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Abstract: This study aims to conduct a comparative analysis of e-government systems in developed countries and Ukraine and suggests ways to improve the Ukrainian e-government. Based on the study of scientific literature, reports of international organisations and government websites, we investigated the development of the main components of e-government in 12 countries. We have selected 3 European countries, such as the UK, France, and Estonia to compare with Ukraine. We also examined the relationship between the GDP of these countries and the development of e-government and e-democracy. The study provided an opportunity to identify optimal ways to improve the development of e-government in Ukraine and to propose such forms of cooperation between government and business as outsourcing and crowdsourcing.

Keywords: e-government; electronic services; e-democracy; electronic portals; outsourcing; crowdsourcing.

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1 Introduction

The rapid spread of information technology in various fields of human activity is an important characteristic of the development of the information society. An important task of the Ukrainian state is the implementation of the state policy, which should be aimed at the development of the information society, e-governance and e-democracy.

In recent years, a large number of publications have been written about the introduction and improvement of e-government. The study by Zhang and Kimathi (2022) examines the stages of development of e-government and their structure in terms of social value. They proposed a new model of development and analysed the consequences of its implementation. Currently, the study of the spread of e-government is relevant. Processes of such proliferation among local governments in US are leading to an expansion of e-government services, the most important factor in this proliferation being the percentage of residents with broadband access (Epstein, 2022). A study of the factors

influencing citizens' intentions to use e-government in Pakistan was conducted by Hasan Zahid et al. (2022). The authors used a marketing approach. The application of laws, regulations and the control of undue influence of civil servants are important issues in the development of e-government (Alsaad, 2021). The study by Razak et al. (2021) shows the relationship between the quality of information and the adoption of e-government. This takes into account the gender aspect. The paper by Batista et al. (2021) proposes an index for assessing local government portals, which measures the maturity of e-government. The index is structured in nine dimensions.

Linders et al. (2015) studied proactive e-Governance issues by flipping the service delivery model from pull to push, Yu (2015) conducted an empirical analysis of the relationship between environmental performance and sustainable e-governance. Nistor and Adela (2014) studied Public Sector Transparency Approached by E-governance; Choi (2018) researched factors influencing public officials' responses to requests for information disclosure.

A number of studies addressed issues such as the application of innovative technologies in e-government (Meijer, 2015; Lallmahomed et al., 2017), E-Governance the Paradigm Using Cloud Infrastructure (Dash and Pani, 2016), Cloud-Based E-Governance System (Smitha and Chitharanjan, 2012; Liang et al., 2017), E-Governance systems as socio-technical transitions (Kompella, 2017; Snellen et al., 2012), issues of Information Protection (Şerban et al., 2014). Since 2001, the United Nations has been conducting studies analysing the status and prospects of e-government in the Member States. The 2020 report examines the Digital Government in the Decade of Action for Sustainable Development (United Nations E-Government Survey, 2020).

State Agency for e-Governance of Ukraine (2018) also conducts research on the status, problems and prospects of electronic administrative services, e-democracy, interoperability and e-readiness. These and other studies show that the e-government system in Ukraine is fragmented and duplicates many components of the public administration system. In many cases, there is a non-systematic use of modern information technology to solve local problems. The information systems at different levels of government have different degrees of development, which requires further work in this area. Therefore, the study of trends in the development of e-government in Ukraine and the use of experience of the most developed countries are particularly relevant.

The study's main objective is to conduct a comparative analysis of e-government systems in Ukraine and developed countries, with further formulating recommendations for improving e-government in Ukraine.

Our study is based on an analysis of the literature on e-government in developed countries and focuses on identifying the most successful solutions for its development. The rest of the paper is structured as follows. The next section provides a literature review. Section 3 discusses data and methodology. Section 4 provides a comparative analysis of the development of e-government in Ukraine and in the leading countries. Section 5 examines the e-government development trends in Ukraine, Great Britain, France and Estonia. Section 6 explores the e-Government functioning in Ukraine. Section 7 presents the experience of implementing e-government in the UK, France and Estonia. The discussion section explains the ways of developing e-government in Ukraine. The conclusion summarises the results of the research.

2 Literature review

Many scholars have spent a great deal of research on developing e-government in developing countries. The paper by Nistor and Adela (2014) investigates the problems of electronic regulation in Romania. The authors propose to simplify and eliminate bureaucratic procedures by improving citizens' access to information and access to documents. Other authors compare the risk and cost of an e-government project (Palaco et al., 2019) in studies of critical success factors that fit into the context of e-government and public-private partnerships in developing countries.

The study by Choi et al. (2016) examines the development of e-government in developing countries. The paper offers a method for evaluating the implementation of e-government. The Indonesian e-procurement system is used as an example. Research by Peter Adjei-Bamfo et al. (2019) indicates that the promotion of sustainable management of supply chains, in particular the practice of sustainable public procurement, is of great importance in developing countries. The e-government facilitates expanding the sample to assess market readiness and an integrated e-procurement system. The paper "The role of trust in e-government efficiency, operational efficiency and user satisfaction: Lessons from Saudi Arabia in e-G2B" explores e-government systems as the most important strategic tool for providing e-government services to businesses (Santa et al., 2019). The paper by Muhammad et al. (2017) provides a thorough analysis of the factors influencing the adoption of e-government in Mauritius.

The author of the study, "Modernizing Bangladesh public administration through e-governance: Benefits and challenges", looks at changes in government functions to achieve the effectiveness of providing electronic services to citizens. The paper examines the role that e-government can play in modernising public administration and increasing its capacity to fight corruption and reduce poverty (Bhuiyan, 2011). The paper by Stefanovic et al. (2016) considers the success of the e-government system from the point of view of employees of e-government systems in Serbia and empirically assesses the model for measuring the success of e-government systems. The paper by Dias (2019) offers an analysis of e-government research in Ibero-America. The analysis has shown that there are relatively homogeneous groups of countries concerned with production and influence: leading, evolving, developing and expected countries. The empirical test results of a unified model for the adoption of e-government in South Africa are proposed by Verkijika and Wet (2018) and others. The study indicates the need to adequately improve e-Government acceptance models for use in different contexts. Liang et al. (2017) offer an analysis of the determinants and mechanisms for implementing the cloud of e-government in government institutions in China. The study by Yu (2015) defines the relationship between regional environmental indicators and the level of environmental management. A study by Twizeyimana and Andersson (2019) examines the state of research on the public value of e-government and the importance of e-government for the state and society.

Newly industrialised countries have contributed to the development of e-government. For Taiwan, for example, is important to develop the use of IT innovations in e-Governance in particular a "proactive" service and providing information. The transition from traditional e-government to a model where the government actively provides timely services to citizens is relevant for this country (Linders et al., 2015). Sangki (2018) conducted a study on the impact of changes in the social paradigm in the Republic of Korea, which led to the emergence of a new e-government development

model. The research by Kurfalı et al. (2017) uses a model that takes into account factors such as Internet trust and State-owned trust. The study by Choi (2018) seeks to determine the factors that influence the bureaucratic decision to disclose information in Korea. Kompella (2017) studies the possibilities of applying the multi-level perspective (MLP) to improve the e-government of India.

