Source: Viešoji politika ir administravimas

Public Policy and Administration

Location: Lithuania

Author(s): Orlova Nataliia, Mokhova Yuliia, Bril Mykhailo, Viktoriia Beliavtseva

Title: A SCIENTIFIC-METHODICAL APPROACH TO THE EVALUATION OF ELECTRONIC GOVERNMENT IN THE REGIONS OF UKRAINE

A SCIENTIFIC-METHODICAL APPROACH TO THE EVALUATION OF ELECTRONIC GOVERNMENT IN THE REGIONS OF UKRAINE

Issue: 4/2022

ISSN 1648-2603 (print)
ISSN 2029-2872 (online)

VIEŠOJI POLITIKA IR ADMINISTRAVIMAS
PUBLIC POLICY AND ADMINISTRATION
2022, T. 21, Nr. 4 / 2022, Vol. 21, No 4, p. 407-422.

A SCIENTIFIC-METHODICAL APPROACH TO THE EVALUATION OF ELECTRONIC GOVERNMENT IN THE REGIONS OF UKRAINE

Orlova Nataliia
Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine
E-mail: nsorlova78@gmail.com
ORCID: https//orcid.org/0000-0003-0785-751x

Mokhova Yuliia
Donetsk National Technical University, Pokrovsk, Ukraine
E-mail: julimokhova@gmail.com
ORCID: https // orcid.org / 0000-0002-0093-2620

Bril Mykhailo
Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine
E-mail: msbril01@gmail.com
ORCID: https // orcid.org / 0000-0001-6529-7747

Viktoriia Beliavtseva
Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine
E-mail: victoria.belyavtseva@ukr.net
ORCID: https // orcid.org / 0000-0001-8773-9307

DOI: 10.13165/VPA-22-21-4-05

Abstract. *This article substantiates the notion that the development of e-governance is an important direction of increasing government efficiency in the conditions of building an information society. The modern development of globalization trends determines the need for systems for monitoring and analyzing the development of e-governance in regions. The purpose of the article is to assess the level of development of e-governance of the regions of Ukraine in order to determine digital opportunities and prospects for the introduction of the latest information technologies. The information base for the evaluation of e-governance of the regions of Ukraine is: the data of the State Statistics Service of Ukraine and the Ministry of Digital Transformation of Ukraine; the data of regional and district state administrations; and reference and information publications of the Ukrainian Institute of the Future and the Innovation Development Center regarding the state of development of e-governance. On the basis of the taxonometric approach, a comparative assessment of e-governance of the regions of Ukraine was carried out according to certain indicators: the share of internet subscribers by region in the total number of subscribers in Ukraine; the level of development of local electronic democracy; the share of state authorities that use e-democracy tools in the region in the total number of state administration bodies; the number of registered e-applications; the share of "Participation budget (pub-*

lic budget)" projects submitted by the public of the region in the total number of submitted projects; the level of publicity of local self-government; the share of electronic services provided in the TsNAP of the region per day in the total number of services provided; and the share of published reports in the region based on the results of the implementation of the open data policy in the total number of published reports. According to the results of the assessment of the level of development of e-government in the regions using the taxonometric method, the leading regions (the Kyiv, Dnipropetrovsk, Lviv, Odesa, and Ivano-Frankivsk regions) and the regions with the lowest level of development of e-government (the Luhansk and Cherkasy regions) were determined. The main prospects for the implementation of the latest information technologies in the regions were also determined: the creation of digital platforms; the introduction of innovative technologies into the management system based on the smart city concept; the development of IT infrastructure; the increase of institutional capacity; and the implementation of digital development projects and open data.

Keywords: *e-government, public administration, region, taxonomic method, information and communication technologies*

Reikšminiai žodžiai: *elektroninė valdžia, viešasis administravimas, regionas, taksonominis metodas, informacinės ir komunikacinės technologijos*

JEL Classification: R13, R50

Introduction

Information resources are an important strategic resource of any country and a necessary infrastructural component of building an information society and implementing electronic governance. Digitization is a multi-vector process of society's transition to digital technologies that affects all spheres of social life, but it is of primary importance in the context of modernization of the public sector because it is this process that should determine the directions of improvement of various social sectors. The value of digital technologies is determined by their use as strategic tools that allow the success of public policy. With the gradual introduction of digital technologies, the development of e-governance is becoming the focus of the government's efforts to improve the efficiency of the public sector.

The modern development of the globalization trends of various countries proves the need for systems of monitoring and analyzing the development of electronic government. In the conditions of global transformations, regions are considered as a unit of the regional level of state management, capable of maximally taking into account the needs of local residents and reducing the burden on central authorities. The digitization process provides ample opportunities for the transformation of the state regional management system, both ensuring the economic and social unity of the state and increasing the level of competitiveness of the regions. Therefore, research on the implementation of the state regional policy on the development of e-government and its evaluation becomes relevant.

1. Literature review

Theoretical coverage of the issues of information technology development and e-government and their importance in public administration has been provided by Gupta et al. (2007), Jansen (2005), Koniyo (2021), McBride and Draheim (2020), Sakowicz (2003), Salam (2013).

