Comparative Legal Analysis of Electronic Services Provided by Government Agencies to Citizens and Legal Entities

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Abstract

[Purpose] The purpose of the study was to analyse the regulatory framework governing the provision of e-services in Finland, Estonia, the United States of America and the Kyrgyz Republic.

[Methodology/approach/design] The quality of e-service provision in the countries was compared based on the Network Readiness Index (NRI) of 2023, in which the United States was ranked 1, Finland – 4, and Estonia and the Kyrgyz Republic – 22 and 94, respectively.

[Findings] It was found that the widespread adoption of e-services is one of the key factors contributing to a country's economic development, as it enhances management efficiency and attracts both investors and specialists. However, such adoption depends significantly

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on government involvement, particularly through financial support for digital initiatives and the establishment of a robust legal and regulatory environment. The analysis reveals that Estonia, Finland, and the United States are actively working toward creating universal regulatory standards to ensure the quality, accessibility, and security of e-services. In contrast, the Kyrgyz Republic lacks a sufficiently modern and comprehensive legal infrastructure, which hinders the effective regulation and development of electronic services.

[Practical implications] Therefore, it was recommended to increase state support for e-services by increasing funding for this sector and revising the current legislation taking into account the successful experience of other countries in Europe and around the world. It was suggested to implement the proposed transformations using the Kurt Lewin model.

Keywords: Digitalization of Space. Network Readiness Index. Digital Divide. Kurt Lewin's Transformation Model. Legislative Initiatives.

INTRODUCTION

The growing popularity of the World Wide Web has led to the rapid digitalization of various areas of human activity, including services. More and more people are realizing and taking advantage of the benefits of digital services, including advertising, medical, accounting and scientific and technical services. The advantages of such services include: customer-centredness, i.e., providing services in the most convenient way for the customer; transparency and accountability of the service delivery process; and cross-border mobility, meaning that customers can receive a particular service regardless of their location (GAZUDA et al., 2025; XHAFKA et al., 2024). Thus, there are indications that e-services will surpass, and in some cases supplant, services provided in government offices.

At the same time, the successful implementation of e-services remains uneven across countries, highlighting a gap between digital frontrunners and countries with limited institutional or technical capacity (HAJIYEV et al., 2025). The increasing role of digital governance raises essential questions regarding the effectiveness of legal frameworks, infrastructure readiness, and strategic investment in ICT. This divergence is particularly evident in countries with transitional economies, where the development of e-services is often constrained by regulatory, financial, or organizational challenges (ROMERO-CARAZAS et al., 2023). Investigating these dynamics is crucial for understanding how digital services can support economic development, improve governance, and foster inclusive access to public and private services. In this context, the present study aims to compare and critically assess national approaches to the regulation and

implementation of e-services, focusing on selected countries with varying levels of digital maturity.

D.S. Duran (2021) pointed out that e-services aim at the electronic transmission of information, including data and content, through various platforms and devices such as websites or mobile applications. The increasing demand for such services raises the question of their efficiency and security. In addition to being a time-consuming and costly process to implement e-services, there are also risks of data leakage and/or misuse (XHAFKA et al*.,* 2023). To avoid such problems, countries are developing legal mechanisms to regulate e-services provided by authorities to citizens and legal entities. The comparative analysis of such mechanisms is not a fully explored issue.

According to the report of the International Telecommunication Union (2024), in 2023, 67% of the world's population will be Internet users, which is 4.7% more than in 2022. Experts from the World Bank Group (2024) pointed out that access to the network often depends on where the user lives: while in high-income countries more than 90% of residents have access to the internet, in low-income countries only 25% have access. At the same time, almost 11% of the world's people are still not identified by any of the available digital tools. Thus, access to and quality of e-services varies by country of residence.

Nevertheless, countries are striving to implement e-services in various areas, realizing the benefits (HELYI et al., 2022). According to J. Goodman-Deane et al. (2024), such benefits include reduced cost of services provided, easy access and improved customer experience. Data obtained from a sample of 3,454 respondents from Germany, Italy, Barcelona, Flanders, and the Netherlands explains why more than 90% of European Union residents use various digital platforms, including for e-services. The researchers, however, also pointed out problematic aspects related to the digitalization of services. These aspects included, in particular, digital inequality entailing digital exclusion. T. Kemppainen and T.E. Paananen (2024), interviewed 14 Internet users between the ages of 22 and 30. Based on the data collected, the researchers identified the following groups of risks associated with the adoption of e-services: digital stress, digital dependence, digital devastation, digital isolation, digital pressure and digital exclusion. User responses indicated that in addition to the data security issues already mentioned, there are also a number of ethical aspects associated with the use of e-services.

The understanding of these aspects and concerns motivated the leaders of the European Union to sign Regulation (EU) No. 2002/22 of the European Parliament and of the Council "On Universal Service and Users' Rights Relating to Electronic Communications Networks and Services (Universal Service Directive)" (2002). According to A. Turillazzi et al. (2023), this law aims to create

a single market for digital services that respects the fundamental rights of citizens, as well as the principles of data privacy and stakeholder protection. In conformity with D.C. Nunziato (2023), the adoption of this law has provoked mixed reactions in the United States of America (USA), as its implementation involves increased monitoring of internet platforms with thousands of users, which may contradict the principles of freedom of expression applied to digital platforms, including social networks. According to K.D. Ismailova et al. (2023), the debate around the monitoring of e-services is also of interest in the Kyrgyz Republic, which has declared its commitment to the digitalization of the economy. G. Kachkyn (2020) stressed that digitalization contributes to improving the quality and accessibility of services, especially in the case of the least protected groups. The progress of the Kyrgyz Republic towards digitalization of the economy, however, is slow because, unlike the European Union, there is no unified law on the provision of e-services in the country. Individual digital spheres in the Kyrgyz Republic are regulated by various regulations, including Law of the Kyrgyz Republic No. 127 "On E-governance" (2017) and Law of the Kyrgyz Republic No. 154 "On Electronic Commerce" (2021).

