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Ethics of Digital Innovation in Public Administration

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Abstract: *In public administration, digital technologies are considered a necessary direction of technical modernisation, improving the work of government agencies and the quality of their interaction with stakeholders. However, along with the benefits, several ethical concerns exist about using digital technologies. The purpose of the article is to analyse the state of the implementation of digital innovations in the field of public administration, as well as to systemise and analyse the main groups of ethical concerns arising in connection with the use of digital technologies in public administration. The article uses methods of bibliometric, comparative, and statistical analysis. The Google trends toolkit was used to study global trends in interest in e-governance, e-government, digital government, and related terms. Digital government and e-government were identified as the most common terms to define the use of digital technologies in public administration. The bibliographic analysis was carried out using VOSviewer v.1.6.18 based on Scopus articles for 2001-2022 and made it possible to identify four clusters of scientific research on e-government / digital government and ethics. The analysis used the criterion of at least five times the co-occurrence of all keywords in publications. Based on data from the World Bank, an analysis of the level of maturity of government technologies in European countries, particularly Ukraine, was carried out. The analysis showed that most countries had reached a very high level of e-government development in the European region. In recent years, Ukraine has significantly increased the indicators of the level of e-government, especially regarding the provision of digital administrative services. The article systematises the main ethical issues of using digital technologies in public administration. Three ethical problems were formed, namely 1) privacy, security, and data protection; 2) transparency and accountability; 3) inclusion, accessibility, and non-discrimination. The third group is defined as the most relevant at the current moment. The growing digital divide in the world necessitates the search for effective mechanisms to increase digital inclusion and ensure equal access to e-government for all stakeholders. The results of the research can be useful for scientists, state, and local self-government bodies in managing their technological and digital modernisation.*
Keywords: digital government, digital technologies, e-government, e-inclusion, ethical issues, privacy, security, transparency.
JEL Classification: O30, Q41, Q42.

Ethics of Digital Innovation in Public Administration

Introduction

In today's world, information technologies are integral to almost all business and management processes. In public administration, information and communication technologies are considered a necessary direction of technical modernization, improving the government agencies' work and their interaction with stakeholders. Almost all digital innovations are used in public administration, including artificial intelligence, the Internet of Things, Big Data, blockchain, etc. (Muliawaty & Framesthi, 2020; Nam et al., 2022). Several synonymous terms are used to define the use of digital technologies in public administration, the most common of which are e-government and digital government. The modern approach to e-government involves the formation of complex digital platforms (e-government as a whole) through which various government agencies interact with all groups of stakeholders: citizens (government to citizens – G2C), businesses (government to businesses – G2B), employees (government to employees – G2E), other governments (government to governments – G2G), as well as receive reverse digital interaction (citizens to governments – C2G) (Gebeyehu & Twinomurinzi, 2022; Sharma et al., 2012).

Research shows that the achievement of a high level of development of digital governance is accompanied by a decrease in the level of corruption in the country and also provides other advantages, such as the speed and quality of the provision of administrative services, active citizen participation, etc. However, along with the benefits, it is worth paying attention to the ethical concerns of digital technologies. The relevance of this issue in the field of public administration is more critical. First, unlike the business sector, citizens have no alternative to public services. Secondly, given the scale and nature of data accumulated at the government level, the leakage and misuse of this data could have far worse consequences. Therefore, the purpose of the article is to analyse the state of the implementation of digital innovations in the field of public administration, as well as to systemise and analyse the main groups of ethical concerns arising in connection with the use of digital technologies in public administration.

Literature Review

Research on digital ethics is a reaction to the widespread adoption of digital technologies, which began to affect all aspects of people's lives significantly, changing communication approaches and becoming disruptive to technology and moral principles. Digital technologies are currently in their nascent phase, so it is difficult to fully assess the consequences of their impact on society (Mišić, 2021). A comprehensive review of the ethics of digital technologies in public administration is provided in several scientific publications (Janssen et al., 2018; Liywalii & Tembo, 2019; Muliawaty & Framesthi, 2020; Roman, 2015; Sharma et al., 2012).

