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INFLUENCE OF THE ECONOMIC GAP ON THE LEVEL OF E-GOVERNMENT IN THE DEVELOPING COUNTRIES – REPUBLIC OF MOLDOVA

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The digital divide of developing countries vis-à-vis developed countries is also reflected in the level of e-Government development. Developing countries face the challenges of e-Government with reduced capacities and resources but also strong incentives for growth prospects.

Developing e-Government as a complex phenomenon involves multidisciplinary efforts: the development of electronic communications infrastructures and data infrastructures, the transformation of internal business processes of government, increased democracy, education, as well as a sustained economic level, and so on.

The research analyses the level of e-Government development in the Republic of Moldova in a regional context of a group of developing countries. It is an attempt to find particularities and similarities in the evolution of e-Government in this space and to identify the development potential and opportunities and to overcome the gap in this area.

The study also addresses the prospect of alignment with European standards on e-Government development, especially with regard to the single digital market, the European Interoperability Framework and others, as levers and drivers for increasing the socio-economic level of Moldova, and building an open, participative and performing government.

KEYWORDS:

Electronic Government, ICT, Eastern Partnership, developing countries, economic development, country in transition

1. INTRODUCTION

Electronic government is a great challenge for the traditional model of public administration. It has an overwhelming influence on how to organise internal government processes and on the services provided by citizenship and business governance.

Over the years, the issue of implementing e-Government in developing countries and especially in transition countries¹ has been the subject of numerous studies.² Research has focused on the specificities of e-Government development in these countries, on the causes of failure of e-Government projects, barriers to e-Government implementation and on issues such as government policies in the field, ICT infrastructure, education, research, culture, democratic freedoms, and so on.

The purpose of this paper is to examine the situation regarding e-Government development in the Republic of Moldova in an attempt to understand to what extent this process takes place in line with the general trends in the digitisation of government, but also to help identify development opportunities.

In our study, we have been particularly interested in how the level of economic development of the country influences the phenomenon of e-Government and whether there are specific characteristics for developing countries in comparison to developed countries.

2. REASON OF RESEARCH

Several studies highlight factors with an essential influence on the implementation process of e-Government.³ These include, for example, lack of awareness of the role and

¹ According to the World Economic Situation and Prospects classification of the countries of the world: developed economies, economies in transition and developing economies, depending on the basic economic conditions of each country. World Economic Situation and Prospects 2020. UN, 2020, 163, 165.

² United Nations E-Government Survey 2020. Digital Government in the Decade of Action for Sustainable Development; Suha AlAwadhi and Anne Morris, 'Factors Influencing the Adoption of E-government Services', *Journal of Software* 4, no 6 (2009); Kazeem Oluwakemi Oseni, Kate Dingley and Penny Hart, 'Barriers Facing E-Service Technology in Developing Countries: A Structured Literature Review with Nigeria as a Case Study', *2015 International Conference on Information Society (i-Society)*, November 2015; Richard Heeks, 'Information Systems and Developing Countries: Failure, Success, and Local Improvisations', *The Information Society* 18, no 2 (2002), 101–112; Mayumi Miyata, 'Measuring Impacts of e-Government Support in Least Developed Countries: a Case Study of the Vehicle Registration Service in Bhutan', *Information Technology for Development* 17, no 2 (2011), 133–152; Richard Heeks, 'Most e-Government-for-Development Projects Fail. How Can Risks be Reduced?', *iGovernment Working Paper* no 14, 2003; Danish Dada, 'The Failure of E-Government in Developing Countries', *The Electronic Journal on Information Systems in Developing Countries* 26, no 1 (2006), 7.

³ AlAwadhi and Morris, 'Factors Influencing'; Dada, 'The Failure of E-Government'; Strategic Programme for Technological Modernisation of Governance (e-Transformation), 2011; Ngo Tan Vu Khanh, 'The critical Factors Affecting E-Government Adoption: A Conceptual Framework in Vietnam', s. a.; Ali M Al-Naimat, Mohd Syazwan Abdullah and Mohd Khairie Ahmad, 'The Critical Success Factors for E-Government Implementation in Jordan', 2013; Princely Ifinedo, 'Examining Influences on eGovernment Growth in the Transition Economies of Central and Eastern Europe: Evidence from Panel Data', *11th European Conference on eGovernment (ECEG)*, 2011; The Global Competitiveness Report 2019; Spyridoula Lakka, Teta Stamati,

opportunities of e-Government,⁴ funding of e-Government projects, political and legal issues, political support, resilience to change, vision and implementation strategy,⁵ lack of infrastructure.⁶