Among the scholarly works of Ukrainian scientists, there are studies that consider e-government as a form of public administration and as means of developing democracy (Arkhypova, 2015; Grabovets, 2016; Solovyov, 2015). There are studies in which the authors analysed the institutional aspects of e-governance development and the problem of overcoming information inequality (Kolesnichenko, 2014; Roschuk, 2017; Miskevich, 2015). A number of authors have explored public administration mechanisms for implementing e-governance (Kondakov and Nadyuk, 2016; Konoval, 2016; Medynska, 2016; Mihrovskaya, 2016). The issue of the introduction of administrative services as the main element of the implementation of e-government has been the subject of research in the papers of Baranov and Popova (2010) and Emelyanov and Bersan (2016). A number of papers considered the mechanisms of government management for the development of the information society and e-government and the principles of its functioning (Semenchenko, 2013; Marchenko, 2017; Ryzhenko, 2015; Pogrebnyak, 2014; Parafiynik, 2016; Matveichuk, 2016).

In Ukraine, a number of laws and regulations on informatisation are in place. The basic principles of state policy on information are determined by the Law of Ukraine "On Information". There is a law "On the National Program of Informatisation", dated August 1, 2016, N 74/98-BP, according to which the Cabinet of Ministers of Ukraine annually reports to the Verkhovna Rada (unicameral parliament) of Ukraine on the state of informatisation, the tasks of the National Program of Informatisation for the next three years, and provides the program tasks for the next fiscal year. The existing Law of Ukraine "On Access to Public Information" dated January 13, 2011, N 2939-VI, defines the procedure for implementing and ensuring the right of everyone to have access to information held by the subjects of power authorities. Law of Ukraine "On the Concept of the National Program of Informatisation" dated February 4, 1998, N 75/98-VR includes a description of the current state of informatisation, strategic goals and basic principles of informatisation, expected consequences of its realisation. In addition, there are a number of normative legal acts issued by the Cabinet of Ministers of Ukraine on the implementation and development of e-governance.

The analysis of the existing legal and regulatory framework shows that there is a sufficient legal basis for the development of e-government in Ukraine. However, in recent years there has been a problem with updating information, given the new trends in improving information systems and telecommunication systems (Koliushko and Demkov, 2014). Adaptation requires a regulatory framework for office work, the provision of electronic services and electronic information resources (Lee et al., 2011). Also important from a legal point of view is the problem of storing information in archives.

In recent years, a number of works have been devoted to the use of outsourcing and crowdsourcing in e-government systems. Outsourcing plays a significant role in the development of e-government, which allows organisations to focus on their core competencies. Appropriate techniques and criteria should be used to analyse the decision on IT outsourcing (Faisal and Banwet, 2008). The choice of outsourcing services for information technology is a problem for companies in a competitive environment, so it is possible to use evaluation methods through group decision-making. The weights of

experts, weights of criteria and rating of candidates are determined. To calculate the weight of the expert, it is advisable to use the interval method of weighing fuzzy collective wisdom (Mousavi and Gitinavard, 2019). The success of outsourcing also depends on the scope of the information systems project, the responsibility of the performers, rational discourse, i.e., the influence of the role and communication of staff (Selamat et al., 2018).

Outsourcing can increase competitiveness and reduce costs, but its use carries a number of risks. The use of multi-purpose risk management models can significantly reduce the likelihood of negative outcomes and losses (Lu et al., 2022). The problem of outsourcing can be staff turnover, which creates direct and indirect costs for the company and reduces the quality of services provided (Alpar, 2020).

Crowdsourcing allows for improving the processes of entrepreneurial cognition and plays an important role in the development of information systems. It uses collective intelligence to mobilise external resources, reducing cognitive constraints and the limits of entrepreneurial agents (Dellermann et al., 2020). The paper by Roth et al. (2013) investigated the relationship between crowdsourcing and urban development, as well as between crowdsourcing and regional development. The authors conducted a comparative analysis of the use of crowdsourcing in one of the Swiss cantons and in the Italian Autonomous Region and offered a number of ideas for regional crowdsourcing projects. The paper by Shen et al. (2021) proves that crowdsourcing based on mobile social media platforms can provide information about emergencies. Mixed crowdsourcing is becoming one of the main organisational models of crowdsourcing platforms (Xu et al., 2021). At the same time, crowdsourcing platforms in smart cities have some security risks that can be overcome by decentralised blockchain-based trusted service mechanisms. (Tan et al., 2021). The study by Modaresnezhad et al. (2020) conducted by reviewing the literature and synthesising crowdsourcing applications, offers a coherent conceptual framework that defines the main components of crowdsourcing and its characteristics.

3 Methodology

We used a qualitative method to collect and analyse information. This method is widely used in public administration research (McNabb, 2002; Creswell, 2006). Scientists prefer this method for solving descriptive and interpretive problems, identifying potential problems and finding solutions (Miller and Yang, 2008; Hammarberg et al., 2016). The study uses several types of sources. Firstly, these are scientific journals, books, and newspaper papers. The second type is the e-government regulatory framework in Ukraine. The third type of source is reports of international organisations. The study also uses the websites of public authorities in different countries. The authors also apply the systematic comparative illustration methodology proposed by Smelser (1976), which provides an opportunity to compare and use the experience of different countries.

In particular, the research aims to:

1 Conducting a comparative analysis of the leading countries in the development of e-government systems.

2 Selection of the leading countries whose experience is most useful for Ukraine.

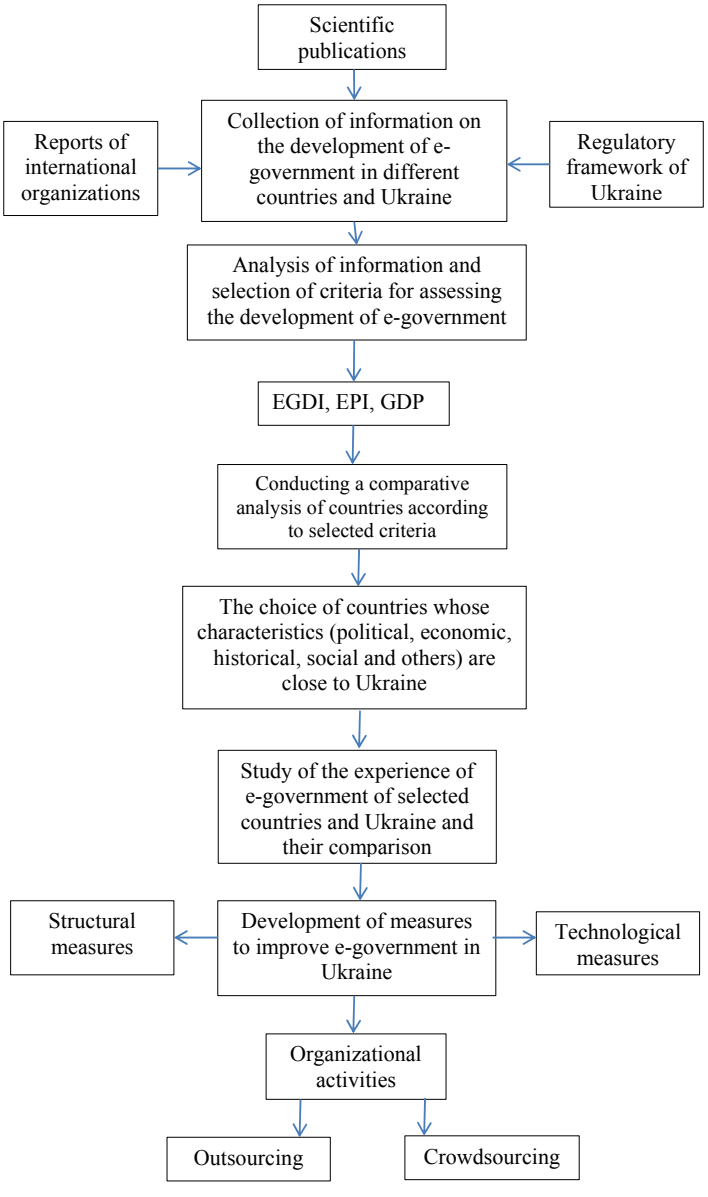
3 Study of the state and development trends of e-government in the leading countries and Ukraine.