Gupta et al. (2007) determined the following parameters for evaluating the success of e-government projects: the electronic environment; the effectiveness of e-government programs (projects); the impact of e-government on the functioning of the general government, economic development and citizens; and the evaluation of the benefits of e-government.

In the works of McBride and Draheim (2020), it is proven that an e-government assessment based on complex adaptive systems and complexity theory allows one to understand and study the complex problems that exist in this field.

The challenges of e-government (lack of a clearly defined goal, failure to take into account specific national contexts and priorities) were discussed by Jansen (2005), who noted that ensuring an effective evaluation system is a necessary condition for the development of e-government.

Koniyo (2021) investigated the components of public policies for the evaluation of e-government at the regional level and identified a new framework for regional governments based on the identification of components and practices of information technology use.

Sakowicz (2003) identified four areas of e-government in the direction of its evaluation: e-services, e-governance, e-democracy and e-commerce.

Salam (2013) identified e-governance as an effective service delivery tool and equated it to good governance in all developed and developing countries. The evaluation of the effectiveness of district centers for the provision of e-services confirmed the importance of e-governance for the implementation of state policy.

Theoretical, practical and methodological issues of the development of e-governance in public administration, along with practical aspects of the influence of digital technologies on the development of public administration, were investigated in works by Aliev (2019), Shymanska and Bondarchuk (2021), Mokhova (2021), and Orlova et al. (2019).

Aliyev (2019) studied the experience of the European Union countries in the digitalization of public services, considered the dynamics and key vectors of application, and analyzed digitalization as one of the mechanisms of implementation of the state's service policy. The digitization mechanisms proposed by Shymanska and Bondarchuk (2021) allow for the gradual introduction of digital technologies in strategic sectors of the domestic economy, which are the foundation for the further process of digitalization. Klimushyn and Lopushynskyi (2010) determined the meaning and conditions of the development of electronic governance in the information society.

Despite the existing achievements related to various aspects of the formation of e-governance in Ukraine, the issue of assessing the development of e-governance at the regional level and strategies for the development of regions in the conditions of digitalization remains unresolved.

The purpose of this article is to assess the level of development of e-governance of the regions of Ukraine to determine digital opportunities and prospects for the introduction of the latest information technologies.

2. Research method

The study of scientific and methodological approaches proves that the rating approach is mainly used to evaluate e-governance. Based on the analysis of shortcomings and debatable provisions in the field of modern instrumental rating, within the framework of multi-criteria rating the most adequate approach is the taxonometric method, which allows the implicit significance of indicators that arose to be eliminated due to their variation. The taxonometric method is one of the most effective tools of multi-level economic analysis, which, as a result of a number of successive stages, involves the calculation of a general rating indicator of the object of research based on the

comparison of the results of its activity with the corresponding characteristics of the reference object of analysis (the best among those available).

Assessing the level of development of e-government in the regions of Ukraine using the taxonometric method allows the strengths and weaknesses of the region in the development of e-government to be objectively identified, and strategic directions of development to be determined.

The information base for the evaluation of e-governance of the regions of Ukraine is: the data of the State Statistics Service of Ukraine and the Ministry of Digital Transformation of Ukraine; the data of regional and district state administrations; and reference and information publications of the Ukrainian Institute of the Future and the Innovation Development Center regarding the state of development of e-governance.

Analysis is carried out on the basis of the calculation of a complex index, which includes the basic components of the development of electronic governance. The following indicators are taken into account for the calculation: the share of internet subscribers by region in the total number of subscribers in Ukraine; the level of development of local electronic democracy; the share of state authorities that use e-democracy tools in the region in the total number of state administration bodies; the number of registered e-applications; the share of "Participation budget (public budget)" projects submitted by the public of the region in the total number of submitted projects; the level of publicity of local self-government; the share of electronic services provided in the TsNAP of the region per day in the total number of services provided; and the share of published reports in the region based on the results of the implementation of the open data policy in the total number of published reports.

The given indicators were chosen in such a way that it was possible to assess the informational and infrastructural features of the region. The regions with the most favorable conditions for the development of e-governance were evaluated according to the following algorithm. The resulting set of proposed indicators by regions of Ukraine is presented in the form of a matrix (Table 3).

$$X = \begin{vmatrix} x_{11} \dots x_{1j} \dots x_{1n} \\ \dots\dots\dots\dots\dots \\ x_{i1} \dots x_{ij} \dots x_{in} \\ \dots\dots\dots\dots\dots \\ x_{m1} \dots x_{mi} \dots x_{mn} \end{vmatrix}, \quad (1)$$

where $i = 1, \dots, m$ is the number of the region; $j = 1, \dots, n$ is the index number.