While Finland, Estonia, the United States of America, and the Kyrgyz Republic are keen to cooperate, including in the provision of e-services, they lack a universal understanding of how such services should be regulated. A comparative legal analysis of e-services provided to citizens of Finland, Estonia, the United States of America and the Kyrgyz Republic would contribute to this understanding. Thus, the aim of this study is to comparatively analyse the legal regulation of e-services in Finland, Estonia, the United States of America and the Kyrgyz Republic. The objectives of the study include the following: to highlight the problematic issues related to the legal regulation of e-services in the selected countries and recommendations for the correction of these issues. The fulfilment of these objectives will contribute to effective cooperation between the countries and cross-border provision of basic e-services.

MATERIALS AND METHODS

To analyse the selected legal and regulatory acts, a qualitative document analysis methodology was employed. This method involved systematic examination of primary legal texts to identify and interpret patterns in the legal regulation of e-services across the four selected countries. The analysis was guided by a theoretical model comprising three interrelated components: the typology of regulated services (what is regulated), the mechanisms of regulation (how regulation is implemented), and the identification of legal and ethical challenges, including the strategies proposed or adopted to address them (what's next). The documents were analysed with attention to their normative content,

institutional arrangements, and practical implications for service delivery. Special focus was placed on the coherence of national legislation with international digital governance standards, the presence of rights-based safeguards (e.g. data protection), and the adaptability of legal norms to emerging technological developments such as artificial intelligence. This approach enabled the identification of both convergences and divergences in national legal frameworks and allowed the formulation of evidence-based recommendations for improving the quality, accessibility, and legal certainty of e-services.

The sample for comparative analysis included two European Union countries (Finland and Estonia), the United States of America and the Kyrgyz Republic. When selecting the European Union (EU) countries, the multi-component Digital Economy and Society Index (DESI) (2022) was taken into account. Based on this data, the proposed index is calculated considering the following components: connectivity; human capital; digital inclusion; and e-government services. Finland and Estonia were added to the sample because, according to the latest available data, Finland ranked first among EU countries on the cumulative Digital Economy and Society Index (DESI) (2022), and Estonia outperformed the rest of the union on a particular aspect of the index, e-government services. The United States of America was included in the sample as a country with one of the highest levels of digitalization of services in various areas, including medicine. In turn, the Kyrgyz Republic was selected as one of the active participants of the Belt and Road Initiative of the People's Republic of China (PRC) (2024), which envisages digitalization with the aim of active information exchange between 149 countries and international organizations in Eurasia. The legal and regulatory acts governing the provision of e-services in the sample countries were selected for analysis:

1.Finland: Data Protection Act No. 1050 (2018), Regulation (EU) No. 1689 of the European Parliament and of the Council "Laying Down Harmonized Rules on Artificial Intelligence and Amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act)" (2024), Regulation (EU) No. 2847 of the European Parliament and of the Council "On Horizontal Cybersecurity Requirements for Products with Digital Elements and Amending Regulations (EU) No 168/2013 and (EU) No 2019/1020 and Directive (EU) 2020/1828 (Cyber Resilience Act)" (2024), Regulation of the European Parliament and of the Council No. 0225 "On ENISA, the "EU Cybersecurity Agency", and repealing Regulation (EU) 526/2013, and on Information and Communication Technology cybersecurity certification ("Cybersecurity Act")" (2017), Regulation (EU) No. 2002/22 (2002).

2. Estonia: Directive (EU) No. 2102 of the European Parliament and of the Council "On the Accessibility of the Websites and Mobile Applications of Public Sector Bodies" (2016), Directive (EU) No. 882 of the European Parliament and of the Council "On the Accessibility Requirements for Products and Services (Text with EEA relevance)" (2019), Regulation (EU) No. 600 of the European Parliament and of the Council "On Markets in Financial Instruments and Amending Regulation (EU) No. 648/2012 (2014).

3.USA: Telecommunications Act (1996), Health Insurance Portability and Accountability Act (1996), American Innovation and Choice Online Act (2022), Open Apps Market Act (2022).

4.Kyrgyz Republic: Law of the Kyrgyz Republic No. 127 "On E-governance" (2017) and Law of the Kyrgyz Republic No. 154 "On Electronic Commerce" (2021), "Roadmap" for the implementation of the Digital Transformation Concept "Digital Kyrgyzstan 2019-2023" (2019), Resolution of the Government of the Kyrgyz Republic No. 606 "On Measures to Implement the Law of the Kyrgyz Republic "On Countering the Financing of Terrorist Activities and Legalization (Laundering) of Criminal Proceeds" (2018), Regulations on the Unified Identification System of the Kyrgyz Republic (2019), Law of The Kyrgyz Republic No. 128 "On Electronic Signature" (2017).

Digital tools have been considered: Estonian virtual assistant Bürokratt (2024), Finnish artificial intelligence (AI) programme Aurora AI Finland (2024).

A theoretical model was used to analyse the selected legal acts, which includes the following components: types of regulated e-services ("what?"); approaches to regulating e-services ("how?"); complexities and controversial issues in the analysed legislation and approaches to solving them ("what's next?"). The theoretical model used in this study is presented in Figure 1.