4 Proposal of ways to develop e-government in Ukraine based on the experience of developed countries.

5 Proposal of ways to improve e-government in Ukraine based on the use of outsourcing and crowdsourcing.

The framework of the study is presented in Figure 1.

Figure 1 The framework of the study (see online version for colours)



To conduct a comparative analysis of the leading countries in the development of e-government systems, we used the UN indicators available on the organisation's website https://publicadministration.un.org/egovkb/en-us/Data-Center. There are comprehensive indicators for evaluation, such as the E-Government Development Index (EGDI) and the E-Participation Index (EPI). Currently, the UN has published 10 reports from 2003 to 2020 (https://publicadministration.un.org/egovkb/en-us/). The EGDI methodology provides an assessment of the national websites of 193 United Nations Member States, as well as an evaluation of e-Government policies and strategies. EGDI allows us to evaluate the development of e-government in the country under study. This index consists of three indicators: the Telecommunications Infrastructure Index (TII), the Human Capital Index (HCI), and the Online Service Index (OSI). The latter assesses the online presence of all United Nations Member States.

We selected 11 countries for the study, including 10 e-government leaders and France. France was chosen as a European country with a high potential for e-government. Ukraine was compared to these countries. The analysis was carried out using sources of information from the state web portals of these countries and UN reports. In addition to the EGDI and EPI, the analysis took into account criteria such as political order in each country, population and historical development, as well as leadership in e-government, decentralisation reform and a single entry point for all online government services.

Based on the results of the analysis of all factors and criteria, we selected 3 European countries with a high index of e-government readiness for comparison with Ukraine. These are Great Britain, France and Estonia.

The next stage of the study used the regulations of the European Commission, the UN Knowledge Base and other official documents to study the state and trends of e-government in selected countries. The dynamics of the e-government development index and the e-participation index, the analysis of the functioning of e-government in Ukraine and the experience of e-government implementation in the UK, France and Estonia were studied. We also compared the dynamics of nominal GDP, the e-government development index and the e-participation index. The analysis of these interdependencies was performed by determining the correlation coefficients between GDP and EGDI and GDP and EPI.

On the basis of the conducted research we have given recommendations concerning the decision of problems of e-government in Ukraine, increase of its efficiency, application of advanced methods of digital verification, have defined requirements to structure of the system of e-government. We also considered the possibility of using outsourcing, which involves the transfer of public authorities' part of their tasks or processes to third parties, and analysed the advantages and disadvantages of outsourcing in e-government.

We also proposed the use of crowdsourcing as a technology to implement the latest information and telecommunications systems and improve the quality of e-government in conditions of limited funding.

The methodology we have chosen has allowed us to gather the necessary information on the best practices of e-government in developed countries and to identify the most acceptable solutions for use in Ukraine.

4 Comparative analysis of the development of e-government in Ukraine and in the leading countries of the world

In order to carefully analyse the development of e-government in Ukraine and come up with proposals for its improvement, it is necessary to identify the countries whose experience may be useful. These countries should have common features with Ukraine, which will allow confirming the similarity of the processes of development of e-governments and using their experience.

Table 1 shows the data of the United Nations e-Government Survey (2020) for 12 countries, including leaders in the ranking, as well as countries that are close in the political order, territorial location, and historical background to e-Government development.

Table 1 Ranking of countries by e-government development index

Rank	*Country*	*EGDI*	*OSI*	*TII*	*HCI*	*EPI*
1	Denmark	0.9758	0.9706	0.9979	0.9588	0.9643
2	Republic of Korea	0.9560	1.0000	0.9684	0.8997	1,0
3	Estonia	0.9473	0.9941	0.9212	0.9266	1,0
4	Finland	0.9452	0.9706	0.9101	0.9549	0.9524
5	Australia	0.9432	0.9471	0.8825	1.0000	0.9643
6	Sweden	0.9365	0.9000	0.9625	0.9471	0.8214
7	UK of Great Britain and Northern Ireland	0.9358	0.9588	0.9195	0.9292	0.9762
8	New Zealand	0.9339	0.9294	0.9207	0.9516	0.9881
9	United States of America	0.9297	0.9471	0.9182	0.9239	1,0
10	Netherlands	0.9228	0.9059	0.9276	0.9349	0.9643
19	France	0.8718	0.8824	0.8719	0.8612	0.9048
69	Ukraine	0.7119	0.6824	0.5942	0.8591	0.8095

The analysis of the rating of the countries shows that Ukraine is far behind the leading countries. The top rankings have countries such as Denmark, the Republic of Korea and Estonia. These countries have indicators that are almost 30% larger than Ukraine. Denmark also ranks first in an independent evaluation of online services conducted by UN DESA in 2018. The country received the highest result in connection with the successful implementation of the Digitalisation Strategy for 2016–2020. In Denmark, digital interaction between citizens and the state is recognised as mandatory, but not to the detriment of those who cannot use digital services.

The second place is in South Korea. The country shows good performance in the areas of online services and technological infrastructure. The rate of development of human capital is lower than in other countries. South Korea provides convenient, effective and transparent interaction with the state.

Estonia has moved from 16th place in the 2018 ranking to third in 2020. Estonia is the most dynamically developing in the field of e-government. It is the leading country among the post-Soviet countries. The experience of this country can serve as an example

of the comprehensive deployment of e-government. Estonia also shows the best results among European leading countries according to the Online Service Index that measures the evolution of e-government services. The development of such services is one of the priorities of the Ukrainian Government (E-service Development, 2020). In addition, Estonia has the highest value of EPI, which positively distinguishes this country from other leading countries.

Finland took fourth place in the ranking. Australia dropped from second place in 2016–2018 to fifth. One of the main factors determining the development of e-government in Australia is human capital. The government continues to work on the implementation of the Digital Transformation Program.

Sweden is in sixth place. Nordic countries such as Denmark, Finland, Norway and Sweden have joined forces to implement open government (European Commission, 2016a). This uses the X-Road concept to ensure a standardised exchange of information and data between public sector organisations and national datasets.

The UK, which ranks seventh in the ranking, has always been a leader in e-government, has powerful technological and economic potential, and until recently was part of the European Union. Ukraine can use, among other things, the UK's technical experience in deploying a single portal for the provision of public services. Long time, UK was a leader among other countries and in 2016 was in the first place. The stability of the development of e-government in this country is important for our study. Proof of the effectiveness of its activities is the high values of the Online Service Index (OSI) and E-Participation Index (EPI).

The top 10 in the ranking also included New Zealand, USA, Netherlands. These countries have different political systems than Ukraine. However, their experience in implementing e-government is noteworthy.

Among the countries of great interest to Ukraine is France. It ranks 16th in the 2020 rankings, but in 2018 ranked 9th. The final scores of French e-government are quite high and there is a good reserve for their further growth. Given the peculiarities of France's political system and the processes of e-government development in this country, its experience can be used in Ukraine. This is especially true for the creation of a single e-services portal. The priority of e-government deployment in France is the provision of electronic services to the public and businesses through the use of the Internet. However, insufficient attention is paid directly to aspects of electronic governance, including the possibilities for expanding civic participation in political processes (European Commission, 2016). As part of the e-government deployment program, the sites of the French Parliament and Senate were created. An important project in the framework of the program was the web portal Legifrance Government site, which provides legal assistance to the French (https://www.legifrance.gouv.fr/). The largest project was a single portal for the provision of electronic services Service-public.fr. The mission of the portal is to inform users and then redirect their requests to the desired service. Service-public.fr is the official site of the French administration, a single portal for administrative information and access to online services, created in collaboration with national and local administrations. France is characterised by the uniform development of all components of the E-Government Development Index (OSI, TII, HCI) and a fairly high E-Participation Index, which indicates a comprehensive approach to e-government development and the quality, relevance and usefulness of government websites.

