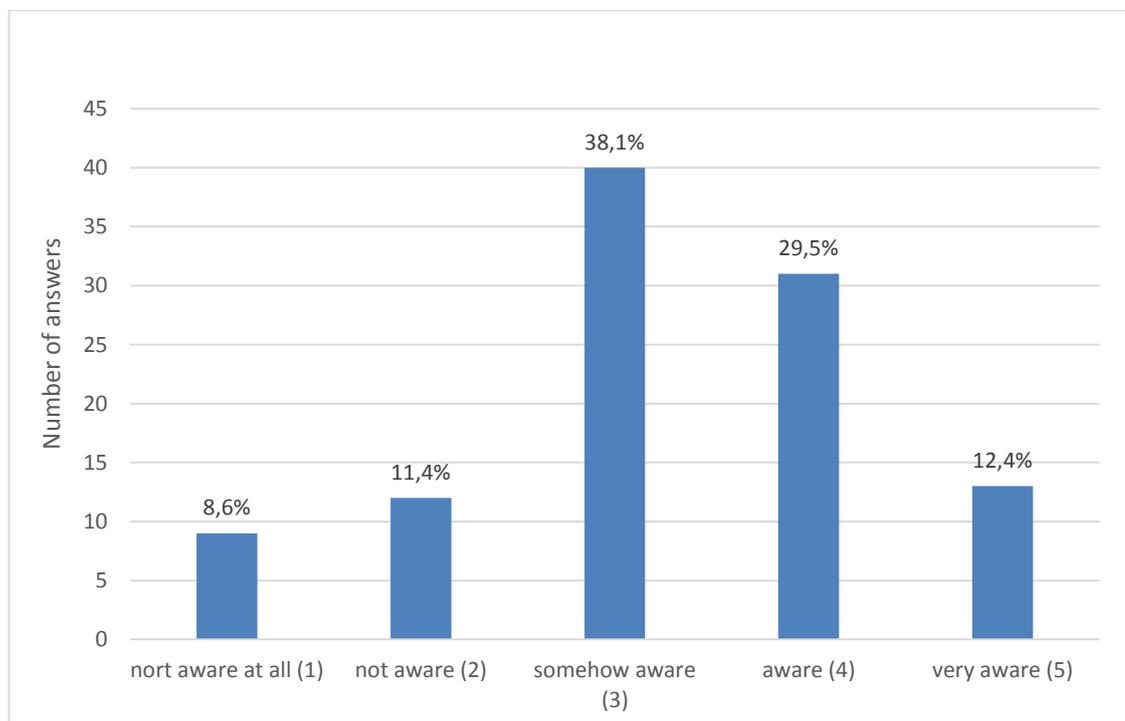


Figure 9. Awareness of the offered e-Services by the state and local government (N=105)

The state portal eesti.ee is an important component of the digital society of Estonia. It binds together all the available public e-services in one website. The results of the survey show that (Figure 10) 96,2% (101 respondents) have heard about the gateway and only 3,8% (4 persons) claimed to have not heard before of the state portal eesti.ee.

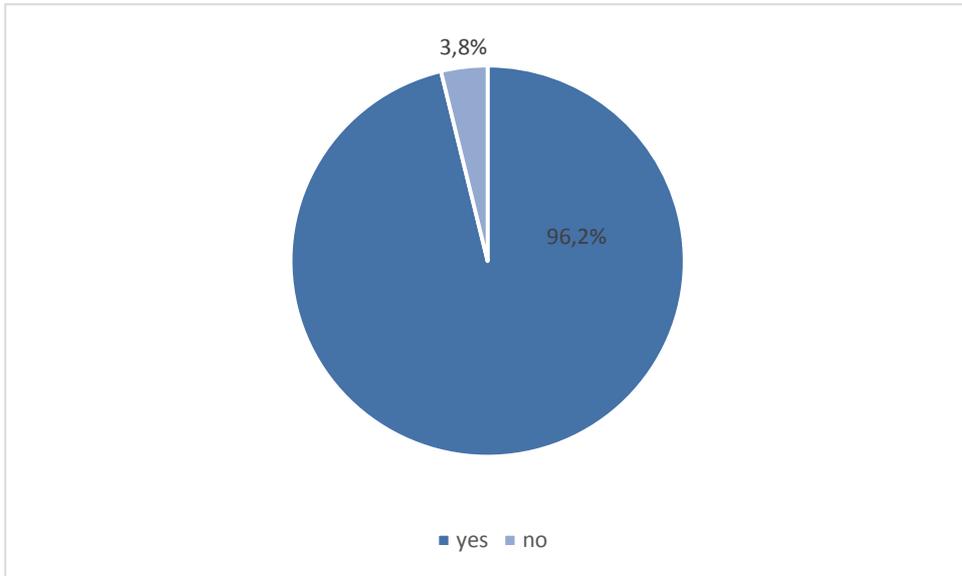


Figure 10. Awareness of the State portal eesti.ee (N=105)

Also how often young people in Estonia use the public e-services were asked. In the graph below (Figure 11) can be seen that the most answers got the option “a few times a year” with 38,4 % the second popular answer was “a few times a month” with 27,6% and the third popular option was “once a month” with 15,2% of the answers. Daily users of public e-services were 7,6 % and people who had never used these services were only 2,9 % of the respondents.