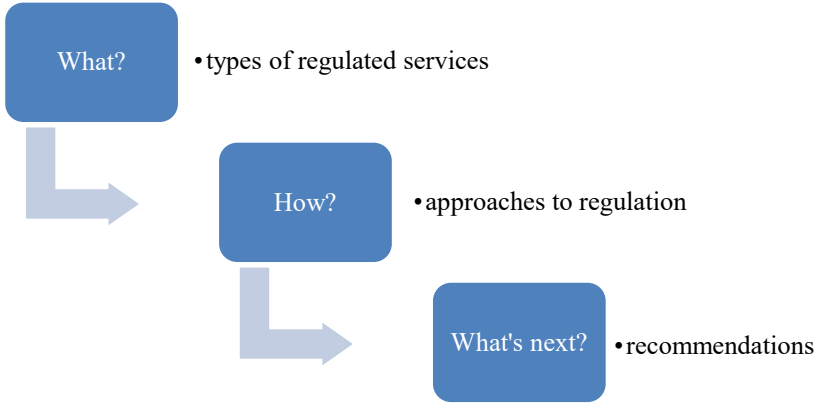

Figure 1 – Theoretical model of the study
Source: compiled by the authors.

Effective approaches to legal regulation of digital services in the countries studied were analysed, as well as the factors of their effectiveness. Further analysis of the factors that reduce the effectiveness of regulation and lead to legal conflicts, moral dilemmas and so on, formed the basis for strategies aimed at improving the quality of legal regulation of e-services for the public. The implementation of these strategies was examined through the prism of Kurt Lewin's model of change, which, according to J. Yli-Kerttula and K. Varis (2023), views change as a three-stage process consisting of unfreezing, immediate transformation and subsequent freezing. For each stage, strategies, and approaches to improve legal regulation of e-services to the public have been proposed.

This study is based on a structured literature review, which involved the identification, selection, and critical analysis of academic publications, legal documents, and policy papers related to the regulation and implementation of electronic services in Finland, Estonia, the United States of America, and the Kyrgyz Republic. The literature review aimed to synthesise existing scholarly and regulatory knowledge to uncover patterns, challenges, and best practices in the digitalisation of public services across different jurisdictions.

RESULTS

Legal Regulation of Electronic Services in Finland

Digitalization of various economic sectors has become an integral part of Finland. The number of users of the internet and various online platforms is growing, including for e-services. Table 1 presents statistics on the use of information and communication technologies in Finland from 2020.

Indicator	2020	2021	2022	2023
	% of population aged 16 to 89			
Used the internet	92	93	93	94
Used the smartphone for personal purposes	87	88	88	90
Used social media daily/almost daily	59	58	59	62
Did online shopping	54	57	58	58

Table 1 – Use of information and communication technologies by the Finnish population aged 16 to 89
Source: compiled by the authors based on Finland 2024 Digital Decade Country Report (2024).

The Table 1 shows that the vast majority of people in Finland have regular access to the Internet and can use it for a variety of purposes, including e-services. Examples of e-services in demand among residents include banking apps, parking apps and apps for interacting with health centres. Parents of school children also frequently use the services of Wilma, an application first introduced in 2001 and currently used by most schools in the country. This application allows parents and guardians to interact with the educational institution, receiving timely information on attendance, homework, upcoming exams, grades and so on. Contacting public administration services is possible thanks to the national service Suomi.fi, which is an aggregator of available service channels. According to T. Heponiemi et al. (2021), V.K. Permatasari et al. (2025), one of the peculiarities of Finland is the active interaction of the country's residents with the authorities through various electronic offices, which can be accessed through personal devices or devices freely available in public libraries. An example of active use of e-services is the fact that in 2022, 88% of Finns checked and, if necessary, corrected their tax returns via an online service.

At the same time, access to e-services is not strongly correlated with the place of residence of the user, as the quality of internet coverage in urban, semi-urban and rural municipalities is approximately the same. A comparative analysis of the availability and quality of internet coverage in different parts of Finland is presented in Figure 2.

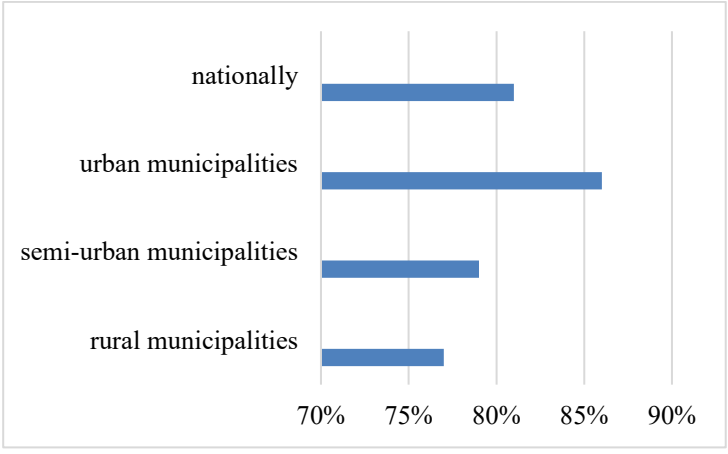

Figure 2 – Uninterrupted access to the Internet and electronic services in Finnish municipalities
Source: compiled by the authors based on A.-S. Backgren et al. (2022).

Thus, affordable and quality internet coverage influences the frequency of use of e-services across the country, which is confirmed by the latest European

Commission report (Finland 2024 Digital…, 2024; Regulation (EU) No. 2847…, 2024). According to this report, 85.6% of the country's SMEs have at least a basic level of digital intensity; of these, 79.5% use the cloud, artificial intelligence and data analytics to enhance their services. On a 100-point rating scale, Finland scores 90.6 in digitalization of e-services for the public, while the European Union average is 78.8.

