









“E-government as a tool to improve the efficiency of public administration: The case of Kazakhstan”

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E-GOVERNMENT AS A TOOL TO IMPROVE THE EFFICIENCY OF PUBLIC ADMINISTRATION: THE CASE OF KAZAKHSTAN

Abstract

Digitalization contributed to the modernization of public administration, particularly e-government development. The purpose of this study is to determine the role of e-government in improving the efficiency of public administration in Kazakhstan. The research methods are comparative, economic-statistical, and qualitative content analysis. The sources of statistical data were the Bureau of National Statistics, the Committee of public services, the e-government portal, and reports of international organizations and national development institutions. The study determined that e-government is a modern paradigm of public administration that contributes to the efficiency of public administration; its development and efficiency are significantly influenced by financial, economic, technological, and legal factors. Kazakhstan has a high level of e-government development. The e-government development portal in Kazakhstan has contributed to improving public administration, especially during the pandemic. However, e-government requires further development, as its functioning has various issues (low degree of information relevance, insufficient portal filling, and low share of automated functions). At the same time, the readiness of public administration organizations for digital transformation is medium. The study proposes recommendations for Kazakhstan's e-government development to improve public administration, mainly developing technological infrastructure and digital human capital. The results can contribute to the further e-government development in Kazakhstan and enrich the theoretical base in increasing the efficiency of public administration in the context of digital transformation.

Keywords

digitalization, information and communications technology, government services, e-participation, pandemic

JEL Classification

L88, O38

INTRODUCTION

The quantity and quality of goods and services provided to citizens is one of the critical factors in determining government efficiency. Many governments strive to create a new system of public administration – proactive, transparent, accountable, and efficient – by innovating their organizational structures, operational strategies, and methods of resource use (Kamolov & Konstantinova, 2017). Digitalization affects modernization of public administration, in particular, e-government development.

Many countries are actively implementing e-government. According to the E-Government Survey 2022 (UN, 2022a), the top 10 countries in the global E-Government Development Index (EGDI), which assesses the quality and reach of online services, telecommunications infrastructure, and existing human capacity, included Denmark, Finland, the Republic of Korea, New Zealand, Sweden, Iceland, Australia, Estonia, the Netherlands, and the United States of America. In this

rating, Kazakhstan was in 28th place. In 2001, according to the E-Government Index, Kazakhstan was among the countries with minimal e-gov capacity (UN, 2021). From 2001 to 2022, the position of Kazakhstan in this ranking has improved, which indicates its significant progress. This was largely facilitated by the state's strategic course toward digitalization. For example, until 2022, Kazakhstan was implementing the "Digital Kazakhstan" program, where one of the five areas was identified as "Transition to a digital state" (Akorda, 2017). Today, the country faces the task of building a fundamentally new architecture of "digital government," eliminating duplication, inefficient costs, and bureaucracy and increasing the accessibility of citizens to 100% of government services from smartphones. Kazakhstan has embarked on a "digital reboot" course of the public sector. There are plans to create a Digital Transformation Center to digitize all government agencies' business processes (Tokayev, 2021).

Digitalization has become an essential evolutionary step in developing the concept of "e-government." This modern paradigm of public administration is built on the principles of efficiency, openness, and citizen participation in order to ensure transparent interaction of the state with citizens or businesses. Examples of successful implementation of e-government in various countries, including Kazakhstan, demonstrate its potential to improve the quality of public administration. Thus, e-government involves simplifying and automating public administration processes, improvement of the efficiency of public services, reducing corruption risks, and improving access to and satisfaction of services for the population and businesses. There is a digital transformation of public services, including through a recommendation system (Kamolov & Aleksandrov, 2023). However, there are also certain challenges and problems, such as data protection, cybersecurity, technical infrastructure, and accessibility of services to all people (digital inequality). Therefore, the theoretical and practical studies of e-government in improving public administration efficiency are relevant research areas, especially for developing countries such as Kazakhstan.

1. LITERATURE REVIEW

The scientific literature uses several conceptual approaches through which e-government is analyzed. In a narrow sense, e-government has been interpreted as providing public services and information, public procurement, and financial transactions online (Twizeyimana & Andersson, 2019). Meanwhile, the e-government services are divided into four groups: government for citizens, government for business, interaction between government agencies, and citizen participation in political life and governance (Palvia & Sharma, 2007) (Table 1). In a broad sense, e-government involves ICT to provide public services, improve government efficiency, and promote democrat-

ic mechanisms and values (Gil-Garcia, 2006). E-government refers to a new system of public administration, which, with the help of information technology, provides a trusting relationship of government with citizens and modernizes the entire process of managerial relations (Scholta et al., 2019).

