Digital Policy Assessment of Elva Municipality, Estonia

Contracting authority:

Tartumaa Omavalitsuste Liit

Executor: OÜ Geomedia

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Contents

ABBREVIATIONS

AECM	Association of Estonian Cities and Municipalities / Eesti Linnade ja Valdade Liit (ELVL)
AFCM	Association of Finnish Cities and Municipalities / Kuntaliitto
AI	artificial intelligence
eID	e-identity
E-ITS	Estonian information security standard
EU	European Union
GIS	geographic information system
ICT	information and communication technologies
IT	information technology
TOL	Tartumaa Omavalitsuste Liit / Association of Municipalities of Tartu County
SME	small and medium-sized enterprises
X-tee	data exchange platform that enables to securely request and exchange information between government authorities [*until 2018 also referred to as X-Road*]

Executive Summary

Estonia is a world leader in the transition to digital society. The country's digital identity is of strategic importance. The deployment of digital solutions, life event-based services and their consolidation, offers an opportunity to increase public sector efficiency, boost economic competitiveness and the well-being of citizens. Smart municipalities channel public services through ICT solutions, fostering a more sustainable economy and quality of life.

At municipality level, the management of digital policy must take into account the objectives and lines of action established at the level of central government. Desk research indicates that there is a considerable gap between central government and local authorities when it comes to digital policy. What is more, there are also significant gaps in digital capabilities across municipalities themselves, especially in terms of strategic digital governance, digital competencies and the development of digital infrastructure and e-services. Furthermore, there is also a lack of coordination between the various e-services being developed. As a result, the quality of services is inconsistent, with duplicative costs for similar services. In some cases, municipalities have been entrusted with tasks for which they lack sufficient competence and support from the government. The transition to the Estonian information security standard E-ITS will increase the need for cooperation and support in the field of information security.[1]

The main challenge for municipalities is to find a sustainable model for the strategic management and development of the digital sector. The growing importance of AI applications will lead to the rapid development of personal identification services, which requires legal clarity, incl. protection of personal data. Although municipalities rate their staff's digital competence as high, it is important to ensure their systematic development in order ensure competency for the deployment of IT solutions. Since municipalities work closely with businesses, it is important to have the competence needed for the procurement of digital solutions available on the market, incl. drafting project briefs and to evaluate the quality of procured services.

Based on the analysis, this report outlines proposals for the development of the digital sector both specifically to Elva municipality and also to Tartu County municipalities in general.

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[1] _Estonian information security standard_ (E-ITS) is a basis for handling information security. The standard is compliant with the internationally acknowledged ISO/IEC 27001 information security management standard.

1. Introduction

This study analyses how IT solutions support the central and local development objectives in Tartu County, including in Elva municipality, and how to effectively link digital solutions and e-services the design of digital policies at municipal level throughout the entire Tartu County.

Therefore, this analysis focuses on mapping the state of play and development potential of Elva municipal digital policy, together with other municipalities in Tartu County, and provide recommendations for collaboration to further develop digital policy at the county level. To better understand the situation, the analysis starts by outlining the context of Estonian and EU digital policies, coupled with international examples of digital policies at municipal level.

The study methodology and report structure were stipulated by the contracting authority, the Association of Municipalities of Tartu County (TOL).[2] The analysis is divided into nine chapters coupled with an executive summary. The survey was conducted between April and September 2025.

The target group included staff from Tartu County local municipalities, focusing on key areas such as IT, education, culture, social, transport and other public services. Additionally, an e-survey was administered to collect input from residents and businesses in the municipality of Elva.[3] What is more, representatives of regional business support organisations and TOL.

The study's findings and recommendations were validated with the project's lead partners. The presentation of the final report and subsequent discussion with representatives from Tartu County municipalities and support structures offered a forum for co-creation for digital policymaking.

The study '*Analysis of digital policy in Elva municipality*' was carried out as part of the cooperation project '*Improving policies for the promotion of Smart Villages and rural digital transformation*' ('Digital Rural'), with funding from Interreg Europe programme.[4] The report was drafted by by Rivo Noorkõiv, consultant at OÜ Geomedia, supported by expert Katrin Rajamäe-Soosaar. From TOL, the project was coordinated by business project manager Piret Arusaar and Elva municipality development specialist, Sirli Pippar.

The study team is grateful to all contributors for their valuable knowledge and time, which were essential to this study.

2. Study methodology

The mapping of the state of play started with the clarification of digital topics and objectives in Elva's development plan 2025-2030[5] and the Tartu County Development Strategy 2040.[6]

This was followed by an analysis of the main documents and studies shaping Estonia's national digital policy, establishing links between the developments at national level and in Tartu County municipalities, with a particular focus on the municipality of Elva.

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[2] *Association of Municipalities of Tartu County* (TOL) is a professional regional cooperation organisation that comprises municipalities of Tarty County in Southern Estonia. It promotes collaboration between local municipalities to ensure the balanced and sustainable development of the county through joint action and long-term strategic planning.

[3] *Elva residents satisfaction survey 2025*. *[in Estonian]*

[4] Interreg Europe programme '*Improving policies for the promotion of Smart Villages and rural digital transformation*' ('*Digital Rural*').

[5] *Elva Municipality Development Plan 2025-2030 and Budget Strategy 2025-2028*, 2024. *[in Estonian]*

[6] *Tartu County Development Strategy 2040*, Association of Municipalities of Tartu County (TOL). *[in Estonian]*

For the study, interviews were conducted with digital specialists from five Tartu County municipalities. In addition, two in-depth focus group discussions were conducted, first one with officials from the municipality of Elva and another one with representatives of Tartu County development organisations. In addition, the municipality of Elva conducted an online satisfaction survey for its residents, which included digital topics that provided valuable input for this study.[7] Moreover, examples of digital policy efforts from other countries – Latvia and Finland – were also included in the study.[8]

The study resulted in digital policy recommendations for both the municipality of Elva and the Tartu County municipalities in general. These proposals were discussed with at municipality level with top management and digital specialists, resulting in an action plan for digital activities.

The study was conducted in two phases, as illustrated in the figure below.
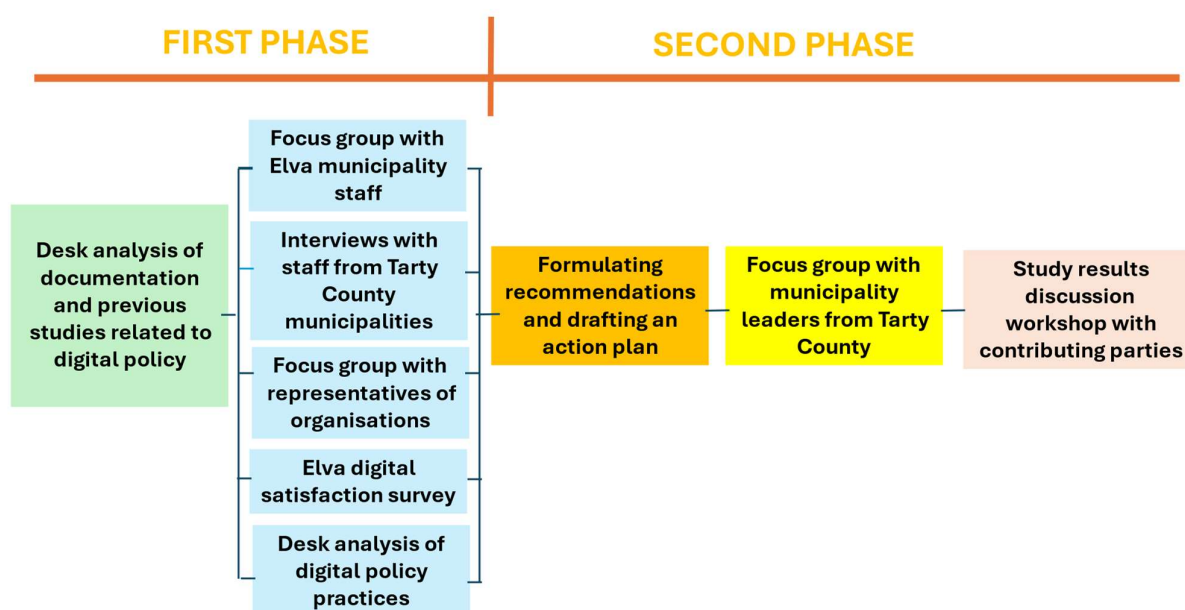
3. Brief overview: Elva municipality, Tartu County and Estonia

3.1 Elva municipality

The municipality of Elva is located in Tartu County and has the largest surface area among the county's municipalities – **732.27 km**^{2}. At the beginning of 2025, Elva's population comprised **14.6 thousand inhabitants**, with 59.5 % in the 16-64 age group (8711). The average age of the population is 42.3 years. The administrative centre is the **town of Elva, home to 38.5 %** of the municipality's population.