Another factor for the active use of e-services is the effective legal regulation of these services in Finland. Personal data protection is regulated by Data Protection Act No. 1050 (2018), while the National Data Protection Ombudsman is responsible for ensuring compliance with its rules, as well as for timely responses to moral and ethical and other dilemmas caused by the digitalization of e-services, including responsibility for the accuracy of the information provided and copyright compliance.

Finland also follows the recommendations and requirements of the European Union in regulating the provision of e-services to the public. These recommendations are, among other things, taken into account when introducing artificial intelligence into public services. The best-known AI initiative in this area is Aurora AI Finland (2024) programme, which, according to a United Nations (UN) report, is a decentralized open network and data-driven model for intelligent services and applications. Having analysed the results of the pilot tests in 2018-2019, it was concluded that the efforts are effective in creating an ecosystem serving the needs of citizens, government, and industry. One of the key benefits of the programme is the creation of a network of government service providers, including document processing, issuing certificates, creating and signing petitions, and users of these services (American Innovation and…, 2022; Regulation (EU) No. 1689…, 2024). An important outcome of this programme is social justice, as the programme promotes equitable distribution of resources and greater inclusion of previously marginalized groups, such as the elderly and people with disabilities. In addition, Aurora AI Finland (2024) is helping to create signatures for electronic petitions that involve an increasing number of the country's residents in the decision-making process. This makes participation in public policy planning more accessible to people in rural or remote areas, people with disabilities and young people who have previously sought to distance themselves from decision-making processes.

Legal Regulation of Electronic Services in Estonia

Estonia is one of the most successful examples of using e-services in various sectors of the national economy. According to the report of S. Aus (2023), 99.9% of public services in Estonia are available online. Thus, Estonia has become one of the world leaders in creating e-government and digital diplomacy,

and its experience can be used by other countries seeking to digitalize their services.

According to V.I. Espinosa and A. Pino (2024), e-government implies digitalization and automation of public administration through information and computer technology (ICT) as an integral part of a modernization strategy to create public value in a more sustainable society. A. Hardy (2024) argued that one of the areas of e-government was the implementation of X-Road, a system aimed at secure, fast and non-re-entry data exchange between government agencies. According to the World Intellectual Property Organization (Global Innovation Index…, 2023), the implementation of this and other strategies enabled Estonia in 2022 to become the first transition country to be ranked among the top twenty countries in e-government development and digital competitiveness.

An example illustrating the successful implementation of e-government is the fact that Estonia became the first country in the world to apply e-voting (AUS, 2023). The same source states that Estonia is the only country that implemented digital citizenship in 2014. According to experts including A. Hardy (2023), and T. Hoffmann and M.C. Solarte-Vasquez (2022), the advent of this system has made it possible to obtain an electronic identity card, regardless of the country of residence. Thus, foreigners have the opportunity to obtain a personal 11-digit identification code, which equates them with Estonian natives, for whom obtaining a physical identity card is mandatory for every citizen who has reached the age of 15.

One of the principles of e-services in Estonia is to minimize bureaucracy, which implies the use of digital tools to speed up the identification process. Since 2017, the digital keys used to identify the owner of a digital ID card have been placed as chips inside the ID card itself, eliminating the need for their owners to enter a pin code (Barikova, 2023; Symonenko, 2024). Many of the above services, including electronic identity verification, are also available in Finland and the US, where there is an extensive system of identification through specialized apps, calls, or messages to the user's phone, and sending confirmation letters to email (Regulation of the European..., 2017). Remote identity verification is also available in the Kyrgyz Republic, where it is regulated by Resolution of the Government of the Kyrgyz Republic No. 606 “On Measures to Implement the Law of the Kyrgyz Republic “On Countering the Financing of Terrorist Activities and Legalization (Laundering) of Criminal Proceeds” (2018). The existence of this provision, in particular, implies that verification of users of the unified identification system (UIS) is possible through a Telegram bot, a Google ID, or a one-time password via SMS (State Portal of E-services of the Kyrgyz Republic, 2024). Thus, remote verification of users of e-services in the Kyrgyz Republic exists, but with less functionality compared to the EU countries and the USA.

Citizens of all these countries can use remote verification to access electronic versions of their documents, access the bank account, obtain reference information, apply for execution and issuance of documents, create and sign petitions, and so on (Regulation (EU) No. 2002/22..., 2002).

An important similarity in the way e-services is provided in Estonia and Finland is the endeavour to create a single digital space using AI algorithms. According to the European Commission report (Finland 2024 Digital…, 2024), in Estonia the transition to a single digital platform took place after the country's Ministry of Digital Transformation realized the inefficiency of using separate chatbots to interact with different government agencies. According to S. Birchall (2023), these chatbots were replaced by a single digital system called Bürokratt, which is a voice-activated virtual assistant designed to help citizens with various issues such as choosing books from the library, getting a driving licence, applying for benefits and so on. As of 2023, pilot studies were conducted to identify and eliminate possible problems in the use of the system, such as leakage of personal data, and subsequent expansion of its functionality. S. Birchall emphasized that the components of the software could be used to develop forecasting models in the Tax and Customs Board, the Estonian Health Insurance Fund and the Information Technology Centre of the Ministry of Environment for forest resource accounting. Similar to Aurora AI Finland (2024), Bürokratt demonstrates the potential for creating a unified digital space that connects all government agencies and citizens in need of their services.