Its development is influenced by organization of power and different technological, financial, organizational, managerial, social, cultural, and political factors (OECD, 2003, 2014), including privacy and security, infrastructure development (Yang et al., 2019), finance, politics and international cooperation (Lee et al., 2018; Amanbek et al., 2020), support, resistance or favorable attitude

Table 1. Classification of services provided by e-government

Service	Feature	Principle
State for citizens	Provision of improved services to citizens (Singh et al., 2017; Singh et al., 2020)	Inclusiveness, democracy, transparency, and participation (Venkatesh et al., 2017), openness, accountability, and public value (Elbahnasawy, 2014; Hatsu & Ngassam, 2017)
The state for business	Provision of enhanced business services (Huang & Benyoucef, 2014)	
Interaction between government agencies	Instant exchange of necessary information between government agencies (Kumar et al., 2017)	
Citizen participation in political life	E-democracy, e-participation (Porumbescu, 2016)	

toward transition to e-government, qualified personnel (Kushwaha et al., 2022), society's ability to use e-government, society's ability to adopt and adapt to relevant technologies, the digital divide, the level of culture (Kassen, 2017), differences between education and income, between user needs and expectations (Gascó, 2003), public sphere regulation, form of arrangement (Effing et al., 2011), degree of state centralization, nature of political regime, and degree of democracy (Kneuer & Harnisch, 2016). A country's technological development is the main guarantee of the formation of an e-government (Jin & Lee, 2020). Another factor is the pandemic, which resulted in innovative ways to solve crises in health, education, and employment spheres (Grinin et al., 2022).

The current environment where the national network infrastructure and ICT are actively developing allows e-government to act as a fundamental tool of transparent measures that have radically changed the way of interaction between the subjects and objects of the public administration process, which improves the efficiency of public administration (Malodia et al., 2021). E-government can qualitatively change the content of public administration, including all the procedures and stages of the management and its functions, with the help of modern information technology, which will improve the quality of public administration. The quality of public administration, in turn, is achieved by meeting essential criteria such as validity, effectiveness, and efficiency (Raskin, 2017):

- effectiveness: improving the quality of public administration in a particular aspect and, consequently, increasing the effectiveness of specific parameters of public administration (e.g., reducing the time required to provide public services);
- efficiency: reducing state budget expenditures and expenditures of citizens and businesses;
- competitiveness: standards, conditions, and parameters that meet citizens' expectations.

E-government provides an opportunity to improve the quality of public services; reduce the waiting time (Vorobyova & Vazhinsky, 2021); eliminate administrative barriers in public ad-

ministration entities; provide a more extensive list of electronic services (Sayimer, 2015); ensure a higher degree of citizens and authorities' involvement in digitalization; ensure a higher level of citizen participation in democratic processes; increase the economic competitiveness of the country. It should be noted that the population's skills to use online services doubles the effectiveness of public administration in countries with intensive digitalization compared to those with less development of digitalization of public services. Also, telecommunication infrastructure development significantly and positively impacts government efficiency (Doran et al., 2023).

E-government can significantly modify the traditional methods of planning, monitoring, and evaluating the performance of public authorities: combining data from different sources, working with unstructured and partially structured information, the ability to integrate continuous feedback collection into processes such as the development, monitoring, and evaluation of state regulation, through which the state can better identify and solve current problems, as well as forecasting and timely response to problems possible in the future (Dobrolyubova et al., 2019). A new level of e-government development is using new technologies, including artificial intelligence (Kamolov & Teteryatnikov, 2021) and blockchain (Goldsmith et al., 2022). The rapid digital development of public services creates an intelligent and agile administration in a smart government environment, which requires legal, financial, technological, and organizational changes (Bojović et al., 2023).

Thus, e-government is an integral part of modern public administration and service delivery and represents the modern paradigm of public administration, which is open, transparent, and with a high level of citizen participation. E-government contributes to the efficiency of public administration, expressed in the provision of quality public services, increasing their accessibility to citizens and businesses of the country, reducing costs, and leveling or reducing bureaucracy. The e-government development contributes to more responsible public administration, meeting the needs of citizens and stimulating economic development. The aim of this study is to define the role of e-government in the improvement of the efficiency of pub-

lic administration by the example of Kazakhstan. This study seeks to answer the following research questions: What are the features of e-government development in Kazakhstan? What measures are necessary to improve the efficiency of public administration in Kazakhstan?