The most frequently mentioned and considered critical factors in the effort to implement e-Government are financing, IT infrastructure, legal issues, awareness and political support.⁷ For example, in case of developing countries, funding for e-Government projects is much more critical because they have limited resources.⁸ As a rule, e-Government projects in these countries are largely funded by external donors and, once these grants are completed, the sustainability of the projects can no longer be ensured. On the other hand, projects financed in this way often do not offer an approach that leads to incremental improvements in which functionalities are improved over time, so that efforts are not wasted if funding is reduced.

In our research we considered the economic aspect of the problem; the level of economic development being the basic criterion according to which countries are classified in different categories of development. We set out to examine the situation in a group of developing countries, according to the International Monetary Fund classification⁹ in regions that were formerly ruled by communist governments, a group that also includes the Republic of Moldova. Countries that are or have been in transition, the idea that these countries have a somewhat common past, certain economic and social characteristics, common cultural and mental features, and so on, allowed us to identify certain regularities in the process of implementing e-Government.

We also wanted to study the dependence between the level of economic development and the level of e-Government in an extended context, at the level of countries across the European continent. On the one hand, we were interested in having a broader vision of the relationship between the level of development of e-Government and that of economic development and, on the other hand, we wanted to see what are, in general, the particularities of countries like the Republic of Moldova, where relations between e-Government and economic development are under development.

The Republic of Moldova is a country increasingly closely linked to European practices in all areas of economic and social life both in geographical proximity and especially through the association agreement. The Moldovan e-Government model will have to take this link

Christos Michalakelis and Draculis Martakos, 'What Drives eGovernment Growth? An Econometric Analysis on the Impacting Factors', *IJEG* 6, no 1 (2013), 20–36; Spyridoula Lakka, Teta Stamati, Christos Michalakelis and Dimosthenis Anagnostopoulos, 'Cross National Analysis of the Relation of eGovernment Maturity and OSS growth', *Technological Forecasting & Social Change* 99 (2015), 132–147.

⁴ AlAwadhi and Morris, 'Factors Influencing'.

⁵ Al-Naimat et al., 'The Critical'.

⁶ Dada, 'The Failure of E-Government'.

⁷ Ibid.

⁸ Dada, 'The Failure of E-Government'.

⁹ World Economic Outlook 2018, 134–135; World Economic Outlook, Database – WEO Groups and Aggregates Information, 2018.

into account, and technological and other solutions for transforming governance will have to develop into an information space increasingly integrated with the European one, by harmonising the regulatory framework and aligning to European practices and norms. This must be one of the most important issues on the e-Government development agenda in Moldova.

3. E-GOVERNMENT IN MOLDOVA

The Republic of Moldova is a developing country, a country in transition, detached from the former Soviet Union in 1991. At the end of the Soviet period, there were a significant number of local technological institutions and enterprises. They had been activated in the Soviet industry, especially in the military industry. For example, more than 35,000 specialists were employed in the electronics industry at the end of the 1980s¹⁰ (for comparison, in 2018, the ICT sector employed 20,000 specialists¹¹). During this time, human potential with experience and culture in the field of ICT was created. The achievements of the Republic of Moldova in the field of ICT, especially in the electronic communications infrastructure, are largely due to this potential. The export of IT services made up a share of 13.1 per cent of total services exported in 2019, exceeding exports of (traditional) alcoholic beverages, as well as exports of other business services, according to the National Bank of Moldova (www.bnm.md).

Moldova is part of the group of countries with a high level of EGDI, between 0.50 and 0.75, with an e-Government Development Index of 0.6881. Also, Moldova, being a lower middle-income country (GDP per capita PPP IC\$ 2019– 13627 US dollars), records very high values of the Online Services Index (0.7529) and the e-Participation Index (0.7619, global position – 55) and is one of 10 countries of this category, which have values of the e-Government Development Index above the global average.¹²

Table 1 • E-Government Development Index in Moldova, 2020
(Source: UN E-Government Survey 2020)

	EGDI	Online Service	Telecomm. Infrastructure	Human Capital
Republic of Moldova	0.6881	0.7529	0.7432	0.5683
<i>Eastern Partnership Countries (EaP)</i>	0.7249	0.6892	0.8206	0.6649
<i>EU</i>	0.8494	0.8157	0.8895	0.8430
<i>Europe</i>	0.8170	0.7802	0.8674	0.8033
World	0.5988	0.5620	0.6880	0.5464

¹⁰ Ion Bostan, *Științele ingineresti și cooperarea cu industria în Republica Moldova* [Engineering Sciences and Cooperation with the Industry in the Republic of Moldova] (București: AGIR, 2016).