The indicators used are different and incomparable with each other, so the next stage is their normalization. For this, matrix X is replaced by matrix Y.

$$Y = \begin{vmatrix} y_{11} \cdots y_{1j} \cdots y_{1n} \\ \cdots\cdots\cdots\cdots \\ y_{n} \cdots y_{ij} \cdots y_{in} \\ \cdots\cdots\cdots\cdots \\ y \cdots y_{mj} \cdots y_{mn} \end{vmatrix} \quad (2)$$

where $y = \frac{x_{ij} - \bar{x}_i}{\delta_i}$, $\bar{x}_i = \frac{1}{n}\sum_{i=1}^{n} x_{ij}$,

at the same time, $\bar{x}_i$ represents the average value of the i_th indicator for all regions;

$$\delta_i^2 = \frac{1}{n}\sum_{i=1}^{n} (x_{ij} - \bar{x}_i)^2 \quad (3)$$

at the same time , δ_i^2 represents the dispersion of the i_th indicator values.

Table 3. Data for evaluation of e-governance of the regions of Ukraine

Region	The share of internet subscribers by region in the total number of subscribers in Ukraine	The level of development of local electronic democracy	The share of state authorities that use e-democracy tools in the region in the total number of state authorities	The share of registered e-applications of the region in the total number of registered applications
Vinnytska	0.0037	0.5810	0.0328	0.0036
Volynska	0.0022	0.6600	0.0257	0.0030
Dnipropetrovska	0.0092	0.6080	0.0684	0.0495
Donetska	0.0059	0.6970	0.0247	0.0226
Zhytomyrska	0.0035	0.3960	0.0380	0.0046
Zakarpattia	0.0024	0.5370	0.0721	0.0143
Zaporizhzhska	0.0053	0.5120	0.0479	0.0223
Ivano-Frankivska	0.0141	0.7000	0.0578	0.0143
Kyivska	0.0054	0.3970	0.0294	0.0076
Kirovohradska	0.0023	0.5950	0.0387	0.0059
Luhanska	0.0014	0.3920	0.0244	0.0042
Lvivska	0.0084	0.6780	0.0554	0.0820
Mykolayivska	0.0056	0.4900	0.0445	0.0343
Odeska	0.0383	0.5610	0.0421	0.0925
Poltavska	0.0055	0.3640	0.0343	0.0077
Rivnenska	0.0022	0.4410	0.0393	0.0273
Sumska	0.0028	0.5490	0.0312	0.0069
Ternopilska	0.0038	0.7530	0.0309	0.0134
Kharkivska	0.0062	0.6240	0.0554	0.0371
Khersonska	0.0032	0.3830	0.0328	0.0111
Khmelnytska	0.0028	0.7250	0.0328	0.0179
Cherkasska	0.0026	0.3400	0.0346	0.0034
Chernivetska	0.0024	0.4190	0.0195	0.0035
Chernihivska	0.0026	0.4250	0.0300	0.0030
Kyiv	0.0640	0.7340	0.0572	0.5079

3. Findings and discussion.

Electronic governance in Ukraine occurs at all levels of state administration. We conducted research on the implementation, use and development of e-government practices in the regions of Ukraine in accordance with the country's administrative and territorial structure. Thus, in Vinnytsia Oblast: a mobile application has been launched to provide feedback from citizens to the authorities;

The share of projects submitted by the public "Participation budget (public budget)" of the region in the total number of submitted projects	The publicity level of local self-government	The share of provided electronic services in the administrative center of the region per day in the total number of provided services	The share of published reports in the region based on the results of the implementation of the open data policy in the total number of published reports
0.0000	0.7100	0.1288	0.0533
0.0085	0.7800	0.0454	0.0000
0.1523	0.6300	0.0336	0.1183
0.1034	0.7300	0.0179	0.0177
0.0023	0.7300	0.0079	0.0051
0.0058	0.6200	0.0094	0.0010
0.0364	0.6000	0.0095	0.0000
0.0359	0.8700	0.0087	0.0053
0.0189	0.6300	0.0186	0.0109
0.0206	0.6400	0.0530	0.0135
0.0165	0.6400	0.0088	0.0006
0.0394	0.7500	0.0272	0.0252
0.0202	0.6100	0.0091	0.0172
0.0282	0.6000	0.0297	0.0167
0.0429	0.5200	0.0336	0.0000
0.0162	0.6400	0.0526	0.0000
0.0104	0.6900	0.0905	0.0106
0.0287	0.7400	0.0092	0.0037
0.0353	0.6200	0.1718	0.0002
0.0132	0.6900	0.0079	0.0103
0.0165	0.7100	0.0095	0.0016
0.0070	0.5700	0.0084	0.0090
0.0000	0.7300	0.0083	0.0024
0.0158	0.6700	0.0569	0.0014
0.3098	0.7500	0.1435	0.6751

a specialized web resource, the Investment Portal of Vinnytsia Region, is in operation; and a system of electronic document circulation and collective work with documents has been implemented by the Department of Education of Vinnytsia Oblast State Administration – Educational Institutions and Educational Institutions of the Oblast (EGAP 2019). In the Volyn, Sumy, and Ternopil regions, the use of electronic services tripled in 2020 thanks to practical classes on the