2. METHOD

The analysis consists of three stages. In the first stage, the study searched for scientific articles from the Scopus, Web of Science, and ScienceDirect databases from 1997 to 2022 on e-government development. The search, review, and selection of publications were performed using search queries by combining keywords such as “e-government,” “public administration,” “e-gov,” and “efficiency.” The search results yielded 408 articles. Based on the purpose of the study, 40 articles were selected, as well as reports of international organizations, scientific publications from other databases, regulations, and reports of national institutions for e-government development. General scientific methods (generalization, specification, systematization, analysis, synthesis, and others) were used for the literature review.

The second stage involved dynamic analysis of Kazakhstan’s E-Government Development

Index and its components from 2003 to 2022, using statistical methods and the resource “Publicadministration.un.org.” The paper analyzed users of e-government services in Kazakhstan and their distribution by types of services in the period from 2015 to 2021 based on data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (BNS ASPR RK), the Committee of Public Services of the Ministry of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan (CPS MDDIAI RK) and reports on e-government performance, namely the section “About the Portal” and the resource Evaluation.egov.kz (evaluation sections: “Cooperation with citizens” and “Organizational development”) (Table 2).

In the third stage, the paper offers recommendations based on the theoretical search and analysis of statistical data; the main methods were generalization, comparison, and synthesis.

The methodology of this study is distinguished by a comprehensive approach and analysis of the e-government portal performance indicators, which have not been previously considered from the prism of public administration efficiency.

Table 2. Indicators used in the study

No.	Indicator	Unit	Period	Data source
1	Users of e-government services, including by types of services	%	2015–2021	BNS ASPR RK (n.d.)
2	Number of organizations that use the Internet to communicate with government agencies, including by purpose of use	Unit	2015–2021	
3	Number of electronic digital signatures	Millions of units	2016–2019	CPS MDDIAI RK (n.d.)
4	Volume of services rendered	Million, %	2015–2021	Evaluation.egov.kz (n.d.a)
5	Number of public services	Unit, %	2018–2021	
6	Total duration of technical failures of services	Hour, minute	2018–2021	
7	Number of violations in the public services provision	Thousands units	2018–2021	
8	The level of satisfaction of recipients of public services	%	2018–2021	
9	Number of integrations to form a single information space between government agencies	Unit	2018–2021	Evaluation.egov.kz (n.d.b)
10	Completeness of the architectural portal with information	%	2018–2021	
11	Number of non-functional information systems	Unit	2018–2021	
12	Share of automated functions of state bodies	%	2018–2021	
13	Degree of the information relevance contained in the information systems and databases	%	2018–2021	
14	Number of public administration organizations, including the use of computers, Internet, cloud IT services	Unit	2019–2021	BNS ASPR RK (n.d.)
15	ICT tools	Unit	2019–2021	
16	ICT professionals, including areas of specialization, skills and staffing needs	Person	2019–2021	
17	ICT expenditures, including by expenditure area	Million tenge	2019–2021	

3. RESULTS

According to the Concept of Development of Public Administration in the Republic of Kazakhstan until 2030, “the efficiency of public administration is a key factor for the development of the state and improvement of the quality of citizens’ life” (Adilet, 2021). E-government improves public administration efficiency through openness and accessibility of state bodies. The e-government portal has been functioning since 2006 and has already passed through several stages: informational (1), interactive (2), transactional (3), and transformational (4) (Figure 1).

Today, e-government is a single mechanism of interaction of state bodies with citizens and each other, ensuring their coherence through ICT. It includes dozens of different information systems (IS), registries, state databases (SDB), and hundreds of applications and services: IS “E-Akimat,” IS “E-Notary,” SDB “Individuals,” SDB “Legal Entities,” SDB “Real Estate Register,” Unified Electronic Document Management System of state bodies, Integrated IS “Citizens Service Centre,” IS SDB “E-Licensing,” intranet portal of state bodies, electronic government gateway, and payment gateway, information system “Mobile Government,” chatbots in social networks. The e-government development is the main objective of the State Corporation “Government for Citizens” – a single public services provider, integrating all Citizens Service Centres (CSC) into one system to ensure that Kazakhstanis receive all public services in

one place. “National Information Technologies” and “National Info-Communication Holding “Zerde” are also essential institutions for e-government development. The EGDI rose from 83rd in 2003 to 28th in 2022 (Table 3).