¹¹ Strategy for the Development of the Information Technology and Eco-System for Digital Innovation for the Years 2018–2023.

¹² UN E-Government Survey 2020.

An important feature at this stage is that the means of communication and use of information applications are becoming more accessible. This especially refers to mobile telephone use, which has a coverage of about 125 per cent, and the penetration rate of broadband mobile internet use of 85 per cent (<http://www.anrceti.md/>). This makes it possible to capitalise on great opportunities for development and better provision of online public services.

Even if the progress made so far by the Republic of Moldova in implementing e-Government is obvious, there are still fears that the situation is not so good, the reasons for this being several factors limiting development. The World Economic Forum highlights the most problematic factors for doing business in Moldova. These include, first and foremost, corruption, political instability, government instability, inefficient government bureaucracy and access to finance.

The reports E-Government Developing Index¹³ and Network Readiness Index 2020¹⁴ place the Republic of Moldova in the last position among Eastern Partnership countries (Table 2, Table 3):

Table 2 • Network Readiness Index, EaP countries, 2020

(Source: *The Network Readiness Index 2020*)

Country	NRI Rank	NRI Score
Armenia	55	51.91
Ukraine	64	49.43
Belarus	65	49.16
Azerbaijan	66	48.76
Georgia	68	47.95
Moldova	71	47.09

Table 3 • E-Government Developing Index, EaP countries, 2020

(Source: *UN E-Government Survey 2020*)

Country	EGDI Rank	EEGDI Index
Belarus	40	0.8084
Georgia	65	0.7174
Armenia	68	0.7136
Ukraine	69	0.7119
Azerbaijan	70	0.7100
Moldova	79	0.6881

¹³ Ibid.

¹⁴ The Network Readiness Index 2020. Accelerating Digital Transformation in a post-COVID Global Economy.

Moldova has characteristics specific for developing countries:¹⁵

- Reduced funding opportunities for e-Government projects. The most important program of e-Government, Strategic Program for technological modernisation of governance (e-Transformation)¹⁶ adopted in 2011, was supported by the International Development Association (IDA) in a rate of over 85 per cent, and, for example, expenditure on computerisation of government, defence and compulsory insurance is just over 0.2 per cent of GDP.¹⁷
- Demographic and territorial disparities.¹⁸ Over half of the country's population, 57 per cent, live in rural areas. About 89 per cent of the total IT expenditure of legal entities in 2019 are made in Chisinau. The expenditures for the purchase of computer equipment were in proportion of 82 per cent/18 per cent, the purchase of software products – 95 per cent/5 per cent, designs and elaborations of computer systems – 98 per cent/2 per cent, according to www.statistica.md.
- Sporadic and uncoordinated use of electronic services.¹⁹
- A poorly developed ICT market, in particular the IT market and low ICT absorption by companies.²⁰
- Low level of government procurement of advanced technologies (136th place from 138 countries).²¹
- Digitising front-office processes, while back-office is still out of digitisation.⁹

4. DATA SOURCES

In order to establish a functional relationship between the economic development level and the level of development of e-Government in the group of countries that make up the research sample, current data with free access were used, namely:

- e-Government Development Index (EGDI), according to the United Nations²²
- GDP per capita, according to the World Bank (<http://api.worldbank.org>)
- Global Competitiveness Index (GCI), according to the World Economic Forum²³

¹⁵ Heeks, 'Information Systems'; Heeks, 'Most e-Government'; Dada, 'The Failure of E-Government'.

¹⁶ Strategic Programme.

¹⁷ Mihai Grecu, Igor Cojocaru and Ion Coşuleanu, 'On e-Governance Development Opportunities in the Republic of Moldova', *Proceeding of the 'CEE eDem and eGov Days 2018' conference*, Budapest, 3–4 May 2018, 327–336.

