E-Governance

Digital Transformation in Learning for Active Citizenship

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E-Governance.

Part of the reader

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Preface:

Into Digital Transformation

The social, economic, cultural and political impact of digital change in education and learning

Digitalisation is an essential part of our lives across all dimensions. Many people think that it is a technological process, i.e. it is mainly about computer servers, algorithms, Internet and the like. But that is only half of the truth. For example, it is difficult to separate digitalisation from almost all activities in our lives. When we shop online – are we online or are we shopping? When we play computer games – are we playing or are we at the computer? And when we are active in social media, we are both social and active in an electronic medium. Moreover, our health system is already digitised, the pollution of the planet is, to a growing extent, caused by digital technology, and activities such as navigating a car or collaboration in civil society are increasingly facilitated by digital technology.

This example seeks to point out that what we ultimately understand by ”digitalisation” depends very much on how we look at the topic. It is after all possible to engage in all the aforementioned activities without information and communication technology (ICT). In this sense, we prefer the term *digital transformation*, because it explains a social, cultural or economic process in which things are done seemingly differently – made possible by information and communication technology. In this sense, education for digital transformation is learning about social, economic and cultural processes and about understanding the differences caused by technology. As such, in further exploring the topic, it is important to:

1. Look at both the technology and the nature of economic, social and cultural activities, for example, what we do in different social roles as digital customers, digital activists, digital workers and digital citizens.

2. Take an interest in the difference that digitalisation brings to such activities. What is changing thanks to new technology? What impact does it have on society?

There is No Overly Complex Issue for Education

A lot of curiosity and increasing concerns regarding digitalisation today have to do with its 'engine room' - the fascinating global infrastructure of the Internet, its enormous costs and hunger for energy, Big Data, AI, and the increasing economic value of digital platforms.

In particular, the growth of new kinds of platforms, fuelled by digital business models successfully capitalizing on users, is a widely visible phenomenon of this new technological and economic configuration. Consequently, their users are at the same time subjects and objects of digital change. They experience the opportunities made available through new, platform-mediated forms of interaction, but also feel uncomfortable since they are also symmetrically affected in their role as autonomous subjects. The right to independent information, privacy and security are, from this perspective, not yet sufficiently respected in the digital sphere.

The migration of substantial parts of working and communication processes to the digital sphere during the last decades is also simultaneously a benefit and a challenge. One aspect is technical mastery – access to current technology and the ability to use it in a competent way. A more fundamental aspect is that the "digital self" is completing people's analogue identity. Their digital traces are accompanying people's lives with related consequences for their various social roles as private subjects, employees and citizens.

Feeling overtaxed by all the associated challenges and concerns is a bad prerequisite for learning and a bad basis for considering future personal and social decisions. It is high time for adult education and youth work to do something about this double-edged sword.

In particular, adult citizenship education has a lot of experience teaching complex social issues and could transfer its methodology and approach to the topic of digital transformation. We know, for example, that nobody needs to be an economist to be able to co-decide on political decisions affecting the economy. We also are capable of understanding the social impact of

cars, despite very limited knowledge of automotive engineering. Considering that it is possible to acquire knowledge about digital transformation, could we not even enjoy learning about Big Data, robotics, algorithms or the Internet of tomorrow similar to the way we passionately discuss political issues such as transport, ecology, or democracy? We should not, however, be blinded by the technical complexity of the digital transformation. It is important that we pay more attention to the social dimension, the intentions behind a technology, exploring its effects and regulations.

Although not familiar with all technical or legal details, most people intuit that it is ill-advised to give out personal information without consent. We suppose what the right to privacy should entail and what distinguishes conscious decisions from uninformed ones, and in our analogue world, we discourage the "used car salesmen" of our society from taking unsuspecting customers for a ride. After all, most of us have experienced the discomfort of having been deceived as a result of not understanding the fine print.

If we transfer this insight to a pedagogy of digital transformation, we must admit that we should also be willing to explore new aspects of the technical dimension such as data processing or the nudging mechanisms in online platforms. But that is not the only priority! The most important thing is that we know what our *rights* and *ethical foundations* are and how they relate to the new digital contexts and are able to act accordingly. These questions are not solely related to privacy and safety, as seemingly no aspect of social life is unaffected by digital transformation.

Using this foundation, we might further explore the potentials and risks of digitalisation in context, assessing its impact. Personal rights, for instance, entail privacy issues, but digital transformation has also led to new opportunities for co-creating, better information, or involvement of citizens in decision-making processes. On this basis, we are then able to define the conditions and rules under which certain digital practices should be rolled-out or restricted.

E*lectronic* communication has changed the character of *human communication* as a whole. There are fewer impermanent ideas or assertions that go undocumented, to later be searched and rehashed. This change is both positive and negative, for example from the perspective of an employee who may be judged based on past decisions which live forever online. Pedagogy might help people to better understand the risks and benefits associated with electronic communication.

In addition, it will be a creative challenge to imagine the technology we want to develop as a society and what will help us to initiate social, economic and cultural

changes in the future. In this regard, it is also important to develop a view towards the so-called 'skill gaps' and 'digital gaps' people may face when mastering digitalisation. What is the purpose of defining a gap; for whom is the gap relevant; in whose interest is it to argue the risk of gaps as opposed to their benefits?

Why Democracy and Rights-based Learning Makes the Difference

The essence of a definition of democracy and rights-based education can be found in the Council of Europe's Declaration regarding Education for Democratic Citizenship (EDC), which is "education, training, awareness-raising, information, practices, and activities which aim, by equipping learners with knowledge, skills and understanding and developing their attitudes and behaviour, to empower them to exercise and defend their democratic rights and responsibilities in society, to value diversity and to play an active part in democratic life, with a view to the promotion and protection of democracy and the rule of law" (CoE CM/Rec(2010)7).

Transferred to the context of learning about digital transformation, we extract three core questions from this:

1. *What digital transformation competence* – knowledge, skills, values and attitudes – do citizens need to understand the digital transformation in their society and how it affects them in their different social roles?

2. How are *fundamental rights and ethical foundations* related to the transformation? Where do they shift their nature, what weakens them and what kind of development strengthens their enforcement?

3. What *active civic competences* do citizens need to contribute to the transformation, including participation in relevant public discourses and decisions, self-organisation and social engagement, and the development of social innovations?

Stakeholders from many different sectors have high expectations in education. In particular, they demand from earning for active citizenship a better preparation of Europeans for big societal changes. Only if we implement ideals of democracy "by design" into digital progress will we create a *democratic* digital society.

Enjoy and Explore

This reader series aims to introduce selected key aspects of digital transformation to educators and teachers in formal, non-formal or informal education. Our perspective is *Education for Democratic Citizenship* and our main goal is to motivate you as educators in adult education and in youthwork or other education fields to dive into the topics connected to digital transformation with curiosity and critical thinking as well as ideas for educational action. In other words: Nobody has to adore technology, but it is definitely worthwhile to become more comfortable with it. Digital transformation is a reality and as such, in principle, relevant for any specific field of education, any subject, or pedagogy.

Together we might work on a broader understanding of what digital literacy is and explore as educators and learners in lifelong learning processes how it affects our lives. With a strong aspect of democracy and human rights in lifelong learning, we should lay the foundations for a democratic digital transformation and empower learners to find a constructive and activea position in this transformation.

We aim to provide basic insights into some of the various aspects of digital transformation as a basis for further exploration. They tackle the digital-self, participation, the e-state, digital culture, media and journalism and the future of work and education. In each of the publications we also present our ideas as to how education might take up this specific topic.

1. Public Services under Transformation

As in all areas, global developments in the field of digitalisation are uneven. However, the new reality poses questions and challenges that are equally important for everyone. The digital transition in regard to governments has made all societies focus on security, democracy and data protection issues. In some countries, digitalisation has moved more quickly and is more widespread than in others. As a result, the confidence about the use of digital opportunities also varies: people in some societies are more afraid of losing their privacy and they are more suspicious of the authorities than in other countries. This is natural and everyone has their own points of view. However, digitalisation has become an unstoppable process, and it is most useful to analyse all kinds of threats and risks and evaluate already existing experiences and achievements.

Estonia is considered to be one of the pioneers and pathfinders in the digital transition of public services and infrastructure worldwide, as it was one of the first to start developing e-governance with wide digital possibilities. Today, Estonia has had an e-society that has been operating for a couple of decades, and its inhabitants can no longer imagine their lives where the tasks necessary for everyday routines cannot be done quickly, without leaving home and without exhausting bureaucracy.

One has to learn to live in new conditions and circumstances. The task of the school system everywhere is to prepare young people for coping with everyday life. But what about adults? The digital transition imposes important precepts for adult education, and also older people have to cope with living in a digital society. Thus, the challenge is twofold: to provide adults with a multifaceted education, which would develop their awareness of the risks of the digital world, but also of using digital learning opportunities and methodologies.

According to Hinz, digitalisation has made a paradigmatic change in the understanding of people as citizens. In addition to traditional citizenship status, people have also become digital citizens who interact increasingly with social and political environments through digital media with the help of tools and platforms that have become essential to participate in society (Hintz & Wahl-Jorgensen, 2017).

Couldry considers traditional citizenship and digital citizenship to be two separate

concepts that should not be confused. Digital citizenship is not political status but a quality characteristic of a civic culture (Couldry et al., 2014). Everybody today needs digital citizenship skills to fully participate in the social life of their communities. Digital technologies offer unprecedented opportunities for access to information, freedom of expression, human connectivity, as well as multi-stakeholder engagement. It has created people's need to gain a deeper understanding of the complexities of the digital environment to make smart choices, both online and in real life. Developments in digitalisation are internationally monitored and assessed, but people also need to measure the compliance of the Internet with their human rights, to evaluate its openness and accessibility, but also to assess the involvement of different actors and communities in its governance.

Even after a quarter of a century of e-democracy, there is an opinion that the primary achievement of e-democracy has been a significant improvement in access to politically relevant information and exchange of ideas. The realisation of e-democracy has supported public debate and con-tributed to deliberation and community building. But it is often mixed, and if compared to direct democracy, not effective. E-participation also appears to be limited to the final and decisive stages of policy-making. It rarely has impact on decision-making and policy implementation in practice.