introduction of e-services and the improvement of digital competences (Volynsk Regional State Administration 2019). In the Dnipropetrovsk region, for the first time, electronic digital signature technologies were implemented at the region's own accredited key certification center in the work of 356 local self-government bodies. The Open Budget initiative provides citizens with open access to expenditures and revenues of the budget of the Dnipropetrovsk region (with transfers). The sphere of electronic governance is included in 7 programs of social and economic development of districts (cities) in the Donetsk region. The city of Mariupol has launched its own open data portal thanks to international technical assistance projects through the UNDP, USAID, EGAP, Eastern Europe Fund, Erasmus+, Transparency International, EGOV4UKRAINE, and DESPRO programs, which are aimed at the development of e-government in the region. The use of the Igov volunteer project to obtain electronic services and the city's target program to expand the number of electronic services for residents of the region (Trokoz 2016) is typical for the Zhytomyr region. The Green Book on e-Government in Ukraine was presented for the first time in the Zaporizhzhia region as part of a discussion of state policy in the field of e-governance in Ukraine. The e-government site created in the Ivano-Frankivsk region allows simplified access to information about the activities of state authorities. In the Kirovohrad region, the Open Medicine project ensures the formation of a mechanism for public participation in the process of forming local policy in the field of health care. Among the achievements of the Kyiv region in the development of e-government, it is possible to single out: the creation of the Unified Information Space of the Territorial Community of the City of Kyiv; the Medical Portal; the official portal of administrative services; the Regional Center for e-Government Electronic Capital, a city data center for data processing; and information and telecommunication systems such as the Electronic archive of the city of Kyiv and the Mobile workplace of deputies and leaders (head's office). In the Luhansk region, citizens actively use the electronic ticket in public transport, the electronic voting system, and the discussion of draft decisions at meetings of the local council and its executive bodies. Thanks to the creation of an information portal by the Lviv City Council, which contains the headings "city government" and "Lvivian," the city of Lviv has become a leader in the field of implementation of electronic governance and a smart city (with its experience of implementing e-democracy and e-governance in Ukraine; Dzyuba 2010). In the direction of the development of e-democracy and e-governance in the Mykolaiv region, the Electronic City of Mykolaiv project was implemented, which ensures the development of social communication for local self-government. In the Odesa region, the Electronic Region pilot project is being implemented, and a system has been created that collects data on unused premises, such as production areas, equipment, facilities and objects of unfinished construction. The presentation of the electronic service for creating electronic petitions through the Action mobile application was held in the Poltava region. Kharkiv became the first city in Ukraine to join the Trembit electronic interaction system and the all-Ukrainian integrated system of electronic identification at id.gov.ua (Kharkiv City Council 2019). As part of the digitization program, an anti-corruption map of repairs has been implemented in the Kherson region alongside a map of the incidence of COVID-19 to obtain operational information about the level of the disease in pandemic conditions (Kherson Regional State Administration, n.d.). In the Cherkasy region, the Digital Cherkasy project was launched and the Dozor and Mapamagic mobile applications are in operation, which allow tracking the movement of public transport in real time. In the direction of the development of e-democracy, an online petition site, a portal for dialogue between citizens and authorities, and the Active Community project were implemented. In Chernivtsi region, the Portal of territorial communities of the Chernivtsi region was created and the "Smart village" and

"Electronic village: new information technologies to increase the efficiency of local self-government bodies of Chernivtsi region" projects were implemented as part of the Smart City Chernivtsi 2025 concept (Ministry of Digital Transformation 2021b).

The introduction and development of electronic governance is a necessary component of the formation of stable and effective relations between authorities and citizens, the community, and the business environment. The key areas of support for the digital transformation of regions by the government are: information infrastructure; digitalization of public services; tools of e-democracy; informational security; and organizational and resource support for the development of digitization. Thus, in the Vinnytsia, Volyn, Dnipropetrovsk, and Odesa regions, during 2015–2019, around 40 communities were involved in digital transformation, as: regional informatization programs were developed and updated; the automation of administrative service centers (CSP) was carried out and interaction with regional service portals was established; the Mobile TsNAP project was implemented; and the Territorial community site builder service platforms were implemented Ministry of Digital Transformation (2021a).

The Ministry of Digital Transformation has supported the Nation IT educational program, which will provide high-quality online and offline education in the field of information technologies for residents of the Donetsk and Luhansk regions. The new position of head of digital transformation, approved by the Cabinet of Ministers of Ukraine for effective regional digitalization, has already been implemented in the Kyiv, Odesa, Chernivtsi, and Ivano-Frankivsk regions. In the Dnipropetrovsk region, a unified information space of the region has been formed and an annual study of the electronic readiness of territorial groups is conducted.

During 2020, three evaluations of regions were conducted on the following topics: a transparency rating from Transparency International Ukraine, a municipal survey from the Rating Group commissioned by the International Republican Institute, and a city democracy index from the Ukrainian Independent Center for Political Research. The following indicators were used for the analysis: democratization of legal acts; availability of IT tools; number of unique active users; percentage of unique active users; number of created cases; number of considered cases; number of supported cases; number of completed cases; and percentage of completed cases. The evaluation of the e-democracy of each city was carried out according to: the state of democracy of the regulatory and legal framework; e-participation of the public in solving issues of local importance; the availability of IT tools; the level of activity of users of IT tools in democracy; and the effectiveness of using such tools. Each block of criteria can be considered as a self-sufficient assessment of the development of a separate aspect (Table 1).