Given the characteristics of the development of e-government, features of political systems, geographical, cultural and historical factors, we identified three countries whose

experience, from the point of view of integrated problem solving, is most useful for Ukraine. These are the UK, France and Estonia.

A study of Digital Government Indicators (Table 2) and e-Government performance across policy priorities (Table 3) shows that these countries have high levels of indicators (Digital Government Factsheets, 2019) such as Downloading official forms, Sending filled forms for Estonia, Citizens cross border mobility, Business cross border mobility for the UK, and User-centricity and Transparency for France (highlighted in grey in the table of indicators), which coincides with the areas of improvement of e-government in Ukraine (E-service Development, 2020).

Table 2 Digital government indicators

	Indicators	*Denmark*	*Estonia*	*Finland*	*Sweden*	*UK*	*Netherlands*	*France*
1	Interacting, %	92	79	83	83	59	82	71
2	Obtaining information, %	90	69	78	75	47	77	46
3	Downloading official forms, %	46	48	67	49	36	55	37
4	Sending filled forms, %	73	71	65	74	45	59	59

Meanings of indicators:

1 percentage of individuals using the internet for interacting with public authorities

2 percentage of individuals using the internet for obtaining information from public authorities

3 percentage of individuals using the internet for downloading official forms from public authorities

4 percentage of individuals using the internet for sending filled forms to public authorities.

Table 3 e-Government performance across policy priorities

	Priorities	*Denmark*	*Estonia*	*Finland*	*Sweden*	*UK*	*Netherlands*	*France*
1	User-centricity, %	93	91	93	89	80	92	87
2	Transparency, %	68	84	66	67	59	69	64
3	Citizens cross border mobility, %	58	69	75	74	53	70	57
4	Business cross border mobility, %	84	73	71	76	90	62	63
5	Key enablers, %	88	90	66	67	22	78	45

Unfortunately, Digital Government Factsheets do not contain data on Digital Government Indicators and eGovernment performance across policy priorities for Ukraine, which could be compared with data for our selected countries, but there are some relevant statistics for Ukraine and data characterising Internet use in Ukraine

- Mobile-cellular subscriptions per 100 inhabitants: 122.6
- Fixed (wired)-broadband subscriptions per 100 inhabitants: 9.3
- Mobile-broadband subscriptions per 100 inhabitants: 45.2
- 62% of households have a computer
- 60.3% of households have internet access at home
- 58.9% of Ukrainian citizens use the internet
- 72% use the internet every day
- 21% use the internet at least once per week
- 4% use the internet at least once per month
- 2% use the internet less than once per month.

These data show that in Ukraine a high percentage of citizens' use mobile phones have access to the internet and use the internet every day. This gives reason to believe that there is sufficient potential to achieve good results in the development of e-government. Projects related to the use of smartphones are especially promising, which is confirmed by the launch in 2020 of the project "State in a smartphone" in the field of electronic administrative services (Ukrinform, 2021).

The Online Service Index (OSI), which is a component of EGDI and characterises the scope and quality of online service, is determined using a special questionnaire (United Nations E-Government Survey, 2020). This questionnaire includes questions about the budget and funding of various Online Services projects. Accordingly, it partially reflects the dependence of the volume and quality of online services on the funding of these projects. Ukraine has a low value on this index compared to the surveyed countries and, accordingly, faces problems in financing e-government. This requires action to find ways to reduce costs. Such ways can be outsourcing and crowdsourcing.

The choice of the UK, France and Estonia for further research does not mean that it is inappropriate to apply the experience of other countries. There are a large number of useful components that can be implemented and effectively used to develop electronic government in Ukraine.

5 Analysis of e-government development trends in Ukraine, Great Britain, France and Estonia

The countries selected by us for comparative analysis belong to the European countries, which have their own characteristics both in terms of political systems and approaches to the development of e-government.

Ukraine is a parliamentary-presidential republic and a unitary state. The only legislative body in Ukraine is the Parliament – the Verkhovna Rada of Ukraine. The

President of Ukraine is the Head of State and acts on its behalf. The Cabinet of Ministers of Ukraine is the supreme body in the system of executive bodies. The system of the administrative and territorial structure of Ukraine consists of the Autonomous Republic of Crimea, oblasts, districts, cities, and districts in cities, settlements and villages. Ukraine is pursuing reforms related to the decentralisation of power. The population in Ukraine is 44.657 million.

UK is a constitutional monarchy. Legislative power is vested in a bicameral parliament. The head of state is a hereditary monarch. The executive power is exercised by the Government headed by the Prime Minister and the Cabinet of Ministers. The Government is also responsible to the House of Commons. The Prime Minister is usually the leader of the largest party of the House of Commons. UK is pursuing a constitutional reform of decentralisation of power through the establishment of a Parliament and Executive in Scotland, an Assembly in Wales and the devolution of power at the regional level in England. (European Commission, 2016b). UK population is 65.39 million (UN e-Government Knowledgebase, 2020). In the UK, there is liberal legislation that works on the principle that "what is not prohibited is permitted." (Modernising Government White Paper, 1999). A significant difference between Ukraine and UK is the existence of over-regulation in Ukraine, which has to do with legal acts on the use of digital signatures, the provision of administrative services, the protection of information, etc.

The population in France is 64.46 million. The political system of the French Republic combines parliamentary democracy with strong executive power. France is a centralised state, although some powers are delegated to the regions, counties and municipalities of the country.

The legislature of Estonia is the unicameral parliament, called the National Assembly. The President is the Head of State. The President appoints the Government with the consent of Parliament. Estonia is divided into 15 counties and 213 urban and rural municipalities. Each county government is headed by a governor who represents the national government at the regional level. Local government is exercised exclusively at the municipal level (European Commission, 2016). The population of Estonia is 1.31 million, which is significantly less than in Ukraine.

Figure 2 provides the dynamics of the E-Government Development Index and E-Participation Index for 2008 and 2020 in Ukraine.

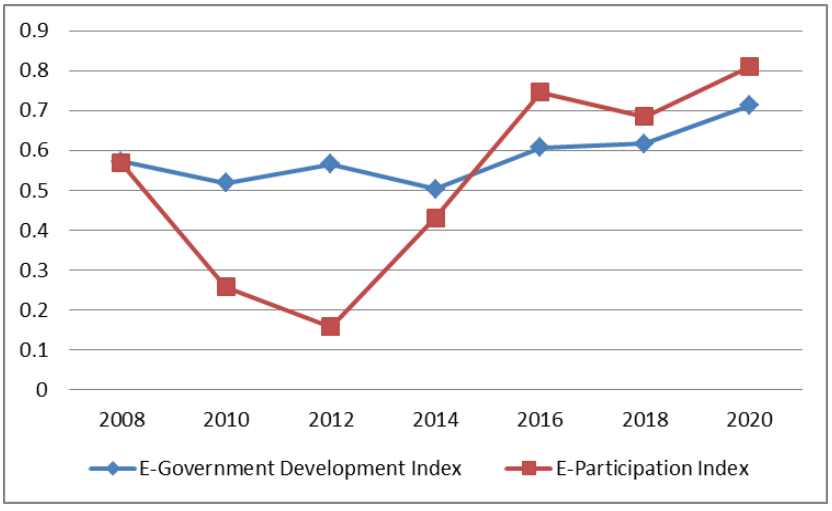
The analysis shows that from 2008 to 2014 the value of the E-Government Development Index ranged from 0.5 to 0.6, and from 2014 to 2020 it increased. From 2012 to 2014, the value of the indicator decreased again. From 2014 to 2020, this indicator grew.
The E-Participation Index declined sharply from 2008 to 2012 to 0.1579 and then increased to 0.8095 in 2020.