The municipality boasts a positive reputation and is a popular destination. Elva invests in its living and business environment to ensure its residents' well-being and opportunities for personal fulfilment. The municipality's development is greatly influenced by its proximity of the administrative centre of Tartu County, the second largest city in Estonia – Tartu, and the two are linked through a significant volume of daily commuting for work, education and leisure. The planned **budget of Elva municipality for 2025 is 33,632 million euro**.

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[7] *Elva residents satisfaction survey 2025*. *[in Estonian]*

[8] Jelgava city and region from Latvia; Association of Finnish Cities and Municipalities (AFCM) and City of Oulu from Finland.

3.2 Tartu County

Tartu County is the second largest county in Estonia and **home to 162.7 thousand inhabitants**, representing 11.9 % of Estonia's population. Its administrative centre is the **city of Tartu**, with a population of 98.2 thousand, which also serves as a regional centre of southern Estonia.

Tartu County is known for its excellent educational, research and development institutions, which have made Tartu an attractive international university city. The county boasts a green and safe living environment, vibrant cultural life, active communities and diverse business landscape. In the past dozen years, Tartu County has significantly increased its potential for adapting to and developing new technologies and production methods. In particular, Tartu County has a competitive advantage in the areas of medicine and biotechnology. Thanks to thriving ICT business and research activities, Tartu's entrepreneurial culture is increasingly modern and international. In 2023, the county's GDP per capita was 97 % of Estonia's average.

3.3 Republic of Estonia

Estonia is a democratic parliamentary republic, with a **population of 1.3 million and a surface area of 45,335 km^2**. Estonia's **capital is Tallinn**, accounting for 33.7 % of the population. The national language is Estonian. Estonia is a member of the European Union and NATO.

There are 79 local municipalities in Estonia, with 15 cities and 64 municipalities. All municipalities decide and organise local life independently and must perform same tasks and provide the same public services to their inhabitants, regardless of size. A one-tier municipal system has been in place in Estonia since 1993.

3.3.1 Digital society

Estonia is a world renown pioneer as a **digital nation**.[9] The country's digital identity is of strategic importance and this expertise, together with R&D, facilitates international cooperation in the digital field. Estonia has leveraged the uptake of digital solutions, event-based services and their consolidation, to increase public sector efficiency, boost its economic competitiveness and the well-being of its people. While there's no uniformly recognised think-maker of **e-Government** at the global level, Estonia remains an inspiring trailblazer.

Estonia was the first country in the world where **citizens could cast their vote online in elections**.[10] In addition, Estonia offers foreign citizens the opportunity to become **e-residents** and benefit from its public e-services and set up in the EU a 100% remotely manageable businesses.[11] As Estonian e-residents, foreigners can sign documents electronically and use a wide range of e-services, unlocked with their e-Residency ID card. Thanks to e-Residency, Estonia is able to attract businesses and talent to boost the local economy, create jobs and increase the international competitiveness of local businesses. In the context of market changes, privacy issues and data protection regulations are becoming increasingly important.

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[9] *Estonia, the Digital Republic*, The New Yorker, 11 December 2017.

[10] *'I-voting is safe and transparent'*. Estonian Information System Authority (RIA), 5 February 2025. *[in Estonian]*

[11] *Estonian e-Residency programme*.

According to the **Digital Economy and Society Index** (DESI), Estonia ranks 16th out of the 27 EU Member States in the sub-index on the digital transition of enterprises.[12] At the same time, Estonia is lagging behind in the spread of AI applications and IT training for staff.

As per the EU's Digital Decade country report, Estonia should step up its efforts on the digitalisation of businesses. In particular, increase the uptake of advanced digital technologies and support SMEs to become more competitive and sustainable.[13] It must be recognised that the benefits of adopting new technologies, including AI, are likely to be distributed unevenly among companies, depending on their capacity, size, sector, and the skills and demographic characteristics of the workforce.[14] When it comes to digital policy, it is also important to monitor digital decarbonisation, i.e. the principle of collecting less data but using it more.[15]

3.3.2 Legal framework

When developing public services, it is important to take guidance from the principles of the Estonian **e-State Charter**, where public service users can check their rights when dealing with national authorities in digital formats and to determine whether they have been respected.[16]

All information on public e-services available online at central **portal *eesti.ee*.**[17] By logging in via that portal, people gain access to a wide range of public e-services and overviews of their personal data in different government registers. Specific services can be found at the Centre of Registers and Information Systems, www.rik.ee. In addition, services can be accessed on websites of designated government agencies, e.g. Police and Border Guard Board services at www.politsei.ee. Such portals offer guidance and explanations on service access and availability, process descriptions, online forms and relevant deadlines, with references to applicable regulations.

At the national level, digital priorities for the coming years are set out in the '**Digital Nation**' chapter of the coalition agreement concluded between Estonia's current governing parties for the period 2025-2027.[18] The focus is set on developing digital infrastructure, quality and cross-use of datasets, digital services and information systems, AI applications, cyber defence and training on digital competences. The aim is to position Estonia among Europe's most successful AI developers.

3.3.3 Visions and roadmaps for digitalisation

Estonian national development strategy '**Estonia 2035**' pinpoints the need to move towards a smart, caring, collaborative and innovative society.[19] In order to develop new high-quality products and services, as well as modernise existing solutions, Estonia will require a significant increase in R & D, in conjunction with improved cooperation between researchers, businesses and other institutions.

The best insight into Estonia's strategic objectives in the area of IT can be found in the '**Digital Agenda 2030**', which focuses on three areas: (1) digital state, (2) connectivity, and (3)

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[12] *Digital Economy and Society Index (DESI)*, European Commission.

[13] *EU's Digital Decade country reports 2023: Estonia*. European Commission, September 2023.

[14] *Estonian Foresight Centre yearbook 2024*, Estonian Foresight Centre (*Arenguseire Keskus*), 2025. *[in Estonian]*

[15] *'Dark data' is killing the planet – we need digital decarbonisation*, The Conversation, September 2022.

[16] *Estonia's e-State Charter*, National Audit Office of Estonia, 28 March 2018.

[17] *Estonia's e-State Portal*.

[18] *Coalition agreement 2025-2027*, May 2025. *[in Estonian]*

[19] Estonia's long-term strategy '*Estonia 2035*', May 2021.

cybersecurity.[20] The aim is to boost Estonia's digitally powered advantages: digital services ensure the best experience, superfast internet is available to everyone, and our cyberspace is secure and reliable. This includes ensuring cybersecurity both in the public sector and in the wider economy. IT solutions offer a wide range of development opportunities that can expand the outreach of a small country. At the same time, we must remember that the future of Estonia's digital society is strongly dependent to the decisions and developments at EU level where Estonia can serve as a test centre.