In particular, Sharma et al., 2012 detail the following issues concerning e-governance ethics as e-governance legislation, right to information, data protection, and privacy legislation. Muliawaty and Framesthi, 2020 consider the ethics of digital governance from the standpoint of the strong morality of government employees and the prevention of maladministration. Liywalii and Tembo, 2019 analyse the following ethical issues that arise in the use of information technology: privacy, security, computer crime, computer decisions, technological dependence (syndrome), computer technology for people living with disabilities, digital divide, trust, reliability, internet addiction, legitimacy, and fairness. Janssen et al., 2018 analyse in detail the trustworthiness of e-government, including such ethically related components as accountability, transparency, privacy and security. Ethical dilemmas related to specific types of digital technologies are often considered in the scientific literature. Artificial intelligence and Big Data technologies are especially controversial in this context (Al-Besher & Kumar, 2022; Giest, 2017; Harrison & Luna-Reyes, 2022; Ma et al., 2022; Sigfrids et al., 2022; Zuiderwijk et al., 2021; Vu et al., 2021; Zeebaree et.al., 2022).

Some studies are deeply devoted only to particular ethical concerns. For example, some authors are focused on the analysis and development of proposals for increasing the e-inclusion of digital public service consumers (Morte-Nadal & Esteban-Navarro, 2022; Giest & Samuels, 2022; AlHussainan et al., 2022). Hochstetter et al., 2022 evaluate the transparency of e-government electronic processes. To sum up, although the issue of the application of digital technologies and their implementation in public administration is given much attention by scientists, the ethical aspects of digitalization remain under-researched at the moment.

Methodology and Research Methods

The methods of bibliometric, comparative, and statistical analysis were used to achieve the research goals. The methodology of bibliometric analysis covers three stages: 1) identifying the most popular terms related to digital management using Google trends; 2) data collection and primary processing; 3) visualization of bibliometric analysis results. The Google trends toolkit was used to study global trends in interest in e-governance, e-government, digital government, and related terms. In the second stage, a selection of publications for analysis was formed. For this purpose, the database of scientific journals Scopus was used. Scopus database publications were filtered. In the "Title, abstract, keywords" field, the following query was set: ("e-government" OR "digital government") AND ("ethics").

In the next step, filters were added for publication language (only English was selected) and publication type (books, book chapters, articles, and conference papers included). The period of publications for analysis is 2001-2022. The third stage of the bibliometric analysis was implemented using the VOSviewer v.1.6.18 software. The final stage of the analysis was constructing a visualization map of scientific publications. A statistical and comparative study was carried out using official databases, particularly the World Bank data on the GovTech Maturity Index for 2020 and 2022. The research is focused on the countries of the European region, in particular, Ukraine.

Results

The rapid development of technological innovations in the 21st century and their active adoption in the economy, politics, and social sphere without an established terminology led to using different terms to denote practically synonymous concepts. Such words and prefixes as "e-," "digital," "electronic," and "cyber" are often used concerning different categories, which essentially mean their connection with the Internet and information technology. Still, they do not have a significant difference in the definition.

There are established (most commonly used) forms of the listed prefixes with specific categories. For example, digital is most often used with general concepts such as economy and society; cyber is used in conjunction with crime, security, etc. The application of technological innovations in public administration can be defined with the concepts of e-government, digital government, electronic government, e-governance, and others, which are used in parallel. Of course, there is a difference in the concepts of e-government and e-governance, which refers to a broader meaning of management, not limited to public administration. However, in general, the listed concepts are most often used synonymously.