A significant jump in the index fell during the pandemic, mainly due to the growth of the Online Service Index and Telecommunication Infrastructure Index, i.e., against the background of the increased availability level of online services and the development degree of telecommunications infrastructure, especially in the last decade. The personnel’s ability to promote and use ICT during 2003–2022 was high and improved significantly during the pandemic. Kazakhstan ranks 15th in the e-participation indicator that peaked during the pandemic. This suggests that the Kazakhstani persons have increased opportunities to influence the formation and adoption of public decisions and the development of public services and regulations, including the Open Government project, which includes Open Data, Open Dialogue, Open NAP, Open Budgets and Assessment of State Bodies’ Performance.

This is also supported by the development of policy documents, where the priority is the training of the population in digital skills at all education stages, which results in the development of digital human capital (Bach et al., 2013). For example, a training program, “E-Government and e-Government Services,” was developed to educate citizens and improve digital literacy: 686,189 trained

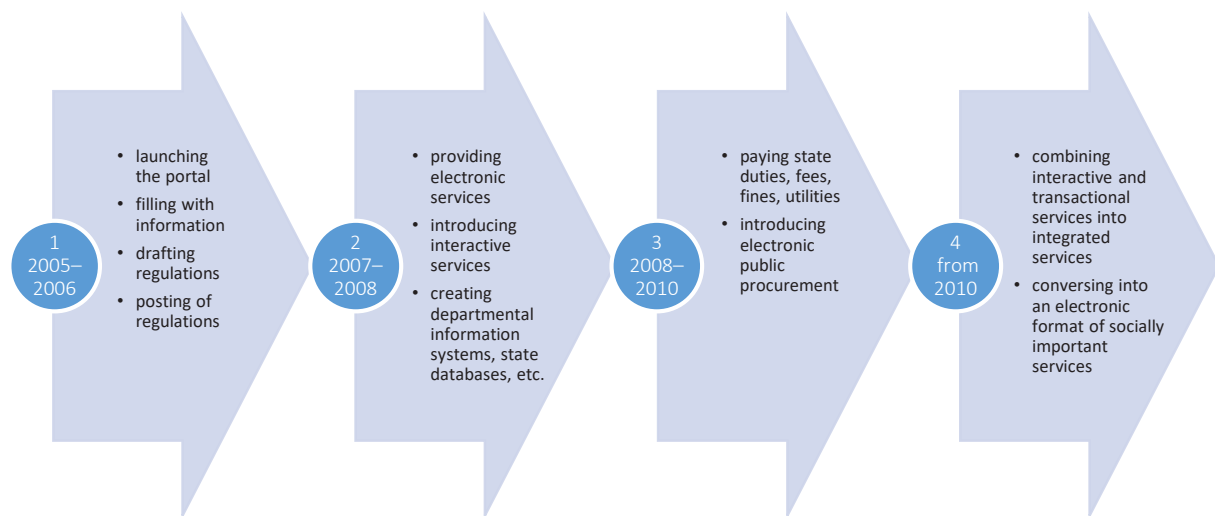


Figure 1. Stages of e-government development in Kazakhstan

Table 3. E-Government Development Index of Kazakhstan, 2003–2022

Index/Sub-index		2003	2004	2005	2008	2010	2012	2014	2016	2018	2020	2022
E-Government Development Index	Rank (of 193)	83	69	65	81	46	38	28	33	39	29	28
	Value	0.38661	0.43437	0.48125	0.47430	0.47430	0.68438	0.72827	0.72499	0.75970	0.83750	0.86280
Online Service Index		0.18777	0.32046	0.45000	0.32107	0.52698	0.78431	0.74803	0.76812	0.86810	0.92350	0.93440
Telecommunication Infrastructure Index		0.06206	0.06266	0.06377	0.13062	0.17969	0.35546	0.57488	0.56677	0.57230	0.70240	0.75200
Human Capital Index		0.91000	0.92000	0.93000	0.97588	0.96773	0.91337	0.86190	0.84010	0.83880	0.88660	0.90210
E-Participation Index	Rank (of 193)	69	59	47	98	18	3	22	67	42	26	15
	Value	0.10340	0.13114	0.20634	0.09090	0.55714	0.94740	0.76470	0.59322	0.83710	0.88100	0.80680