Table 1. Rating of readiness of regions of Ukraine for e-government

Rating of cities according to the Availability of IT tools dimension			**Rating of cities according to the E-participation dimension**			**Rating of cities according to the Performance dimension**		
No.	City	%	No.	City	%	No.	City	%
1	Kyiv	100	1	Kyiv	9.6	1	Khmelnytskyi	74.7
2	Vinnytsia	75	2	Zaporizhzhia	5.5	2	Vinnytsia	63.7
3	Lviv	66.7	3	Vinnytsia	3.4	3	Kyiv	44.6
4	Khmelnytskyi	66.7	4	Khmelnytskyi	3	4	Poltava	41.7

5	Zaporizhzhia	58.3	5	Lviv	2	5	Cherkasy	39.1

Source: Yemelyanova and Loboyko (2020)

The evaluation of each city for each indicator was carried out on a 100-point scale as a percentage of the maximum possible level of e-democracy (from 0% to a maximum of 100%). Each block of criteria is calculated as the arithmetic mean of the indicator values of all instruments.

Electronic democracy is a key indicator of society's interaction with local self-government bodies. In 2018, the Innovation Development Center for the first time presented a study of the Local e-Democracy Index, which covers around of the 30 largest cities and takes into account 90 indicators. Each edition covers a different number of cities amd different sets of indicators, and relies on a different method of calculating the aggregate index with different weight values (factors for taking into account the components in the total values of the cities).

The 2020 rating included 22 regional centers – such as Bucha, Irpin, Kamianske, Kramatorsk, Mariupol, Severodonetsk, and Slovyansk – as well as the cities of Bilhorod-Dnistrovskyi and Drohobych, whose residents took an active part in the survey on the development of local e-democracy. Each city, depending on historical, natural, economic, ecological, and demographic features, as well as its digital capabilities, has an appropriate level of development of local e-democracy. Small cities such as Drohobych, Kamianske and Sloviansk have made significant progress in the development of local e-democracy. The cities of Ternopil (+28.6%), Khmelnytskyi (+20%), Mykolaiv (16.9%), Kamianske (+16.1%), and Sloviansk (+ 15.4%) all showed promising results (Yemelyanova and Loboyko 2020).

The presence in Zhytomyr and Kropyvnytskyi of concepts, strategies, and other documents aimed at the development of e-democracy, e-governance, and digital transformation ensured the approval of e-democracy tools in the charters of territorial communities. In general, the growth of all cities under the "Regulatory and legal provision of e-democracy tools" block was 1.4%, which indicates the need for further improvement of regulatory and legal acts regarding e-democracy (Yemelyanova and Loboyko 2020).

In the cities of Drogobych, Kyiv, and Khmelnytskyi, IT solutions for key tools of e-democracy (for example, the platform of a single office of the resident) were rated at a maximum value of 100%. The city of Mariupol (83.3%) received the highest rating for the development of an IT participation service for conducting contests for residents and public organizations. The strategies and government programs of most state authorities are aimed at the development of such electronic services, but they are hardly used for the transparent formation and operation of advisory bodies.

Drohobych (58.4%), Kyiv and Kharkiv (52.1% each), and Bilhorod-Dnistrovskyi (51.1%) have the highest results regarding the inclusiveness of IT solutions of e-democracy tools. The lowest indicators were demonstrated by Bucha and Zhytomyr (20.8% each) and Cherkasy (20.9%). The cities of Kyiv and Mykolaiv were positively evaluated due to the absence of critical problems in the inclusiveness of portals for e-appeals. Ivano-Frankivsk (24.7%), Lutsk (16.7%), Kyiv (15.1%), and Dnipro (11.1%) had the highest rates of involvement of residents (aged 18 and over) in using e-democracy tools, with Mariupol (10.4%), Sumy and Ternopil (9.3% each) close behind (Yemelyanova and Loboyko 2020).

In general, the performance indicator of e-democracy tools, which also allows the quality of local statistics to be assessed, increased by 12.7% in 2020 compared to the previous year's evaluation results.

The Publicity Index is a practical tool that allows one to comprehensively assess and compare the level of transparency, openness and accountability of government bodies in the process of interacting with the public. The calculation of the Publicity Index is aimed at determining how publicly decisions are made and the policy of the institution is implemented, and what the contribution is of the main subjects of the government to this process. Publicity includes three interrelated principles of good governance: transparency, openness and accountability.

Transparency is considered as the process of local authorities publicizing comprehensive and up-to-date information on their own initiative about their personal composition and structure, powers and functions, finances, current activity and plans, political initiatives and decisions, services provided to residents, and information that is in the public interest.

Government openness is interpreted as the process of the government providing maximum access to the information at its disposal and stimulating the active involvement of citizens in direct communication and regular dialogue on issues of management decisions at the local level.

Government accountability covers the process of systematically informing the public about the results and efficiency of the work of government bodies and the use of public resources and budget funds.