According to the United Nations' e-participation index, e-participation has been expanding all over the world.

Internet Universality Indicators

UNESCO has developed Internet Universality Indicators, which is a tool for assessing internet developments and for identification of different aspects of the quality of governance. On the national level, attention is paid to

- which extent diverse stakeholder groups are involved in national-level policymaking using the Internet,
- which potential participants in policy-making have established their own fora for discussion,
- if the institutional framework for discussions within government itself and through the national Internet Governance Forum format exist.

Source: UNESCO, 2019

The index measures e-participation according to a three-level model of participation including: 1) e-information (the provision of information on the Internet), 2) e-consultation (organizing public consultations online) and 3) e-decision making (involving citizens directly in decision processes) (United Nations E-Government Survey [UN], 2016, p. 54).

The drivers behind e-participation are digitalisation and the development of different ICT tools of the state that can be used for broader citizen involvement - social media, deliberative software, e-voting systems, etc. - and growing access to the Internet. In European countries, especially in those that rank prominently among the top 50 performers, citizens literate and willing to use the above-mentioned tools and opportunities have more opportunities to have their say in issues concerning government and politics.

At the same time, citizens themselves actually want to be more involved. The UN report (2016, p. 3) states that advances in e-participation today are driven more by civic activism of people seeking to have more control over their lives. However, some surveys show that many European citizens do not feel that their voice counts or that their concerns have been taken into consideration (Prospects for e-democracy in Europe, 2018).

Public Services in Transformation

E-government also involves transformation in the way in which public services are delivered. It needs to be accompanied by commitment to digital inclusion. It means that all people should be able to participate in the growing knowledge society, which is delivered through digital inclusion, i.e., ensuring no one is left behind in using ICT. E-government is dependent on citizens changing the way they access services or their individual behaviours, with important implications for social citizenship, through maintaining access to those entitled access to public services.

Time has demonstrated how true the viewpoint expressed in 2018 is. E-government is only a tool and regardless of its potential power, it has limited value and relevance on its own; offering the potential to help governments balance budgets through cost savings but only when the majority of citizens readily access public services online (Hardill & O'Sullivan, 2018).

Tendency tells us that around the world quite considerable differences can be observed in acknowledging and using opportunities of digitalisation. For instance, emerging smart cities in Western Europe, North America and South America primarily focus on applying smart technologies that already exist in cities. In Asia, smart cities are often built from scratch. Morozov and Bria share the opinion that there are two types of reasons for building a smart city: normative and pragmatic. The first is mostly about taking actions in order to de-bureaucratize local government and make public services more personalized. In the end, this would stimulate the local economy and

help reduce social divides. “In a truly democratic city, citizens would enjoy access to knowledge commons, open data, and cities’ public digital infrastructures to ensure better, more affordable, fairer public services and an improved quality of life. This implies taking back the critical knowledge, data, and technology infrastructures which too often remain in the hands of a few large multinational service providers. Furthermore, technological sovereignty — including the adoption of open source software, open standards, and open architectures — must be conceived as a prerequisite to developing a truly democratic technology agenda able to generate new productive economies and facilitate knowledge sharing between cities, countries, and movement” (Morozov & Bria, 2018).

The motivation behind the latter type of reason for building a smart city is, as said, purely pragmatic. Use of technologies can reduce spending in the long term. Of course, another driver could be the desire for more security. The best example here is re-thinking policing during big events (like the Olympic Games). The desire can be even simpler. Imagine if the city absorbed information and ad-justed in real-time by using different sensors and learning AI. In populated cities, it can often be seen that the garbage disposal systems cannot cope when most needed. Using sensors, ”smart trash cans” could let passing trucks know whether they need to be emptied (Morozov & Bria, 2018).

E-governance: Application of information and communication technology (ICT) for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems between government to citizen (G2C), government-to-business (G2B), government-to-government (G2G), government-to-employees (G2E) as well as back-office processes and interactions within the entire government framework.

Digital citizenship: Ability to engage positively, critically and competently in the digital environment.

eEurope

For measuring evolution of EU member states’ digital competitiveness, the Digital Economy and Society Index (DESI) has been developed. It is a composite index that summarizes relevant indicators on Europe’s digital performance and tracks the level of connectivity, basic skills of people, use of the Internet, integration of digital technologies and digital public services. The Digital Public Services (e-government) dimension consists of four indicators: the percentage of internet users who

have sent completed forms to a public administration via the Internet (e-government users indicator); the level of sophistication of a country's e-government services (the pre-filled forms indicator, which measures the extent to which data that is already known to the public administration is pre-filled in forms presented to the user); the level of completeness of a country's range of e-government services (the online service completion indicator, which measures the extent to which the various steps in an interaction with the public administration can be performed completely online); and the government's commitment to open data (open data indicator). Among young people in the EU at all levels of education there has been a marked progression in the use of e-government. Their online activities are not only limited to social media and consumption of digital content, but they have also been extended to the use of more complex services. Also, among the elderly, during the period 2011 to 2016, there has been a progression of using e-government services that is considered one of the driving factors behind older people's digitalisation. At the same time, the middle-aged population with lower education appears to be one of the lowest users of e-government in the European Union countries. Comparing countries in 2017 for digital public services, Estonia had the highest score, followed by Finland, the Netherlands and Denmark. On the scale from 0,0 to 1,0, Estonia's and Finland's positions were above 0,8 and the Netherland's and Denmark's positions were between 0,7 - 0,8 (Europe's Digital Progress Report, 2017).

Top European User Countries of E-government

Estonia
Finland
The Netherlands
Denmark

In order to investigate how to continue with e-democracy at the EU level, 22 case studies of digital tools have been analysed and compared. Two central research questions were asked in the study:

What are the conditions under which digital tools can successfully facilitate different forms of citizen involvement in decision-making processes?
How can these tools and the conditions created that make them successful be transferred to the EU level?

Among 22 case studies, e-voting in Switzerland, e-voting in Estonia, and e-voting for Spitzenkandidaten in the 2014 EP elections within the Green Party are examples of binding decision-making e-government opportunities (Prospects for e-democracy in Europe, 2018).

Experiences with Digital Tools in Different Types of E-Participation

	Benefits	Failures
e-consultations	A differentiated offer of e-consultations has been developing over the years at all government levels in a variety of formats (from simple questionnaires to open formats and crowdsourcing).	It appears that, at times, projects that at first glance appear to be participative turn out not to be consultative or deliberative in nature, but have the objective of informing citizens about decisions that have already been made.
e-petitions	E-petitions are successful examples of modernization. The increasing share of online petitions underlines high public acceptance.	The increasing share of online petitions does not necessarily boost the over-all amount of petition activity. Internet use does not automatically increase transparency and enhance the opportunities for participation.
e-deliberation	On concrete topics e-deliberation systems enjoy high citizen interest and can be a cost-effective tool of engagement. A special advantage of e-deliberation may be that anonymity allows an exchange of ideas without any regard for hierarchical factors such as social status.	
e-budgeting	E-budgeting has produced some of the strongest results when it comes to influencing decision making. Among the impacts identified are: support for demands for increased transparency, improved public services, accelerated administrative operations, better cooperation among public administration units, and enhanced responsiveness.	E-budgeting does not necessarily lead to changed power relations between governments and citizens.
e-voting	The Swiss e-voting exemplifies good practice, the introduction being careful and limited, and efforts having been made to ensure integrity of the systems and to build public trust.	Particularly striking is the large amount of criticism presently focusing on turnout rates, user friendliness or trust in the integrity and transparency of the system.

It appears that both pros and cons emerge in the increasing use of e-participation procedures. A general problem that applies to all e-participatory procedures and tools is that a balance must be struck between structuring e-participatory events and the aspect of inclusivity, which appears incompatible with high expertise levels and complexity: Among those making use of e-voting, e-deliberation and e-petitioning, there is currently a noticeable overrepresentation of young white males with a high educational background. These individuals tend to migrate from offline voting, deliberation and petitioning to online versions without an increase in overall participation (Prospects for e-democracy in Europe, 2018).

There is no doubt that e-democracy has real success stories: Participatory budgeting has been successfully implemented in some European countries, such as Estonia and Iceland. Successful "Your Priorities" projects include the "Better Reykjavik" participatory democracy and budgeting project in the Icelandic capital, and the "Rahvakogu" (People's Assembly) project in Estonia, which has contributed to making the Estonian legal environment more open and participatory. "Better Reykjavik" was one of three pilots run by the European project on direct democracy, D-CENT. It has been used in many countries including the U.K., U.S., Greece, Bulgaria, Slovenia, Croatia and Australia (Morozov & Bria, 2018).

Not only Switzerland but also Estonia provides citizens with the opportunity to vote electronically in local, national and European elections four to ten days prior to the actual election day in addition to the traditional voting method (Prospects for e-democracy in Europe, 2018). In general, out of 22 European case studies, the majority gave participants the option to participate online and/or offline (in hybrid or blended format). Almost all cases had some sort of link to the formal policy or political process, scored positively in sustainability of a digital participation tool, and were clear and adequately delivered for participants during the participatory process.

Source: Prospects for e-democracy in Europe, p. 25

Configurations for Impact on Final Decisions

	Link to formal decision-making	Sustainability	Mobilization and engagement strategy	Participatory process and goals are clarified	Feedback to participants	Voting to consult/decide	Impact
PB Paris PB Berlin–Lichtenberg PB Belo Horizonte Betri Reykjavik E- voting Estonia E-voting Switzerland Five Star Movement	1	1	1	1	1	1	1
German Pirate Party	1	0	1	1	0	1	1
Your voice in Europe	1	1	0	1	0	0	1
Futurium	1	1	0	0	1	0	1
Wiki Melbourne	1	0	0	1	1	0	1
Green Primary Constitution Iceland	1	0	0	1	1	1	C
Podemos	1	1	1	0	0	0	0
Open Ministry	0	0	0	1	1	0	0
Dutch e-petitions	0	1	1	0	0	0	0
Predlagam	0	1	0	0	1	0	0
European Citizens' Consultation	0	0	0	0	0	1	0
E-consultation	1	0	0	0	0	0	0
European Citizens' Initiative	0	0	0	0	0	0	0

Twelve cases of the study Prospects for e-democracy in Europe show a significant impact on final decisions. Seven examples show a significant impact on all six conditions: Participatory Budgeting (PB) in Paris, PB in Berlin-Lichtenberg, PB in Belo Horizonte, Betri Reykjavik, e-voting in Estonia, e-voting in Switzerland and the Five Star Movement.