persons in 2018, 532,021 trained persons in 2019 (Gov4C, 2019). In 2017, the average user profile of the e-government portal looked as follows: a woman aged 25-34 from Almaty or Astana, actively using the portal from 9 am to 12 pm and from 2 pm to 5 pm. For the most part, she logged in from mobile devices. Meanwhile, the top popular services included the issue of various certificates (address certificates; on pension contributions; on absence (presence) of real estate; on presence (absence) of criminal record; etc.), as well as on registration in the waiting list for kindergarten. In 2018, most users of the e-government portal were men, who entered mainly from personal computers (E-gov.kz, n.d.). There is a regional gap in access to e-government services. For the period from 2015 to 2021, the largest percentage of users is in West Kazakhstan (55%-83.2%), Almaty (44%-60.4%), and Karaganda regions (43.1-43.6%), the smallest – Mangistau (4.7%-14.7%), Aktobe (7.1%-19.8%), Zhambyl (10.7%-18%) and Atyrau (14.3-18.9%) regions.

2019 faced an increase in the number of Kazakhstanis who prefer to receive public services online through the e-government portal egov.kz (via digital signature, one-time password), as well as via telegram-bot EgovKzBot2.0 and mobile application EgovMobile. The number of mobile citizens registered in the database in 2019 reached almost 8 million persons; users of EgovKzBot2.0 telegram bot – more than 1 million persons. EgovMobile mobile application was downloaded by more than 500 thousand times (Gov4C, 2019).

The CSC mobile application has been functioning since November 2021. 7,828 users downloaded it. There were 550 public services and 24 types of services, and 5,189 video calls to operators (Gov4C, 2021).

In 2015, 32.9% of the population used the Internet to receive e-government services. It peaked in 2016. Compared to 2019, the rate increased by 0.4 percentage points for the pandemic period. In 2021, it decreased to 26.7%, which may be due to the emergence of new channels intended to receive government services in addition to the portal (social networks, application) and the ability to visit offline public service centers. Users mostly received information – 24.4% in 2015 and 22.3% in 2021. From 2015 to 2021, there was an increase in downloads of official forms and electronic submission of completed forms from 7.4% to 13.3% and from 7.9% to 11.4%, respectively (Table 4).

From 2015 to 2021, the number of organizations using the Internet to communicate with government agencies also increased by one and a half times. The peak was in 2020 – 98,295 organizations associated with quarantine measures during the pandemic. Most organizations used the Internet to obtain information and electronically submit completed forms. In 2018, there was an increase in the number of organizations posting bids online in open electronic bidding. In 2021, their number dropped below the 2015 level. There was a noticeable increase in the number of organizations that performed the procedures to send

Table 4. Distribution of users of e-government portal services, %, 2015–2021

Indicator		2015	2016	2017	2018	2019	2020	2021
Users of e-government services		32.9	33.8	33.2	34.6	30.4	30.8	26.7
By types of services	Obtaining information	24.4	26.5	27.3	28.3	25.2	25.3	22.3
	Uploading (downloading) official forms	7.4	9.3	10.7	14.8	12.7	14.3	13.3
	Electronically submitting completed forms	7.9	10.1	9.8	13.2	12.1	14.8	11.4

Table 5. The purposes for the use of the Internet by Kazakhstani organizations to communicate with government agencies, units, 2016–2021

Indicator	2016	2017	2018	2019	2020	2021	
Number of organizations that use the Internet to communicate with government agencies	61,357	68,332	84,389	88,722	98,295	94 518	
By purposes	Acquiring information	56,447	63,591	78,699	73,534	79,355	75 462
	Downloading forms	47,331	54,891	67,468	53,509	56,457	52,071
	Electronically submitting completed forms	50,318	58,487	71,848	67,572	72,983	72,447
	Completing electronic, paperless procedure for sending documents	37,436	44,351	56,731	49,702	54,574	54,610
	Placing an offer via the Internet in an open electronic tender	19,278	22,037	30,212	21,095	24,106	16,983

documents entirely in electronic format without papers. This indicates high electronic document flow (Table 5).