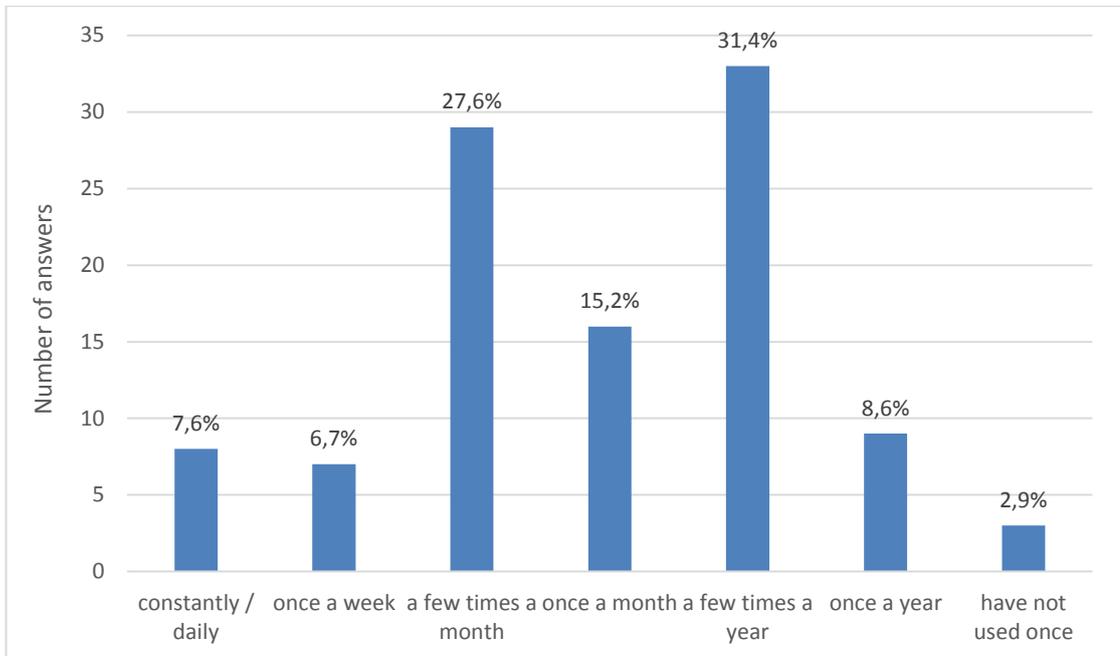


Figure 11. Usage of public e-Services (N=105)

In the Figure 13 can be seen the satisfaction of the range and quality public e-services offered by the state. The respondent had to give a grade to the offering from 1 to 5, where 1 marked “not satisfied at all” and 5 “very satisfied”. 55,2% were satisfied and 21,9% of the respondents were very satisfied with the offering. 19% were somehow satisfied and only 3,9% answered that they are not satisfied (at all) with the available e-services.

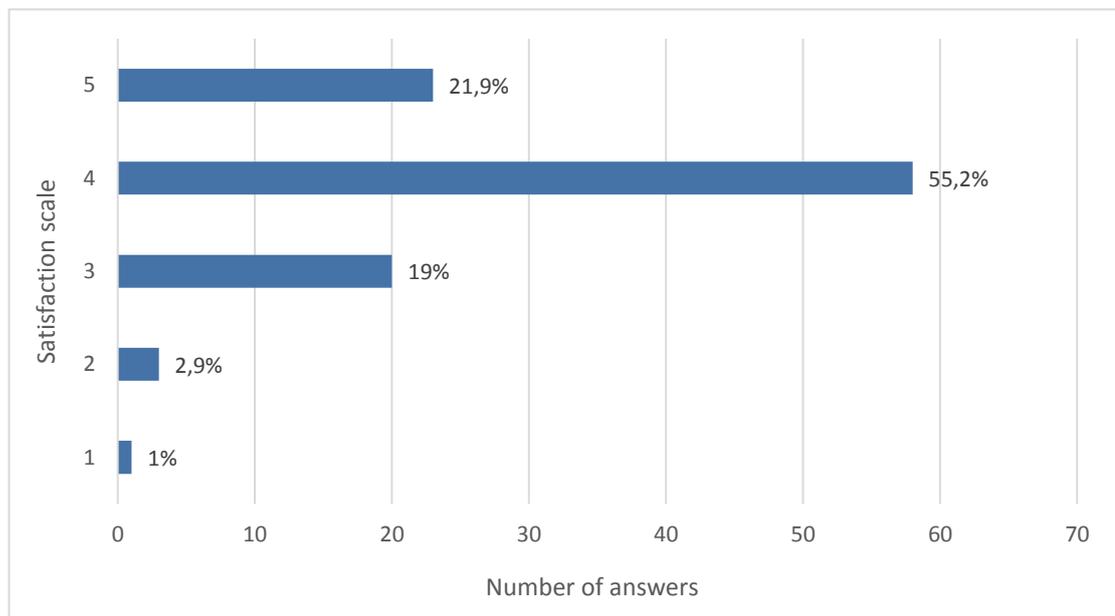


Figure 12. Satisfaction of the range and quality of offered public e-services in Estonia (N=105)

The target of the survey was to find out also which e-services are the most used amongst young people in Estonia. Because of the fact that there are hundreds of different electronic services available, options of the most popular e-services according to TNS Emor survey in 2014 was given to the participants. The respondents were able to add also their own most used e-services. The result showed that submission of the tax return to Maksu- ja Tolliamet, ordering digital prescription, payment for the public service or state fee to internet bank and using e-voting/e-election services were the most popular used e-services. Another popular e-service came forward, what was not listed in the option section was using the Estonian state portal eesti.ee for looking the needed e-service or information about them.