This finding suggests that having impact on final decisions, involves:

Success Criteria for E-participation

Creating a link to the formal decision-making process (in these cases via embeddedness in the policy process, elections/ referenda and official political representation);
Offering an established digital tool to which several alterations have been made to improve the participatory process (sustainability);
Having an active mobilisation and engagement strategy;
Being clear on the participatory process and its contribution to the overall decision-making process from the start (for the participants);
Providing feedback to participants;
Including an option for voting in order to decide on prioritising proposals or on elections/referenda.

Doubts around Implementing E-Government and How to Overcome Them

In talking about e-government, professor Barney Warf from the University of Kansas makes a generalization about the prevailing attitudes towards this phenomenon. He analyses the situation in Asian countries and comes to the following conclusion: "If e-government were easy to implement, every country would have it. Despite its manifold benefits, however, there are substantial obstacles that inhibit its introduction. Foremost among these are poverty, "illiteracy, and low internet penetration rates, including the digital divide. For those concerned with just getting by, the Internet is some alien, remote phenomenon at great distance from their daily lives. For many people living in rural areas, computers are a distant dream. Owning a personal computer is impossible, and even cyber-cafes are not affordable. Not knowing how to read and write certainly prevents people from taking advantage of it. Lack of computer literacy, including basic technical skills, and a phobia of things digital also play a role. Frequently, in rural areas in developing countries, electricity is often in short supply, irregular, and unreliable" (Warf, 2017). This assessment of the situation in Asia does not apply in all respects to other regions. The situation in Europe is different in many respects, but the general caution is often similar here as well.

The COVID-19 pandemic situation in spring 2020 urged people around the world to think and ask seriously how much e-governance helps to build trust among publics towards governments in taking action on COVID-19 while regular governmental procedures appeared to be restricted. It seems that, due to the irregular situation, people at the government level are just starting to realize the importance of e-governance in

providing public welfare and well-being.

There is a growing and ongoing debate around e-governments in different places around the world. This shows the vitality and importance of the matter. Issues of e-government are included in university curricula. For example, in 2019-2020, Stockholm University is offering a Master's programme in Open eGovernment. The programme contains various courses: "Open e-Government and e-Democracy" describes the history of e-government and e-democracy, and tackles the growing phenomenon of open government by discussing how ICT has transformed the public sector. Another course, "Security and Privacy in e-Government: Systems, ICT, Laws and Ethics", describes how theories of systems and social technical systems can be used for analysing ICT security issues and risks in the public sector and discusses ethics and international laws related to privacy issues for the public sector. The course, "IS Governance for e-Government: Requirement, Use, Evaluation" describes IS governance in public administration, methods and models for elicitation of requirement on ICT systems, evaluation of existing ICT system, and selection of the right mix of systems in the overall ICT architecture of the organisation (Stockholm University website, n.d.).

It can be said that one of the biggest doubts and provoking criticisms has been addressed to the issues of e-government are related to privacy and data protection problems (in the publication Digital Self, these concepts are explained in more detail). Stockholm University is working towards the goal that after taking the courses offered, students are able to understand the security requirements for e-services offered by a government, aware of some of the security threats, vulnerabilities, risk and attacks on e-services, are able to evaluate and choose appropriate controls for e-services offered by the government, and can use knowledge to establish, monitor and improve security in services offered by the government (Stockholm University website, n.d.).

One can see that the sphere of digital governance is diverse, consisting of different indicators, and countries in Europe vary when it comes to digital development. Some have implemented certain digital solutions and some are already teaching about digital governance in their universities. A country that stands out from the previous text is Estonia. Estonia is known as a pioneer in digitalisation.

Robert Krimmer, a German professor of e-governance at Tallinn University of Technology (TalTech), has praised Estonia for its many achievements. In an interview in 2019, he shared some of his thoughts on the Estonian e-state.

He praised Estonia for deciding to pursuit the use of ICT technologies, saying it was a step in the right direction. By using digital solutions, life has been made much easier and people are saving time. Digital tax returns are pre-filled and submitted by 95% of the population. As the procedure is so simple, there are no tax advisors in Estonia. In Germany, however, this model probably would not work, because comprehension on the issue of data protection is different and also the tax system is much more individualized, leaving space for exceptions. In Estonia, people can always see who is accessing their data. Patient's data can be accessed by doctors if the need arises

and/or on a need to know basis. Misuse is a punishable crime. The protection of people's data is managed by regulation through transparency, not prevention.

He also touched upon the topic of the user-friendliness of those systems. He said that the systems do not look cool and are not as easy to use in the eyes of many. He went on to say that the benefits clearly outweigh the disadvantages. Because of centralization, the data ministries and authorities can use it efficiently, thus making it unnecessary for people to re-enter their data again and again. "If you move within Germany, for example, it may take a year or two before the tax office knows that you have moved", he said.

Famously, two percent of GDP is saved annually through digitalised infrastructure. Krimmer clarified that this number assumes that every query that is made to the system saves 15 minutes of working time. But who says that every query was really necessary? Krimmer claimed that he is too much of a copycat when he says that Germany should do things like Estonia. Steps toward digitalisation should be about doing it for the benefit to the citizen. "In the end, digitizing the infrastructure is only a public service, it is not gold" (Summary of R. Krimmer's answers from an interview by Ingo Eggert).

E-government:
Electronic government (or e-government) is the application of Information and Communication Technologies (ICTs) to government functions and procedures with the purpose of increasing efficiency, transparency and citizen participation.


e-CABINET MEETING (2000)
e-TAX BOARD
PRINCIPALS OF ESTONIAN
INFORMATION POLICY (FIRST DRAFT 1998)
FIRST BANKING SERVICE (1990)
ROAD ADMINISTRATION
e-PORTAL 2014
M-PARKING (2000)
X ROAD 2001
i-VOTING (2005)
CYBER SECURITY 2007
BLOCKCHAIN TECHNOLOGY 2008
eKool
MY VOTE
e-RESIDENCY (2014)
WORLDS FIRST DATA EMBASSY (2015)
NIIS X-ROAD CONSORTIUM (2019)
SEAMLESS SERVICES
ROAD MAP (2018)
GOVERNMENT AI STRATEGY (2019)

2. How it All Came about in Estonia

There is a legend that Estonia knew from day one that it was going to be a "smart-state" with many e-solutions. In fact, such a political decision has never been officially made. The first prime ministers of the country had much more urgent things to worry about than the latest computer technologies and sales items in the future. Nobody even knew at the time what the future might look like thanks to technology.

In 1998, the goals and problems of a digitalised society were set by a parliamentary vote. They were all confined in the document called the Principles of Estonian Information Policy. The bill stated the future digital society would comprehend the social sphere, an ICT revolution and a big part of it was still totally unknown. The document in its core was not very different from its European counterparts. The main points were: modernisation of legislation to help the development of the private sector, to shape the relationship between the state and the citizen and to raise the awareness about a digital society. Other objectives that were set were de-monopolisation of the economy to boost property reform, to promote and further advance electronic commerce and banking and also, yes indeed, to reduce bureaucracy and improve democracy.

Later on, the approach was improved and new goals were established in the Principles of Estonian Information Policy 2004-2006. The second paper already stated that the plan was to root e-services all across the public sector. Another crucial thing was the plan for further research into e-democracy.

Internet Acces is The Key to Building a Digital Society

Estonia is covered in WI-FI and has the second-best public Wi-Fi in the world

(Tambur, 2015)

There have been talks about adding access to Wi-Fi into the constitution

Achievements that Make Up the Estonian E-State

Estonian digital society consists of a variety of online services and technological solutions that allow citizens to operate and use these services safely. The following will describe those from the citizen's standpoint.

Estonia started issuing national ID cards in January 2002. The card, which met the requirements of Estonia's Digital Signatures Act, now replaced by the Electronic Identification and Trust Services for Electronic Transactions Act, is mandatory for all Estonian citizens and residing foreigners of over 15 years of age. It is recognised as the primary document for identifying citizens and residents and is used in any form of business — governmental or private communications. It is furthermore a valid travel document within the EU. Since 1 January 2007, the card issued by the Citizenship and Migration Board, has become valid for 5 years (instead of 10 years in the past). The ID-card can be used to vote electronically (since 2005), create a business, verify banking transactions, be used as a virtual ticket, and view medical history (since 2010). As of January 2012, more than 1.1 million people in Estonia (almost 90% of inhabitants) have ID cards.

In addition to being a physical identification document, the card has advanced electronic functions facilitating secure authentication and providing a legally binding digital signature for public and private online services. An electronic processor chip contains a personal data file, a certificate for authentication (along with a permanent email address, Name.Surname@eesti.ee, for eCommunications with the public sector), a certificate for digital signature and their associated private keys protected with PIN codes. The certificates contain only the holder's name and personal code (national ID code). The data file is valid as long as the identity card is, and so are the certificates, which have to be renewed every five years (Digital Government Factsheet, n.d.).

Estonia's e-government portal was first launched in March 2003 on the basis of the eCitizen project which was initiated in 2002. Since then, the portal has been

ID Card:
A card used for identification and making transactions through various state

State Services:
An ICT solution which can be used to confirm your identity for actions such as money transfers, online voting and signing documents digitally.

constantly renewed. In the last quarter of 2007, a new version of the portal merged the former State Information Portal and the Citizen Portal, creating a single integrated service. This portal coordinates the information provided and the services offered by various State institutions. It features a safe internet environment for communication with the State and offers reliable information and eSolutions for citizens, entrepreneurs and officials respectively. The access to relevant information and eServices on the portal depends on whether the user is a citizen, entrepreneur or State official (Digital Government Factsheet, n.d.).

Estonians also use mobile ID, which is a non-physical form of their ID card. It allows you to do all the same things but using your phone for clearance. Like the ID card, it has personal codes. One is a four-digit code for identification and the other a five-digit code for confirming your chosen action whether it is a bank transaction, e-voting, etc. You simply type in your phone number (if it is not already saved) in the system that you want to access. After that you are notified that a connection has been established and you have to type in your four-digit verification code. After you are done and want to submit your actions, you are asked to confirm it with your five-digit code (e-Estonia website).