The system of indicators is based on 210 operational questions that cover a wide range of functions, government programs, and strategies of local self-government bodies and officials. In particular, this involves ensuring: access to public information, the transparency of personnel policy, the transparency of the budget process, the functioning of public participation mechanisms, the fullness of content on the official website, the transparency of the regulatory policy of the municipality, the availability of administrative services, etc. For ease of monitoring and comparison, all operational issues are systematized into 13 parameters, which in turn cover 23 indicators. Ivano-Frankivsk (87%), Lutsk (78%), and Lviv (75%) led the publicity index in 2020 (Table 2).

Table 2. Top 10 cities according to the Index of Publicity in 2020

City	Publicity index
Ivano-Frankivsk	87%
Lutsk	78%
Lviv	75%
Kyiv	75%
Ternopil	74%
Zhytomyr	73%
Chernivtsi	73%
Kramatorsk	73%
Vinnytsia	71%
Khmelnytskyi	71%

Source: Yemelyanova and Loboyko (2020)

Different approaches to the formalization of e-democracy applied in the cities of Ukraine testify to an active strategic vision of public control, openness and accountability of self-government.

The presence of a large number of indicators regarding the assessment of electronic readiness does not allow us to draw reliable conclusions about the country's capabilities in the implementation of electronic governance and the presence of favorable conditions for its development. An integrated system of indicators based on the results of ICT market research, statistical data, and the rating assessments of international organizations (UN, EU, World Bank, OECD, etc.) is needed to evaluate e-governance. The analysis of e-governance at the regional level in Ukraine is at the stage of formation. Due to the unsuitability of their indicators and criteria for use in evaluation at the level of the locale, city, or region, global models of e-governance evaluation cannot be used to evaluate e-development in regions. Therefore, it is expedient to define a methodical approach to assessing the level of development of e-governance in regions to determine digital opportunities and prospects for the introduction of the latest information technologies.

According to the regional ranking of e-governance assessment in 2020, the regions of Kyiv, Dnipropetrovsk, Lviv, Odesa, and Ivano-Frankivsk are among the leaders in this regard (Table 4). The city of Kyiv has the highest level of e-government development in the country, which is explained by a sufficiently effective digital development strategy ($Rj = 4.14$).

Table 4. The level of development of e-government in the regions and Ukraine (based on the calculation of quasi-distances)

Region	R_j	Rating
Kyiv	4.14	1
Dnipropetrovska	83.11	2
Lvivska	92.55	3
Odeska	95.54	4
Ivano-Frankivska	97.31	5
Kharkivska	99.51	6
Donetska	105.37	7
Vinnytska	107.45	8
Sumska	114.24	9
Ternpilska	115.44	10
Kirovohradska	116.40	11
Volynska	117.02	12
Khmelnytska	118.23	13
Rivnenska	120.10	14
Zaporizhzska	120.23	15
Mykolayivska	120.47	16
Zakarpatska	121.59	17
Chernihivska	123.74	18
Zhytomyrska	125.70	19
Khersonska	128.09	20

Kyivska	129.85	21
Chernivetska	134.64	22
Poltavska	136.10	23
Luhanska	137.22	24
Cherkasska	141.71	25

The following nine regions have a significant gap in the values of the combined rating, so it can be considered that the degree of development of e-government in these regions is mediocre: Dnipropetrovsk (*Rj* = 83.11), Lviv (*Rj* = 92.55), Odesa (*Rj* = 95.54), Ivano-Frankivsk Oblast (*Rj* = 97.31), Kharkiv Oblast (*Rj* = 99.51), Donetsk Oblast (*Rj* = 105.37), Vinnytsia Oblast (*Rj* = 107.45), Sumy Oblast (*Rj* = 114.24), and Ternopil (*Rj* = 115.44).

Other regions of the country, despite quite positive indicators, have a low level of e-government development. According to these calculations, the Luhansk (*Rj* = 137.22) and Cherkasy (*Rj* = 141.71) regions can be considered to have the lowest level of e-government development. The main reasons for this are their low levels of transparency of information and the activities of state administration bodies.

Conclusions

On the basis of the conducted research, it has been proven that the development of electronic governance is a necessary infrastructural component of building an information society and a strategic tool for ensuring and achieving the effectiveness of state policy.

On the basis of the taxonometric approach, a comparative assessment of the e-government of the regions of Ukraine was carried out according to the following indicators: the share of Internet subscribers by region in the total number of subscribers in Ukraine; the level of development of local electronic democracy; the share of state authorities that use e-democracy tools in the region in the total number of state administration bodies; the number of registered e-applications; the share of "Participation budget (public budget)" projects submitted by the public of the region in the total number of submitted projects; the level of publicity of local self-government; the share of electronic services provided in the TsNAP of the region per day in the total number of services provided; and the share of published reports in the region based on the results of the implementation of the open data policy in the total number of published reports. The Kyiv, Dnipropetrovsk, Lviv, Odesa, and Ivano-Frankivsk regions were among the leaders in the 2020 e-governance assessment. The Luhansk and Cherkasy regions were among the regions with the lowest levels of e-government development.