E-Voting has been become very popular amongst the Estonian Internet user over the last years. In the research was studied how actively young people have been using the possibilities of e-Voting. The graph below (Figure 13) shows the e-Voting amongst young people. Only 7,6% of the respondents have voted over 5 times, 19,1% people 3-4 times and

37,1% of the persons 1-2 times , 36,2% respondents said that they have not yet voted electronically in the elections.

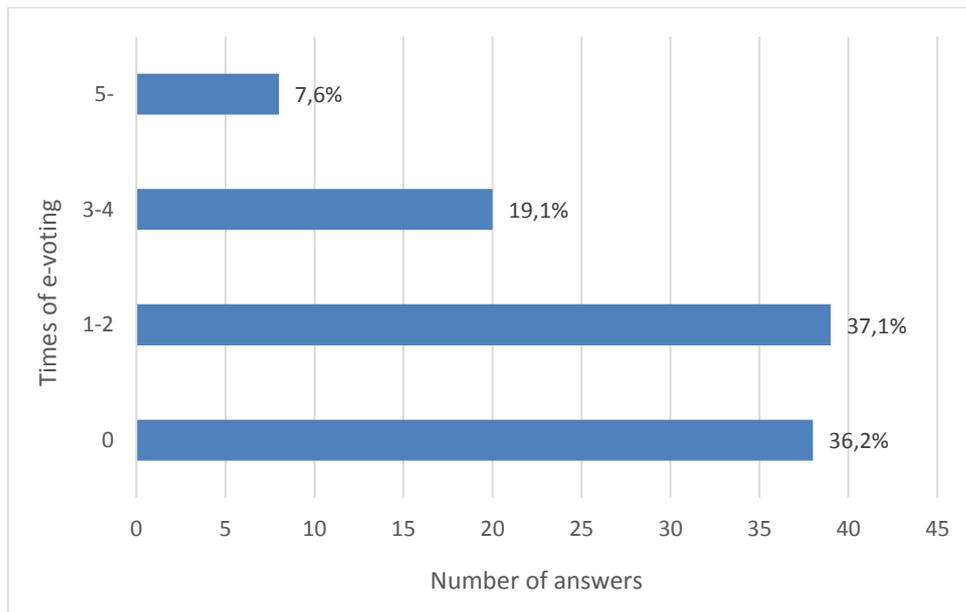


Figure 13. E-Voting amongst young people (N=105)

For the participants was given option to give some examples of e-services what are not yet available, but would be useful. Majority of the respondents do not think there is any need of more e-services, some of the people even think that there are too much of electronic services and the face-to-face communication between humans is fading. Examples of new e-services that could be developed in the future: buying a public transport ticket via Internet or a mobile application, ordering food to home and electronic courses.

Because target of the research was to find out the young people feelings towards e-services, was crucial to learn if electronic service offering has overall influenced also the functioning of Estonian state. The opinion can be seen in the graph below (Figure 14). In general the respondents think that offering e-services are influenced the work of Estonian in positive way: 47,6 % thought that it has become more positive, and 25,7% answered that it is already become much more positive. 24,7 % believe that is has not influenced in any way and 2 % of the respondents think that it has become more negative.

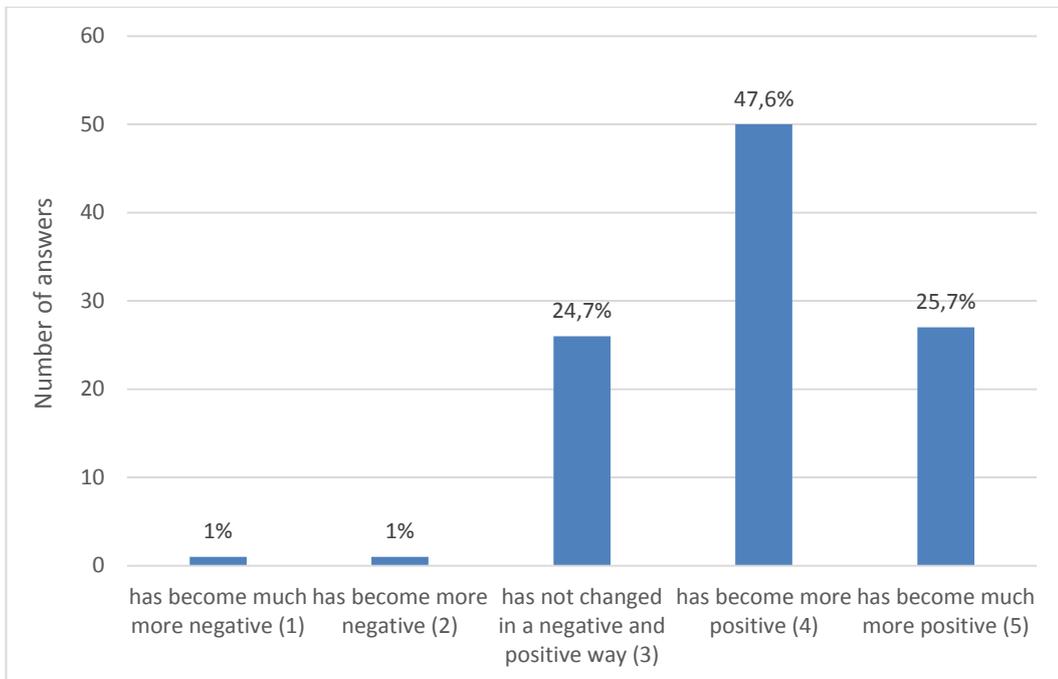


Figure 14. Assessment of e-service influence of functioning of the Estonian state (N=105)

Estonia’s public e-services are developed for the purpose of making the citizens life easier and decrease bureaucracy. In the survey was asked also how the usages of e-services have changed their life. The respondent had to choose from 1-5, where 1 was option “has made more difficult” and 5 “has made easier”. The Figure below (Figure 15) shows that over the half of the respondents 51,3% think that the usage of e-services have made their life easier, 21,9 % believe that the services have made a little bit easier and 21 % somehow easier. People who consider that the electronic services have made their life difficult were only 5,8%.