The growth in the number of users of e-government services from both the population and organizations, as well as the increase in the number of issued digital electronic signatures, indicates the efficiency of the e-government platform of Kazakhstan. The service volume decreased from 24.2% to 17.4% from 2018 to 2021. It can also be attributed to the emergence of new channels for public services. The number of public services provided electronically increased to 664 units during the period under review, i.e., 94% of all public services. The total duration of technical failures of services on the e-government portal has significantly decreased, which improves the quality and reduces the waiting time, as well as reduces red tape (when only identity document is required for many services). The number of violations of the requirements in terms of the list of documents in the provision of public services decreased by more

than 20 times. The number of facts of violation of terms of rendering state services has tripled simultaneously. This is primarily due to the pandemic when the remote provision of public services' high load on "E-government" portal led to interruptions and increased load on the information systems of state bodies (Ismailova et al., 2021).

However, despite this fact, state service recipients' satisfaction increased from 72.4% to 75.4%. These indicators may indicate an improvement in public services provision, especially on the part of local executive bodies (Table 6).

Based on the analyzed data, e-government in Kazakhstan contributes to the improvement of the efficiency of public administration. In this regard, further development is necessary. Thus, the e-government platform has the following problems: failure to implement the plan of integration to form a single information space between government agencies, insufficient (74.1%) content of the architectural portal with information about

Table 6. Performance indicators of Kazakhstan's e-government platform, 2018–2021

Indicator	Unit of measure	2018	2019	2020	2021	
Volume of services rendered	million	24.2	19	16.1	17.4	
	%	15.9	10	8.4	7.5	
Number of electronic public services	unit	–	571	622	664	
	%	61	80	90	94	
Number of digital electronic signatures issued	million units	6.49	8.3	–	–	
Total duration of technical failures of services on the e-government portal	hour, minute	1600	271 h 40 m.	537 h 45 m.	552 h 24 m	
Number of violations of terms of public services	thousand	4.9	2	4	14.5	
Number of violations of the requirements in terms of the list of documents in the provision of public services	thousand	23.5	17	7.5	1.2	
Level of satisfaction of recipients of public services, including	%	72.4	74.8	75.1	75.4	
	central state authorities	%	71.3	72.1	69.9	77.8
	local executive bodies	%	61.5	60.3	71.7	74.9

Table 7. Indicators of the public administration system of Kazakhstan for the e-government platform development, 2018–2021

Indicator	Unit of measurement	2018	2019	2020	2021
Number of integrations for the formation of a single information space between government agencies					
Planned	Unit	67	170	115	135
Implemented	Unit	17	146	91	120
Filling the architectural portal with information about information resources	%	–	61.1*	64.8	74.1
Number of non-functional information systems	Unit	–	44	35	5
Share of automated functions of state bodies	%	61	63*	67.4	51.4
Degree of relevance of information contained in information systems and state databases	%	–	16.4	8.9	–

Note: * – Calculated data.

information resources, the presence of non-functioning information systems, reducing the share of automated functions of state bodies, the low degree of relevance of the information contained in the information systems and databases. In contrast, there are positive development dynamics in some areas (Table 7).

In connection with the above, the readiness of public administration organizations to further develop e-government becomes essential. It requires ICT availability and digital human capital in public administration. In Kazakhstan, public administration organizations use computers with access to the Internet. In 2021, the number of computers per organization averaged 18 units, of which only

60.4% had Internet. This figure is higher compared to 2019 – 56.2%. Moreover, only 10% of organizations use cloud IT services in their work. There is a twofold increase in the number of organizations using cloud IT services (Table 8).

The number of ICT specialists in public administration organizations decreased by 113 persons against the background of the reduced need for ICT specialists. On average, there are 1.9 ICT specialists per public administration organization. And only 4% of organizations have information security specialists, the number of which decreased by 12 persons. In 2021, the number of employees who use computers with Internet access for business purposes and have been trained in computer literacy increased. ICT ex-

Table 8. Indicators of ICT development of public administration organizations, 2019–2021