¹⁸ Mihai Grecu, Ilie Costaş and Artur Reaboi, 'E-Government Services in Moldova: Value and Opportunities', *Proceedings of the Central and Eastern European e|Dem and e|Gov Days 2017*, Budapest.

¹⁹ Ibid.

²⁰ The Global Competitiveness Report 2016–2017.

²¹ Ibid.

²² UN E-Government Survey 2020.

²³ World Economic Outlook 2018.

- The Network Readiness Index 2020. Accelerating Digital Transformation in a post-COVID Global Economy (<https://networkreadinessindex.org>)
- Population structure of the Republic of Moldova, 2019 (www.statistica.md)
- Expenditure of legal entities for IT, in territorial profile, 2019 (www.statistica.md)

5. DATA ANALYSIS AND MODEL ESTIMATION

We understand the notion of the level of e-Government development in a particular country, as defined in E-Government Reports,²⁴ as the availability and capacity of national institutions to use ICT to provide public services, and the E-Government Development Index (EGDI) as a measure, which is used by government officials, policy makers, researchers and representatives of civil society and business to better understand the relative position of a country in using e-Government to deliver public services.

As an indicator of the level of development of e-Government, the composite E-Government Development Index (EGDI) indicator was taken, and as an independent variable and indicator attesting to the level of economic development, GDP per capita of the countries was taken into account.

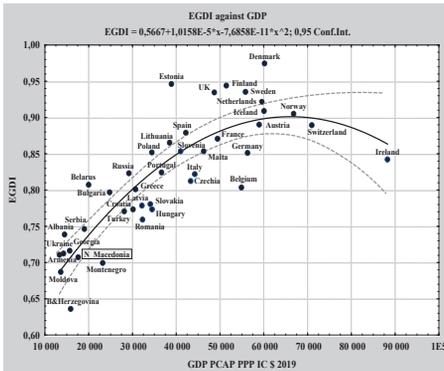


Figure 1a • EGDI 2020 against GDP PCAP. European countries (Source: Compiled by the authors.)

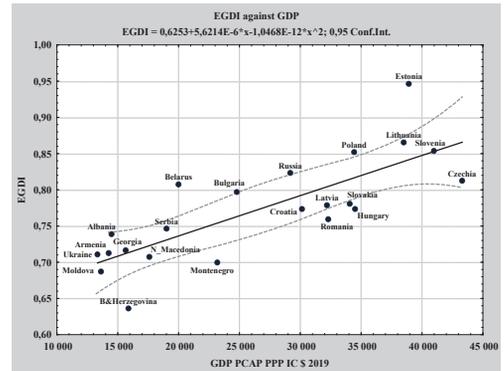


Figure 1b • EGDI 2020 against GDP PCAP. former or current European countries in transition (Source: Compiled by the authors.)

In the analysis process we also used another development indicator – the Global Competitiveness Index, calculated and maintained in the global competitiveness reports of the World Economic Forum. The idea of analysing the relationship between EGDI and GCI comes from the belief that this indicator would reflect a more complex and nuanced level of development in its calculation. Many more factors than the level of economic

²⁴ UN E-Government Survey 2020.

development were taken into account, the weight of which becomes more and more visible with the evolution of e-Government phenomena.

From a mathematical point of view, EGDI, like many similar composite indicators, is a weighted average, in this case, of three sub-indices: the Online Service Index (OSI), the Telecommunication Infrastructure Index (TII) and the Human Capital Index (HCI). The preference for EGDI came from the fact that it is established as a result of complex questionnaires (140 questions), in which the emphasis is on the identification of multiple aspects of the e-Government concept, in close connection with the Sustainable Development Objectives.

The level of economic development is primarily represented by the broad general indicator used in development process research such as Gross Domestic Product (GDP) per capita, and secondly by the composite Global Competitiveness Index as a measure of the level of the competitiveness of national economies, which in turn determines the productive level of these economies. Built on 98 variables that describe different aspects of country economies, GCI highlights the determinants of long-term development.

To identify the relationship between the e-Government Development Index and Gross Domestic Product (GDP per capita), as well as between the EGDI and the Global Competitiveness Index and to verify the results, we used data from 2010–2019 for GDP and GCI and 2010–2020 for EGDI.