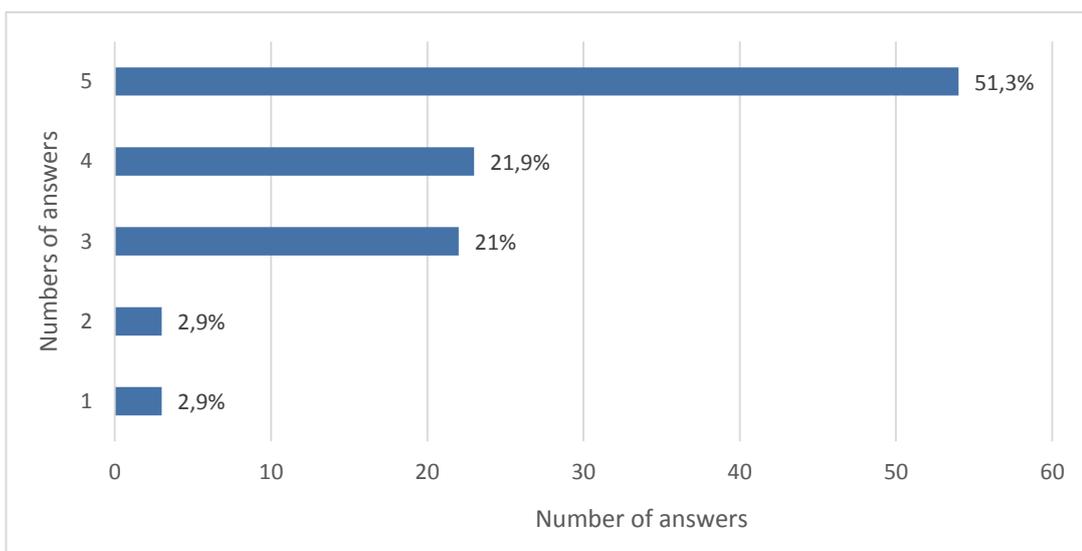


Figure 15. Opinion of the usage of e-Services (N=105)

Linked with the previous question a free option was given to the respondents to bring some examples about how e-services have made their life easier. Majority of the participants of the survey skipped the question, but still a descent amount of opinions were gathered. The most popular argument was saving time and money, when using e-services. People claimed that the service was faster and less paperwork was needed when using public services via Internet. Also the time saved with not having to travel physically to a government agency; this argument was especially outlined by the people who are living outside Estonia.

Figure 16 displays the answers of the question “Do you have had any problems when using e-services?”. 41% (43 respondents) claimed to have had issues and 39% (41 persons) have not had any complications when using e-services. 20% (20 people) chose the option “I don’t know”.

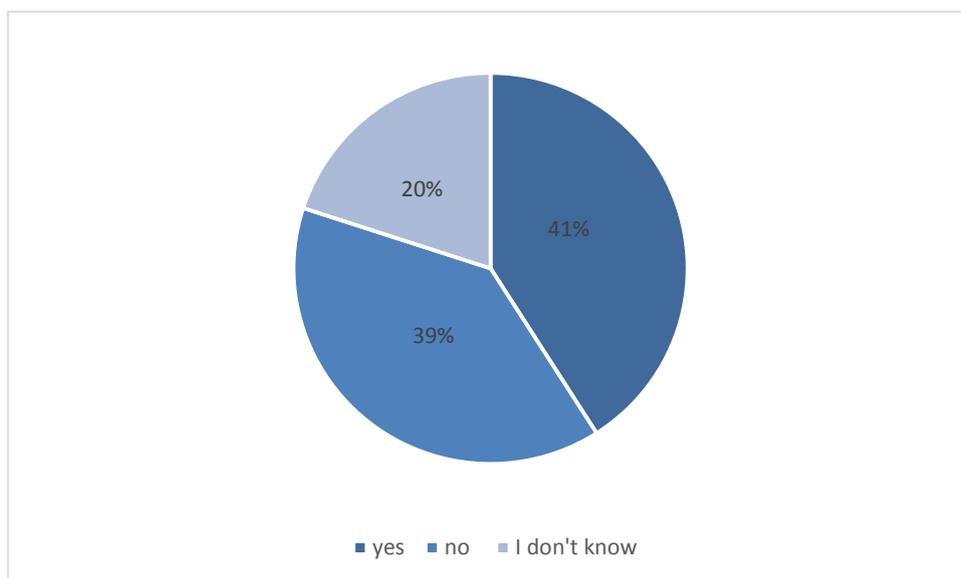


Figure 16. Problems occurred using e-Services (N=105)

People who answered “yes” to the question “Do you have had any problems when using e-services”, had an option to refine the issues they have had. Six popular answers from the “*Effectiveness and impact of the usage of e-services*” research was given to choose an option. The most popular problems that have occurred when using e-services are the technical problems with the services, Internet connection problems and the fact that the service is too difficult to use. People also mentioned that some actions are limited when using e-services and do not give all the needed data requested.

The figure below (Figure 17) displays the people opinion about the security of public e-services. Majority of the respondents 64,8% (68 respondents) find the services to be se-

cure and 12,4% (13 persons) think that they are not safe. 22,8% (24 respondents) chose the answer “I don’t know”.