For biometric analysis, it is advisable to limit the number of keywords to the most used ones. The article uses the Google trends toolkit to identify the most popular queries among the terms "e-government," "e-governance," "electronic government" and "digital government" (Figure 1).
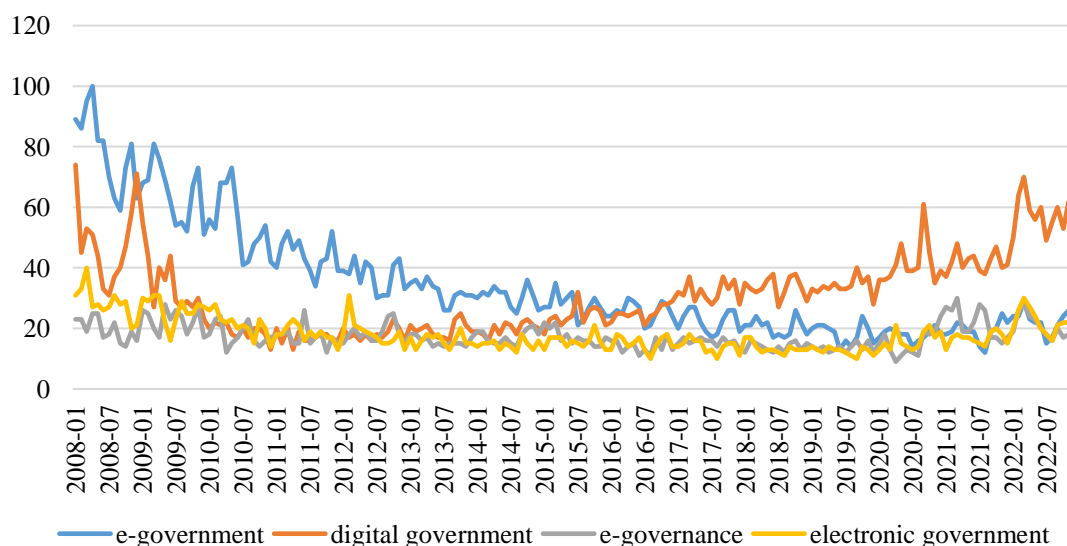

Figure 1. The Popularity of the Search Terms 'E-Government,' 'E-Governance,' 'Electronic Government,' and 'Digital Government' According to Google Trends for the Period 2008-2022

Sources: Developed by the authors using Google Trends

Figure 1 shows the results of Google trends analysis for "e-government," "digital government," "electronic government," and "e-governance" for the period 2008-2022. This period was chosen, firstly, due to the availability of data in Google. Secondly, 2008 is often considered a new stage in technological innovations, including in public administration, due to the appearance of smartphones, artificial intelligence, blockchain, BigData, and other technologies. Figure 1 shows that e-government and digital government are the most popular terms analyzed. At the same time, there is a tendency to decrease searches for the word "e-government," which was more widespread until 2016, and on the contrary, an increase in searches for "digital government".

The analysis of search queries in Google trends shows regional differences in the popularity of various key terms for e-government. In particular, the term "digital government" is commonly used in the USA, Canada, Great Britain, Australia, and New Zealand. The term "e-government" is more prevalent in most other countries. Therefore, the terms e-government and digital government were chosen for the next stage of bibliometric analysis. Since the research aims to study ethical issues related to the use of digital technologies in public administration, the bibliometric analysis includes publications in the Scopus database that simultaneously cover such areas as ethics on the one hand and e-government or digital government on the other hand.

Compared to the entire array of e-government or digital government research, the Scopus database contains relatively few publications that include ethical issues. Thus, for 2001-2022, out of more than 15,000 publications on e-government or digital government, less than 900 publications, i.e., 5.8% of the total, included ethical issues (the study includes books, book chapters, articles, and conference papers in English). The first Scopus publication on ethical issues in digital governance appeared in 2001. The annual number of such publications has been at least 40 since 2010. There has been a positive trend of increasing interest in this topic and the corresponding number of publications in recent years.