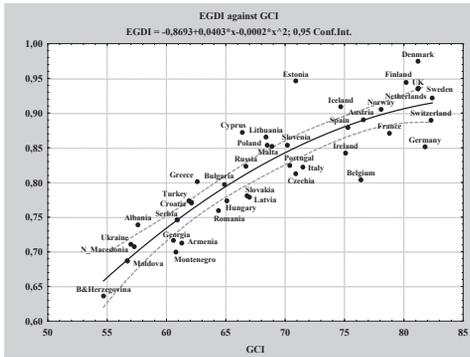


Figure 2a • EGDI 2020 against GCI 2019 European countries (Source: Compiled by the authors.)

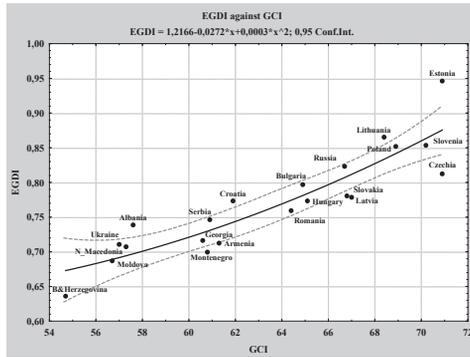


Figure 2b • EGDI 2020 against GCI 2019 European countries that were or are still in transition (Source: Compiled by the authors.)

The data analysis showed that there is a direct relationship between the level of economic development of the country and the level of development of e-Government. The nature of the relationship between EGDI and GDP (Figure 1a) is somewhat similar during that period. Also, the condition of the relationship between EGDI and GCI (Figure 2a) is the same throughout this period. These relations are stronger when the economic level and competitiveness of the country is at a lower level and the economic factor is a critical one. In case of countries with strong economic potential and a high level of global

competitiveness, the EGDI–GDP and EGDI–GCI relations become less pronounced. Our research shows that in these conditions the role of social, cultural, management factors, and so on, increases. This phenomenon is to be investigated in more depth.

Over the years, the level of development of e-Government is increasing in all countries. Thus, in Europe, the average value per country of the e-Government development index increased by 31 per cent from 2010 to 2020. The increase, in the same period, of the EDGI value at the EU level was of 35 per cent, in the Eastern Partnership countries – EaP (Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine) the index increased by 58 per cent, and in Moldova by 49 per cent.

Developing countries have registered a higher pace in the development of e-Government (Figure 1b, Figure 2b). In our opinion, this growth was based on and supported by the increase in the economic level. Gross Domestic Product per capita at purchasing power parity increased in Europe by 45 per cent, in the EU by 47 per cent, in EaP by 53 per cent, and in Moldova by 113 per cent. The faster rise in EGDI levels in developing countries could also suggest that they are much more motivated at this stage to develop their own e-Government systems.

For countries in transition, the implementation of e-Government is an even greater challenge as these countries are still in the process of building economic and social mechanisms and even states and nations.²⁵ These countries have neither sufficient governance experience nor the resources necessary for good governance in the modern vision of this concept such as democratic practices, accountability, transparency and the participation of citizens and business in the act of governing. On the other hand, this challenge can also be seen as an opportunity to implement new social and economic models and mechanisms based on digital technologies that allow them to develop.

An eloquent example of this is, in our view, Estonia, which has made amazing progress in digital development in a short time. The e-Government solution developed in this country is a remarkably successful one, and the United Nations E-Government Survey 2020 Report ranks it 3rd in the world and second in Europe in the e-Government Development Index. Estonia has thus surpassed countries such as the Netherlands (Figure 3b), for example, a country that has always been at the top of this ranking with a much higher economic potential than Estonia (Figure 3a).

In the case of the Netherlands, for example, inconsistencies and shortcomings in the management of the public sector IT process led to unjustified costs and inefficiencies in the implementation of e-Government,²⁶ in Estonia, on the contrary, an innovative systemic approach has ensured progress and efficiency.²⁷ Estonia has shown that e-Government can be built in a small country, a country in transition, just as the Republic of Moldova is,

²⁵ Mihai Grecu, 'Provocări privind e-Guvernarea în Europa de Est: Cazul Republicii Moldova' [E-Governance Challenges in Eastern Europe: The Case of the Republic of Moldova], *Intellectus* no 1–2 (2020), 139–147.

²⁶ Dada, 'The Failure of E-Government'.