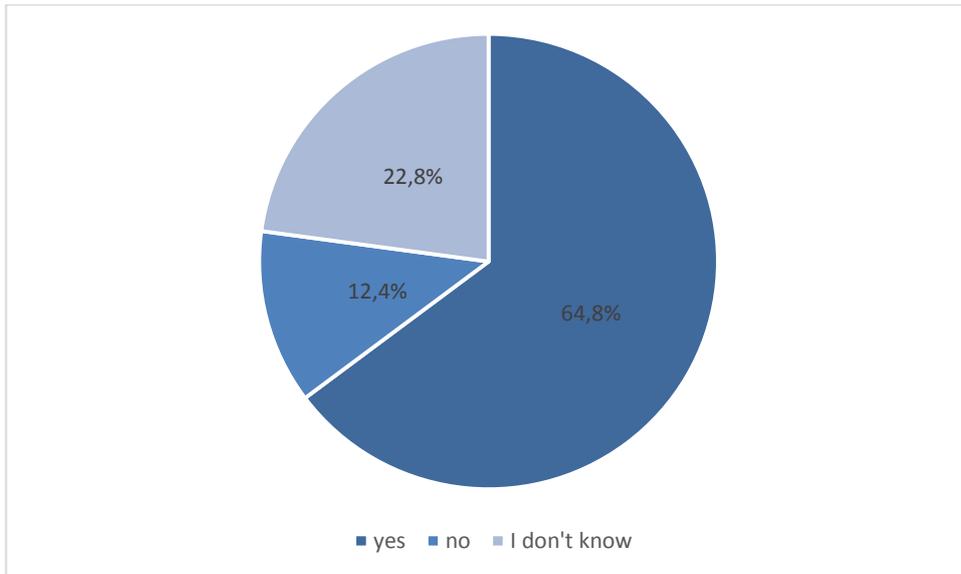


Figure 17. Security of the e-services (N=105)

E-Residency is a new phenomenon and was introduced in the year 2014. 78%) of the respondents (82) have heard about the new form of digital identity. 22% (23 persons) answered that they do not know what e-Residency is.

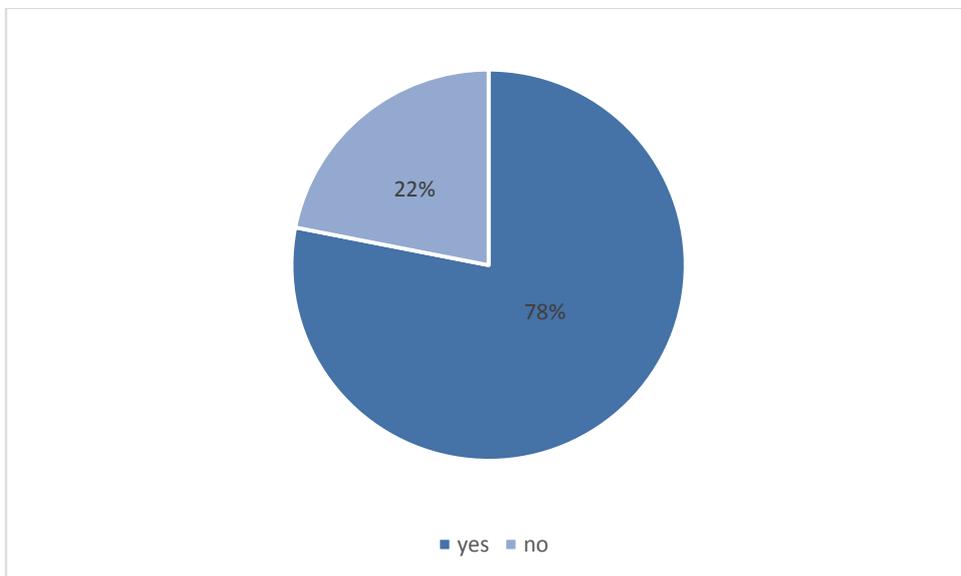


Figure 18. Awareness about e-Residency (N=105)

8 Analyses of the results & discussion

The average respondent is a male in age of 25 to 30. Lives in a bigger city, is working and has a higher education. When gathering the results, more answers were gathered from men in the age group 25 -30.

The results of the survey showed that young people in Estonia are somehow familiar with the offered public e-Services by the state and local government. There is for almost every public service an electronic one available in Estonia, so it is natural that people are not aware of every single one of them. When analysed possible correlation between background information and the awareness of e-services it revealed that the most knowledge about the services have young people in the age group 25-30, with higher education and living in a small city or in villages. Majority of the respondent did know about the Estonian state portal eesti.ee, what binds all the electronic services, and information about them, in one website. Most of the respondents had also heard about the new phenomena e-recidency what was introduced in the year 2014.

Young people in Estonia use public e-services averagely few times in a month or a year. There are very few people who use the services daily or few times in a week but in the other hand there are also not many individuals who have not used an electronic service once. These facts show that young are not yet so active users of e-services, but almost everyone already has used some kind of e-services once in their short lifetime. Young people living in villages, towns and outside of Estonia are The most used public e-services amongst young people in Estonia are submission of the tax return to Maksu-ja Tolliamet, ordering digital prescription, payment for the public service or state fee to internet bank, option to vote electronically and using the Estonian state portal eesti.ee. Using e-Voting is arising amongst young people, since it is a quite new phenomenon, there are not been so many possibilities to young people to vote. Still over half of the respondents have voted electronically at least one time. This shows that this service is getting more popular and has a great utility in the future elections.