A person can get mobile ID by applying for it from their mobile operator. When the agreement has been reached, they are given a new SIM card. After putting it in his/her phone, they have to activate it through the Estonian police and border guards' network.

Many people become very anxious and apprehensive when they hear how much private infor-mation about a person is stored on one small-format ID card. What happens if this card disappears and falls into the wrong hands? How is the information on the ID card secure? We asked this question to Mr. Mark Erlich, Head of the eID Department of the Estonian State Information System Board.

The ID Card Chip in Estonia

Mark Erlich,
Head of the eID Department of the Estonian State Information System Board

"The ID card chip is QSCD certified. It is a device that can protect a secret key from complex attacks. In essence, it is not possible to read or copy the key from the card. The key is never exposed outside the security feature on the chip. The key itself is generated inside the security element on the chip and never exits it - perhaps it cannot be read or copied from it during production. When the chip is manipulated, the chip destroys the key. It has been scientifically proven that the key can be read from such chips by means of a laser and an electron microscope: by burning the layers of the memory section of the security element of the chip with a laser and at the same time counting the bits in each layer. Such an operation would take more than 50 years to read one chip and one key. Therefore, this risk is considered to be theoretical and not applicable in practice.

Other possible attacks are not related to the ID card chip but to the mathematical weaknesses of the algorithms. Maybe it depends on what algorithm we use in our ecosystem, but not on the technical security of the ID card chip. Attacking algorithms uses a public key to calculate the secret key. Such activities are directly related to the available computing power. This is also the reason why we periodically change the algorithms used in ID card transactions.

In Estonia, we always try to be one step ahead - in other words, we monitor what other countries are doing, which is recommended on the side of other countries' national security authorities, and what is happening on the cyber science side. In essence, we always use algorithms that have not yet been scientifically broken and have been given a positive assessment of sustainability. We try to get the most out of the market in terms of key lengths/strengths. Today, (ID cards from 2018) have an elliptic curve algorithm with a key length of 384. „Breaking" such a key would require computing power equivalent to today's largest supercomputer operation for more than 100 years, and energy costs of millions of euros - all in just one ID to break one of the keys on the card."

E-Governance and its Modern Infrastructure

E-governance is made up of a number of tools that make it possible for the cabinet to conduct its affairs more efficiently. Through that, the government is able to save lots of working hours and millions of paper documents.

One of its keys is e-Cabinet, a system that holds all the upcoming agendas of the weekly cabinet meeting, which ministers can access with their personal ID on their smart devices. It allows ministers to see the agendas before and determine their stances. If they have any objections, they can mark that they would like to speak on the issue. If they do not, this topic will not be put on discussion in the cabinet session and is adopted without further discussion. With this practice, cabinet meetings have been reduced from lasting five or six hours to 30 minutes (e-Estonia website, n.d.).

Government keeps its data in the government cloud. It hopes to gradually overtake current foundation of e-services and public administration by embracing cloud technology and new security principles. For the same reasons all data is stored in a backup server which is called the "data embassy". It is located in Luxembourg under a Tier 4 level of security — the highest level for data facilities. It is not an embassy in the traditional diplomatic sense and while the founding agreement does take into account the Vienna Convention on Diplomatic Relations, it is something completely new under international law. It is fully under the control of Estonia, but has the same rights as physical embassies with a specified immunity. Luxembourg is the first data embassy location because of the high-quality technical capacity, but also because of their openness to working with this new concept. In this collaboration, Luxembourg

and Estonia are pathfinders in creating a unique and innovative way to ensure digital continuity in the world (e-Estonia website, n.d.).

Security Issues

We previously mentioned the government cloud, which represents a super database and is highly dangerous. Attention should be paid to proper and secure data exchange:

Both sender and receiver of the data are registered and verified. Both sides are identified through agreed-upon procedures and mechanisms. The data exchange is encrypted, ensuring confidentiality. If somebody tries to steal or copy the data while in transit, it will be unreadable. The data transactions are time stamped.

A time stamp confirms the time of the data transaction. By time stamping the data, it is possible to later verify its original state. Electronic records are logged and archived to ensure a legal audit trail. It should always be possible to trace who did what.

Estonians have grown accustomed to the many e-services available to them from anywhere in the world. Some of these services include:

Health

Digital health records – These records contain a full record of health: the sicknesses you have been through, what treatment you received, what operations you have had, etc. These are accessible by you and your doctors.

Digital prescriptions - There is no need to go to the doctor for a paper prescription. You can simply call your doctor and they can prescribe you the medicine you need. When the prescription needs to be renewed, you let the doctor know and they do it. The renewed prescription will then appear in your personal digital health record which can be viewed by the pharmacist with proof of identification.

Education

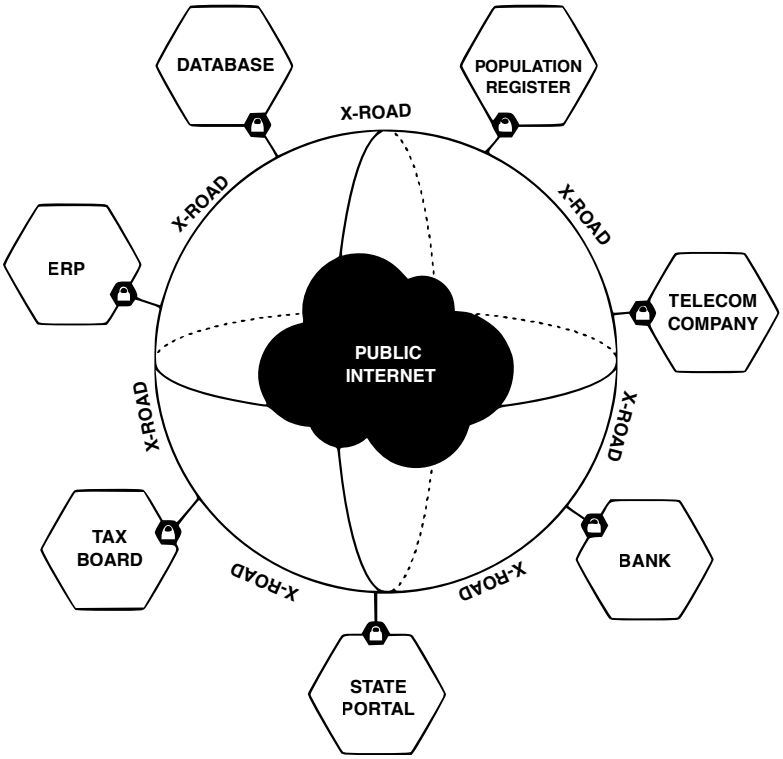
E-School – A national system for all stakeholders: teachers, pupils and parents. It enables the teachers to grade children, assign homework and send messages. Parents can check how their kids are doing in school, and they are able to see if their child is absent. To provide a reason for an absence, parents can simply fill in an absence confirmation form through the platform.

Digital education record – You can register to take national exams within just a few minutes and also see the results online. When applying for university you can easily send required records directly to the university.

The Citizen and the State

Digital birth certificate – All the required paperwork can be skipped and completed through your computer from home.
Signing documents – Within a few minutes, you can digitally sign documents by using your ID card or Mobile-ID. These digital signatures are equivalent to signatures on paper documents, and they are legally acknowledged.

X-road allows all digital services to connect and come together, making sure that the exchanged data is encrypted and secure. It enables the exchange of many types of information: simpler cases involve texts, but you can also exchange files (Estonia's Information System Authority, n.d.).



Services and Communications in E-society

Over the past decades, different countries have been experimenting with a variety of virtual services. Solutions most likely to be necessary and promising have been introduced and practiced. On one hand, such a practice is simply a social development trend. On the other, globalisation, virtual administration and communication with authorities, banking, distant/remote jobs, crediting of documents, etc. are increasingly becoming a common demand. The need for high speed procedures, credibility

and transparency of actions, democratic access and participation and other similar expectations encourage developers to create new digital opportunities.

The 2020 worldwide COVID-19 emergency and restrictions on peoples' gathering and movement have made such needs more acute and given impetus to the uptake of digital solutions. Distance learning, virtual meetings and seminars, web-based ordering of food and goods, working from home, virtual concerts and even (sports) competitions have become the most direct practical needs. These developments are no longer "new" in many countries, but the crisis appears nevertheless to have challenged humankind. Therefore, good practices and innovations where they do appear are worthy of learning and, when possible, adopting more widely.

In Estonia, the practical necessity has helped to transfer a number of everyday activities to the Internet. Some ICT-services have functioned in the country already for years, but some have developed as a result of more recent demands. Sparse population and shortages in the labour force are one of the main boosters for several initiatives.

E -Health

For European Union citizens there is the electronic cross-border health service, an infrastructure ensuring the continuity of care for European citizens while they are travelling abroad in the EU. This gives EU countries the possibility to exchange health data in a secure, efficient and interoperable way. Currently in all EU countries, two electronic cross-border health services have been pro-gressively introduced. ePrescription (and eDispensation) allows EU citizens to obtain their medica-tion in a pharmacy located in another EU country. Electronic Patient Summary provides people's information on important health related aspects such as allergies, current medication, previous illness, surgeries, etc. It is part of a larger collection of health data called Electronic

E-cabinet:
An ICT solution that allows ministers to familiarise themselves with the cabinet's agenda before meetings. Thus, the cabinet meetings last for less than an hour.

Government Cloud:
Instead of owning and maintaining a server on its own, the government has chosen to preserve information in a cloud system, which was developed and is maintained in cooperation with the private sector.

Data Embassy:
The government's back- up cloud server, which is located in a different and secure location abroad and has "diplomatic immunity".

X-road:
Since different systems all exist separately, they use X-road as a passageway to come together.

Health Record (European Commission: eHealth, n.d.). The patients' rights in the EU are secured by the directive made on 9 March 2011 on the application of patients' rights in cross-border healthcare.