The next step was bibliometric analysis using VOSviewer v.1.6.18. Based on the results, the key directions of scientific research on e-government/digital governance and ethics were determined, the points of intersection of these studies were clarified, and a corresponding visualization map was built (Figure 2).
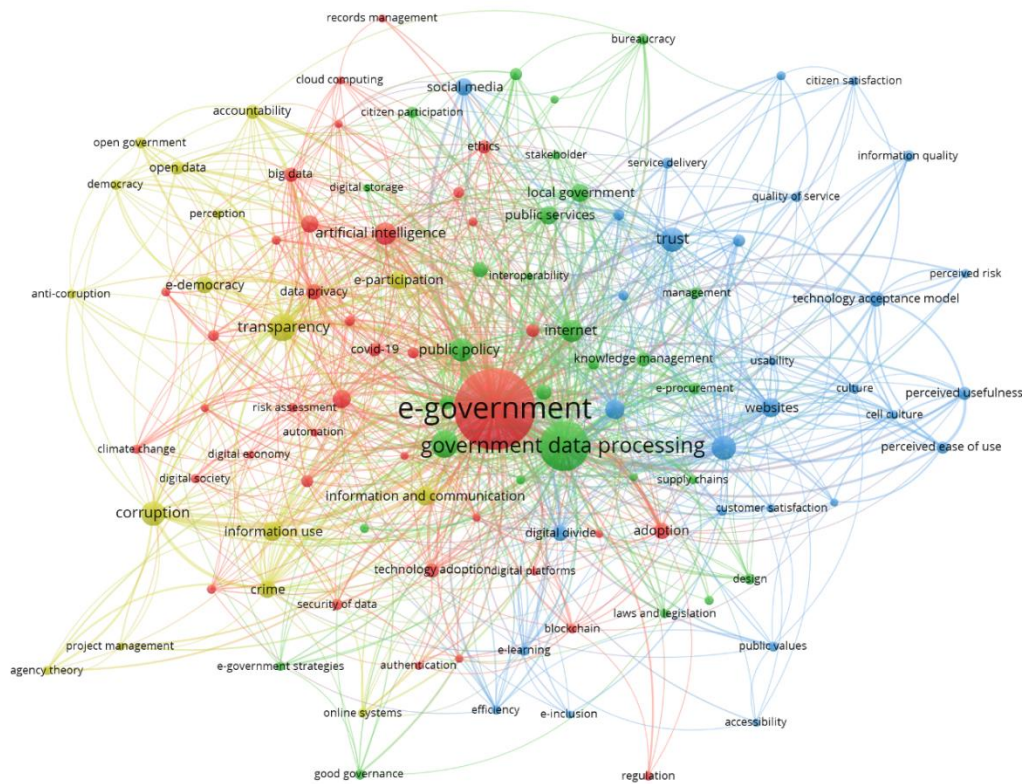

Figure 2. Results of Bibliometric Analysis of Scientific Research on 'E-Government' / 'Digital Government' and 'Ethics' for the Period 2001-2022

Sources: Developed by the authors based on Scopus publications using VOSviewer 1.6.18

The bibliographic analysis was conducted based on 893 articles in Scopus for 2001-2022. The analysis used the criterion of at least five times the co-occurrence of all keywords in publications. As a result, four contextual clusters were identified. Table 1 gives a brief description of each cluster.

Table 1. Composition of Clusters Based on Bibliometric Analysis Results

Cluster	Number of items	Description of the cluster	Key items
Cluster 1 (red)	38	Issues related to digitization and digital technologies adoption in public administration	E-government, artificial intelligence, big data, blockchain, cloud computing
Cluster 2 (green)	29	Issues related to the general government approach and public administration procedures on different levels	Government data processing, interoperability, public policy, sustainability, government initiatives
Cluster 3 (blue)	29	Issues related to e-government services from a consumer perspective	Quality of services, accessibility, trust, digital divide, e-inclusion
Cluster 4 (yellow)	16	Issues related to the transparency of public administration, active participation of citizens, and overcoming corruption	Transparency, accountability, corruption, e-democracy, open government

Sources: Developed by the authors using VOSviewer 1.6.18

Thus, scientists often analyse digital government through the prism of specific digital technologies, their advantages, disadvantages, and relevant ethical issues concerning using a particular technology. A separate line of research examines digital government comprehensively and touches on such issues as sustainable development, interoperability, and data processing. A substantial proportion of publications is devoted to problems of accessibility, the inclusion of digital services in public administration, the quality of these services, and consumer trust. The smallest share of research concerns the issues of transparency, accountability, the openness of the government, and the role of digital technologies in overcoming corruption and developing democracy. The relevance of digital government research is growing in connection with the rapid introduction of digital technologies, the acceleration of the pace of application of artificial intelligence, blockchain, the Internet of Things, Big Data and other technologies in recent years.

According to World Bank estimates, as of 2022, 69 countries (35%) have reached a very high level of digital governance development. Other 46 countries have a high level of technology in public administration and a significant focus on this issue. These findings are derived from the calculation of the GovTech Maturity Index (GTMI), which includes four components: Core Government Systems Index (CGSI), Public Service Delivery Index (PSDI), Digital Citizen Engagement Index (DCEI), and GovTech Enablers Index (GTEI). The Core Government Systems Index captures general aspects of public administration based on information technologies, including cloud technologies, interoperability framework, digital platforms and others. The Public Service Delivery Index summarizes the indicators of the provision of public services through online portals, including their accessibility and citizen-centricity. The Digital Citizen Engagement Index measures aspects of citizens' feedback, particularly the presence of public participation platforms and data openness. The GovTech Enablers Index summarizes the factors that contribute to the digitalization of public administration, including strategies, regulations, GovTech development programs and digital skills (The World Bank, 2022).