Overall the respondents are satisfied with the offered range and quality of the public e-services. Young people in the age 20-25 are the most pleased with the services, also individuals with higher education and those who are living in a village or town. Compared with the TNS Emor research "*Citizen's satisfaction with provided public e-services in year 2014*" can be said that younger people are more satisfied with the services than the average people in the age group 16-74. There can be still done some developing and improvements on the existing electronic services. Estonia has stated that the country has a

bold plan to develop more innovative online services. It would be beneficial for the future also to ask the opinion of the citizens in Estonia, to make the offering more effective and efficiency. The results of the survey showed that young people in Estonia would like to have a service where it is possible to buy public transport tickets online or via mobile application. Also respondents pointed out the lack of electronic courses. As mentioned before, there is still need for improvements needed in the offered e-services. Referring to the theoretical background of the developing and measuring quality of the e-services, it is important to take into account the usability. Additionally in the results of the TNS Emor *"Citizen's satisfaction with provided public e-services in year 2014"* survey revealed that for Estonian e-service user a good online service is not too hard to use and should provide enough support and guidance. In the Estonian e-service there are still lot of concerns in this field, also the research *"Effectiveness and impact of the usage of e-services"* is conducted by the cooperation of Institute of Baltic Studies and Praxis Centre for Policy Studies presented the facts that there are still the need of making the available e-services more easier to use. A lot of young people have faced issues like technical, connection and usage problems. For the respondents some of the services were too hard to use and also did not offer enough guidance and support. Additionally some of the services did not serve the information or outcome needed. Security is always a big concern in online services. Estonia has managed to keep the systems and applications very protected. Also majority of the respondent think that the offered public e-Services are safe to use.

Majority of the young people think that the electronic services have made their life easier. Saving money and time was the most important factor that comes when using e-Services. Respondents found it costly and time-consuming to drive to the needed government agencies for managing paperwork. This was a crucial improvement especially for those participants who live outside Estonia. Also the based on the answer the electronic services are faster and need less paperwork. For the people is also important to have an opinion to choose the time and place for making the needed queries. This serves the need of the customers more efficiency then the regular service. Another important fact for the respondents was the easy access of needed information, for example looking for travel routes and tickets, checking personal information provided in the various state registers and communicate with the teachers via eKool. The most named e-Service helping to make life easier was the opportunity to vote on elections electronically.

For conclusion can be said, that young people are aware about Estonian digital society components. They are familiar with the e-service offering in Estonia. Participants of the survey are using actively the available e-service and the usage is growing constantly. Overall young people think that electronic services are positively influenced their everyday

life and the functioning of the Estonian state. The e-services have increased greatly the time and money expenditures. But still some improvements are needed: there are still lot of technical issues with the existing services.

9 Conclusion

The objectives of the project were to find out the awareness and feelings towards public electronic services offered in Estonia. Also study the usage habits and assessment of e-services amongst young people. The research started with gathering background information about the selected topic. The goal was to understand the meaning of the term “digital society” and the concept of electronic services. Also a research was done to give an insight how Estonia has become a digital society. To provide new information a survey was conducted via Internet. The questions provided mostly quantitative data but also some qualitative questions were used to support the research. Overall the answer of 105 participants were analysed and a conclusion was written based on the findings.

The research was supported a lot with the theoretical background. Also the earlier studies of the topic were used as a framework when conducting the survey. The questionnaire was assembled so that they would provide enough information to answers the stated research questions. The main result of the study showed that young people in Estonia are familiar with the offered public e-services. Also the feelings towards these services are positive; people are satisfied with the range of the services and think that they are eased their everyday life. Still the respondents said that there are crucial improvements needed with the available e-services, there are still a lot of technical issues when using the services online.

This research will be useful for people who want to learn about more of the phenomena of digital society and e-services. The study can be act as a framework for future bigger researches about this subject. When adding more open-ended questions and gather more answers the research can be wider and would give more qualitative data, what helps in predicting the future and give also some requirements for developing new improved public electronic services.

References

Ancarani, A. 2005. Towards quality e-service in the public sector: The evolution of the web sites in the local public service sector. *Managing Service Quality*. 15, 1, pp. 6-23. URL: http://www.researchgate.net/profile/Alessandro_Ancarani/publication/235307489_Towards_quality_eservice_in_the_public_sector_The_evolution_of_web_sites_in_the_local_public_service_sector/links/02e7e51f7c23adb97b000000.pdf. Accessed: 10 June 2015.

Asgarkhani, M. 2005. The Effectiveness of e-Service in Local Government: A Case Study. *The Electronic Journal of e-Government*. 3, 2, pp. 157-166.

Bertram, D. Likert Scales are the meaning of life. URL: <http://poincare.matf.bg.ac.rs/~kristina/topic-dane-likert.pdf>. Accessed: 20 May 2015.

Castro, D. 2011. Explaining International Leadership: Electronic Identification Systems. The Information Technology & Innovation Foundation. URL: <http://www.itif.org/files/2011-e-id-report.pdf>. Accessed: 12 May 2015.

CCDCOE. 2012. e-Estonia The Digital Society. NATO Cooperative Cyber Defense Center of Excellence. URL: https://ccdcoe.org/cycon/2012/workshops/e-Estonia_03.2012.pdf. Accessed: 20 April 2015.

Cléirigh, C. 2012. Tiger Leap Foundation and iTEC: increasing standards in education through use of new technologies. *Innovative Technologies for Engaging Classrooms*. URL: <http://itec.eun.org/web/guest;jsessionid=468B938E03F0C2E5AD079919FD111635>. Accessed: 15 April 2015.