The Estonian Research and Development, Innovation and Entrepreneurship Strategy **'Digital solutions for all areas of life'** highlights that Estonia should primarily focus on the development of science-based solutions that contribute to cybersecurity.[21] When it comes to new and better products and services, the focus should be on solutions that increase productivity and the efficiency of business processes, as well as allowing easy and intelligent use of various types of data. It is important to develop digital solutions in education and lifelong learning and develop electronic devices and systems. In case of entrepreneurship, it is considered necessary to develop ecosystems that improve the ability of SMEs to innovate, grow and thrive in international competition.

The Estonian Association of Information Technology and Telecommunications (ITL) has put forward a comprehensive vision for Estonia's information society in 2035, under the heading **'Smart Estonia'**.[22] ITL envisions that by 2035, Estonia will be a world leader in digital transformation, both in the private and public sector, recognised as a trailblazer by others. Their vision is based on three pillars: (1) innovative and sustainable economy, (2) smart people and (3) bold state with a vision.

Additionally, the public and private sectors have joined forces to develop a vision for the personalised state for **proactive government services**, with a view to making digital services could support people and businesses more effectively.[23] The document '**Personal Government 2024-2030**', published by the ministry of Justice and Digitalisation, stresses that a smart and simple approach is Estonia's unique feature in the world.[24]

A 'personal government' is a model, where public services are adapted to their individual needs but remain invisible to citizens. The upkeep of new services would be based on the widespread application of AI.

The personal government approach is described through services that are characterised as:

  1) **human-centric**, where the service runs in a single flow;

  2) **widely available**: the service is ubiquitous and available to everyone;

  3) **proactive**: the service meets the person where they are, instead of them having to go to where the service is provided;

  4) **reliable and transparent**: certainty and a clear overview of the process;

  5) **creating new value**: the service is adaptable to personal circumstances and the person must be able to make use of the service as easily as possible and when needed.

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[20] *Estonia's Digital Agenda 2030*, Estonian Ministry of Economic Affairs and Communications, 2021.

[21] *Digital solutions across all areas of life*. Estonian Research and Development, Innovation and Entrepreneurship Strategy 2021-35.

[22] Estonian Association of Information Technology and Telecommunications (ITL) vision 2035 '*Smart Estonia*', 2022.

[23] *Proactive government services*, Estonian Ministry of Justice and Digital Affairs.

[24] Vision and roadmap '*Personal Government 2024-2030*', Estonian Ministry of Justice and Digital Affairs. *[in Estonian]*

In addition to the above, various other documents are being prepared, such as white papers or sector-specific strategies in various IT sub-domains, e.g. proactive government services, data and AI, cybersecurity, eID, etc. Also **guidelines, tools, policies and instruments for the creation of public digital services that are in compliance with relevant standards**.[25]

3.3.4 Analysis of the situation

The majority of municipal services are uniform and quite simple, which mean that they do not always require a dedicated information system to be provided in electronic form. In addition, the majority of online public services are mostly provided via various national registers, e.g. Population Register, Building Register, Social Services and Benefits Data Register. In practice, people don't differentiate whether the service is delivered by the state or local municipality. However, there is no one place where people can find all public e-services, so people must go to different website for each. What is more, the existing systems have all been developed separately, based on differing logical models, and are not interoperable nor are the activities linked as events.

Although many municipalities have published on their webpages downloadable application forms which their residents must fill out and return via e-mail or by ordinary mail, there are also those municipalities that provide an electronic environment for simpler applications, with e-forms pre-filled with data from national registers and the application can be signed electronically and the information system itself organises the sending of the document to the municipality's information system.

Estonia does not have a super-database, user-friendliness and smooth cooperation between different authorities is ensured by the X-tee data exchange layer.[26] Over the years, municipalities have developed a number of solutions for pro-active e-services where the resident does not have to go looking for services, instead the municipality itself offers them based on the resident's profile and needs.

In some cases, municipalities have been entrusted with tasks for which they lack sufficient competence and state support. The transition to the Estonian information security standard E-ITS will increase the need for cooperation and support on issues related to information security.

The analysis of municipal information systems found that the terminology remains unclear. [27] There is no strategic IT management and IT investments are fragmented, activities and resources are not systemically thought out. The management of municipality IT services faces systemic challenges, and the main goal is to find a sustainable model for the provision and management of information systems, a mindset change at the level of top management and lack of cooperation between the state and municipalities in area of digitalisation.

These conclusions were confirmed by the analysis of Elva' municipal development plan and the development strategy of Tartu County, and also by the interviews conducted with local specialists in the framework of this project. The organisational prerequisites and capabilities for the implementation of digital activities vary greatly across municipalities. Since technology alone cannot improve things, it is necessary to start with the enhancement of

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[25] Estonian Ministry of Economic Affairs and Communications: *e-Service Design Toolbox*.

[26] *X-tee data exchange layer*, Estonian Information System Authority (RIA).

[27] *Final report on information systems used by Estonian municipalities for the provision of services*., 2022. *[in Estonian]*

organisational process management and design, approaching this task from the perspective of whether and how technology could help.[28]

In the future, the provision of integrated and proactive personalised services and the development of smart solutions will be increasingly important. Competency requirements for municipality staff will continue to expand to make governance arrangements more needs-based and flexible.

4. Digital economy

4.1 Impact of digitalisation on rural entrepreneurship

The rapid rise in information and digital technologies, including artificial intelligence, has the potential to increase productivity and efficiency by creating a stronger and more resilient economy. However, the impact of these technologies varies from region to region and is influenced by factors such as access to digital infrastructure, talent and skills.

The quality of digital connections becomes a determining factor when people choose their place of residence and companies decide where to set up their business, not to mention an important part of interaction via social media. The role of teleworking continues to increase, including in manufacturing and agriculture, as a result of introducing Internet of Things (IoT, AKA Internet of Everything, IoE), robotisation, AI, machine learning, etc.[29] This trend is supported by the automation of production, widespread use of remote and self-automated equipment, and the deployment of technology for distributed smart electricity grids.

At the regional level, digitalisation creates more equal opportunities for access to public services. To this end, it is necessary to ensure a consistent and comprehensive development of digital infrastructure using or combining different types of solutions – fibre, mobile and satellite. However, there are signs that digitalisation and automation also support spatial polarisation – concurrent concentration and dispersion; there seems to be an increase of regional competition favouring global and national development leaders, but also the creation of technological conditions for more dispersed living and economic activity.[30]

In manufacturing, automation and robotisation are aided by the integration of IT solutions throughout the entire process – from production to the logistics and marketing of goods. The biggest negative impact of job losses brought about by automation occurs where traditional industries account for the highest share of employment and low levels of automation. In Estonia, the areas at this risk for such negative impacts are Central and North-Eastern Estonia. However, regions that depend on one (or few) low-automated production plants are also at risk. At the same time, automation and robotisation of production may open up new opportunities for settlements located further away from small-scale centres, such as peripheral small towns, which create opportunities to sustain industries and attract new investments, as the need to hire large numbers of workers from other regions decreases.

Digitalisation enables generating better data-based information, better-informed decisions and faster adaptation to change. One of the main areas of digitalisation are geographic information systems (GIS), which enables data collection, processing and visualisation. GIS can collect a variety of information, such as data on land use, transport and energy

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[28] Peppard, J., Lambert, R., & Edwards, C. (2000) *"Whose job is it anyway? Organizational information competencies for value creation"* Information Systems Journal, 10(4), 291–322. *https://doi.org/10.1046/j.1365-2575.2000.00089.x*

[29] *Analysis of innovation and trends affecting regional economic development in Estonia*. Estonian Foresight Centre (*Arenguseire Keskus*), 2019. *[in Estonian]*

[30] *National planning baseline study: Impact of trends on spatial development in Estonia*. RAKE, 2023. *[in Estonian]*

infrastructure, demographics and natural environment, and use it to improve spatial planning.