At the end of 2013 and the first half of 2014, there were revolutionary events, the annexation of Crimea and the beginning of hostilities in the eastern part of the country. The nature of changes in indicators indicates the dependence of the state of the e-government system on these events.

Ukraine's EGDI rating in 2014 was 87 compared to 68 in 2012, and in 2016, 2018 and 2020 it was 62, 82 and 69, respectively. The high value of the EGDI rating in 2016 can be explained by the combined effect of information society programs and e-government development programs, which were developed before 2014. The sharp drop in the rating from 62 to 82 is due to the growth dynamics of e-government systems in other countries. The growth of EGDI in 2020 is explained by the stabilisation of the

political and economic situation in the country and the beginning of the implementation of new programs in the field of digital transformation. In addition, the e-participation index increased significantly in 2016 and 2020.

Figure 2 Dynamics of E-Government Development Index and E-participation Index in Ukraine (see online version for colours)



The most significant achievement of e-governance and e-democracy in Ukraine is the growth of the E-Participation Index, which characterises the growth of online information, increased appeals to public authorities, local governments to public organisations for obtaining electronic consultations, and increased participation of citizens in decision-making processes. This is confirmed by the data of Freedom House – international human rights non-governmental organisation that supports and studies the state of democracy, political freedoms and the observance of basic human rights (Freedom House, 2021).

To compare the development of e-government in Ukraine with developed countries, Figure 3 shows the dynamics of the e-government development index (EGDI) for the UK, France, Estonia and Ukraine from 2008 to 2020.

Figure 4 shows the dynamics of the e-participation index for these countries.

UK e-Government Development Index has been steadily raising from 2008 to 2020, with slight slowdowns in 2010, 2014 and 2018 (Figure 3). The E-Participation Index rose steadily from 2008 to 2014 and peaked in 2016 when UK took first place. In 2018, the country took fourth place in the ranking and in 2020 seventh (Figure 4).

The e-government index in France was lower than in the UK, but in 2014 the country had better positions. Subsequently, France began to show worse results. As for the dynamics of the E-participation index in France, it was changing in a similar scenario to the Ukrainian one. The highest rank was in 2008. The country occupied the lowest positions in this index in 2010 and 2012. In 2018, this figure has come close to UK value, but in 2020 began to decline again.

Figure 3 Dynamics of E-Government Development Index (see online version for colours)

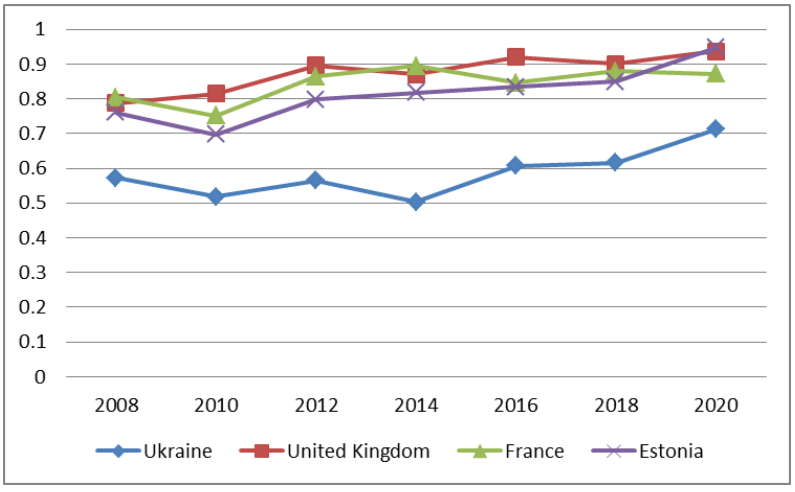
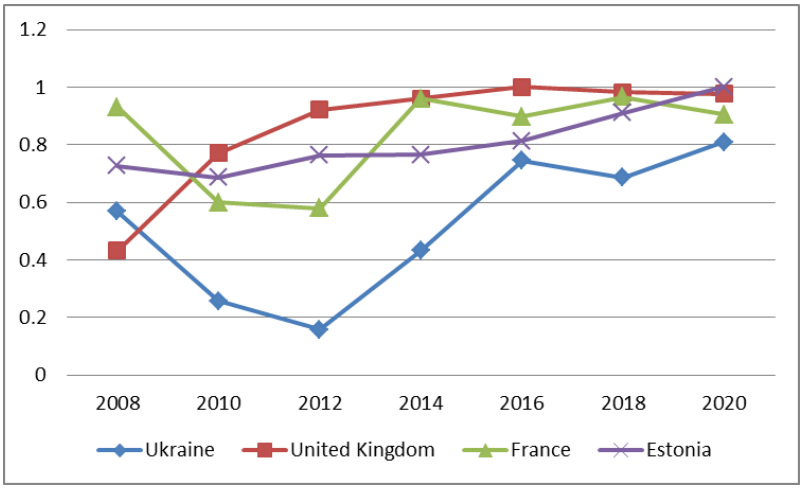


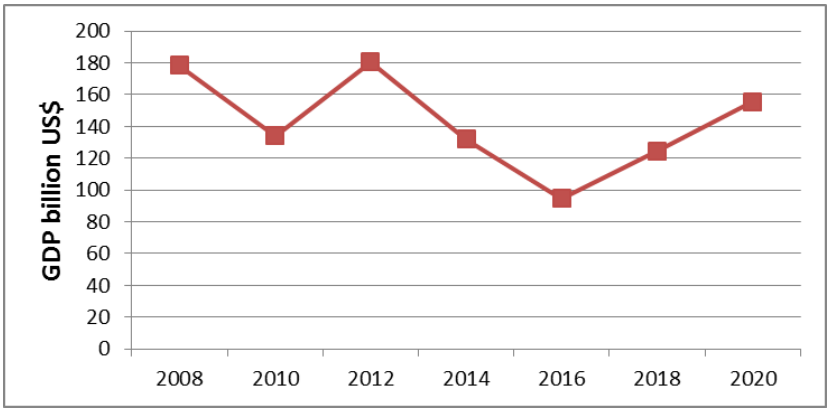
Figure 4 Dynamics of E-Participation Index (see online version for colours)



In order to find the relationship between the economic situation in Ukraine and the development of the e-governance system, it is necessary to analyse the macroeconomic indicators of socio-economic development and indicators that characterise the processes of improving the system of e-governance. For this, it is appropriate to use the Gross Domestic Product (GDP) as a macroeconomic indicator and the E-Government Development Index (EGDI), which is an indicator of e-governance development.

The nominal GDP of the countries we selected for the research is available on the World Bank website (http://www.worldbank.org), as well as on CEIC (https://www.ceicdata.com/) and World Data Atlas (https://knoema.ru/atlas). The study compares nominal GDP, E-Government Development Index and E-Participation Index by years when the United Nations conducted e-Government Surveys. Figure 5 shows the dynamics of the GDP of Ukraine from 2008 to 2020.