Cornu, B. 2011. Digital natives: How to they learn? How to teach them? UNESCO Institute for Information Technologies in Education. URL: <http://iite.unesco.org/pics/publications/en/files/3214698.pdf>. Accessed: 20 April 2015.

Corradini, F., Polzonetti, A., Re, B. & Tesei, L. 2008. Quality of service in e-government underlines the role of information usability. *Information Quality*. 2, 2, pp. 133-151. URL: <http://www.cs.unicam.it/tesei/updown/CPRT08.pdf>. Accessed: 10 June 2015.

De Kare-Silver, M. 2011. *e-shock 2020: How the Digital Technology Is Changing Business And All Our Lives*. Palgrave Macmillian. Hampshire.

Drysdale, K. 2014. Journalist Edward Lucas becomes Estonia's first e-resident, will use e-residency to run a small company. *Australian Broadcasting Corporation News*. URL:

<http://www.abc.net.au/news/2014-12-02/journalist-edward-lucas-becomes-estonias-first-e-resident/5933826>. Accessed: 30 March 2015.

Estonian Business Consulting & Services. 2015. Smart card reader. URL: <http://www.ebcs.ee/en/10-smart-card-reader.html>. Accessed: 30 March 2015.

e-Estonia. 2015a. Estonian e-Residency. URL: <https://e-estonia.com/e-residents/about/>. Accessed: 30 March 2015.

e-Estonia. 2015b. How we got there: Estonia's Road to a Digital Society. URL: <https://e-estonia.com/the-story/how-we-got-there/>. Accessed: 20 May 2015.

e-Estonia. 2015c. X-Road. URL: <https://e-estonia.com/component/x-road/>. Accessed: 30 March 2015.

e-Estonia. 2015d. Become an Estonian e-Resident. State-proven digital identity to non-residents. URL: https://e-estonia.com/wp-content/uploads/2014/09/eResident_leaflet.pdf. Accessed: 28 March 2015.

Estonian State portal. 2015. Gateway to eEstonia. URL: <https://www.eesti.ee/eng>. Accessed: 12 May 2015.

Fisk, P. R., Russell-Bennett, R. & Harris, L. 2013. *Serving Customers: Global Services Marketing Perspective*. Tilde Publishing and Distribution. Prahran, Australia.

Herzog, S. 2011. Revisiting the Estonian Cyber Attacks: Digital Threats and Multinational Responses. *Journal of Strategic Security* 4, 2, pp. 49-60. URL: <http://scholarcommons.usf.edu/jss/vol4/iss2/4>. Accessed: 25 May 2015.

Identity Documents Act. 2000. URL: <http://www.refworld.org/cgi-bin/texis/vtx/rwmain?docid=4728ab1b2>. Accessed: 30 March 2015.

Kalvet, T., Tiits, M. & Hinsberg, H. 2013. *E-teenuste kasutamise tulemuslikkus ja mõju*. Balti Uuringute Instituut & Poliitikauuringute Keskus Praxis. Tallinn. URL: http://www.praxis.ee/fileadmin/tarmo/Projektid/Valitsemine_ja_kodanike%C3%BChiskond/E-teenuste_kasutamise_tulemuslikkus_ja_moju.pdf. Accessed: 24 May 2015.

Kalvet, T. 2007. *The Estonian Information Society Development Since the 1990's*. PRA

XIS Centre for Policy Studies. Tallinn.

Kansas State University. 2015. The Basics of Digital Citizenchip. URL: https://online.ksu.edu/COMS/player/Feed/c4c4d5114226ecc7e01bcd9d5b0626b7/EDADL_786_MRIBBLE/content/WeekTopics/Week1/Week%201.pdf. Accessed: 4 June 2015.

Middelton, C. 2014. Building a Digital Society. Australian Journal of Telecommunication and the Digital Economy. 2, 1. URL: <http://telsoc.org/ajtde/2014-03-v2-n1/a27>. Accessed: 8 June 2015.

Miller, V. 2011. Understanding Digital Culture. SAGE Publications Ltd. London.

Norris, P. 2001. Digital divide: Civic engagement, Information poverty and the Internet Worldwide. Cambridge University Press. Cambridge. URL: <http://www.hks.harvard.edu/fs/pnorris/Books/Digital%20Divide.htm>. Accessed: 20 April 2015.

Lindgen, I. 2013. Public e-Service Stakeholders. A study on who matters for public e-service development and implementation. URL: <http://www.diva-portal.org/smash/get/diva2:616838/FULLTEXT01.pdf>. Accessed: 20 April 2015.

Peetersoo, I. 2012. How a small nation became an ICT powerhouse. Life in E-Stonia. URL: http://www.ericsson.com/res/thecompany/docs/publications/business-review/2012/issue2/life_in_e-stonia.pdf. Accessed: 19 May 2015.

Postimees. 2015. Kaart: Eesti e-residente on pea igas kolmandas riigis. URL: <http://majandus24.postimees.ee/3136441/kaart-eesti-e-residente-on-pea-igas-kolmandas-riigis>. Accessed: 30 March 2015.

Rehman, S. 2013. Estonian's Lesson in Cyberwarfare. U.S.News. URL: <http://www.usnews.com/opinion/blogs/world-report/2013/01/14/estonia-shows-how-to-build-a-defense-against-cyberwarfare>. Accessed: 25 May 2015.

Republic of Estonia. Information System Authority. 2012. State Portal eesti.ee. URL: <https://www.ria.ee/government-portal/>. Accessed: 12 May 2015.