Legal Regulation of Electronic Services in the USA

According to DataReportal, 97.1% of Americans have regular access to the internet and are active users of various platforms, including e-services (Kemp, 2024). One of the examples of e-services that are popular in the country is the electronic appointment with medical specialists and instant access to medical history, facilitating the interaction of experts and helping to make better decisions in individual situations. According to O. Bak et al. (2023), the intensive adoption of the electronic system was due to the 2010 medical reform in the country aimed at increasing the number of citizens with access to health services. Also, common is the use of online platforms for various kinds of counselling, including legal, economic and so on. Like citizens of Estonia, Finland, and the Kyrgyz Republic, U.S. citizens can use online platforms to sign a petition, get advice, or receive feedback from local government officials. Despite significant progress in these areas, the U.S. digital government is at a lower stage of development than the Estonian digital government because, in particular, it does not offer the possibility

of electronic voting. This possibility is also absent in the other countries in the analysed sample (Directive (EU) No. 2102…, 2016).

The country has undergone transformations aimed at providing efficient, accessible and secure e-services to the population. For instance, the Telecommunications Act (1996) came into force which, as noted by R. Spano et al. (2023), set standards for the content and quality of electronic services provided. The Health Insurance Portability and Accountability Act (1996) was also enacted, one of the objectives of which was to preserve data privacy as a way to protect the interests of users of electronic services.

Decades after the adoption of these laws, the U.S. remains committed to an international partnership to enforce rules and regulations for the provision of e-services to the public, as well as antitrust regulation of the e-services market. In particular, it is expected that in the future, e-service providers will plan their activities in accordance with Regulation (EU) No. 2002/22 (2002). This draft law aims to create a secure digital space that guarantees the protection of the fundamental rights of users of electronic services and to create a level playing field to stimulate innovation, growth, and competitiveness in the single European market and worldwide. According to the assertion of R. Spano et al. (2023), the bill predominantly regulates digital platforms, including Google and Amazon, which have more than 45 million monthly users. It requires eligible e-service providers to conduct regular monitoring to identify and address factors affecting the quality and security of services provided.

In the US, protecting sensitive data is just as important as in EU countries developing AI-enabled single information platforms (AVTALION et al., 2024). According to S. Birchall (2023), one of the challenges facing the developers of e-service platforms is to encode the data received and create mechanisms to prevent the transfer of this data to third parties without the consent of its owner. In the Kyrgyz Republic, the issue of data protection has been raised in connection with the healthcare reform aimed at the interaction of medical institutions within the framework of the Unified Identification System (UIS) (Regulations on the Unified Identification System of the Kyrgyz Republic, 2019). This system provides for authorized access to information contained in state, municipal and other systems, except for information that is a state secret.

Similarly to the EU countries, the US is striving to create a unified digital platform that provides citizens with access to the most popular electronic services (TROFYMCHUK al*.,* 2019). The U.S. Digital Service (2024), a collection of small but highly skilled teams using their expertise to develop human-centred solutions to the federal government's pressing technical challenges, is charged with this task. Like Bürokratt, U.S. Digital Service (2024) aims to minimize the number of communication channels for ease of use. This platform can be used to

complete tax returns, apply for childcare assistance, get advice on changes in tax laws, obtain veteran's benefits, and other purposes. The platform, similar to Finland's Aurora AI Finland (2024), uses massive amounts of data to create better services and solve important strategic tasks, such as predicting future epidemics and developing an action plan to minimize damage. The platform is governed by national laws, including the Telecommunications Act (1996), the Health Insurance Portability and Accountability Act (1996), and EU standards under Regulation (EU) No. 2002/22 (2002).

Legal Regulation of Electronic Services in the Kyrgyz Republic

Compared to the USA and the EU countries under consideration, the Kyrgyz Republic has a significantly smaller proportion of the population with access to the Internet and various e-services. While precise figures for Kyrgyzstan remain limited, existing national reports indicate that access to the global network is still restricted, particularly in rural areas. By contrast, according to S. Kemp (2024), approximately 79.8% of the population in the United States is connected to the global network and actively uses its opportunities to achieve various goals. The researcher also emphasized the insignificant but stable positive dynamics of growth in the number of American users of the World Wide Web. This contrast highlights the digital divide that continues to exist between countries with advanced digital infrastructures and those still developing the necessary technological and legal ecosystems. In conformity with G. Madaminov et al. (2022), these dynamics may be due to the national policy "Digital Kyrgyzstan 2019-2023", the key objective of which is to create a digital economy, similar to Finland, Estonia, and the USA. K.D. Ismailova et al. (2023) also noted the Kyrgyz Republic's attempts to create a digital government to ensure equal access of all citizens to information and other national resources. There is a State Portal of E-services of the Kyrgyz Republic (2024), where citizens can obtain 165 services in fourteen categories: 'Property', "Inquiries", "Social Benefits", "Business", "Family", "Education", "Health", "Licensing", "Intellectual Property", "Culture, Art", "Security", "Utilities", "Document Authentication" and "Digital Nomad". The latter type of service is of interest to citizens of six neighbouring countries because, according to Resolution of the Cabinet of Ministers of the Kyrgyz Republic No. 464 'On Conducting a Pilot Project on Granting Foreign Citizens the Status of "Digital Nomad" (2022), they can enter and stay in the territory of the country without obtaining a visa, registration at the place of stay or labour permits. The adoption of this provision makes the Kyrgyz Republic more attractive to foreign citizens and helps attract talent to accelerate innovation processes in the country.

Despite the attempts made, Kyrgyzstan's progress in terms of Network Readiness Index (NRI) (2023) is rather modest. According to M. Tokmergenova and I. Dobos (2024), Network Readiness Index is one of the objective indicators of a country's readiness to provide e-services. Similar to the previously mentioned Digital Economy and Society Index (DESI) (2022), it includes several components: 'technology', "people", "governance" and "influence". In 2023, the Kyrgyz Republic was included in the global Network Readiness Index study, and its performance on certain aspects is presented in Table 2.