Figure 5 Dynamics of the GDP of Ukraine (see online version for colours)



We can use a correlation coefficient to determine the relationship between the variables. To find the correlation coefficient between two sets of data we used the MS Excel CORREL function. The first dataset is the GDP of Ukraine from 2008 to 2014; the second one is EGDI for the same years. The correlation coefficient is 0.9814, which indicates a very close relationship between the variables. But its value is 0.3811 in the analysis for 2014–2020, which indicates a decrease in interconnections due to a significant drop in GDP in Ukraine since 2014.

An analysis of the interdependence between GDP and the E-Participation Index for Ukraine indicates that for 2008–2014 the correlation coefficient is 0.0150, which means low dependence between variables. For 2014–2020 its value is 0.0260. This means slightly increasing the availability of e-services and facilitating citizen engagement, despite the deteriorating economic situation in Ukraine in recent years. Thus, we can conclude that the development of e-government in Ukraine depends on two factors: the economic situation and the state of democracy. Economic leverage enables the development of e-Government and information technologies in the public sector; the development of democracy provides E-Participation in this area.

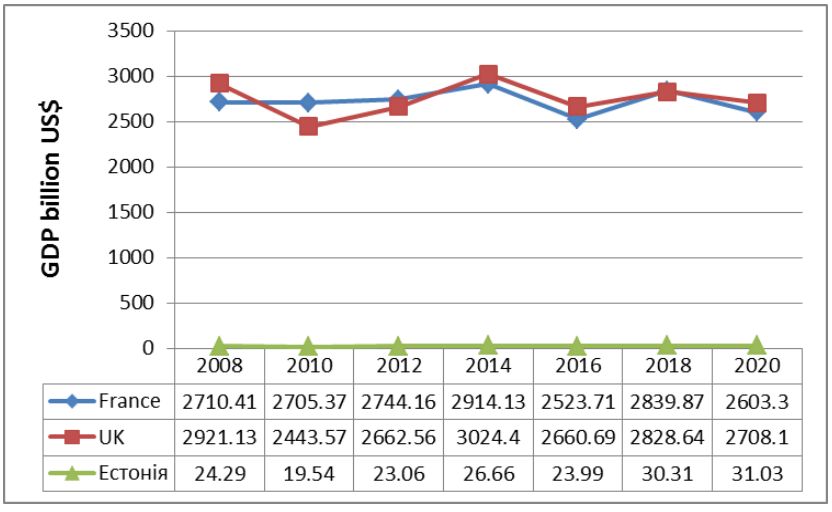
Figure 6 shows the dynamics of the GDP of France, UK and Estonia. The GDP of the countries studied is very different in level, but not only the level itself but also the dynamics of its change are important for studying the relationship between the development of e-government and the economic condition of the country (Nominal GDP, 2021).

Changes in French GDP show similar dynamics to the UK, but from 2008 to 2014 fluctuations in French GDP are smaller. In 2018, GDP is nearly the same in both countries, but in 2020 GDP of UK is slightly bigger. Given the large difference in GDP between Ukraine on the one hand and UK and France on the other, it is possible to explain the difference in the results of e-government formation and development. The study shows that the economic status of the country is a determining factor in achieving a high result in the formation of e-government, and the state of democracy determines the possibility of implementing the concept of e-democracy.

Estonia shows stable economic development results. Insignificant GDP fluctuations occurred only in 2010 and 2016. These dynamics are similar to the Ukrainian until 2014. Estonia demonstrates the greatest stability in the development of e-government among the countries we consider. As for the dynamics of the E-Government Development Index

and the E-Participation Index, in recent years the values of these indicators were lower than in UK and France, but in 2020 Estonia overtook these countries.

Figure 6 Dynamics of France, UK and Estonia nominal GDP



The analysis of the correlation coefficients between GDP and EGDI for the period 2008 to 2020 for the developed countries showed the following values: for the France 0.3140, indicating a close to the average level; for UK it is –0.0700, which corresponds to the low level and for Estonia 0.8813, indicating a close relationship. However, when conducting the analysis from 2012 to 2018, the coefficients take the values: France 0.8709, Estonia 0.7801. For the UK, the correlation coefficient takes a negative value for this period – 0.7623, which is associated with significant fluctuations in GDP in these years. For the period from 2010 to 2020, it amounts to 0.3138.

The correlation coefficient between two data sets, such as the GDP and the E-Participation Index for the UK, France and Estonia, indicates the instability of the relationship between the variables when choosing different time intervals for analysis. These coefficients have the highest values for UK 0.6671 for 2010–2020, for France 0.9693 for 2014–2020, and for Estonia 0.9001 for 2008–2020. All coefficients have positive values and indicate a high level of correlation.

Conducting correlation analysis with a small number of statistical data allows a rough assessment of the relationship between the variables. However, our study indicates that there is a trend toward a direct correlation between economic development and the development of e-government systems.

Analysis of the interdependence between GDP and EGDI, as well as between GDP and EPI shows the need to reduce costs for e-government development projects in Ukraine, which can be achieved through the use of outsourcing and crowdsourcing.

Improving the system of e-government and, accordingly, informational support of the activities of state authorities and local self-government leads to the creation of powerful channels for information exchange between the state, citizens and business (Homburg, 2008; Stoffregen and Pawlowski, 2018). Intense communications between the state and

society, state and business, between different branches of government lead to a positive effect of joint actions, which significantly increases the overall performance of the various components of e-government.

Despite the economic, political and social problems of Ukraine, the E-Government Development Index and E-Participation Index are growing. This is a sign that the e-government system in Ukraine continues to develop and retains its potential.

6 Analysis of e-Government functioning in Ukraine

The development of e-government in Ukraine has been going on since 1998. During this time, the authorities have implemented a large number of information and telecommunication systems, such as state registers, departmental electronic document management systems, and decision support systems. The key components of e-Government development are the introduction of electronic interaction at all levels, the organisation of powerful data centres and electronic data exchange networks, the modernisation of regulatory and organisational approaches to the introduction of information technology into the public service sphere (Volokh, 2017).

In general, Ukraine has significant scientific and practical experience in creating e-government infrastructure. However, the factors hampering the development of this area include the problems of financing, the shortcomings of interagency cooperation, and the lack of formalised typical decisions on the provision of services by executive authorities in the remote mode. The human factor also plays a significant role in this. The problem of hardware and software in Ukraine is quite acute, especially in rural areas. Also, many segments of the population need practical help in mastering the use of sites and web portals. Modern libraries with their staff as teachers help bridge the gap in computer literacy. A striking example is the project "Public Libraries – Bridges to e-Government". For many years, in the libraries of cities of Ukraine, Citizen Service Centres have been created to provide public access to electronic government services (Emelyanov and Bersan, 2016).

The number of Internet users is increasing every year in Ukraine. The international agency "We are social", which specialises in media research, in the report "Digital in 2018" provides the number of Internet users in Ukraine. According to the report, 44.12 million people live in Ukraine and 25.59 million of them use the Internet, accounting for 58% of the population (Global Digital Report, 2018). As of January 1, 2021, the number of Internet subscribers in Ukraine was 28.787 million people (http://www.ukrstat.gov.ua/). An important issue remains the equal access of subscribers to the network. If in large cities the quality and level of services have an almost European level, then residents of villages and sparsely populated areas experience limitations in their ability to connect to the Internet.