Another important area of digitalisation is the use of 3D models that allow visual representation of space and simulation of its use. In addition, digitalisation is also used to create different e-services and web-based map applications. Therefore, thanks to digital solutions, businesses are also much better placed to make their decisions, including in a long-term perspective.

5. Conceptual framework for digital policy

Since municipalities are constituent parts of the country and provide services to its citizens, their digital strategies should take guidance from national strategic roadmaps in the area of digitalisation. Better coordination is particularly needed at the level of local governments.

The weaknesses at municipality level have also been noted in the report '**Future of Data Society. Scenarios until 2035'**, which pinpoints the absence of data management and sharing frameworks and insufficient attention to increasing data literacy among local authorities.[31]

The main obstacles and challenges faced by municipalities are outlined in more detail in the document '**Information and Communication Technology Development Plan for Estonian Municipalities 2020-2023', commissioned by AECM,** which aims to facilitate IT development, together with the improvement of e-services at the local level.[32] The analysis came to the following conclusions:

- wide-ranging differences in IT capabilities and maturity,
- IT base, standard and professional services are problematic,
- core processes are not supported by IT,
- locally created software solutions are not shareable,
- lack of expertise for procuring software development services,
- involvement of municipalities in the development of national solutions by the central government is problematic,
- financial capacity is dispersed and inefficient,
- maturity of municipal e-services is low.

In 2018, the National Audit Office of Estonia mapped the development of IT at the level of local governments in its report on the **implementation of IT security systems in local authorities**.[33] The report highlights the following aspects:

- Information security is not managed, and knowledge level is poor; for many municipalities, IT security is an issue whose risks are still not recognised, and therefore nationally established requirements remain largely unmet.
- There is no comprehensive overview of the data collected by municipalities. A considerable number of datasets have not been registered with the Estonian administration system for the state information system RIHA and those that are registered have usually not been verified. The number of interfaces between municipal datasets and the X-tee data exchange layer remains low and data are often collected twice.

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[31] *Future of Data Society. Scenarios until 2035*. Estonian Foresight Centre (*Arenguseire Keskus*), 2022. *[in Estonian]*

[32] *ICT Development Plan for Estonian municipalities 2020-2023*, AECM. *[in Estonian]*

[33] *Implementation of IT security systems in local governments*, National Audit Office of Estonia, 2018. *[in Estonian]*

- Municipalities do not consider themselves responsible for the security of the datasets hosted elsewhere, the proper registration of datasets with RIHA and interfacing with X-tee, not do they require these things from service providers.

The challenges listed above could be overcome by the central government joining forces with municipalities to develop common digital solutions and platforms (e.g. underlying security infrastructure, interfaces and interoperability frameworks), which would support the joint provision of integrated services and across municipalities.

Municipalities need a modern legal framework to deliver on the vision of the digital state. Fragmented data systems and the lack of legal clarity in the processing of personal data hamper service efficiency and innovation. It is therefore necessary to establish a clear mandate and interfaces between platforms. Without access to data from national datasets, municipalities are forced to collect data directly from citizens, which is time-consuming and may affect service quality.

The implementation of AI in the public sector must be done systematically and in partnership with local authorities. This is the only way to ensure that innovation goes beyond major centres, with improved services available also to smaller communities. The implementation of a new IT leap without aligning the legal framework at municipal level will not provide a clear basis for data processing.[34]

6. Strategic and political context

The rapid uptake of digital technologies is one of the main global megatrends. New solutions and technological opportunities are introduced at an accelerating rate. For Estonia, this means moving forward in digital development, as new technologies open new areas of application or an opportunity to upgrade existing digital solutions.

At the same time, the rapid rollout of new technologies may lead to a situation where a more conservative part of society is not ready to deploy them immediately and the gap between different user groups continues to widen.

In the 21st century, digital competence is one of eight key competences, like literacy or math skills. By definition, '*key competence*' means a combination of knowledge, skills and attitudes that all people must have to ensure success, personal fulfilment and development, active citizenship, social inclusion and employment, regardless of their background or profession.[35]

The **European Digital Competence (DigiComp) Framework** identifies 21 key competences in five main categories, covering almost all aspects of digital competence: [36]

- **information and data literacy**, including the ability to find data, assess its relevance and reliability, storage and management of digital data;
- **communication and collaboration**, including data sharing, management of personal digital identity and data generated through the use of digital technologies;
- **digital content creation**, including understanding of copyright and licences related to digital content;
- **safety**, including the protection of personal data and privacy in digital environments;
- **problem solving**, including using digital tools solve problems in digital environments.

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[34] *AECM positions on national budget strategy 2026-2029 and for 2026 budget negotiations.*, AECM. *[in Estonian]*

[35] *Council Recommendation on key competences for lifelong learning*, OJ C 189, 22 May 2018.

[36] *EU Digital Competence (DigiComp) Framework,* European Commission, Joint Research Centre (JRC),

Digital vulnerability is a situation where people do not have access to the internet, devices, or they lack sufficient skills and knowledge about the use of digital solutions and tools. As a result, they cannot use e-services. One of the main groups excluded from digital services are seniors.[37] The second excluded group, alongside seniors, are people living in rural areas. The two groups overlap to a large extent, since the rural population tends to be largely older. In rural areas, young people are also at risk, due to limited access to certain digital services.

At the same time, new technologies come with new **cyber threats**. It is worth noting that digital solutions are becoming increasingly complex and specialised. Therefore, the identification, prevention and mitigation of cyber threats requires an increasingly specialised competence. Universal expertise is no longer adequate to address the complex risks posed by cloud computing, AI, cryptography, quantum computers, Internet of Things, augmented reality, robotics, etc.

The growing importance of **AI applications** in both production and consumption has prompted the rapid development of personal identification services. The role of consumers in developing and implementing services and business models is growing, requiring more efforts to protect personal data.

In order to achieve the ambitious targets for Estonia's digital society, ICT solutions need to be used as smartly as possible. In this context, the extremely uneven level of uptake of digital services and solutions in municipalities is a matter of concern, especially since the financial or human resources are insufficient. On the positive side, the Association of Estonian Cities and Municipalities (AECM) is spearheading the development of an ICT competence centre to shape a common digital strategy at municipal level.

6.1 EU's digital policy

The Commission's document '**Europe's Digital Decade: Digital Targets for 2030'** sets out specific goals and targets for digital transformation by 2030.[38] With this, Europe aims to empower businesses and people in a human-centred, sustainable and more prosperous digital future. Performance indicators have been set in four areas: (1) digital skills, (2) secure and sustainable digital infrastructure, (3) digitalisation of public services, and (4) digital transformation of businesses.[39]

Under the objective '**digitalisation of public services'**, the targets is to achieve the goal of 100 % of key public services available online, with more specific targets for e-Health – 100 % of citizens have access medical records online; and in the area of Digital Identity – 100 % of citizens have access to digital ID.

As for the objective '**digital transformation of businesses**', the aim is to increase tech uptake to 75 % of EU companies using cloud computing, AI or big data. Additionally, the target is to increase scale-ups and funding to double the number of fast-growing start-ups in the EU and to have more than 90 % of SMEs reach at least a basic level of digital intensity.

The **Declaration on European Digital Rights and Principles** highlights the following:[40]

- Digital technologies should protect people's rights, support democracy and ensure that all digital actors act responsibly and safely.

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[37] Sakkeus & Tambaum (2019). *Pilk hallile alale II. Vananemine elukaare vaates*. II overview of SHARE Estonia survey. *[in Estonian]*

[38] *Europe's Digital Decade: Digital Targets for 2030*, European Commission, 2023.