Component	Kyrgyz Republic	Low-income countries	Sample average
Network Readiness Index	39.80	38.41	45.81
Technology	27.07	32.12	38.11
People	31.90	34.38	41.35
Control	47.22	43.27	51.08
Influence	53.00	43.89	52.69

Table 2 – Comparative analysis of the Network Readiness Index of the Kyrgyz Republic in comparison with other countries
Source: compiled by the authors based on Network Readiness Index (NRI) (2023).

Given the table, the Kyrgyz Republic's performance is comparable to that of low-income countries, but significantly different from the sample average. In the 2023 results, in which 134 world economies participated, Kyrgyzstan ranked 94th, indicating that the country's digitalization is not at a high enough level, although the country has made progress in certain sectors of the digitalized economy despite the challenges. In comparison, the United States ranked first, Finland ranked third, and Estonia ranked twenty-second. Selected indicators point to the Kyrgyz Republic's progress towards digitalization of the economy and expansion of e-services. In particular, the country ranked 69th in the "Impact" component of the Network Readiness Index, while the indices for other components ranged from 94 to 111 (Kateryniuk, 2022).

A key feature of legal regulation of e-services in the Kyrgyz Republic is a branched system of laws and legislative acts related to different sectors of the economy. The branching is one of the similarities between the state and legal regulation of e-services in the Kyrgyz Republic, Finland, Estonia, and the USA. The difference is that a number of laws in force in the Kyrgyz Republic are outdated, i.e., unable to fully reflect the changes in e-services provision. An

example is Law of The Kyrgyz Republic No. 128 "On Electronic Signature" (2017), which has not undergone any transformation since the year of adoption.

In addition to the outdated legislative framework, the country has an acute problem of digital divide, which, according to M. Amanalieva (2020) and Q. Zhang et al. (2023) is that certain groups of the population have limited access to the global network and electronic services. The digital divide is particularly noticeable between people living in urban areas with access to fast and uninterrupted internet and those living in rural areas where internet coverage is poor or non-existent (TUREMURATOV et al., 2024). The digital divide is also noticeable between middle- and high-income citizens who can afford to purchase digital devices and pay regularly for internet connections and low-income citizens who cannot afford such costs. This digital divide makes e-services unaffordable for some groups. At the same time, narrowing this gap is a challenge because, unlike Finland and other countries, the Kyrgyz Republic has not developed a system for providing free access to the Internet in libraries and other public places.

Strategies for Ensuring Quality and Improving the Security of Electronic Services for the Population

According to B. Faith (2023), cost savings and process automation play a significant role in the social services sector, providing equal opportunities through real-time problem analysis and scaling of service providers' activities. That is, it is fair to argue that compared to traditional services, e-services are more scalable and effective in addressing the problems of different populations.

The scaling up of e-services allows solving the problem of social inequality manifested through the lack of access of certain groups of population to various benefits. The example proposed by A. Arykova et al. (2024) indicates that despite the high level of medicine in the Kyrgyz Republic, people in rural areas have more chronic diseases and seek medical advice less often. This inequality exists, in part, because access to Internet resources and information necessary for decision-making is much lower in rural areas than in urban areas. Broad internet coverage and a stable signal could, however, solve this problem by providing people in rural and remote parts of the country with access to electronic services such as doctor's appointments and online counselling (KERIMKHULLE et al., 2023).

Subsequent success in the digitalization of the Kyrgyz Republic's economy depends on the country's ability to cope with the following challenges: lack of support, including financial support, for initiatives aimed at introducing e-services in various sectors of the economy; insufficient internet coverage and/or lack of coverage in some parts of the country; concerns about the security of sensitive data, including medical records, financial transactions and so on; and low levels of public trust due to a lack of awareness about e-services in the Kyrgyz

Republic (BEKMURATOV et al., 2024; KHAMZAEVA et al., 2020). Despite the variety of reasons, they all have a common root, as can be seen in Figure 3.

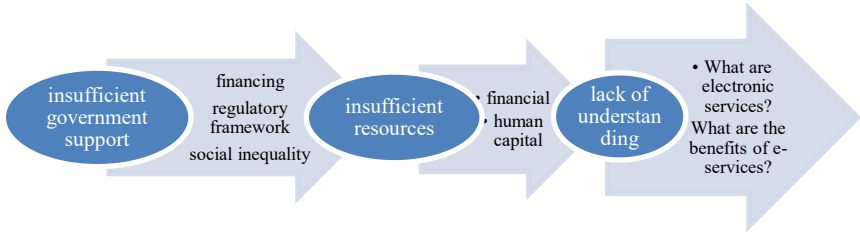

Figure 3 – Root cause analysis of underutilization of e-services
Source: compiled by the authors.

Based on the figure, the low prevalence of e-services in various sectors of the economy is due to the lack of support from those who decide to implement such services. These stakeholders have insufficient understanding of the nature of e-services and the benefits of their implementation. The transition to more intensive digitalization of services is possible by using Kurt Lewin's model to help stakeholders understand the benefits of digitalization and take the first steps towards its adoption in different sectors of the economy (YLI-KERTTULA and VARIS, 2023).

The first stage of transformation is "unfreezing", the essence of which is to show the involved parties the benefits of implementing e-services in different sectors of the economy. At this stage, an effective approach may be to analyse the positive experience of other countries, for which the transition to e-services has stimulated economic development. An example of such a country is Estonia, which spends between 1.1% and 1.3% of the total annual budget on digitalization and aims to reach the European level of 1.5% of the budget (Directive (EU) No. 882…, 2019; Organization for Economic Cooperation and Development, 2024). Gradual increase of financing of the e-services sector is one of the factors of attracting investors and growth of the national economy. For the Kyrgyz Republic, the example of Estonia can be an inspiring one, as the country does not have significant natural resources or a large population, but nevertheless demonstrates stable economic growth. That is, the main objective of unfreezing is to contextualize the use of e-services and provide sufficient arguments for their implementation in various sectors of the economy (Regulation (EU) No. 600…, 2014).