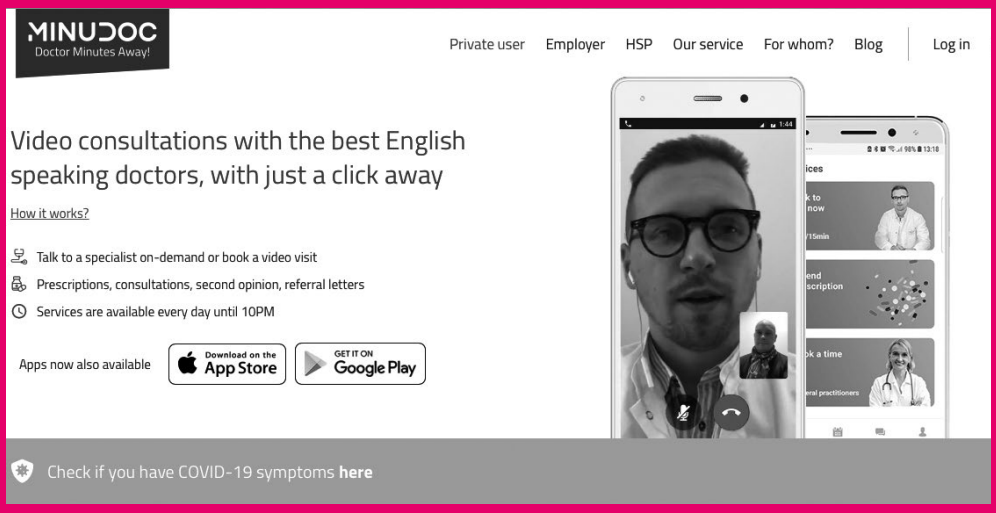
Countries develop, of course, their own electronic health services. In Estonia, one of the recent initiatives launched in the sphere of medical services is a new portal, Minudoc.ee. This portal enables a patient to contact a doctor via computer and webcam for talking to a specialist on-demand or booking a video visit. Prescriptions and consultations are available. An app is downloadable from Apple's App Store and Google Play. A portal development manager explained the idea that the goal is to bring patients and doctors together who would otherwise not be able to meet. Perhaps there is a long waiting list with a real doctor or maybe the doctor or the patient is abroad, or maybe it is difficult for a person to even leave their house. (See www.minudoc.ee)

All doctors who have free time for video consultations are immediately visible on **Minudoc.ee.** Similarly, a patient can see the price. It is a kind of marketplace, where one can choose the best doctor at the best price at the time that suits you. As usual, in Estonia you need to sign in to the portal with your ID card, mobile ID or Smart-ID to connect.

After logging in, you do not make an anonymous video bridge with your doctor. Instead, you will need to make an appointment and pay a visit fee.

As the booked time approaches, you will have to go to the portal again and wait for the doctor to call you. Just like in a real clinic, a doctor in the hallway or waiting room calls out your name.

General practitioners (essentially family doctors), but also gynaecologists, physiotherapists and psychologists can be met for consultations online. The portal also offers in its secure conditions a prescription renewal service.



Minudoc.ee front page (https://www.minudoc.ee)

The question may arise — does the doctor now know who the patient is? For sure, the doctor knows who the patient is. Consultation cannot be offered anonymously. He also knows a person's health history, because contacting a doctor gives him/her permission to view his/her personal health records. This way, the doctor will be able to familiarize himself/herself before the agreed time without the patient having to tell all of his/her biography. The trace of the consultation remains in digital history, which the patient can see when going to the normal family doctor, for example.

Technically, to use e-health opportunities, one needs a webcam, computer and a modern browser like Chrome, Firefox or Safari. In modern browsers, WebRTC video bridge technology is already built-in, so no separate software installation or download is required. Concerning safety, there is a video bridge between the doctor and the patient, and all communication and data on the portal would only go through user accounts that could be logged into with an ID card, mobile ID or smart ID. The whole system also meets the highest European data protection requirements.

Medical consulting over the Internet is not new in Estonia. For example, family doctor Madis Tiik has been doing the same thing with his patients on the small Vormsi Island for 20 years. Now, he serves patients on his list through the Minudoc.ee portal. Madis Tiik is also owner of private clinic, Terviseagentuur OÜ, and he manages the Haapsalu town patient list of more than 1,700 people. "Video consulting is not something new and striking, the same format is used in many countries. In Estonia, we will probably find more and more such solutions in the future as well", said Dr. Tiik (Laidre, 2020).

According to Pille Saar, the head of the Health Services Department of the National Health Board, in a situation where family doctors often no longer want to work outside the bigger cities of Estonia, Tallinn and Tartu, new solutions must be sought to provide people with medical care. Video consultations are used in Estonia in more remote locations and on the smaller islands. Based on the experience of the Haapsalu model project, the Health Board and the Health Insurance Fund are planning to develop possible e-solutions for the provision of primary health care in areas where family doctors have not wanted to participate in the list (Kui arst., 2020).

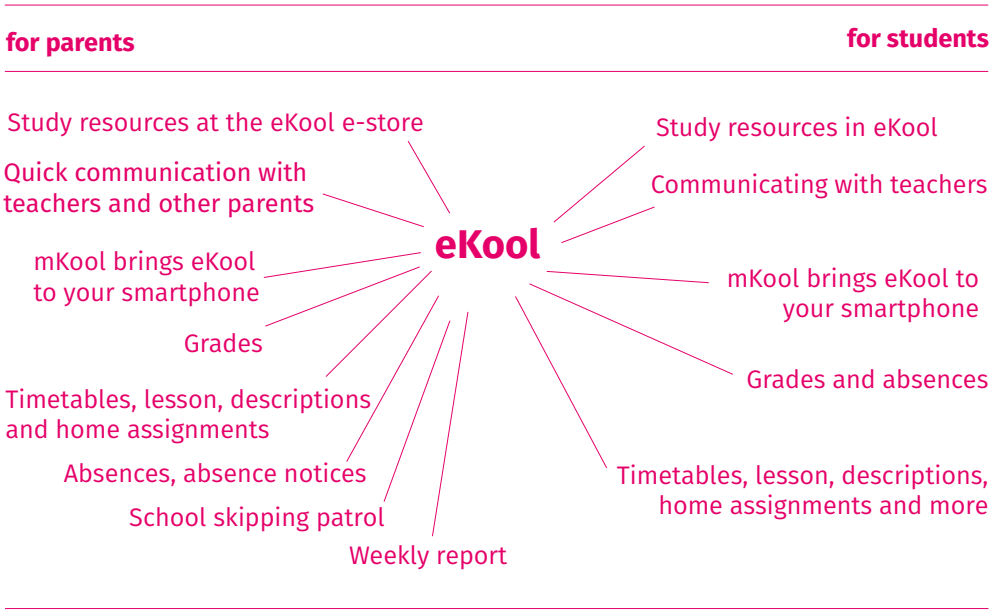
E-Learning Platforms

eKool (eSchool) is a school management tool in Estonia for the compulsory education system created to bring together pupils and their families, schools and supervisory bodies. The platform contains specific information for pupils, for parents, for teachers, for schools, for government, and for different partners in order to improve the learning and teaching experience. It allows users to manage, communicate and follow students' progression and participation in the lessons.

During the coronavirus restrictions in Estonia, the eKool platform gained special

importance in distance learning. It enabled teachers to provide study materials and tasks, for students to be informed and guided when learning, and enabled parents to follow the study process of each learner. For the schools and government, it provided an opportunity for current observations over distance learning outcomes and statistics. The restrictions period also brought up weak points and things-to-improve. The most difficult experience was that both students and teachers used a variety of different platforms and communication options. Although Ekool is a universal record-keeper of what is happening at school, it does not have a video communication capability that can be shared by all. It appears that some people used Skype, some Zoom, some FaceTime, while some had no experience in video conferencing. For virtual lessons a proper common platform is needed.

The situation is better with virtual study materials platforms like Opiq. Since the 2018/2019 school-year, schools have had free access to more than 200 different study sets, complete with digital textbooks from various publishers, materials tasks, illustrations, videos, quizzes, etc. via the Opiq platform, which if used systematically, make online teaching and learning rather organised and impactful. About 7,500 teachers and 40,000 students used digital textbooks every month. “The fact that teachers are actively using digital textbooks gives hope that in the coming school years more and more students will reach digital textbooks”, said Antti Rammo, founder of Opiq and CEO of StarCloud (Tisler, 2019). Anneli Dietrich, a teacher at Illuka School in Ida-Viru County, is one of many teachers who used biology, chemistry, physics, history and humanities



materials from digital textbooks on Opiq every day. According to Dietrich, Opiq, makes teachers' lives easier: "I can get the kids to work quickly in class and I can see right away, if they understood the topic. If necessary, I can quickly send another task that suits them better", Dietrich described how she uses digital textbooks in her studies (Tisler, 2019). Nevertheless - not all schools had created access to the virtual study kits.

Presumably the emergency situation created by COVID-19 will further boost development of online services for people. In Estonia, several private initiatives are busy with that. There is a government initiative, Start-up Estonia, that is aimed to supercharge the Estonian start-up ecosystem in order to unite the best of start-ups, incubators, accelera-tors, and the priate and public sectors.

Start-up Estonia divides its activities into four categories:

Strengthening the Estonian start-up ecosystem — uniting and building the community through different events and activities, creating and executing unified marketing and branding strategies.

Carrying out training programs for start-ups in areas they currently lack certain knowledge that keeps them from achieving their (international) business goals.

Working on educating the local investors to help them invest more and smarter, help attract foreign investors to Estonia, and kick-start new accelerator funds in order to bring more smart money into the local ecosystem.

Working on eliminating regulative issues and barriers that are complicating the process of operating a start-up, investing or raising funding in Estonia, and implementing start-up friendly regulations (Start-up Estonia website, n.d.).

Estonia's Smart City Concept

Estonian capital city Tallinn has surpassed the first milestones of becoming a smart city. Tallinn is vastly covered by Wi-Fi and provides a vast range of e-services to its citizens. Future goals would be solutions for intelligent transport, urban planning, tourism and smart homes (Invest in Estonia website, n.d.).