An analysis of the GovTech Maturity Index for Ukraine showed that Ukraine achieved a significant increase in the GTMI score in 2022 compared to previous estimates of 2020. Growth occurred in the GovTech Maturity Index and all its components (Figure 3). It allowed Ukraine to join the group of countries with a very high level of GovTech Maturity in 2022.
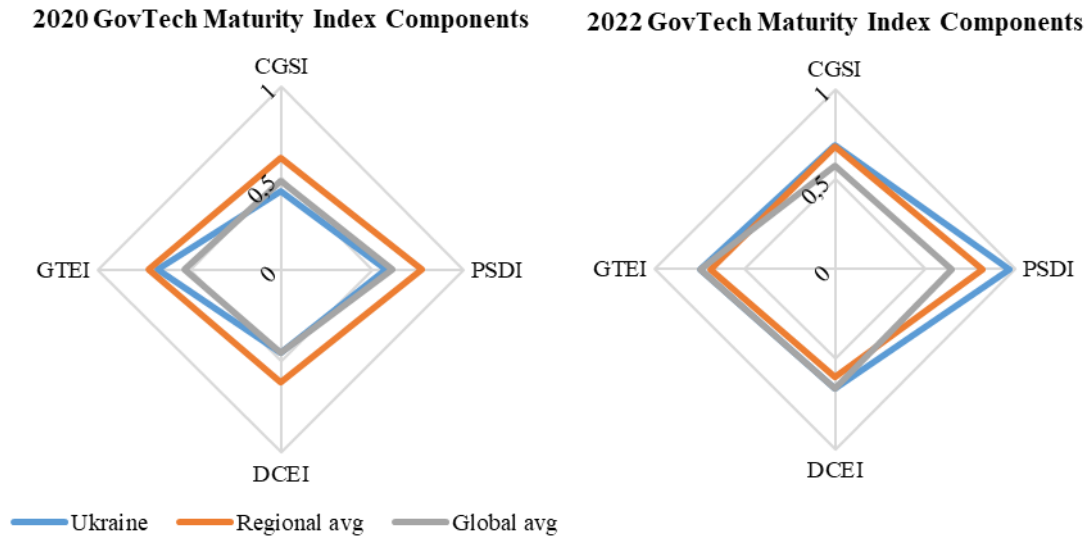
Figure 3. Govtech Maturity Index of Ukraine in 2020 and 2022