The second stage is transformation itself, i.e., the transition from traditional services to digital services. This stage is the most challenging, as the implementation of new strategies and approaches is resource-intensive and

labour-intensive, and the parties involved are tempted to revert to previous practices (YLI-KERTTULA and VARIS 2023). During the transition to e-services, one of the most effective strategies will be to provide a legal framework that regulates the main aspects of activities in different sectors of the economy.

For the Kyrgyz Republic, it will be relevant to revise existing laws and regulations, including Law of The Kyrgyz Republic No. 128 "On Electronic Signature" (2017), to bring them in line with modern realities such as the use of biometrics and double verification. Training and retraining of e-service providers would also be an effective strategy. In the European Union and the United States of America, officials are trained through the functioning of professional associations, including those involved in cross-border exchange of experience (SAVCHENKO, 2022). The transfer of knowledge and experience takes place through onboard training, in which a newcomer is supported by a more experienced staff member who acts as a mentor. It is also not uncommon to see initiatives aimed at exchanging staff between companies to transfer experience, discuss challenges and develop strategies to address them.

In the Kyrgyz Republic, training is being provided as part of the Belt and Road Initiative (2024) strategy to transform the country into a digital hub by 2040, according to the National Statistical Committee of the Kyrgyz Republic (Assessment of the level of…, 2019). The strategy also provides for deepened co-operation in the humanitarian sphere, meaning that specialists from the republic have the opportunity to learn from colleagues from other coalition countries. The above data indicate that in the Kyrgyz Republic, the changes leading to the digitalization of the services market are taking place at a much slower pace than in other countries in the analysed sample.

At the third stage of the transformation process, it is important that the achieved positive changes are long-term, which is made possible through "freezing". The essence of this stage is to provide mechanisms to incentivize the use of e-services in various sectors of the economy. One such mechanism is to reward collectives and sectors that have made the transition to e-services. Examples of such incentives used in Finland, Estonia, and the United States include providing grants to companies for the digitalization of services, financial rewards for businesses that have made significant progress in digitalizing their operations, and international internships as a way to promote the provision of e-services in different sectors of the economy. Many of these incentive strategies can be used in the Kyrgyz Republic, including as part of the implementation of the Belt and Road Initiative (2024).

The proposed strategies in this subsection are designed as practical recommendations for the Kyrgyz Republic to enhance the quality and security of its electronic services and to narrow the digital gap with countries such as Finland,

Estonia, and the United States of America. Given that Kyrgyzstan currently ranks 94th in the Network Readiness Index, its advancement will depend on a coherent and well-resourced digital transformation agenda. First, the government should institutionalize stable funding mechanisms dedicated to the development of digital infrastructure, prioritizing rural and underserved regions. Second, it is crucial to adopt a unified legislative framework that consolidates and modernizes dispersed legal norms, ensuring compatibility with international standards on data security, user rights, and AI-based service delivery. Third, the state should develop national programmes for digital literacy and professional training in cooperation with international partners, with an emphasis on public sector staff and local entrepreneurs. Drawing on the experiences of Estonia's X-Road or Finland's Aurora AI, Kyrgyzstan could pilot integrated platforms that offer core government services through a single access point, leveraging AI and mobile-first design. Moreover, introducing public-private partnerships, innovation grants, and regulatory sandboxes could stimulate the development of domestic digital solutions tailored to the country's socio-economic context. Through the sequential implementation of these strategies, aligned with Kurt Lewin's model of change, Kyrgyzstan could not only improve its global digital standing but also ensure that e-services become a tool of equitable development, institutional trust, and regional competitiveness.

DISCUSSION

The results obtained in this study coincide with the statistics on the growth in the use of e-services in countries around the world. According to A.S. Huque and J. Ferdous (2024), one of the reasons for using e-services is the availability of internet coverage and signal quality. E-services are accessed through digital centres, which are an extensive structure. According to A.G. Duisenkul et al. (2023), an example of such a centre is the digital portal of Kazakhstan with a single database and e-services for the whole country. Such digital centres are popular among the citizens of the country, however, their use, according to the observation of V. Pusvita and M. Muttaqin (2023), depends on a number of factors, one of which is the individual experience of users, i.e., their satisfaction with previously received services. In a study conducted by authors, the decision to use e-services by users of different ages depended largely on whether they were satisfied with the quality of previously provided services and whether the way in which such services were provided was convenient. Thus, previous research confirms that the availability of services, their variety, and the willingness of professionals to provide quality services influence the user's decision to switch from traditional services to their electronic version.

The constant increase in the range of e-services and the number of citizens seeking them has confirmed the need for continuous improvement of legislation, especially in the use of confidential information. Regulation of e-services in compliance with national and international standards could significantly increase the availability of e-services, especially in low-income and/or transition countries (KRASIVSKYY, 2023). According to H. Härkönen et al. (2024), the provision of e-services would help to overcome inequalities by providing timely services to the least protected segments of the population. A similar view was expressed by A. Klarare et al. (2024) who investigated the potential impact of access to e-services on the quality of life of homeless women. Based on the data collected, the researchers concluded that the availability of digital media and access to e-platforms improves the quality of life of the least protected populations who access essential services such as health care.