Republic of Estonia. Ministry of Economic Affairs and Communications. Estonia has launched its e-residency program. URL: <https://www.mkm.ee/en/estonia-has-launched-its-e-residency-program>. Accessed: 3 April 2015.

Rust, R. T., Kannan, P.K. 2002. E-Service: New Directions in Theory and Practice. M.E. Sharpe Inc. New York.

Secure Identity Alliance. 2014. eServices in Estonia: a success story. URL: <https://www.secureidentityalliance.org/index.php/resources/preview?path=14-06-02-SIA-Estonia%2BVisit%2BReport.pdf>. Accessed: 21 May 2015.

Tambur, S. 2014. Estonian world. Estonia becomes the first country in the world to offer e-residency. URL: <http://estonianworld.com/business/estonia-becomes-first-country-world-offer-e-residency/>. Accessed: 31 March 2015.

TNS Emor. 2014. Kodanike rahulolu riigi poolt pakuta avalike e-teenustega 2014. URL: https://www.mkm.ee/sites/default/files/avalikud_e-teenused_2014_lopparuanne_tns_emor_korrigeeritud05022015.pdf. Accessed: 21 May 2015.

Turban, E., King, D. & Lang, J. 2011. Introduction to Electronic Commerce. Pearson Education Inc. New Jersey.

Tustin, D. H., Goetz, M. & Heydenrych Basson, A. 2012. Digital divide and inequality among digital natives: A South Africa Perspective. 6, 31, pp. 9140-9150. URL: http://www.academicjournals.org/article/article1380714346_Tustin%20et%20al.pdf. Accessed: 19 May 2015.

Vabariigi Valimiskomisjon. 2011. Statistics about Internet Voting in Estonia. URL: <http://www.itif.org/files/2011-e-id-report.pdf>. Accessed: 21 May 2015.

Van Dijk, J. 2006. Digital divide research, achievements and shortcomings. URL: <http://edglo-ict.wikispaces.com/file/view/Digital+divide.pdf>. Accessed: 19 May 2015.

Walliman, N. 2011. Research Methods the basics. Taylor & Francis. Oxon.

Wimmer, M. & Bredown B. 2002. A Hollistic Approach for Providing Security Solutions in e-Government. IEEE Computer Society. URL: <http://www.computer.org/csdl/proceedings/hicss/2002/1435/05/14350128b.pdf> Accessed: 4 June 2015.

Zu'bi, M. H., & AL-Onizat, H. H. 2012. E-Government and Security Requirements for Information Systems and Privacy (Performance Linkage). Macrothink Institute. Journal of Management Research. 4, 4, pp 367-375.

X-Road Europe. 2015. URL: <https://www.x-road.eu/about.html>. Accessed: 23 April 2015.

Appendices

Appendix 1. Usage of Estonian public e-Services survey

Usage of Estonian public e-Services

The purpose of the survey is to find out the knowledge and usage of public e-Services in Estonia among young people.

The survey is conducted for my Bachelor Thesis: Building a digital society: Success story of Estonia.

Answering the questionnaire will take about 2-5 minutes. All the answers are anonymous.

If you wish to receive information or feedback about the survey/feedback, please write to me: kristiina.juurikas@my.haaga-helia.fi.

Thank you!

***Required**

Gender *

- female
- male

Age *

- 16-19
- 20-24
- 25-30
- 31-...

Living in *

- bigger city (Tallinn, Tartu, Pärnu, Narva, Kohtla-Järve)
- other city
- town / village
- abroad

Level of education *

- primary education
- secondary education
- vocational education
- higher education

Current status on the labour market *

- working
- unemployed
- student
- other

How aware are You about e-services offered by your state and local government? *

1 2 3 4 5

not aware at all very well aware

Have You heard about the state portal eesti.ee? *

- no
- yes

How often do you use public e-services ? *

Select the answer that best fits your e-service using habits.

- constantly / daily
- once a week
- a few times a month
- once a month
- a few times a year
- once a year
- have not used once

How satisfied are You with the range and quality of the offered e-services? *

1 2 3 4 5

not satisfied at all very satisfied

If you use e-services, than which one? *

The answer options below are some of the most popular e-services according to TNS Emor survey in 2014. Please name also other e-services that you use and are not mentioned.

- ordering digital prescription
- submission of the tax return to Maksu- ja Tolliamet
- payment for the public service or state fee to internet bank
- using e-voting/e-election services
- the use of national public transport travel planner
- communicating with the teachers or the school via e-diary (eKool)
- using the public legislation portal: www.riigiteataja.ee
- applying for identification documents (ID-kaart, digi-ID, pass)
- applying to a school/courses
- using the e-business register (rik.ee)
- Other:

How many times have you e-voted in Parliament, local government councils and / or European Parliament elections? *

- 0
- 1-2
- 3-4
- 5-

Is there any e-service that is missing/You would like to have?

How is e-service offering influenced your assessment of the functioning of the Estonian state? *

1 2 3 4 5

has become much more negative has become much more positive

How is e-service changed for You the usage of a public service ? *

1 2 3 4 5

has changed more difficult has changed more easier

Bring an example of how e-services have changed the usage of public services easier?

Do you have had any problems when using e-services? *

- yes
- no
- I don't know

What are the problems You have faced when using e-services?

Answer the question, when You answer was in the previous question "yes"

- internet connection problems
- technical problems with the service
- service is too complicated to use
- guidance and support is inadequate when using the e-service
- using the e-service takes too long
- the service does not offer enough options
- Other:

Is using e-services in your opinion secure? *

- yes
- no
- I don't know

Have you heard about e-residency? *

- yes
- no

Submit

Never submit passwords through Google Forms.