Sources: The World Bank, 2022

In 2020, Ukraine had lower values of all components of the GovTech Maturity Index, except the GovTech Enablers Index, compared to the regional average (economies in Europe and Central Asia) and the global average. In 2022, Ukraine scored higher on the GTMI and all its components than the regional and global averages. The Public Service Delivery Index, which characterizes the provision of administrative services online, had the largest increase in 2022. As of 2022, most European countries have achieved a very high GovTech Maturity (index value equal to or greater than 0.75) (Figure 4). Countries such as Bulgaria, Poland, Slovak Republic, North Macedonia, Romania, Montenegro and Ireland have a high value of GovTech Maturity ($0.5 \leq$ GTMI < 0.75) with a significant focus on information technologies. A few more European countries are characterized by a slight focus on information technologies in public administration and average values of the GTMI: Liechtenstein, Bosnia and Herzegovina, Monaco, Andorra and San Marino.
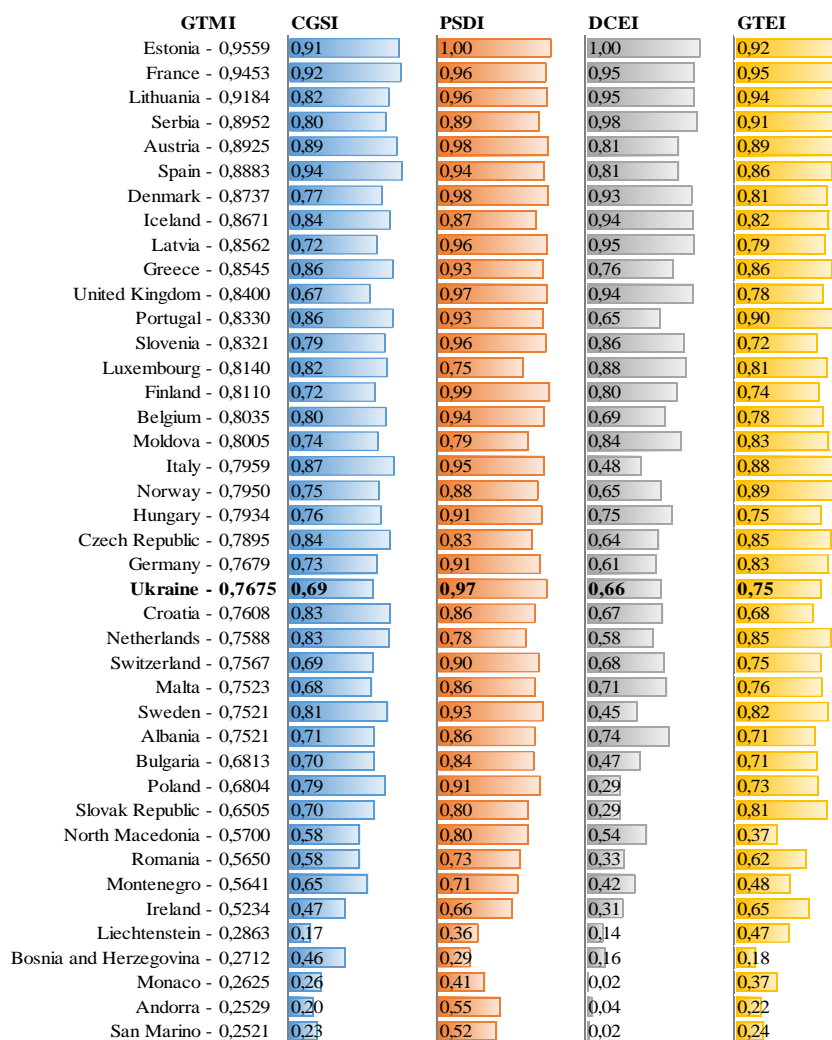
GTMI	CGSI	PSDI	DCEI	GTEI
Estonia - 0,9559	0,91	1,00	1,00	0,92
France - 0,9453	0,92	0,96	0,95	0,95
Lithuania - 0,9184	0,82	0,96	0,95	0,94
Serbia - 0,8952	0,80	0,89	0,98	0,91
Austria - 0,8925	0,89	0,98	0,81	0,89
Spain - 0,8883	0,94	0,94	0,81	0,86
Denmark - 0,8737	0,77	0,98	0,93	0,81
Iceland - 0,8671	0,84	0,87	0,94	0,82
Latvia - 0,8562	0,72	0,96	0,95	0,79
Greece - 0,8545	0,86	0,93	0,76	0,86
United Kingdom - 0,8400	0,67	0,97	0,94	0,78
Portugal - 0,8330	0,86	0,93	0,65	0,90
Slovenia - 0,8321	0,79	0,96	0,86	0,72
Luxembourg - 0,8140	0,82	0,75	0,88	0,81
Finland - 0,8110	0,72	0,99	0,80	0,74
Belgium - 0,8035	0,80	0,94	0,69	0,78
Moldova - 0,8005	0,74	0,79	0,84	0,83
Italy - 0,7959	0,87	0,95	0,48	0,88
Norway - 0,7950	0,75	0,88	0,65	0,89
Hungary - 0,7934	0,76	0,91	0,75	0,75
Czech Republic - 0,7895	0,84	0,83	0,64	0,85
Germany - 0,7679	0,73	0,91	0,61	0,83
Ukraine - 0,7675	**0,69**	**0,97**	**0,66**	**0,75**
Croatia - 0,7608	0,83	0,86	0,67	0,68
Netherlands - 0,7588	0,83	0,78	0,58	0,85
Switzerland - 0,7567	0,69	0,90	0,68	0,75
Malta - 0,7523	0,68	0,86	0,71	0,76
Sweden - 0,7521	0,81	0,93	0,45	0,82
Albania - 0,7521	0,71	0,86	0,74	0,71
Bulgaria - 0,6813	0,70	0,84	0,47	0,71
Poland - 0,6804	0,79	0,91	0,29	0,73
Slovak Republic - 0,6505	0,70	0,80	0,29	0,81
North Macedonia - 0,5700	0,58	0,80	0,54	0,37
Romania - 0,5650	0,58	0,73	0,33	0,62
Montenegro - 0,5641	0,65	0,71	0,42	0,48
Ireland - 0,5234	0,47	0,66	0,31	0,65
Liechtenstein - 0,2863	0,17	0,36	0,14	0,47
Bosnia and Herzegovina - 0,2712	0,46	0,29	0,16	0,18
Monaco - 0,2625	0,26	0,41	0,02	0,37
Andorra - 0,2529	0,20	0,55	0,04	0,22
San Marino - 0,2521	0,23	0,52	0,02	0,24