In the context of the paradigm proposed by A.G. Duisenkul et al. (2023), a positive effect is observed due to the fact that access to information increases awareness and motivation of different groups of the population and increases their involvement in state-forming processes. Thus, access to e-services helps to realize the basic rights of citizens, including freedom of speech and equal access to resources, declared in the constitutions of the countries analysed. This study, however, does not negate the fact that the introduction of e-services in various sectors of the national economy may be hindered by a number of internal and external factors. An example from earlier studies is the Republic of Kazakhstan, which has not made the expected progress despite declaring the transition to digital governance (KIREYEVA et al., 2021).

Using the case study method, S.M. Abdulnabi (2024) identified a number of factors slowing down the adoption of e-services in various sectors of the economy, the most likely of which were identified as regulatory, legal, engineering, and procedural. The resource-intensive process of training and constant software upgrades was also cited among the reasons for not utilizing e-services in certain sectors of the economy. According to A.M. Samsor (2020), the mentioned obstacles are especially evident in countries with low level of economic development, such as Afghanistan. In turn, the study by Y. Zongpu and K.H.K. Samsu (2023), with a sample of 200 respondents, suggested that public trust, high quality e-services and positive user experience can effectively overcome these barriers. Policy coherence in relation to e-service provision in the country is also important. The study provides insights into strategies aimed at widespread adoption of e-services in the country. In particular, political leaders in the Kyrgyz Republic may be advised to review the legal regulation of e-services, as some laws and legislative acts are outdated, i.e., incapable of reflecting the realities of the modern digital space. In the course of revising the legal framework,

political leaders in Kyrgyzstan can co-operate with political leaders in other countries, including EU countries, which have made significant progress in introducing e-services in various sectors of the economy.

One of the most recommended partners is Estonia, whose experience of transition to digital governance has been analysed by a number of experts (GINTERS et al., 2018; PIERA et al., 2016). According to R. Kattel and I. Mergel (2019), the main reason why Estonian political leaders were able to make a rapid transition to e-services was the boldness of their decisions. The experts emphasized the strong state support for the innovative ideas that emerged in the Estonian information space in the early 1990s and ensured the transition of the economy and governance to the digital sphere. A similar idea was proposed in the work of A. Aus (2023), who confirmed Estonia's status as a country where the most daring technological projects, including Wise, Fortumo, Starship Technologies and Skype, have emerged and developed. The importance of state support was also confirmed by I. Skierka (2023), who emphasizes that in the case of Estonia such support ensured the legitimacy of e-services, i.e., facilitated their widespread adoption.

Thus, the results of the comparative analysis coincide with the findings of an earlier study highlighting the importance of introducing e-services in different sectors of the economy in order to create equal opportunities and involve the citizens of the country in the decision-making process at different levels. Compared to the USA, Estonia and Finland, the Kyrgyz Republic is at the beginning of its journey of increasing the network readiness index accompanied by widespread introduction of e-services. Earlier studies suggest that the country should draw on the experience of the Republic of Kazakhstan, China, Estonia and other countries with similar political, socio-economic, cultural and other prerequisites for the introduction of digital governance. Thus, the Kyrgyz Republic has a number of positive examples to follow on the path to digitalization and effective political regulation of the economy and governance. Having learnt from the experience of these countries, the government of the Kyrgyz Republic will be able to revise its legislation in such a way as to bring the provision of e-services in line with international standards and increase their accessibility for the population.

CONCLUSION

The conducted comparative analysis of the legal regulation of electronic services in Finland, Estonia, the United States of America, and the Kyrgyz Republic has revealed substantial asymmetries in digital development,

institutional support, and regulatory coherence. Finland and Estonia demonstrate highly integrated e-government systems, underpinned by robust legal frameworks, inclusive service models, and advanced use of artificial intelligence, as illustrated by Aurora AI and Bürokratt. In both countries, access to e-services is nearly universal, with internet penetration rates exceeding 90% and legal provisions ensuring the security, accessibility, and inclusiveness of digital interactions. These features have enabled them to achieve top positions in digital readiness rankings Finland being ranked 3rd and Estonia 22nd in the 2023 Network Readiness Index.

The United States, although not offering universal e-voting or digital citizenship, exhibits strong sectoral initiatives, particularly in healthcare and data protection. Legal instruments such as the Telecommunications Act and the Health Insurance Portability and Accountability Act have contributed to the widespread adoption of e-services and the protection of user data. Over 97% of the population uses the internet regularly, and platforms like the U.S. Digital Service illustrate the state's commitment to human-centred, scalable e-solutions.

In contrast, the Kyrgyz Republic occupies a much lower position 94th in the same index reflecting persistent challenges in legal integration, infrastructure quality, and digital equity. Internet usage remains limited, particularly in rural areas, and the legal regulation of e-services is fragmented and, in some cases, outdated. Nevertheless, progress is visible in areas such as the development of the State Portal of E-services and efforts to digitize public services through initiatives like “Digital Kyrgyzstan 2019-2023.” However, the absence of a unified legislative approach and limited access to stable internet continue to hinder the widespread and equitable use of e-services.

Based on this conclusion, it was proposed to review and, where possible, modernize the existing legal regulation of e-services in the Kyrgyz Republic. It was also proposed to increase the financial involvement of the Kyrgyz government in the creation of a unified digital space of the country. To achieve this goal, Kurt Lewin’s model of transformation as a three-stage process was recommended. The first stage involved familiarizing stakeholders with the benefits of e-services, including economic, political and socio-cultural ones. The second stage involved direct transformation to increase the use of e-services in various sectors of the country's economy, which included staff training and upgrading facilities. The third stage proposed to ensure the long-term sustainability of positive changes by encouraging the effective application of implemented practices.

The study acknowledges limitations, including the small sample of countries analysed. In the future, this sample could be expanded by adding study sites that are low-, middle- or high-income countries. A comparative analysis of

such countries will help to identify whether economic profile is a factor in the adoption of e-services in national economic sectors.

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