In 2011, Ukraine joined the Open Government Partnership Initiative. During this time, public administration bodies with the participation of civil society institutions developed and implemented three two-year action plans. The most important achievement is the ProZorro electronic public procurement system, which is an open-source resource that provides free access to e-tendering information. Global Open Government Partnership Summit in Paris recognised ProZorro's electronic procurement system as the winner of the third annual Open Government Awards 2016. In 2016–2018, the State Agency for Electronic Governance, together with the relevant state authorities

and with the support of international partners, introduced about 120 priority e-services. The most important activities of the Open Government Partnership Initiative in 2018–2020 are the implementation of international standards for the operation of the electronic trading system; ensuring transparency in the sale of public assets and property; improving the effectiveness of public control in the field of public procurement; informing the public in an accessible manner about public finances and economic and social development projects; introduction of electronic procedures for conducting tenders for providing financial support; raising the level of knowledge on anti-corruption policy; ensuring free access of citizens to environmental information; E-Service Implementation (Decree of the Cabinet of Ministers of Ukraine, 2018).

The system of providing state services using modern information and communication technologies enables to reduce costs and save time spent by authorities, citizens and businesses (Garnett and Kouzmin, 1997; Reddick and Anthopoulos, 2015). In addition, the e-government system helps to reduce risks in public administration through the exchange of data and information (Danziger and Andersen, 2002). The analysis of e-governments in Ukraine and other countries suggests that there are some differences between them. This is especially true of the level of use of electronic services by citizens, which is uneven and sometimes very low in Ukraine. The assessment of the level of development and the effectiveness of the application of managerial technologies of e-governance is a rather difficult task, especially as regards the impact on economic performance indicators. However, the experience of developed countries shows that it is important to focus on the development of Public Service Portals (Garson, 2006; Rocheleau, 2006).

The society in the person of the most active citizens in Ukraine takes part in the introduction of innovations in the field of informatisation. An example is the creation of a public services portal iGOV (https://igov.org.ua/). This portal is established thanks to the initiative of active citizens and allows providing access to all administrative services in accordance with international standards. The portal provides services to citizens and businesses. There is also the Unified State Portal of Administrative Services in Ukraine (http://my.gov.ua/). Both portals offer the same services. However, the public services portal iGOV looks more socially oriented. The state portal is more focused on business activity (even in services to citizens) and on business. There is also a portal for providing electronic services in Ukraine called “The Cabinet of Electronic Services” (https://kap.minjust.gov.ua/about).

The Government Portal (https://www.kmu.gov.ua/ua) is an important portal in terms of providing information on the functioning of the state, the system of public administration and local self-government. It is the only web portal for executive bodies of Ukraine. The portal provides services that are divided into electronic and administrative. When accessing the portal for receiving administrative services, there is a transition to the Unified State Portal of Administrative Services.

In 2021, the Ministry and the Committee for Digital Transformation of Ukraine launched the Unified Public Services Portal (https://diia.gov.ua/) and the Diia mobile application. The Ministry plans to transfer 100% of public services to Diia by 2024 (Ministry and Committee for Digital Transformation of Ukraine, 2020; Diia, 2021). More than 10 million people already use Diia (ZaxidMedia, 2021).

7 Experience in implementing e-government in the UK, France and Estonia

Ukraine needs to learn and use the experience of developed countries to improve e-government. As our research shows, it is most appropriate to use the experience of UK, France and Estonia.

UK provides identity assurance for individuals entirely digitally and has extensive experience in implementing government portals and integrating them into a portal, which provides a single point of access to all online public services. In 2011, the Cabinet Office launched a plan for the implementation of four strategies called: Government Cloud, Environmental Government: ICT, Government ICT Capacity, and Government Device for end-users (GOV.UK, 2011). The Civil Service Capabilities Plan (2014) highlighted the priority of digital skills for civil servants who can use the Internet and technology to improve public policy and digital services.

In the UK, open file formats are used to ensure that citizens and government officials can use the applications that best meet their needs. Government portal GOV.UK Verify provides identity assurance for individuals entirely digitally and is a secure means of accessing public services. The user does not need to personally confirm his identity. In the UK, the digital market also operates. This is a place that can be used by all public sector organisations to find and purchase cloud services. The Cabinet Office has created a service for transformed technology for public servants, enabling them to choose devices, cloud-based applications, and access to fast Wi-Fi (European Commission, 2016b).

The experience of France indicates the feasibility of increasing the use of private providers in the management of information systems in public administration (Rapport au Premier ministre sur la gouvernance de la donnée, 2015). France is also making significant steps towards the implementation of open government and implementing projects related to the opening of public data. The country plans to increase the number of innovative ICT companies and digital businesses in the country. The next objective is to promote the proliferation of digital tools and enhance the digital competence of citizens.

France is taking steps to centralise the e-government system. The country has an Inter-ministerial Network of the State (RIE – Réseau interministériel de l'état, 2019), which is in line with the Open Data strategy. It is a common network that connects all administrative sites. Another step in the digital transformation of the State is the web portal of the central government. There is a FranceConnect service in the country that allows Internet users to identify themselves in an online service through an existing account (https://api.gouv.fr/api/franceconnect.html).

The French government publishes free software templates used for government purchases of software. There are two legal projects related to the opening of public data: "gratuité", which is responsible for simplification and reform of the state, and "Numérique", which is responsible for digitisation. The French Parliament has the opportunity to consult online on proposed laws. The general public has the opportunity to submit ideas and comments (European Commission, 2015). For the first time in Europe, France has set up a national level Data Administration (Administrateur Général des Données, 2014).

Estonia is introducing cloud technologies into the public sector that support the innovation and development of the information society. There is also Data embassies, which are defined as data centre in a foreign country. Data embassies store data from state information systems and mirror critical services. These technologies make it

possible to secure the country's critical data (Ministry of economic affairs and communications, 2015).

Estonia uses electronic voting systems. About 30% of voters vote in elections electronically. The country is implementing an ambitious EU-funded digital literacy plan. The plan envisages the implementation of projects aimed at improving the skills of civil servants and developing basic computer literacy skills. The Government approved a Green Paper on Open Data. The new version of the open data gateway operates at https://opendata.riik.ee in real-time. Estonia is the world's first e-residence country. People from all over the world have the opportunity to obtain the digital identity provided by the Estonian government. Measures are being implemented in Estonia to increase cyber security and raise public awareness of cyber risks.

Since 2014, all government agencies have webpages, in addition, there are government webpages that form an online environment and form a government portal. The country implements the Digital Agenda 2020, which is approved by the government of the republic. The overall objective of the program is to provide an environment for ICT development, contributing to economic growth, improved public governance and the well-being of people (European Commission, 2016).

8 Discussion

Solving E-governance problems is necessary to improve the functioning and development of this system. Among the measures the most important are: the introduction of more effective centralised control; simplifying the purchase of the necessary software and hardware; creating digital service standards to ensure the security and compatibility of information systems; creating a comprehensive register of information resources; creating conditions under which high-level officials regularly report on the results of the implementation of e-government components (Stenzel, 2018; Sousa and Oz, 2014; Stair and Reynolds, 2014).

Despite the advances in the formation of e-government in Ukraine, there are a number of problems that need to be addressed in the near future. This is first and foremost a matter of authorising a person through the Internet. Electronic signature and electronic printing may be more appropriate methods of authorisation. The Verkhovna Rada of Ukraine adopted the Law on Electronic Trust Services of October 21, 2017, N 2155-VIII, which facilitates the introduction of online services and defines the legal and organisational bases for the provision of electronic trust services, including cross-border ones. The use of UK experience in digitally verifying full identity and FranceConnect's French service is feasible and appropriate in Ukraine. Also important is Estonia's experience in voter identification in the e-voting system.

The Ukrainian authorities need to address the issue of collecting information by government agencies. This is particularly the case for collecting documents when providing services to citizens when public authorities require extra information that is not directly related to obtaining a service. France's experience in implementing an open government is advisable for improving information gathering.