[39] EU Digital Strategy '*Shaping Europe's Digital Future*', 22 May 2025.

[40] *Declaration on European Digital Rights and Principles*, European Commission, 15 December 2022.

- People should benefit from a fair online environment, they should not be threatened by illegal and harmful content, and they should be empowered when interacting with new and evolving technologies such as artificial intelligence.
- The digital environment should be safe and secure.
- Technology should connect, not separate people. Everyone should have access to the internet, digital skills, digital public services and fair working conditions.
- Citizens should be able to participate in the democratic process at all levels and they should have control over their personal data.
- Digital devices should support sustainability and the green transition. People need to know about the environmental impact and energy consumption of their devices.

Estonia must ensure that it contributes to the objectives and targets of the EU's Digital Decade in view of successful digitalisation that promotes competitiveness, resilience, sovereignty, European values and climate action.[41] In the EU, Estonia is at the forefront of providing essential public services online, with 98.9 points for public e-services for businesses and 95.8 points for digital public services for citizens. In 2023, Estonian government introduced new online applications to streamline administrative processes for citizens and businesses. [42]

6.2 Estonia's national digital policy

Estonia known around the world as trailblazing and smart digital nation. Its national digital development plan '**Estonia's Digital Agenda 2030**' aims to ensure the continued success of Estonia's digital society and to provide all people with the best digital experience.[43]

To this end, the following three development areas have been defined:
1) **digital government**, i.e. using digital solutions in the public sector;
2) **electronic communications/connectivity**, because sufficient connectivity is the foundation for using digital solutions, be it in people's daily lives or in business;
3) **national cybersecurity** enhancement to ensure that Estonia's cyberspace remains reliable and secure.

The stated vision foresees that Estonia is **powered by digitalisation**. By 2030, Estonia will offer an ultra-fast, reliable and affordable communications, irrespective of location, enabling the development and use of innovative services. Estonia's cyberspace is safe and secure.

As a digital state, Estonia is set to undergo the following developmental leaps:
1) **Transition to event-based and proactive services** for which individual event services are developed, the government supports the development of corporate event services and implements the development of pro-active event services.
2) **AI-powered government** with ambition to be the world leader in the use of AI solutions in the provision of public e-services.
3) **Human-centric digital government** fostering people's trust in using digital solutions to provide public services. To this end, it is essential to safeguard people's fundamental rights, democracy and the rule of law by leveraging technological innovation for the development and implementation of digital solutions. At the same time, the

[41] *EU Digital Decade 2024: Country reports*, juuli 2024.

[42] *EU's Digital Decade country reports 2024: Estonia*. European Commission, 22. juuli 2024.

[43] *Estonia's Digital Agenda 2030*, Estonian Ministry of Economic Affairs and Communications, 2021.

development and delivery of public services must ensure that everyone has equal opportunities to take part in digital society and services.

4) **Green digital government**, where climate and environmental concerns are taken into consideration in the development and administrations of digital government.

The development plan sets out activities that enable a developmental transition, while also ensuring the sustainability of the digital government. These include:

1) mainstreaming public service management and user-centric approach,

2) data-driven governance and data re-use,

3) future-proof digital government platforms,

4) core IT services provided centrally,

5) continuous testing of new approaches,

6) open innovation and development of digital governance community,

7) leveraging the digital transformation of the public sector,

8) targeted external cooperation.

The development plan outlines the main lines of action for the three core sub-objectives: **(1) digital government, (2) connectivity, and (3) cybersecurity.**

To successfully implement this agenda, digital must be mainstreamed into all policy areas. It is important to remember in this context that from a citizen's point of view, it does not matter who is providing the public e-service – whether it is the national government or the municipality; what matters to them is that the services is of high quality, accessible and secure.

The national digital strategy '**Estonia's Digital Agenda 2030**' is implemented by the '**Digital Society Programme for 2024-2027**' that lists the following prerequisites for digital governance: design-thinking approach and relevant tools, sharing best practices and quality-based data management, all with a view to ensure that a citizen's interaction with the government is improved and simplified. [44]

6.3 Tartu County digital policy

One of the transversal principles of **Tartu County Development Strategy 2040** is innovation, defined as the inherent courage at the local level to test novel and forward-looking solutions that increase the quality of the local living and business environment.[45] It envisages a smart, sustainable and inclusive Tartu County as one of Europe's most vibrant living and business environments.

The strategy refers to **digitalisation** under various topics, for example by linking culture and creativity to the development of communities and regions through the skilled application of new technologies, establishment and development of high-speed fibre-optic internet connectivity in rural areas, teleworking capabilities, digitalisation of businesses and the co-creation of smart solutions.

The section focusing on the City of Tartu includes the introduction of innovative digital and green solutions that improve the quality of the urban environment, and further development

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[44] Estonian Ministry of Economic Affairs and Communications '*Digital Society programme 2024–2027*'. *[in Estonian]*

[45] *Tartu County Development Strategy 2040*, Association of Municipalities of Tartu County (TOL). *[in Estonian]*

of digital and green solutions. However, no direct investments in digital are foreseen in the **Tartu County Development Strategy 2040 Action Plan 2024-2027**.[46]

In conclusion, the approach to digital in Tartu County's development strategy is quite fragmented, primarily only mentioned, instead of constituting an integral part of developments in certain sectors. In addition, it is not clear what are the specific needs that are addressed with digitalisation and who will be responsible for implementation. Furthermore, it is unclear how much resources, both material and intangible, are needed for digitalisation.

All Tartu County municipalities have a vested interest in the implementation of the development strategy, which will be done with the support of and in collaboration with the national government. To ensure that the vision set out in the Tartu County Development Strategy is achieved, they must outline a common vision for digitalisation, designate responsibilities at county level and define sectoral digital policies.

6.3.1 Tartu County: current state of the digital domain

In the framework of this study, interviews were conducted with representatives from **five Tartu County municipalities** – City of Tartu and municipalities: Kambja, Luunja, Nõo and Peipsiääre. The interviews focused on exploring local digital development and demonstrated that digital capacities vary considerably across municipalities.

Based on these interviews, it is possible to distinguish between three digital performance models at municipal level:

1. **No full-time digital specialist on staff**, responsibilities are divided between multiple staff members. Digital infrastructure solutions are outsourced to the private sector, e.g. Luunja, Nõo, Peipsiääre.
2. **One full-time IT specialist on staff**, development activities are undertaken, if possible, e.g. GIS, commercial solutions in education and social services, e.g. Kambja.
3. **Several staff members who are responsible for various aspects of digital infrastructure and e-service development**, with additional digital solutions services sourced from private sector, e.g. City of Tartu.

The interviews indicated that digitalisation is deemed important in the municipality's governance (depending on the competence of management), but there is no strategic long-term approach to the development of this area, with the exception of the City of Tartu, who have performed a self-assessment exercise and are drafting a digital strategy. Across municipalities, there are significant differences in human resources, job titles and funding. The primary focus is on operational management and the core tasks and roles are described in the job descriptions of IT specialists.

The development of central IT solutions in collaboration among municipalities and with the national government is problematic as financial resources are scarce, and their use is inefficient. The services developed by municipalities are not coordinated at county level; as a result, the service quality varies to a great degree and municipalities spend concurrently on similar services.

The interviewed specialists were of the opinion that municipalities are in compliance with digital requirements, at least at the minimal level. The City of Tartu was the only municipality that has independent capacity to develop digital services, which does not mean that other

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[46] *Tartu County Development Strategy 2040 roadmap 2024-2027*, Association of Municipalities of Tartu County (TOL). *[in Estonian]*

municipalities do not engage in digital development. However, initiatives remain at the level of individual staff members and are mainly procured from the private sector.