Taking into account the processes of globalization and regionalization of world economic relations, the priority of the innovative path of development, the informatization of society, and the implementation of administrative reforms in the country, the main prospects for the introduction of the latest information technologies in the regions are highlighted: the creation of digital platforms; the introduction of innovative technologies into the management system based on the concept of smart networks; the development of IT infrastructure; the increase of institutional capacity; the implementation of digital development projects; and open data. The use of public-private partnerships will allow the long-term tasks of regional development to be solved, will increase the competitiveness of the regions, and will attract additional funds for the implementation of e-gov-

ernment development projects. The implementation of the proposed measures will make it possible to form open and transparent communication between the authorities, citizens, communities, and the business environment, will increase the level of use of electronic democracy tools, and will ensure the effectiveness of the regional digital development strategy.

References

1. Aliev, A. 2019. "Digitization as a mechanism for implementing the state's service policy." *Bulletin of Lviv University* 22: 125–129.
2. Dzyuba, S.V., ed. 2010. *Experience of implementing e-democracy and e-governance in Ukraine*. Kyiv. Available at https://www.irf.ua/files/ukr/e-gov-exp.pdf
3. EGAP. 2019. "The Vinnytsia City Council is launching a mobile application for city residents." https://egap.in.ua/novyny/proekt-e-servisu-shho-peremig-u-egap-challenge-realizuyut-u-vinnytsi
4. Gupta, M. P., Jaijit Bhattacharya, J., and Agarwal, A. 2007. "Evaluation e-government." In *E-Governance: Case Studies*, edited by A. Agarwal, 1–56. India: Universities Press.
5. Jansen, A. 2005. "Assessing E-government progress– why and what." In *Norsk konferanse for organisasjoners bruk av IT: NOKOBIT 2005*, edited by B. Tessem, J. Iden and G. Christensen. Accessed November 10, 2021. https://www.jus.uio.no/ifp/om/organisasjon/afin/forskning/notatserien/2005/7_05.pdf
6. Kharkiv City Council. 2019. "New electronic services are being implemented in Kharkiv." May 21, 2019. https://dr.city.kharkov.ua/ua/news/34-u-kharkovi-vprovadzhuyutsya-novi-elektronni-servisi.html
7. Kherson Regional State Administration. n.d. "Digital transformation." https://khoda.gov.ua/cifrova-transformac%D1%96ja/
8. Klimushyn, P. S., and Lopushynskyi, I. P. 2010. "Electronic governance in information." *Public administration: theory and practice*, No. 2: 194–198.
9. Koniyo, H. 2021. "Identification of components for evaluation e-government governance framework according to regional government characteristics." *IOP Conference Series Materials Science and Engineering* 1098: 032073. https://doi.org/10.1088/1757-899X/1098/3/032073
10. McBride, K., and Draheim, D. 2020. "On Complex Adaptive Systems and Electronic Government: A Proposed Theoretical Approach for Electronic Government Studies." *The Electronic Journal of e-Government* 18(1): 43–53. http://dx.doi.org/10.34190/EJEG.18.1.004
11. Ministry of Digital Transformation. 2021a. "Development of open data in the regions." Press Office of the Ministry, February 1, 2021. https://thedigital.gov.ua/news/rozvitok-vidkritikh-danikh-v-regionakh
12. Ministry of Digital Transformation. 2021b. "Digital transformation of Chernivtsi – the concept of Smart City by 2025 has been approved." Press Office of the Ministry, April 14, 2021. https://thedigital.gov.ua/news/tsifrova-transformatsiya-chernivtsiv-zatverdzheno-kontseptsiyu-smart-city-do-2025-roku
13. Mokhova, Y. L. 2021. "Conceptual principles of formation of e-government mechanisms in conditions of digitalization." *Public Administration and National Security* 19(3). https://doi.org/10.25313/2617-572X-2021-3-7419
14. Orlova, N., Mokhova, Y., Diegtiar, O., & Khomutenko, O. 2019. "Methodology of the electronic government evaluation of the European Union countries based on taksonometric method." *33rd IBIMA Conference Proceedings (Granada, 10–11 April 2019), Granada, Spain*.

15. Sakowicz, M. 2003. *How to Evaluate E-Government? Different Methodlogies and Methods.* https://www.researchgate.net/publication/265117473_How_to_Evaluate_E-Government_Different_Methodologies_and_Methodes
16. Salam, M.A. 2013. "E-governance for good governance through public service delivery an assessment of district e-service centers in Bangladesh." Master's diss. BRAC University, Bangladesh. https://core.ac.uk/download/pdf/61804691.pdf
17. Shymanska, K.V., & Bondarchuk, V.V. 2021. "Priority directions and mechanisms for the development of the digital economy in Ukraine." Economics, Management and Administration 95(1): 17–22.
18. Trokoz, O. 2016. "What is e-governance and why do Zhytomir residents need it." Zhytomir.info, May 23, 2016. https://www.zhitomir.info/news_157103.html
19. Volynsk Regional State Administration. 2019. "The regional state administration is working on increasing the number of electronic services." February 12, 2019. https://voladm.gov.ua/new/v-oblderzhadministraciyi-pracyuyut-nad-zbilshennyam-kilkosti-elektronnih-poslug/
20. Yemelyanova, A., and Loboyko, S. 2020. *Index of local e-democracy in Ukraine*. Kyiv: Innovation Development Center. https://cid.center/wp-content/uploads/2021/01/e-dem.pdf