Indicator	2019	2020	2021	
Number of enterprises	8,243	8,029	8,039	
Number of organizations	using computers	8,105	7,904	7,939
	having access to the Internet	7,612	7,479	7,510
	using Cloud IT services	348	484	704
Availability of ICT tools in organizations	number of computers	145,529	151,951	147,103
	connected to the Internet	81,831	84,248	87,847
ICT specialists, person	number of ICT specialists	1,565	1,595	1,452
	number of employees who use a computer at least once a week during working hours	128,801	131,068	128,802
	number of employees who use a computer with Internet access for business purposes	92,869	95,183	94,155
ICT costs, million tenge	37,582.8	46,391.5	45,185.0	
of which	purchasing software tools based on a license agreement	4,074.2	6,693.6	5,460.7
	independent software development within the organization	100.5	223.1	958.0
	employee training related to ICT	50.5	52.2	74.2
	services of third-party organizations and specialists related to ICT	20,212.1	22,201.8	18,797.3
ICT personnel	number of organizations that have ICT specialists, units	826	786	787
	number of employees with computer literacy, persons	142,731	146,732	147,547
	number of specialists with information security skills, persons	338	389	326
	number of employees trained in computer literacy, persons	942	867	1,185
	need for ICT specialists, persons	703	712	664

penditures in public administration organizations increased from 37,582.8 to 45,185 million tenge, i.e., by 20.2%, mainly due to an increase in the cost of independent software development within the organization by 9.5 times. From 2019 to 2021, there was also an increase in costs for the purchase of software tools based on a license agreement and employee training related to the development and use of ICT. The costs of third-party organizations and specialists related to ICT decreased.

Thus, e-government in Kazakhstan is actively developing and has a high level of development. One-third of the country's population uses the Internet to receive e-government services, and the number of organizations that use the Internet to communicate with government agencies is growing. 94% of public services are provided electronically. The satisfaction level of consumers with them is 75.4%. Implementing and developing an e-government portal has improved public administration in Kazakhstan, especially during the pandemic. However, e-government requires further development, as its functioning has various problems. The readiness of public administration bodies is at an average level.

4. DISCUSSION

The e-government development portal in Kazakhstan has contributed to an increase in the public administration level, especially during the pandemic, as confirmed by the findings of Grinin et al. (2022) and Doran et al. (2023). Satisfaction with electronic government services is relatively high and growing, which confirms the findings of Ismailova et al. (2021). The law "On amendments and additions to some legislative acts of the Republic of Kazakhstan on the regulation of digital technologies" was approved in 2020. Nevertheless, in the process of achieving sustainable economic development, public administration is still affected by some challenges, including excessive centralization of state power, limited authority at the regional level, corrupt practices, and lack of transparency (OECD, 2017), as well as bureaucracy and paperwork (Kapoguzov & Suleimenova, 2017). There are also other challenges. For example, public distrust of state structures is exacerbated by the complete lack of state accountability and the lack of transparency in state budget spending, which, in turn, exacerbates the problems of corruption. The

lack of information about how the public budget is spent in the public domain results in distrust on the part of citizens, leading to the inefficiency of public administration (Thai et al., 2019).

The results show that the introduction and use of e-government can solve these public administration problems and improve its efficiency. In Kazakhstan, there is a new stage of e-government development as a coherent system where the state freely cooperates with citizens and businesses. The main characteristic of this stage is active citizen participation in the affairs of the state and open two-way communication (Adilet, 2021). Public administration bodies should focus on improving their activities' efficiency and quality management (Maidurova, 2013). To form a new generation of Kazakhstan's e-government, it is advisable to perform the following activities:

- prepare reports on the results of the activities of state bodies, place them in automatic mode on a single platform, as well as make decisions based on these data (Yakovleva, 2014);
- increase the use of big data in processes such as public policymaking, official statistics, control and audit of state budget revenues and expenditures, and other government functions (Myeong, 2019);
- evaluate the performance of government agencies using more advanced methods, such as predictive analytics and other analytical methods based on artificial intelligence technologies instead of binary evaluation on the principle of "done vs. not done";
- reduce budget expenditures, calculate and evaluate the costs with the help of information technology;
- integrate all public administration information systems on a single platform.

It requires appropriate skills, infrastructure, equipment, and technology. So, the national e-government strategy outlines new/emerging technologies (blockchain, artificial intelligence, big data, or robotics) and projects such as Smart Data Ukimet (a single space of big data about Kazakhstani Government activities), Smart Bridge (a simplified process of inte-

gration of information systems of public and private sectors), National Association for Blockchain and Data Center industry development (crypto-mining) function. They increase government agency transparency, eliminate bureaucracy, and reduce the time for managerial processes (UN, 2022b).