The focal issue in the use of digital data and services is that local specialists are aware of applicable regulations and have acquired the skills to make the most use of the digital solutions to perform their tasks. For example, the use and integration of spatial data for data-driven decision-making across different domains, whereas the use of AI tools is primarily based on individual preferences and competences. On the positive side, municipalities have integrated the digitalisation of various entities managed by the municipality. This is especially important when it comes to the shared management of digital infrastructure. AI assistance is used, for example, replying to letters, searching for solutions for sectoral issues, etc.

Among the most pressing topics is **data management** – from data generation to storage, in particular regarding legal clarity and applicable regulations. It is too expensive for municipalities to develop their own digital solutions in-house, and excellent solutions for different tasks are already commercially available. It is important to have the necessary competence for purchasing commercially available digital solutions, to draft technical briefs and to evaluate the quality of services provided. To ensure continued evolution of municipal digitalisation, it is also necessary to raise awareness among local residents and businesses about using digital services. Another important aspect in this regard is to ensure access to digital services, incl. teaching digital competences tor older people, etc.

Tartu County is working on several exciting digitalisation projects: community garden, beauty salon booking solution, online exhibitions, notifying authorities of injured animals, using drones for the provision of public services.

6.4 Elva municipality digital policy

6.4.1. Strategic role of digital policy in Elva

Elva Municipality Development Plan 2025-2030 and Budget Strategy 2025-2028 provide a broad-based framework for shaping the future of Elva municipality.[47] In the main text of the Development Plan, '*digitalisation of services*' is highlighted among development challenges. However, no specific objectives or targets have been set in the area of digitalisation, but this could be framed as achieving the ability to use high-quality data when making decisions.

The municipality's **Development Plan Roadmap 2024-2030** outlines altogether 24 digitalisation activities under six objectives related to digitalisation across different areas. The following areas have indicated a **need for digital solutions**: education, social services, culture, infrastructure, entrepreneurship, mobility, planning, governance and marketing. Unfortunately, it is not clear which specific digital activities will be developed, who are potential partners and how much resources are allocated. On the positive side, the Development Plan indicates responsible persons for each development goal.

Certainly, the SMART model would have been helpful in setting the targets, according to which the stated objectives must meet the following criteria: specific, measurable, achievable, relevant and time-bound.

Overall, we can conclude that the digitalisation is present in the municipality's development plan, but mainly as a high-level generalisation and with a focus on services. Monitoring is done on the use of social media. The analysis also shows that there is **no comprehensive digital policy** to provide guidance for digital development. The development plan does not indicate the municipality's ability to deal with the digital domain, or that information and

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[47] *Elva Municipality Development Plan 2025-2030 and Budget Strategy 2025-2028*, 2024. *[in Estonian]*

communication technologies are a seen as an instrument to achieve the municipality's objectives. In this regard, the recommendation is to analyse and assess whether and to what extent digital solutions can/should support the achievement of Elva's general objectives.

The focus group interview with staff from Elva municipal government confirmed that the municipality uses commercially available e-services and programmes, such as:

- geoportal: spatial data used for planning activities;
- social services: digital programme that home care workers use to simplifies their work and enables better management;
- education and social services: document registers: ARNO (digital platform for the selection/validation of schools and a school lunch portal), SPOKU (municipal platform for applications), STAR (social services procedural platform);
- ArcGIS: map application environment;
- Amphora: public document management system;
- VOLIS: municipal council broadcast and voting platform.

The overall aim is to bring all digital services together under the 'one door' approach for user convenience, and to reduce fragmentation. The municipality's council meetings are broadcast via the VOLIS virtual environment. The entire municipality staff underwent AI training and now use AI tools in the performance of their duties, e.g. automation of routine procedures. In addition, the key personnel, including managers of subordinate entities, has received information security training and there is also an EITS working group. There are many bureaucratic requirements to ensure that all digital steps are in compliance with legislation. There are also problems with the wider digital literacy among local residents, especially among the senior age group.

On digital matters, the municipality of Elva cooperates with the City of Tartu and also with other municipalities in Tartu County via SPOKU.[48]

The recommendations for Elva include joining forces with other Tartu County municipalities for procurement, e.g. joint acquisition of software and hardware. The municipalities should draft individual digital strategies for local level and also a joint strategy at county level, setting targets that take into account the needs of residents on e-services, the potential of digital technologies, the capacity of staff and residents to use digital tools and services, and the financial resources available. The collaboration between municipalities at county level could be more active and coordinated by the TOL.

6.4.2. Public satisfaction with digitalisation in Elva

Between 12 March and 12 May 2025, Elva municipality carried out a satisfaction survey among its residents.[49] The survey was anonymous and could be answered both on paper and online. A total of 618 people – 4.2 % of local residents – sent in their responses, with 73 % of then women. In terms of age, participation was highest – 60 % – among 16-49-year-olds, followed by 50-64 age group (24 %), with 65 and older rounding up the top three (16 %). The proportion of respondents with higher education was 54 % and 23 % of the respondents with upper secondary education.

The key takeaways on digitalisation were as follows:

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[48] Spoku is an online platform developed for local municipalities for processing applications, and provides an online self-service platform for local residents. For more, see *https://spoku.ee/ulevaade* [in Estonian]

[49] *Elva residents satisfaction survey 2025*. [in Estonian]

- majority of respondents (94 %) use digital solutions on a daily basis,

- high satisfaction with internet connection: 50 % satisfied and 20 % very satisfied,

- digital competences depend heavily on people's age, i.e. better among younger age groups, with more insecurity among older people. Digital devices are primarily used to read emails and keep up with news. Only 1 % of respondents do not use a computer or smart device;

- digital services provided by the municipality are highly valued: 51 % of respondents consider them very important and 38 % quite important.

- 87 % of users of digital services have deemed their user-friendliness to be high, local digital channels are working well and local expectations of modern service;

- 17 % of respondents need further training and guidance on using digital tools and services. In particular, people need to develop digital skills in more complex areas such as video calls, data security and AI applications. Almost a third of respondents have had no exposure to AI and only 27 % consider their skills to be strong.

In addition, survey respondents highlighted the need for the municipality to improve its digital communication with residents, incl. using social media platforms, improving the user-friendliness of the municipality's website. However, in addition to digital communication, it is also necessary to maintain alternative means of communication, such as phone or print.

When it comes to improving digital skills, the main priority is to train older people and those with lower digital competence, either in a group setting or individually. In any case, any further development of digital services must ensure that all residents have access to the necessary information and services.

7. International examples from Latvia and Finland

Rural areas and communities face specific challenges related to a limited market, low population density and long distances. These communities tend to have an older population and socio-economically higher share of low-income households. While the *'smart cities'* concept is quite well established in urban contexts, the concept of smart rural communities is still emerging.

Smart rural communities refer to rural areas and communities that rely both on their existing strengths and resources and also on the development of new potential. The concept of **'smart communities'** recognises that ICT technologies need to integrate social and economic aspects into digital development through the involvement of communities.[50] Therefore, traditional and new networks and services must be improved to the benefit of communities, using IT solutions, innovation and better use of data and knowledge.

This requires investment in both physical and **digital connectivity** and in digital environments for innovative services. This could improve the economic and social sustainability of rural areas, the preserve and create new jobs, while also boosting social capital, thereby contributing to the creation of active and thriving rural communities. The achievement of this objective requires not only digital technologies, but also innovation in business and social services and improving digital competences and skills of local residents.

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[50] *Smart communities in the Nordic-Baltic region: A literature review*, Nordregio working paper 2025:3, 13 May 2025.

The analysis of foreign experience focused on examples from countries that are similar to Estonia in terms of digital development and where digital solutions are used by municipalities to support community development.