²⁷ Miguel Goede, 'E-Estonia: The e-Government Cases of Estonia, Singapore and Curaçao', *Archives of Business Research* 7, no 2 (2019).

and the economic power of the country, even if it is especially important, is not the only factor on which the identification and successful realisation of innovative and efficient e-Government solutions depends.

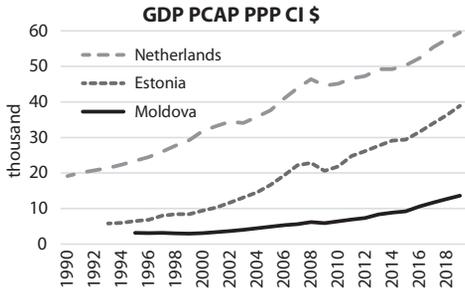


Figure 3a • GDP per capita evolution (Netherlands, Estonia, Moldova, 1990–2019) (Source: Compiled by the authors.)

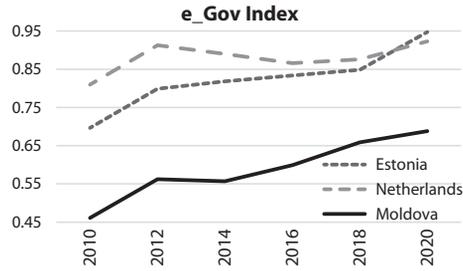


Figure 3b • EGDI evolution (Netherlands, Estonia, Moldova, 2010–2020) (Source: Compiled by the authors.)

6. OBSERVATIONS AND CONCLUSIONS

The study aimed to investigate the dependence between the level of economic development of the Republic of Moldova and the level of development of e-Government in the context of a group of developing countries that were formerly communist. The choice of this group of countries is not coincidental, with several common features between these countries, such as the economic model, social relations, similarities in how to organise, how governance is perceived, and so on. On the other hand, it has been interesting to see how these countries are positioned in relation to economically advanced countries. Some of the European countries, which are now developed countries, have already gone through a transition from a planned economy to a market economy.

In parallel with the dependence between e-Government development and the level of revenues, another dependence was considered, the level of e-Government and the level of economic competitiveness. The reason for choosing to include GCI in research is that it is a much more complex variable that takes into account several aspects of economic development, some of which, in our opinion, may give us a slightly more appropriate picture of the essence of the economic factor.

Research finds a clear dependence of e-Government on the level of economic development, which is in line with studies in the field.²⁸ At the same time, there is a visible distinction

²⁸ AlAwadhi and Morris, 'Factors Influencing'; Heeks, 'Information Systems'; Heeks, 'Most e-Government'; Dada, 'The Failure of E-Government'; Al-Naimat et al., 'The Critical'; Ifinedo, 'Examining'.

between the level of e-Government and the level of income between developing countries and developed countries. This finding suggests that, although there are a variety of other influences about the level of e-Government development, income levels are decisive. The studies did not find significant quantitative influences between the level of development of e-Government and specific components of GCI such as Public-sector performance, Entrepreneurship, Digital skills among the population, Government policy stability policy, Government's long-term vision, Government's responsiveness to change, except for the E-Participation Index, the influence of composite factor Global Competitiveness Index 4.0, which is a significant factor.

The challenge for the Republic of Moldova in this respect is both the gap with other countries and the internal disparities of economic and social development that will not be overcome very soon. This can be significant in the context of the global development competition that will be largely devoted to the digitisation of social activities both within the government and in the private space. IT investments in the government sector and businesses are far too limited.

The Republic of Moldova is a country more closely linked to European practices in all areas of economic and social life both in geographical proximity and especially through the Association Agreement and the Eastern Partnership – a regional and multilateral initiative that includes the European Community and its six Eastern Partners: Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova and Ukraine, and which aims to support and provide assistance for reforms in the region in various fields in order to bring the six neighbouring countries closer to the European Union. The EaP's digital agenda provides support for creating a better digital environment in partner countries, developing e-services for citizens and business, and establishing a policy framework for e-services. This involves harmonising digital markets in partner countries and extending the European, digital single market to the Eastern Neighbourhood, aiming at developing digital potential and growth through the adoption of European rules and practices.

The research was carried out using current data from the countries in the sample. We consider it of interest to investigate the evolution of the level of development of e-Government, both depending on the level of economic development and on various other aspects, taking into consideration, for example, the temporal aspect of the phenomenon, but also a broader context of research subjects, which we hope to be able to achieve further.

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