Figure 4. GovTech Maturity Index Components for the European Countries in 2022

Sources: Consolidated by the authors based on (The World Bank, 2022)

In general, most European countries have achieved a high level of digitization of public governance, including general aspects of public administration, online provision of public services, digital citizen engagement, innovative strategies, and digital skills. On the one hand, the obtained results indicate a high level of e-government development and attention to ethical issues of digital technologies in public administration. On the other hand, such scale and multifaceted application of digital technologies create increased risks and actualize ethical matters. Therefore, the main types of ethical issues related to the digitalization of public administration have to be considered in detail, as well as possible solutions.

Summarizing the results of the bibliometric analysis and the conducted research, it is possible to distinguish three directions of ethical concerns about e-government:

➢ Privacy, security, and data protection;
➢ Transparency, accountability;
➢ Inclusion, accessibility, and non-discrimination.

The first group of ethical issues includes privacy, security, and data protection. These issues are interrelated but have some differences in application. Privacy is a universally recognized individual right. Personal information subject to protection includes names, dates of birth, photo and video materials, addresses, and phone numbers. Security refers to the general safety of information systems, information resources, and access control. Ensuring adequate data protection and security is critical in building trust in government digital platforms. Data protection and security issues are regulated at the national and international levels. Considerable attention is paid to this issue in the European Union. In particular, the EU's primary regulatory documents on data protection are The General Data Protection Regulation (GDPR) and the Data Protection Law Enforcement Directive.

The second group of ethical issues is related to transparency and openness of data, as well as accountability and transparency of government structures. Digital governance, in this case, is a means of achieving these goals. Electronic public procurement systems, transparent budgets, and open reporting data of government agencies make it possible to reduce corruption (Androniceanu & Georgescu, 2021; Kim, 2014). However, some researchers note a potential conflict between the openness of data and the need to maintain personal data privacy. Sometimes it is not easy to distinguish between these components. In addition, there is the issue of protecting information about secret government spending, such as military spending.

The third group of ethical issues concerns the need to ensure inclusive access to digital government services and create a non-discriminatory digital environment. Implementation of these tasks is currently the most difficult. Research shows that countries have achieved a high level of GovTech maturity, but the digital divide is growing globally. A possible solution to this ethical issue is promoting digital inclusion by implementing national strategies for improving digital skills and conducting digital literacy training for vulnerable populations. In addition, digital by default is preferred over digital by design. Digital by default means that the user can receive the service in digital format, but other options are not excluded. While digital by design implies the existence of an exclusively digital form of a service/product, in which it is created without a physical analogue. Such products discriminate against people who do not have access to the Internet or are otherwise digitally excluded.

Conclusions

Implementing digital innovations in public administration is the main direction of its modernization and a condition for ensuring transparency, efficiency, and citizen-centricity. Most world's economies already focus on adapting digital technologies in public administration, and a considerable proportion of economies have already reached a high level of e-government maturity. Ukraine has also demonstrated significant progress in developing government technologies in recent years. Given the rapid pace of adaptation of digital innovations, the current focus of e-government research should consider the potential threats and ethical issues that arise in connection with digital technologies. Based on the study results, it is proposed to consider three groups of ethical concerns regarding digital governance: privacy, security, and data protection; transparency and accountability; inclusion, accessibility, and non-discrimination. The problems of digital inclusion and non-discrimination of e-governance are the most relevant at the current stage. The growing digital divide in the world necessitates the search for effective mechanisms to increase digital inclusion and ensure equal access to e-government for all stakeholders. This issue is a priority direction for further scientific research.

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