7.1 Example 1: Jelgava city in Latvia

In Latvia, Jelgava city has become a leading innovator in digital governance by integrating digital solutions into the municipality's day-to-day work.[51] For example, **Jelgava Digital Centre** provides IT support, IT development and project management, in conjunction with monitoring cybersecurity and data protection processes. In addition, the centre hosts the **Municipal Operational Information Centre** that coordinates civil defence processes.

The developments in the city and the wider Jelgava region take guidance from **Jelgava's long-term strategy**[52] **and investment programme for 2023-2029.**[53] Jelgava city offers the following digital solutions for its residents:

1. **Mobile application and an interactive digital map** for reporting problems, malfunctions and various incidents. Incoming notifications are recorded and forwarded to relevant municipal authorities for resolution. To avoid overflooding the system with multiple reports on the same topic, all those notifications are public (i.e. accessible to other residents) to indicate that a particular problem is already being addressed. Residents are also updated on the measures taken by the municipality to rectify reported issues.

2. **Smart video surveillance systems with AI features** are a key component of the Jelgava city security framework. Alongside capturing video images, these systems have a number of additional features, such as human behaviour analysis (detection of aggressive behaviour to be introduced in future), identification of vehicle registration plates, traffic flow analysis (detection of vehicle types, record keeping, etc.), automatic detection of traffic violations (illegal parking, driving in the wrong direction, etc.).

3. **Drone technologies for situation monitoring** in times of crisis, such as flooding. Monitoring data is forwarded in real-time to relevant authorities. Going forward, Jelgava Digital Centre plans to introduce AI solutions that would allow drones to independently identify potentially dangerous situations, thereby helping relevant authorities to respond more quickly.

Jelgava-Smart city 13.01.2025.

- 367 streets with total length of 271 km
- 259 km street lighting network
- 54 traffic lights
- 428 km of waste-water draining system
- 7512 street lamps
- ~800 video surveillance cameras
- 3 water level control stations
- 5259 LED luminaires
- 221 buss stop
- 38 km bicycle route
- 69,4 km total length of optic fiber cables
- 29 playgrounds and outdoor training areas
- 14 parks and squares
- 3 observation towers
- 4 fountains
- 16 bridges
- 5 rivers: Lielupe, Driksa, Svēte, Platone, Vircava

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[51] *Latvia's Digitalisation: The Road to a Modern State Administration,* Investment and Development Agency of Latvia, 2024.

[52] *Jelgava City and Jelgava County Development Plan 2023-2029*. *[in Latvian]*

[53] *Jelgava City and Jelgava County Development Plan 2023-2029 and Jelgava City Investment Programme*. *[in Latvian]*

4. **Resident card and student ID**. In cooperation with Mastercard, Jelgava has introduced the CityKey card, which serves as identity document for residents. In the future, this card will also have bank card functionality to facilitate easy and efficient access to municipal services. For example, the card gives children a free lunch at school without having to publicly disclose that they receive municipal support, which in turn reduces social stigmatisation. The card is a useful tool, as it allows municipalities to collect precise data on which residents use municipally subsidised services and how often, and it will also streamline processing of payments and benefits.

5. **Early warning system** to provide citizens with timely information on crisis situations, e.g. natural disasters or flood risks, throughout the municipality's territory. The system sends warnings to phones of registered property owners, providing information not only to those who are on site but also to those who may be away from their property at that time.

6. **Smart traffic management system** optimises traffic flows throughout the city. One of the system's key functions is the management of traffic lights, using state-of-the-art sensors and AI data analysis to regulate traffic in real-time based on actual traffic flow. For example, the traffic light turn signal is activated only when a vehicle has entered the relevant lane, thereby improving traffic flow and reducing waiting times.

Jelgava city is also involved in the development of digital solutions at the national level. In cooperation with the Latvian Ministry of Welfare, Jelgava Digital Centre is taking part in the development of a **platform for the digitalisation of social services**. This project is an important step to improve social services by creating a single centralised system enabling all Latvian municipalities to efficiently manage social data for data-driven decision-making. The platform integrates AI solutions, such as voice recognition, allowing social workers to automatically record essential information and documents already during conversations with clients. In addition, AI is also used to automate reporting and data analysis, which not only streamlines routine tasks, but also increases the accuracy and efficiency of service provision and is a useful instrument for budget planning and for identifying the needs of local residents.

Another important project implemented by Jelgava is related to improving the operation of the **national rescue service call centre 112**. This project integrates innovative technologies which will facilitate quicker forwarding of calls to relevant municipal police departments, thereby reducing response times in emergencies. In addition, the project is also set to streamline data exchange between national and municipal police by creating a single data system.

7.2 Example 2. Kuntaliitto and the City of Oulu in Finland

7.2.1 *Kuntaliitto* – Association of Finnish Cities and Municipalities

In Finland, the coordination of municipal digital policies is led by *Kuntaliitto* (Association of Finnish Cities and Municipalities, AFCM), counterpart of AECM in Estonia. In this role, AFCM serves a **solution-oriented partner for municipalities in supporting digital development**, bringing to the table its expertise as developer and facilitator of digitalisation, as well as long-term experience with specific needs of municipalities and a strong collaboration network. Together with Finnish municipalities, AFCM is actively involved in collecting ideas, planning, implementation and communication related to both national and local digital solutions. In addition, AFCM offers consulting services and new opportunities for digitalisation.

Each year, AFCM organises **Digital Weeks** for municipalities.[54] Those events provide a forum for discussing digital topics and new networking opportunities. Presentations cover new insights on digitalisation and municipal development projects, as well as presentations of digital solutions offered by the private sector and overviews of university research on digitalisation and municipal IT solutions. The programme is free of charge for municipalities. In addition, AFCM organises **regular digitalisation workshops for municipalities**.[55]

In addition, AFCM regularly maps the **state of play of digitalisation in municipalities** across Finland. The last large-scale survey was conducted in 2024 among municipal IT managers.[56] The survey covered digitalisation governance, development of IT services, IT costs and resources, data management, procurement of IT services, development of digital services, digital security, change management, artificial intelligence and cloud services.

7.2.2 City of Oulu

In Finland, the City of Oulu is one of the prime examples where planning and development are based on the *'smart city'* concept.[57] Oulu boasts that it has all the necessary knowledge and opportunities to produce, test, finance and market innovation.

Oulu is currently testing the digital infrastructure for implementing **automated and secure drone systems**. For example, drones are used daily to transport medical products from Oulu University Hospital to the health centre operating on the island of Hailuoto, which is done in a partially controlled and uncontrolled airspace, offering an alternative to more time-consuming and weather-sensitive ferry connections. Drones are also used for delivering goods and mail between the city centre and Oulu airport.

One example of a public e-service is **eVaka for early childhood education**. The system ensures communication between parents and childcare institutions, including real-time information on their experience in childcare.[58] eVaka facilitates information exchange on the following:[59]

- apply for early childhood education, training or kindergarten;
- register a child to pre-school and additional schooling;
- submit a request for change in service needs (n/a in private care);
- communicate income data or consent to accept higher customer fee;
- report child's attendance and absences (e.g. illness) (n/a in private care);
- declare child's periods of leave (n/a in private care);
- communicate with early childhood education and nursery staff (n/a in private care);
- view the child's documents, e.g., learning plan;
- book a time for a conversation about the child (n/a in private care);
- photos, videos and products depicting the child or produced by them (n/a in private care);
- stop using kindergarten, nursery or early childhood education services.

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[54] *Finnish Cities and Municipalities Digital Week 2025*, AFCM. *[in Finnish]*

[55] *Digitalisation Workshops for Municipalities*, AFCM. *[in Finnish]*

[56] *Mapping of Digitalisation in Finnish Municipalities 2024*, AFCM. *[in Finnish]*

[57] *Smart City Oulu*.