Principles to be implemented to improve the efficiency of public administration through e-government include: technological neutrality, including compatibility between platforms and devices (eGov.kz); open standards, open software, and open data (“Open Dialogue” eGov.kz); confidentiality and information security; protection of rights and legitimate interests violated in e-government. However, the implementation of these principles should be done in a coordinated manner, as some principles may contradict each other, for example, open data and data privacy (Ismailova et al., 2021). Another crucial principle is the e-participation of citizens, which embodies the ideas and values of civic participation. E-government, particularly information technology, acts as a tool to avoid the limitations and disadvantages of participation and enables non-participatory groups to become involved and participate in political decision-making (Tejedo-Romero et al., 2022). It is impossible without leveling or reducing the digital divide in the regions, especially without the provision of technological infrastructure in rural, vulnerable, and depressed areas of the country (Kireyeva et al., 2022a; Kireyeva et al., 2022b), as well as provision of the population with affordable and high-quality laptops and smartphones, which are most popular among young persons (Kangalakova et al., 2023), who in turn are the main users of e-government services. The above requires an increase in spending on ICT in the area of “General Government Administration,” which is 7.2% (Alibekova & Bapiyeva, 2019).

Thus, for the e-government development in Kazakhstan to improve the efficiency of public administration, the following measures are required, covering the development of technological infrastructure and human capital:

- 1) include digital competencies in qualification requirements for state and municipal employees along with such competencies as responsibility, stress resistance, strategic thinking, leadership, cooperation and interaction, and decision making;

- 2) develop a centralized system of training and retraining of those employed in state and municipal administration for the use of digital technology, as well as courses in programming, data management, machine learning and artificial intelligence, cybersecurity, design and web development, blockchain technologies, game development, multimedia, Internet marketing, data analytics, e-commerce, and medical literacy. For example, the training may be based on the Public Administration Academy under the President of the Republic of Kazakhstan;
- 3) provide access to broadband Internet and increase bandwidth, especially for regional and local governments;
- 4) develop existing and use new/emerging technologies for the development of digital government and the government open data portal, followed by training the population in their use.

There were studies related to e-government in Kazakhstan, but they were either conducted long ago or covered only its components: government openness (Kassen, 2017; Ismailova et al., 2021), technological infrastructure (Alibekova & Bapiyeva, 2019), legal support of e-government organization (Kusherov, 2015), and marketing promotion (Sange Research Center, 2007). There were also studies to assess the efficiency of public administration in Kazakhstan (Maidurova, 2013; Kapoguzov & Suleimenova, 2017). However, this study is the first to consider e-government as a tool intended to improve the efficiency of public administration in Kazakhstan based on a comprehensive study of its performance. The future research directions include the development of a methodology to assess the efficiency of e-government and the assessment of public administration within e-government through primary data collected via a large-scale survey of the country’s population and expert interviews of representatives of public administration and e-government development institutions. The limitation of the study is the lack of data for 2022 and for a certain period because of changes in the country’s methodology for the collection of statistical data.

CONCLUSION

This study examines e-government as a tool intended to improve the efficiency of public administration based on a comprehensive study of its performance and offers recommendations for its development in the example of Kazakhstan.

E-government has become an integral part of modern public administration and the provision of public services. It represents a modern paradigm of effective, open, and transparent public administration based on the broad participation of citizens. E-government helps to improve the efficiency of public administration, which is expressed in quality public services, increased accessibility to citizens and businesses of the country, reduced costs, and leveled or reduced bureaucracy. The introduction and development of e-government contribute to more responsible public administration, meeting the needs of citizens and stimulating economic growth and inclusive development.

E-government in Kazakhstan has a high level of development and acts as an inclusive innovation. Kazakhstan ranks 28 among 193 countries. Its rapid development was facilitated by political will and the country's strategic course toward digitalization. A third of the country's population uses the Internet to receive e-government services, and a growing number of organizations use the Internet to communicate with government agencies. The number of public services provided in electronic format is 94%, and consumers' satisfaction level of public services is 75.4%.

Implementing and developing the e-government portal in Kazakhstan have contributed to improving public administration, especially during the pandemic. However, e-government requires further development, as its operation has various problems. New technologies that require appropriate infrastructure and human capital also facilitate this process. To improve the efficiency of public administration in Kazakhstan and cover the development of technological infrastructure and human capital, the following measures are required: the inclusion of digital competencies in the qualification requirements for public and municipal employees and the development of a centralized system of training and retraining of employees in public and municipal administration to use digital technology, as well as their implementation. The readiness of public administration organizations for digital transformation is at an average level.

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