The aim that has already been achieved to some extent is urban planning and inclusion of citizens in the process. Tallinn has created an app called OpenCity where people can submit their ideas on how to shape the city's environment. In 2005, the city's planning register was created. It exists as a digital communications tool between the local government and the constructor (Plantera, 2018). One of the solutions that Estonia has

Smart City:
a framework, predominantly composed of Information and Communication Technologies (ICT), to develop, deploy, and promote sustainable development practices to address growing urbanization challenges.

implemented is smart parking. Estonia's solutions (apps and ticketing systems) are used in many regions of the Nordic countries (Invest in Estonia website, n.d.). These are used by both private and public parking facilities. Through a quick transaction on your phone, the private or local entities will know that you are paying for the parking space.

A new solution allows even more. By connecting your smartphone and car by Bluetooth, your parking session will start as soon as your car ignition is turned off and will end once you start it again. When you stop the engine, the app will select your parking area by GPS. Once you are done, you will be sent a notification showing the amount of time you were parked and the cost (e-Estonia website, n.d.).

The future holds even bigger projects. One of these is FINEST Twins. It is a joint venture, which has been started to do research and development into forming a new partnership between Tallinn and Helsinki. It has got 32 million euros in funding from the European Union to establish a research centre under Tallinn University of Technology in cooperation with Aalto University in Finland. The first projects, hoping to make breakthroughs in building a cross-border environment based on innovation, should start by the end of 2020. FINEST Twins aims to find solutions on topics like mobility, energy, built environments, governance and data (Finest Twins website, n.d.). The last two are of most importance to us.

Stories of Estonians in a Digital Society

50-year-old lawyer

"As an attorney-at-law, I communicate daily with my colleagues and courts using digital signatures. For attorneys, there is a must to use digital court platform to file applications, protest and other sorts of court files. The decisions will be made digitally as well and published, after taking effect. All the companies are registered in the digital register and all documents related to them can be seen digitally. This is the case with real property register and taxes as well which makes it very easy to work everywhere one has internet connection, including home".

20-year-old student

"I have not yet come to the need to use all the e-services that for most Estonians are essential. Although e-school has been there for a long time, I only started using it on my mobile in the 11th grade. It was super convenient I had no need carrying a notebook to mark down homework. Of course, the downside was that whenever I got a bad mark, or was absent, my parents got a notification on their phone right after which I got an angry phone call. I remember when there was time to take my physical records for the military service instead of going to the doctor and asking for my record I simply had to log in to my health records and give permission the share my health records with the department of defence resources. In my daily life, I'd say I most use Mobile-ID to log into systems and for doing bank transfers".

About E-Democracy and I-Voting

As a core characteristic, democracy has been understood as government in which power and civic responsibility are exercised by all adult citizens, either directly or through their freely elected representatives. In practice, the general understanding prevails that if we wish to have a functioning democracy, its procedures must be transparent and understandable. Digitalisation instead has made several everyday procedures that people exercise with the help of ICT technology rather opaque, hardly understandable due to their hidden nature. (One can also call the situation intuitive and ubiquitous. Ubiquitous computing is introduced in the publication "The Digital Self".) People often do not understand and/or know how electronic processes in general take place, who can access people's data, how are online and other actions at all safeguarded, etc. Although some services such as use of bank cards and virtual banking, data exchange with public institutions like income tax return documenting, and digital signing of documents are increasingly wide-spread, there is still a lot of mistrust toward digitalisation as a new way of living.

Many people do not trust card payments, countries have not introduced electronic tax return opportunities, and instead of digitally signed documents only traditional on-paper proof is accepted. This is a picture of how daily routines work in a society at a time when various digital opportunities have existed in the world for decades already. More serious attitudes and doubts towards digitalisation appear in regard to the functioning of democracy. Democratic procedures that determine national policies must be even more transparent and understandable than the digitalisation opportunities in citizens' everyday lives. Those basic democratic procedures are mostly embedded in developing public opinion on political issues — effective participation, voting and elections, equality at the decision-making stage, enlightened understanding, control of the agenda and inclusiveness.

However, an administrative culture of great quality of governance is critical to the success of e-participation initiatives. Although obvious conflicts exist regarding the impact of e-democracy on e-government and e-participation, e-participation brings great hopes for community revitalization and promotion of social change (Quental & Gouveia, 2014). To what extent can online political debate, electronic voting and e-elections be trusted? Does e-democracy exist, or is it impossible?

Some countries like Estonia have made visible progress and have long histories of e-democracy. Some countries are currently developing e-democracy and introducing new opportunities, some have sceptical views, and some are even trying to limit it.

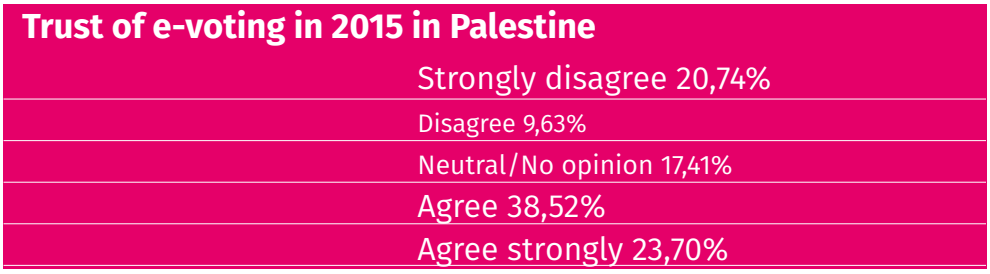
The Council of Europe expressed a common attitude towards electronic democracy already in 2009, stating that e-democracy offers new opportunities to enhance public engagement and participation in democratic institutions and democratic processes. In this way, it helps empower civil society and improve policy-making procedures. E-democracy's strength lies in its capacity to facilitate both bottom-up and top-down initiatives, and its growth can contribute to a redefinition of political priorities and a

transformation of the ways our local and global communities are governed.

Spring 2020 put the issues of e-democracy into an entirely new light. The coronavirus epidemic prompted, within a very short amount of time, an unbelievably new type of life: closure of schools, interruption of air traffic for ordinary citizens and restrictions on public transport, self-isolating "stay at home" orders and working from home, and unprecedented interventions by governments and international financial institutions. It all has changed people's daily routines tremendously. Several countries are facing new challenges in their political life. In France, polling for local elections was scheduled for Sunday, 15 March and Sunday, 22 March (voters had been advised to take their own pen), but the second round of mayoral elections was postponed to 21 June (French set to, 2020). In Russia, the vote for a package of constitutional amendments that was set for 22 April 2020 was postponed on 25 March without announcing the new date of 1 July (Khurshudyan, 2020). In the United States, there are already warnings that the coronavirus pandemic will threaten the safety and integrity of the presidential election in November 2020 (Cohen & Mena, 2020).

At the end of March 2020, when the changes caused by the coronavirus pandemic were largely enforced across the world, the awareness about a new lifestyle had come. Remote work, distance learning, online cinemas and Skype parties. Now the Internet is the main means of communication and coordination. Of course, this existed before, but now it has acquired a more global character. The Internet is becoming more collective, business understands that remote work is possible, and the entertainment industry is quickly moving online. There is no doubt that e-democracy has also acquired new meaning and perspective. Recent practical situations like local war conflicts and huge waves of refugees have attracted attention to the necessity of e-governance in the closest past.

For instance, according to the study from 2017, proper registration and efficient administration of the refugees/asylum seekers to allow them to be accounted for and to be introduced to services that would enable them to enter a normal phase in their new lives has become a necessity (Shat & Pimenidis, 2017). Authors of the study "I-voting vs E-Trust: A test bed for e-democracy in a World in Crisis?", explored the level of trust of i-voting systems of the Palestinian diaspora on a world-wide scale. The questionnaire asking whether i-voting systems raise participation in general elections was available for a short period of time in the early days of 2015 and demonstrated the following results:



Source: Shat & Pimenidis, 2017

At the same time, the need to widen the possibilities of e-democracy is increasingly recognized.

So - what is e-democracy in action? It can be learned through the example of Estonia. While there are numerous research and theoretical papers written about the trustworthiness of e-democratic procedures, mainly i-voting, the Estonian government began the digitalised legislative process in 2001 and introduced the new voting system in 2005 in the local elections. By 2002, Estonia had also introduced an ID card system and by 2005, almost 80% of the electorate had this ID card. At the time, Estonians were saying they did everything with their computer — their banking, taxes, signing documents – and asked: "Why not voting?".

The Estonian internet voting system allows any citizen to vote at their convenience, no matter how far they are from a polling station. As an added benefit, making the process easy and accessible increased the number of voters. Estonia has a population with high e-readiness, a modern infrastructure, effective governmental ICT programs, and well-functioning cooperation between the public and private sectors that together are the crucial factors for having successful e-services for a citizen-oriented state. In 2002, the Estonian Parliament created the legislative basis for conducting internet voting. The widespread use of national ID cards was vital for introducing the new voting channel. The ID card, established by the Estonian Government in 2002, is the new generation's primary identification document, with dual purpose: besides being a physical document, it also functions as an electronic identity (Estonian Internet Voting, n.d).

I-voting, or electronic voting via the Internet, is the easiest way to vote in Estonia on Riigikogu (Parliament) elections, European Parliament elections or local government council elections. I-voting can be done in two ways: with ID card or with mobile ID. The latter was introduced in the 2011 Riigikogu elections. Estonian statistics of i-voting over the past decades shows the increasing trust of the Estonian electorate towards e-democracy in action (Galano, 2019).

The voting process in Estonia is made very simple for a citizen. The voter goes to the elections webpage and downloads an application to cast their vote. Next, the voter identifies his or herself using an ID card inserted into a smart card reader or mobile phone. Once the voter is authenticated with a PIN code it would say "Welcome, here is your candidate list". The voter can then cast their vote for their preferred candidate. The whole process takes around 40 seconds — unless you take more time to decide which candidate to vote for. Such simplicity caused the number of e-voters in Estonia to increase. Of course, there are several factors influencing people's behaviour and preferences.

What do you think about the opportunity to vote electronically in Estonian elections?

Ms. Urve, 73, retired teacher

I personally prefer to go to the polling station, because it is a kind of emotional act for me to vote for a particular candidate. I just like to carry out this procedure — show my ID or passport, get the vote, write the number of the candidate, fold it, have it stamped and finally cast it into the box. I just feel as a citizen whose opinion matters, when I can vote in a special room, and all the votes can be checked later on. I am perfectly able to use my ID card and vote electronically as well, but I do not trust it. The people organising it can do as they please and the votes can be manipulated. They cannot be checked, or re-counted later. The electronic votes collected in Estonia have always been deleted in several cases too fast and they are not preserved, so nobody can question the validity of results. I sincerely doubt that there were over 100 really old people (95-100+) who voted electronically themselves. Anybody can use anybody's ID card and there are really few countries that organize their elections electronically. Probably they have a good reason for that. Democracy should work, but it has to be proved as trustworthy.