[58] *AFCM support to municipal early education e-service eVaka*, AFCM. *[in Finnish]*

[59] *Early education management system eVaka*. *[in Finnish]*

eVaka was developed in collaboration between the cities of Espoo, Tampere, Oulu and Turku. The system is based on open-source code, it can be freely used by all interested municipalities. The eVaka project also encourages companies to participate in software development and business. The eVaka project was supported by AFCM who is also responsible for communicating about eVaka among Finnish municipalities.[60]

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[60] *eVaka e-service for early childhood education*, City of Espoo.

8. Recommendations for the development of digital policies for the municipalities of Tartu County, incl. Elva municipality

Based on the analysis, an indicative action plan is recommended for the development of digital policies and digital services in Tartu County municipalities, in particular Elva municipality, altogether in six focus areas: 1) strategic management, 2) cybersecurity, 3) data and artificial intelligence, 4) services and digital solutions, 5) cooperation and communication, and 6) skills and awareness.

Focus area	Recommendations for Tartu County municipalities	Recommendations for Elva municipality
(1) Strategic management	**Not much attention is paid to the strategic management of digitalisation; there is no IT strategy or other document with addressing this objective.**	
	• ensure management support for digital development and provide targeted training for managers to enhance digital competences; • prepare strategic documents to provide guidance for digital development; • develop digital cooperation model for municipalities to ensure efficient use of resources and avoid duplication of activities; • perform digital mapping exercise to clarify which digital developments are carried out by the municipality, which are outsourced and in which areas the government of AECM could support; • together with AECM, develop indicators to measure digitalisation and propose to integrate them into the minuomavalitsus.ee portal; • contribute to greater legal clarity for the deployment of technologies and the provision of pro-active services; • designate a Digital Coordinator in each municipality.	• Draft a digital strategy for Elva municipality and establish links to the municipality's overarching development plan, define metrics and resources needed. • Analyse the problems and challenges with digitalisation among Elva's municipal authorities and managed agencies; prepare an action plan to address them.
(2) Cybersecurity	**Municipalities do not understand the nature and necessity of information security measures, it is considered a technical and not an organisational problem.**	
	• Systematic implementation of the Estonian Information Security Standard E-ITS, incl. staff training to ensure basic skills and knowledge. • Raise awareness among staff about cyber threats and information security practices. • Request national authorities to expand their role from oversight to offering support and guidance for the implementation of digital solutions. • Consider joint procurement for E-ITS audit.	• Draft descriptions of digital work processes and make them available to staff. • Collaborate with other municipalities in the implementation of the Estonian information security standard E-ITS.

Focus area	Recommendations for Tartu County municipalities	Recommendations for Elva municipality
(3) Data and artificial intelligence	**Data analysis skills are insufficient for making data-driven decisions at the level of top management.**	
	• Map municipality's public databases to support data-driven management. • Develop staff's ability to use and analyse open data and increase the use of data in decision-making processes, incl. in managed entities. • Create interactive maps of developments in Tartu County (e.g. visitor sites, monitoring visits) and use them to develop digital services. • Develop staff skills in the use of AI tools in the municipality's work processes.	• Establish a data management process, incl. description, analysis and data-driven decision-making. • Ensure that local residents and businesses can easily and safely access accurate information about the municipality in a safe manner. • Use spatial data systematically in municipal planning and decision-making processes. • Utilise AI capabilities to support decision-making and work processes.
(4) Services and digital solutions	**Digital services are not managed properly, and respective staff competences are uneven.** **Municipalities have adopted many standard solutions from the private sector** **that are not compliant with national cross-functional requirements and guidelines regarding future architecture.** **Insufficient capacity to act as a smart contractor/developer of digital solutions.**	
	• Develop e-services and ensure harmonised level of quality, including by training service owners. • Create standardised service templates for municipal digital services to be used by municipalities for the development of digital services or adapting them to their needs. • Launch e-service pilot projects to support the uptake of digital solutions by municipalities and businesses, with the expectation of active participation, incl. testing solutions and human resources. • Procure digital solutions in partnership with several municipalities and submit joint applications for development, e.g. in the areas of education, social care and spatial planning.	• Increase staff expertise in the area of service development. • Introduce a system to measure user satisfaction with digital services. • Improve user-friendliness of digital solutions. • Ensure the reliability and functioning of the municipality's critical information systems and IT components in crisis situations.

Focus area	Recommendations for Tartu County municipalities	Recommendations for Elva municipality
(5) Cooperation and communication	**Uptake levels of digital services and solutions vary greatly across municipalities; insufficient financial and human resources to ensure consistent quality. Modest cooperation between municipalities in the area of digitalisation.**	
	• Establish a county-wide working group on digitalisation, incl. ministries, Estonian Information System Authority (RIA) and AECM. • Promote the sharing of knowledge and experience with digitalisation and create a rotation system for staff. • Involve students and professors in the development of local digital solutions by providing them with input and ideas for practical projects and final thesis. • Improve communication between municipalities and national authorities, focusing on critical e-services and their development plans.	• For municipal digital solutions, implement to maximum extent the services offered by central government at national level. • Participate in cooperation networks and the rotation system for municipality staff.
(6) Skills and awareness	**Digitalisation is not a priority for municipalities, neither municipalities nor their managed entities have coherent digital policies. Municipality staff lacks digital competences and there is little support from national authorities when it comes to digitalisation. Digital skills of residents cover a wide spectrum, certain groups have limited access to digital services.**	
	• Develop staff's digital skills and knowledge, incl. AI tools, risks and application. • Establish rules for Digital State Academy.ee platform to provide training to municipality staff. • Improve awareness and skills among local residents, focusing on seniors and people with low digital competence. • Utilise the know how of Tartu Science Park and other local educational and research institutions on the use of AI to train municipality's staff and develop digital services. • Launch a training programme to ensure basic digital skills, E-ITS implementation and mitigation of information security risks. • Organise joint trainings for different target groups, e.g. in the framework of the Smart Villages Training Programme. • Shape public attitudes towards smart use of digital technologies, with support from the State Chancellery Innovation Fund.	• Prepare an action plan for the development of staff's digital capacities. • Train municipal staff in digital skills, incl. use of data and AI tools, e.g. creation of databases, data privacy assurance, use of data in decision-making, etc. • Develop the digital capacities and skills of local residents.

9. Conclusion

Tartu County municipalities have adopted different models to manage and develop their digital services. Tartu City Council has demonstrated the greatest potential in this area, but it is of utmost importance that digitalisation would become a **strategic management tool** in all municipalities. Therefore, it is recommended to pay more attention to digital development when updating Tartu County's development strategy.

At county level, the best course of action would be to develop a **common digital strategy** that takes into account the needs of residents, technological capabilities and digital skills of municipal staff and local residents. Its implementation should be supported by a county-wide cooperation model, which should be coordinated by the Association of Municipalities of Tartu County (TOL). To this end, a steering group of municipality leaders and IT specialists should be established, with the participation of the private sector and AECM. Worth considering a pilot project to test the asymmetric allocation of digital responsibilities, with a view to strengthening internal collaboration among municipalities and boost the digital capacity throughout Tartu County.

For the **development of Elva municipal digital sector**, it is important to:

- define a strategic approach to digitalisation and link it to the municipal development plan, incl. development of appropriate indicators of desired outcomes and define necessary resources;
- collaborate with other municipalities in the implementation of the Estonian information security standard;
- establish and enforce data management processes, incl. description, analysis and use;
- implement AI tools to enhance day-to-day work and decision-making processes;
- improve user-friendliness – analyse existing processes and measure user satisfaction;
- take part in IT cooperation networks for municipalities and national authorities and implement a staff rotation system to build digital competences;
- design activities and trainings to develop digital skills among staff, incl. development of digital services, data and AI tools;
- offer training to residents to enhance their digital knowledge and skills to ensure accessibility and proficient use of digital services.