Nataliia Orlova, Yuliia Mokhova, Mykhailo Bril, Viktoriia Beliavtseva

MOKSLINIS-METODINIS UKRAINOS REGIONŲ ELEKTRONINĖS VALDŽIOS VERTINIMAS

Anotacija. *Straipsnyje teigiama, kad elektroninės valdžios plėtra yra svarbi viešosios valdžios efektyvumo didinimo kryptis informacinės visuomenės kūrimo sąlygomis. Šiuolaikinė globalizacijos tendencijų raida lemia e. valdžios raidos regionuose stebėsenos ir analizės sistemų poreikį. Straipsnio tikslas – įvertinti Ukrainos regionų e. valdžios išsivystymo lygį siekiant nustatyti skaitmenines galimybes ir perspektyvas diegti naujausias informacines technologijas. Siekiant įvertinti Ukrainos regionų e. valdžią buvo pasirinkta tokia informacinė bazė: Ukrainos valstybinės statistikos tarnybos, Ukrainos skaitmeninės transformacijos ministerijos duomenys, regionų ir rajonų valstybės administracijų duomenys, Ukrainos ateities instituto informaciniai ir informaciniai leidiniai, Inovacijų centro pateikti duomenys ir kt.*

Lyginamasis Ukrainos regionų e. valdžios tyrimas atliktas taksonometrinio metodo pagrindu. Pagal tam tikrus rodiklius buvo tiriama: interneto abonentų dalis pagal regionus bendrame abonentų skaičiuje; vietinės elektroninės demokratijos išsivystymo lygis; e. demokratijos priemones regione naudojančių valstybės institucijų dalis bendrame valstybės valdymo įstaigų skaičiuje; registruotų e. prašymų skaičius; regiono visuomenės pateiktų projektų „Dalyvavimo biudžetas (viešasis biudžetas)" dalis bendrame pateiktų projektų skaičiuje; vietos savivaldos viešumo lygis; regiono teikiamų elektroninių paslaugų dalis per dieną nuo bendro suteiktų paslaugų skaičiaus; paskelbtų ataskaitų dalis regione pagal atvirų duomenų politikos įgyvendinimo rezultatus ir t. t. Pagal taksonometriniu metodu įvykdyto tyrimo duomenis, regionų e. valdžios išsivystymo lyderiai yra Kijivo, Dnepropetrovsko, Lvivo, Odesos, Ivano-Frankivsko regionai (sritys), o kaip žemiausio e. valdžios išsivystymo lygio regionai buvo nustatytos Luhansko ir Čerkasų sritys.

Nustatytos pagrindinės perspektyvinės kryptys diegti naujausias informacines technologijas Ukrainos regionuose (srityse): skaitmeninių platformų kūrimas, novatoriškų technologijų diegimas į išmaniojo miesto (smart city) koncepcija grįstą valdymo sistemą, IT infrastruktūros plėtra, institucinių galimybių didinimas įgyvendinant skaitmeninės plėtros projektus, atvirųjų duomenų diegimas.

Orlova Nataliia – Doctor of Science in Public Administration, professor at the Department of Public Administration and Economic Policy at Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine.
E-mail: nsorlova78@gmail.com

Nataliia Orlova – viešojo administravimo mokslų daktarė, Simono Kuzneco Charkivo nacionalinio ekonomikos universiteto Viešojo administravimo ir ekonominės politikos katedros profesorė, Charkivas, Ukraina
E. paštas: nsorlova78@gmail.com

Mokhova Yuliia – PhD candidate in Public Administration, associate professor at the Center for Postgraduate Education at Donetsk National Technical University, Pokrovsk, Ukraine.
E-mail: julimokhova@gmail.com

Yuliia Mokhova – viešojo administravimo mokslų kandidatė, Donecko nacionalinio technikos universiteto Podiplominio mokymo centro docentė, Pokrovskas, Ukraina
E. paštas: julimokhova@gmail.com

Bril Mykhailo – PhD candidate in Economics, associate professor at the Department of Public Administration and Economic Policy at Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine.
E-mail: msbril01@gmail.com

Mykhailo Bril – ekonomikos mokslų kandidatas, Simono Kuzneco Charkivo nacionalinio ekonomikos universiteto Viešojo administravimo ir ekonominės politikos katedros docentas, Charkivas, Ukraina.
E. paštas: msbril01@gmail.com

Viktoriia Beliavtseva – Doctor of Science in Economics, professor at the Department of Public Administration and Economic Policy at Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine.
E-mail: victoria.belyavtseva@ukr.net

Viktoriia Beliavtseva – ekonomikos mokslų daktarė, Simono Kuzneco Charkivo nacionalinio ekonomikos universiteto Viešojo administravimo ir ekonominės politikos katedros profesorė, Charkivas, Ukraina.
E. paštas: victoria.belyavtseva@ukr.net