Mr. Taivo, 50, attorney at law

I have voted electronically since the very beginning of possibility to do so. First time I voted in a bus in between Tallinn and Tartu. I find it very comfortable, quick, normal and up to date solution which is definitely not more dangerous compared with the old paper method.

The situation in the wider world varies by country. The major concerns about e-democracy worldwide that cause mistrust are mainly related to security and privacy. Of course, Estonia has experienced setbacks. Two years after introducing the first e-elections, a denial-of-service cyberattack targeted both private and public sector websites. It happened after a Soviet-era statue was relocated, and hit media outlets, banks and government bodies. Estonians could not use cash machines or online banking. Newspapers and broadcasters were unable to reach their audiences. Hacking and cyberattacking is a daily concern in the contemporary world. It is enough to remind us of incidents such as the Wikileaks scandal or the U.S. presidential elections in 2016.

Estonian i-voting experiences have been under active local and international observation. OSCE/ODIHR election expert teams have published their final reports after Estonian parliamentary elections in 2007, 2011, and 2015. The 2015 report says that most of the people interviewed by OSCE/ODIHR observers expressed strong confidence in the reliability and security of internet voting. The internet vote, according to those interviewed was conducted efficiently and in accordance with the legal framework. Although the Estonian organising committee considered the earlier part of the OSCE/ODIHR recommendations, further steps could be taken to improve the transparency and

accountability of the process. “However”, the executive summary of the report says, “the system does not allow an end-to-end verification” (Office for Democratic Institutions and Human Rights, 2015). There have been other national and international studies of Estonian e-democracy including i-voting that highlight imperfections of the system. National developers have used the cases and criticism to improve the system and eliminate threats.

People in Estonia, as well around the world, want to be confident in the credibility of e-democracy including e-elections and therefore ask how the internet voting process is secured in Estonia. Securing the internet voting process is similar to the way we secure other high-importance information systems such as banking and critical infrastructure. The trick is to guarantee the secrecy of voting. To do this, the ballots are immediately encrypted on the computer when you vote, and they are decrypted centrally by the election commission only once they are made anonymous. There is no tag of who voted how, thus maintaining secrecy and privacy. Our system is like using a double envelope system for a ballot, where we can only count — or decrypt — anonymous votes. The voter can also check whether his or her vote has arrived at the election commission server properly using a secondary device. After the voter casts their vote online, they can then use an application on their smartphone to scan a QR code from the computer. The QR code enables your device to communicate to the state election servers to show the voter how he or she voted without compromising the privacy of the vote cast. Finally, there are additional mechanisms to preserve the integrity of the electronic ballot box. Votes are registered with a third party — an accredited trust service provider that issues a timestamp. These timestamps, collected from the trust’s service provider logs, are later compared with the electronic ballot box to make sure they match. That ensures that the administrator of the electronic ballot box cannot delete votes at random or produce extra votes (Electronic voting, 2019).

What happens to e-democracy — whether experiments in this area remain as trials or become more widespread — can be predicted by answering the question, “who benefits most from an i-voting system?”. There is a correlation between i-voting and how far a voter lives from a polling station. The further away a voter lives, the more likely they are to vote from home. If you are between the ages of 25 and 45, you are more likely to vote online because young people are more familiar with technology. I-voting is also helpful for people with disabilities. While Estonia has long supported making the voting process accessible for people with disabilities through paper-based voting from home, they can now also vote online. And of course, i-voting is pretty much the only option for people travelling or residing out of the country for a longer period. In comparing the costs of the paper voting system and i-voting, the Estonian experience shows that initially, there are additional costs, but once it is set up, i-voting is significantly cheaper. After the fourth election using i-voting, the cost of Estonian i-vote was about half the price of the paper vote. The i-voting process is also easier to manage, because it is centralised. Things can be done very quickly and conveniently (Electronic voting, 2019).

Benefits of I-Voting in Estonia

1. Convenience for voters, particularly those who are traveling outside the country or in areas away from their local polling stations.
2. Potential to increase voter turnout.
3. Cost savings from fewer paper ballots having to be entered
4. Median length of the i-voting session was 1:29, 1:21 and 1:36 minutes in 2013, 2014 and 2015, a time savings of 30 minutes for citizens.
5. Owners of activated e-mail address @eesti.ee will receive electronic voter card by e-mail; decrease of postal expenses.
6. In the case of i-voting, the cumulative time savings in the Estonian parliamentary elections of 2011 were 11,000 working days, which would amount to around 504,000 Euros in average wages.
7. In the 2015 Parliamentary Elections, internet voting accounted for 30.5 percent of the votes cast. Estonians worldwide cast their votes from 116 different countries.

E-society and e-governance is a relatively new phenomenon in human development. Today, we can speak more seriously about this stage with only a few decades of experience. Every society has to build e-governance according to its own traditions and conditions. There is no doubt, however, that e-governance is the future of states and nations, and that the introduction of e-democracy in this context is inevitable.

Due to its own conditions and needs, Estonia has contributed very intensively to the development of e-governance, highlighting both achievements and setbacks. All societies can learn from them.

Lessons Learned

Enablers	Barriers
Legal and organizational interoperability: legislation approved by stakeholders; government solutions pass interoperability assessment process. eID and PKI infrastructure needed. Citizen can use for login ID card, mobile ID or digi-ID. The use of open source software solution increases trust of the i-voting system. Secure data exchange layer for confidential and legally binding data needed. In case of Estonia, the X-Road is used. Data in Population Register are relevant and up to date. Master data in population registers must be described in catalogue RIHA properly.	Some people (parties) do not trust i-voting. Trusting internet transactions by citizens. Level of computer skills may be higher. First solution in the world requires sophisticated software and methods for protecting privacy and for achieving high level of security.

E-Residency

Estonia is the first country in the world to offer e-residency. The e-residency program was developed with the support of the Estonian Ministry of Economic Affairs and Communications and was launched on 1 December 2014. It was a leap in the dark, as the developers have said. Today, this innovation has gained interest in the world, and as usual, there are supporters and opponents of it. At the same time, the programme is boosting economic growth, tax revenues, and the country's profile of Estonia by connecting with an emerging generation of global, highly mobile entrepreneurs (Ross, 2019).

The electronic ID is key to all the Estonian e-services that require authentication. Holders of an e-resident's card can sign documents digitally, log into every portal and access every information system that accepts the Estonian ID card.

E-residency enables digital entrepreneurs to start and manage an EU-based company online. E-residents can establish a company in Estonia over the Internet and actively participate in managing it while living abroad. It also makes management easy for entrepreneurs who have already invested and created a company in Estonia. Thanks to e-residency, entrepreneurs from outside the European Union will have a chance to conveniently establish a company in Estonia and organise management within the European Union from anywhere, entirely online.

By 2020, e-residents have established 60,000 new enterprises and e-residency has generated net profits of €10.4 million from the start of the program to date (e-residency website, n.d.). In addition to the economic income of e-residency, Estonia benefits from,

among other things, the growth and investments of local companies serving e-residents and the positive image created for Estonia.

E-democracy:
The smart use of digital tools to enrich and transform the existing e-governance models and practices.

I-voting:
System that allows voters to cast their ballots from any internet-connected computer anywhere in the world.

E-resident:
A foreigner for whom, as a benefit, Estonia has created a digital identity and issued a digital identity card — an e-resident digi-ID on the basis of the identification credentials of their own country of citizenship.

E-residency :
Also called virtual residency or E-residency, is a program launched by Estonia on 1 December 2014. The program allows non-Estonians access to Estonian services such as company formation, banking, payment processing, and taxation.

E-Residency

Possible Beneficiaries of an E-Residency

Digital Nomad - to start and manage paperless company while he/she travels;
Freelancer - to start a company with access to the EU market and payments;
Start-up Company - to grow the company with access to EU customers and EU start-up funding;
Digital Entrepreneur - Go-to-market in the EU quickly without excess paperwork or travel (e-residency website)

Benefits of E-Residency

Be location independent
Start a company 100% online from anywhere in the world
Travel and operate your business remotely
Move abroad without the need to re-establish your company

Start an EU company

Register an EU-based company entirely online
Accept online payments through providers like PayPal
Own your company without the need to appoint a local director

Grow business remotely

Sign, authenticate, encrypt and send documents digitally
Declare business taxes online
Access EU Single Market and cross-border capital

Join a global community

Network with e-Residents across 165+ countries
Connect with service providers in a growing marketplace
Discover new ways to grow your business (e-residency website)

All necessary information about e-residency is accessible on Estonian official websites like https://learn.e-resident.gov.ee/

e-Residency Kit

The e-residency application procedure is made very easy and simple. You can apply for e-residency

online at the Estonian e-residency website.
in Estonia, at the service points of the Police and Border Guard in Estonia.
or at the Estonian embassies and consular offices around the world.

One may ask how Estonia controls provision of e-residency. Is it safe for the country? Is everything legal? Do applicants follow and obey Estonian legislation? The procedure is safe. Once the application has been submitted, the background check of the applicant would take place over 10 business days. The international identity verification process provides one safeguard, ensuring that every e-resident's government-issued ID is inspected by Estonian officials. Police then carry out "international background checks" and scrutinize social media accounts, while e-Residents' financial transactions are monitored by the government and banks. Afterwards, the applicant receives a starter kit which contains the digital ID card and a smart card reader. E-residency in itself has not created any new risks, but risk mitigation should always be improved. That is why monitoring applicants before and after granting them e-residency needs to be risk-based. (Aasmae, 2019).

Of course, cases of misuse on Estonian e-residency privileges have been observed. For example, one e-resident from India created a fake university in Estonia to grant bogus

diplomas, and one e-resident from the Philippines turned out to be on the management board of almost 60 Estonian companies that were facing financial difficulty. According to Ott Vatter, current Managing Director of the governmental start-up e-residency, "prevention of fraud is a priority within all the Estonian institutions, although we must always bear in mind that in the business world the zero risk does not exist".