There are a number of requirements for the structure of the e-government system. This structure should be capable of improving. It is necessary to take into account the further development of information technology and the possibility of improvement by any executor of such works (Andersen, 1995). The next important requirement for e-

government is the ability to integrate into various computer networks. Portals created by public authorities should be able to integrate into various information systems and networks. Combining portals with other services makes it possible to provide convenient use of them to different categories of consumers of electronic and administrative services (Nicola et al., 2016). The experience of countries with advanced e-governance demonstrates the need to centralise public electronic resources.

An important requirement for the administrative services portal is ease of use. Any citizen has the right to use this resource. In doing so, users' knowledge of the information system should be minimal (Jafarkarimi et al., 2014). For the convenience of portals' use, authorisation should be provided through various services (Kożuch and Sienkiewicz-Małyjurek, 2015). The development of electronic and administrative services should be aimed at expanding these services. The most popular services among users should be implemented and improved. To help facilitate the development of these services, it is useful to use the experience of France in the dissemination of digital tools and to enhance the digital competence of citizens and the experience of UK in implementing the digital market.

The experience of developed countries shows that in order to carry out the implementation of e-government, public authorities outsource parts of their tasks or processes to outsourced contractors. This is an agreement whereby people from outside companies work. One of the most acceptable forms of interaction between the state and information business in this area is the use of outsourcing. Outsourcing problems interest electronic government researchers in various countries. Debendra Kumar Mahalik's paper proposed a balanced strategy between internal and external agencies, which reduces the frequency of failures in e-government projects. (Mahalik, 2010). A study by Chen and Perry (2003) confirms the importance of management and capacity building in IT outsourcing. Huai (2012) proposed an approach to e-government outsourcing quality management. Outsourcing related IT security issues are listed in C. Warren Axelrod's book (2011) "Outsourcing Information Security".

Outsourcing has several advantages and disadvantages that must be considered when applying it. Manojlenko in the research on the use of outsourcing at Ukrainian enterprises divides them into four groups, namely: economic, managerial, technical and technological, as well as institutional (Manoilenko, 2006). Zavodovskaya (2006) cites a similar classification of advantages of using outsourcing operations. The author highlights the organisational, managerial, and technological and costs advantages of outsourcing. There are also classifications of advantages and disadvantages of outsourcing in the conditions of Ukraine by such authors as Omarova (2008), Didukh (2013), Popovichenko and Dubinskaya (2010).

Given the above classifications of the advantages and disadvantages of outsourcing identified by the authors of the above-mentioned studies, we propose our own classification regarding the implementation and development of e-government (Table 4).

For the e-government of Ukraine, the use of outsourcing outside the country is now virtually impossible, since the legislation of Ukraine will not allow the transfer of management of nationwide projects outside the country. However, information storage is possible both on servers in Ukraine and in the "clouds" of foreign companies. The process of managing IT technologies through the use of the Internet makes the e-government of a particular country globally accessible.

Table 4 Advantages and disadvantages of outsourcing in e-government

Advantages	*Disadvantages*
Performing individual functions by an outsourcer at less cost due to scale effects and other related factors	Lack of direct control over the execution of tasks
Optimisation of the number of personnel performing the supporting function	Threats to the confidentiality of information
Concentration on the fulfilment of the main power functions of public authorities	Threat of bankruptcy for an outsourcing company
Reducing the time for building the architecture of e-government, developing appropriate software, supporting individual processes	Reducing the speed of obtaining information necessary for making managerial decisions, and accordingly the response speed in case of unforeseen situations
Introduction of new technologies	The possibility of increased costs in the case of the transfer of many functions to an outsourcer
Improving the quality of task performance by leveraging outsourcing best practices	The probability of an increase in transaction costs
Sharing responsibilities and risks	Gaps in the regulatory framework for the use of outsourcing for e-government outside the country

One of the most significant reasons restraining the development of e-government in Ukraine is the insufficient funding of projects for its implementation and the low level of efficiency in the use of available resources. This trend is especially observed at the local level (Arkhypova, 2015; Dyachenko, 2013; Koval and Markovets, 2016).

Limited funding requires the search for and implementation of the latest technologies for improving the quality of government, and improving the interaction between government and citizens, which will not be burdensome for the budget. Such technologies include crowdsourcing, which involves engaging the masses of the population to solve complex problems. Crowdsourcing aims to test the reality and capacity of ideas in development strategies. Crowdsourcing is common in many countries. Iceland was the first to apply crowdsourcing in the constitutional process. UK government has created the social network Jolitics (https://twitter.com/Jolitics), which allows citizens and social groups to lobby for their interests in the lawmaking process. A similar function in US is performed by the Pop Vox crowd platform (https://www.popvox.com/about), which is open to proposals for bills under consideration by Congress. In Finland, citizens can initiate amendments to laws by using the Open Ministry e-resource (http://openministry.info).

At present, three types of crowdsourcing activity are most common in the public sphere: the creation of crowdsourcing resources in emergency situations; legal crowdsourcing; cooperation between authorities and civil society in regions and municipalities (Miroshnichenko, 2011).

Ukraine also demonstrates its willingness to use crowdsourcing. Based on crowdsourcing principles, a team of volunteers with the support of the E-Government Agency, together with the Ministry of Economy and the Presidential Administration, created a portal of state-owned electronic services iGov in June 2015. In Ukraine, there is a tendency to develop public initiatives and platforms at the local level. An example,

holding a public platform "New Country" for strategic sessions in some cities of Ukraine, during which citizens were able to form a strategic vision for the development of the respective region (New Country Civic Platform, 2015). Promising areas of application of this tool can be attracting investments, supporting and developing small businesses, creating new high-tech jobs, etc. (Kireeva, 2016). With the help of the public, it is possible to conduct e-monitoring of the implementation of government programs, compliance with legislation, and the fight against corruption (Kovbasyuk, 2016).

9 Conclusion

This study aims to find ways to improve the e-government system in Ukraine based on the experience of developed countries. Comparing best practices in modern information technology to improve public administration, the interaction between society and the state, between the state and business allows developing countries to find the best ways to improve e-government development and achieve better results on the path to the information society.

A comparative analysis of the dynamics of nominal GDP and the dynamics of the E-Government Development Index shows that the processes of implementation and improvement of information technologies in the UK, France, Estonia and Ukraine are directly dependent on economic development and as a consequence on the expenditures of state and local budgets directed towards the development of e-government.

The study proves that the most important steps to improve e-government in Ukraine are the integration of public web resources and the creation of a single access point; providing identity assurance for individuals entirely digitally; creating a digital market; implementing open government; implementing projects related to the opening of public data; deploying cloud technologies into the public sector, implementation of electronic voting systems.

Studies have also shown that in Ukraine indicators of e-governance development are increasing. This growth testifies to the presence of the management potential of the public administration system of Ukraine, which is one of the most important factors of economic growth. The promising forms of cooperation between the state and business in e-government in Ukraine are the application of outsourcing and crowdsourcing. These forms allow you to save resources, focus on the main tasks, and attract experienced performers using community projects.

A limitation of this study is that the experience of improving public administration and e-government systems cannot be mechanically transferred to countries with other political systems, economic status, traditions of public administration and the attitude of the population to the introduction of modern information technologies. However, adapting ideas and successful solutions to the realities of a particular country allows for avoiding mistakes and creating their own effective information systems. In future research, we plan to pay attention to using the experience of other countries in improving the user acceptance of e-government and bettering the system of providing electronic services using the Unified Public Services Portal.

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