People sometimes also ask if they can live in Estonia with e-residency? The status of an e-resident does not grant permission to live in Estonia nor within the EU. Benefits related to EU residency would not be enjoyed by becoming an e-resident.
The official blog of the Republic of Estonia's e-residency programme exists to provide more information about the program:

Estonian officials are aware of possible risks connected to e-residency. According to the Estonian Security Police, there is considerable interest among e-residents in the field of anonymous virtual currencies. E-residence sees the possibility of obtaining a Schengen visa, which is why various schemes are used for this purpose. The Security Police has identified persons involved in extremism and terrorism among the applicants for e-residency. In fact, there is no effective cooperation in the field of justice, law enforcement and security between most of the countries of origin of such applicants and Estonia. Failures when taking these circumstances into account would damage the e-residency program, the Estonian economic space and the state more generally (Terrorismi, 2020).

There are True Stories about E-Residents and their Experience

Christoph Huebner, a German entrepreneur and digital nomad, a serial entrepreneur, started his first business at just 16 years old making websites and never stopped building companies after that. The e-residency team caught up with Christoph while he was managing his business remotely in Malta to learn more about his background, what drives him, and how he ended up becoming an e-resident.

Chris Muller from Durban, South Africa, co-founded Pango – a digital product studio. In May 2017, he collected his e-residency card in Paris, France, from the local Estonian Embassy (one of over 40 pick-up locations worldwide). Within 2 weeks, he had set up an Estonian business, and a bank account. The primary reasons he joined the e-residency program include: To gain insights into forward thinking administrations. To set up a European-based company. Allow for completely remote operation and administration.

Andrii Omelianenko, founder of Corporate News Agency, after finding initial success in the Ukraine, wanted to expand his business to the EU. He began looking for a place to establish his European base of operations and decided to choose Estonia after being impressed during a short visit to the country.

The stories of e-Residents can be read at:
https://e-resident.gov.ee/meet-the-e-residents/

3. Through the Lens of Democracy and Human Rights

There is no doubt that reading the previous text raised a few eyebrows and left people wondering how someone could put so much trust into state institutions, private companies and, potentially, foreign entities.

Owing to the ever-increasing opportunities for using information technology, privacy of individuals as well as security and integrity of data must always be on the agenda. The challenge of digital privacy can be addressed as follows: Since governments collect large amounts of data from individuals and organisations, there must be mutual trust between the government and the data owners, i.e., individuals and organisations. Governments have an interest in motivating data owners to provide correct and up-to-date data. And both sides are interested to ensure that data is maintained and managed securely. This is a point-of-view that is promoted by the Population Register of the Estonian Ministry of the Interior (https://www.siseministeerium.ee/en/population-register).

Here we have to keep in mind that the state is not interested in fake data. This will not help them in setting up their services. Private companies mostly want to make sure that users will become subjects of targeted advertising. It does not matter how users present themselves, or if they lie about their name, age, nationality, etc.

The Estonian Information Authority comes out with monthly analysis reports on the condition of the e-state (including threats), showcasing exactly how many incidents there were and what has been done to ensure further security.

While promoting itself, Estonia has also made sure that everything that they do is simultaneously protected by law, which is the foundation of a democratic state.

In 2011, there was heated discussion about surveillance activities. In that year, new regulation was passed, postponed and redrafted at the end. This was mostly due to the fact, that the bill conflicted with the constitution, which guarantees the right to human dignity. When a person is under surveillance by the state, then they become objects of the state. The bill also clashed with the right to private life, private home-sphere and private messages, which are all mentioned in the constitution. Although all sides of the aisle were not satisfied with the final outcome it is possible today to follow people only if courts agree with the purpose of the activity (Käsper & Meiorg, 2011).

In January 2019, the Electronic Identification and Trust Services for Electronic Transactions Act was amended, making the State Information Authority the single competent authority regarding rights and obligations arising from European eIDAS regulation. The eIDAS gave all digital signatures across the European Union the same value and forced public institutions to accept digitally signed documents from all countries in Europe (Digital Government Factsheet).

In the current crisis, Estonia has also started amending laws to make sure the declared national emergency can be solved efficiently and according to the law as quickly as possible. The Ministry of the Interior has suggested amending the Emergency Act. The amendments would allow the leader of the emergency (the prime minister), foreman of the emergency and officials appointed by the prime minister to process people's personal data which is stored in national databases (Abipolitseiniku, 2020). Managers of the database have to grant access to the named people, allow them to process the data and forward it to their will if necessary. One of the opposition leaders has said that the databases, which can be used, should be stated in the amendments because there are databases that have no value when it comes to solving the crisis. He also suggested that authorities that can make use of people's data should be given the right to do this following a list of principles that have been approved by either the Data Protection Agency or the Chancellor of Justice instead of giving wide access to a few individuals. In addition, he suggested that people whose data are being processed should be notified of the action.

The government has discussed monitoring people in order to prevent gatherings by positioning people using their mobile's GPS systems. This requires help from the mobile operators. The three biggest operator companies have gone on record saying they would not approve of this lightly and will decide after legislation is drafted.

Downside to e-Estonia

Thanks to its positive digital image, Estonia is represented around many tables, where a small state usually would not be invited. When praising Estonians for their achievement, we also have to talk about the negative sides.

In 2019, the State Audit Office came out with a report. The first point mentioned was that Estonia should make sure all its databases are registered. Although this obligation has existed since the 2000s, registered databases do not represent the actual number. This type of registration should also prevent collecting data that the state already has (National Audit Office's report, n.d.).

A study found that in one local government, the application for benefits could be done using only 17 queries whereas in another it was conducted with 50.
(National Audit Office's report, n.d.)

Secondly, it was reported that there is no overview about costs of these systems, so the Audit Offices tried to calculate it themselves. They found that in 2016 the maintenance of the systems and investments were roughly between €81 million and €100 million. The budget of ICT-related topics will continue to rise, according to the Audit Office. The money used for development is usually provided by the EU and cannot be used for maintaining old systems. This has caused a problem in the eyes of ICT leaders in the public sector. Instead of preferring old systems working to their maximum potential, totally new projects are started. (National Audit Office's report, n.d.)

The maintenance of systems is included in the general funding for ministries, so the amount of money that is provided for the upkeep of systems is based upon how important ICT maintenance is considered to be by the establishment.

Conclusions for Education

How does all this link to learning and why have we taken the time to talk about Estonia? A digital society could guarantee that people can interact with the support of digital technologies. So, in some sense, Estonia has taken steps to make sure that people are familiar with the transformation happening in our daily lives as technologies advance. It goes without saying that practice makes perfect. As long as those services provided by the state make life more convenient, people are willing to use them. Trust is being built over time. Although Estonian public digital infrastructure has not managed to function without any shake-ups, the foundations for growth in trust have been established.

A case could be made against e-governance, saying that one never knows how data is used by the state. For instance, during the COVID-19 pandemic situation, as of 13 April 2020, citizens of Moscow were provided with a special e-passport on their smartphones so they could leave the house to use personal or public transportation. One could get a movement permit by filling in the form on the Mos.ru website or by sending an SMS to the special number. Three types of permit e-passports were provided for going to work, visiting the doctor for medical aid, and other purposes. E-passports were issued daily after personal request, and offenders were caught if checked by the police. The permit application form on the Internet contains a lot of people's personal information. People ask if this is now a digital Big Brother that will continue to keep an eye out after the corona-virus pandemic? In general, there is no mechanism to limit the use of this technology afterwards (Digital passes, 2020).

It is true that the worldwide emergency situation has had a huge effect on people's lives. One impact is that people have been forced to use existing ICT solutions to a greater extent and new solutions have been provided by developers. A vigorous development of new solutions has begun. Digital transition that for many people was previously a rather theoretical possibility has started to make sense and change lives. Already in April 2020, the changes in human lifestyles caused by the pandemic were analysed. It is believed that the top three positive impacts of COVID-19 on enterprises are:

> Improved corporate ability of long-distance collaborative work.
> Wide recognition of the value of digital transformation and information technology among all employees.
> Acquiring ability of online marketing and business development
>
> (Nicolls, 2020).

These are true not only for enterprises but also more widely. School lessons, meetings, concerts and theatre performances, bureaucratic procedures, etc. have started to move to the digital world. This transition is a real matter and challenge for adult education from now into the future. COVID-19 is pushing digital transformation to the front of the line.

But still what about security and democracy in this situation? The truth is, the word

law is not empty. For fair and effective legal regulation, people need to learn about their rights and to know how they are implemented. In order to know this, knowledge about the diverse e-systems and their functioning and control is critical.

While raising digital citizens, Estonia has also simultaneously made sure that laws protect people's human rights concerning personal data and privacy. Surveillance in Estonia is only permitted if courts give the right to do so as is the same for all democratic societies. The new situations and opportunities should be analysed, learned and implemented properly and successfully.

From Point to Point text Messaging to E-Governance

E-governance is defined as the application of information and communication technology for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems between government and different players in the society. As such, it might be interesting to look back to the history to see what landmarks can be identified on the way from the first point-to-point text messaging system until today's ICT solutions that form the basis for e-governance and the e-state.

- In 1844, the first telegraph is sent from Washington to Baltimore
- In 1858, the transatlantic cable is established
- In 1859, the "Carrington event" occurs, taking down telegraph systems
- In 1895, Guglielmo Marconi developed the first radio transmitters and receivers
- In 1959, the integrated circuit is created, making the computer age possible
- In 1963, The UN Secretary General U Thant delivered his statement via satellite connection
- In 1971, the first ever email sent transmitting random letters between computers sitting next to each other
- In 1977, the PC arrives
- In 1980, United America Bank introduces „home banking" with a monthly cost
- In 1989, The World Wide Web is created by Timothy Berners Lee
- In 1994, the first smartphone able to receive emails and faxes is released
- In 1997, the first version of Wi-Fi is invented with link speed of 2 Mbit/second
- In 2003, Skype is launched, connecting people via video
- In 2007, the iPhone comes out and changes technology forever / Estonia becomes the first country to conduct electronic voting in national elections
- In 2011, the first fully functional banking app is released, only available for Apple devices

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