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E-Government as a Key to the Economic Prosperity and Sustainable Development in the Post-COVID Era

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Abstract: Our paper focuses on the role of e-government in relation to economic development within the post-COVID era. Nowadays, e-government represents the service which utilizes digital technology to create electronic pathways to improve the efficiency of public services, increase economic prosperity, and improve the standard of living. In this paper, we argue that e-government presents the only proper and viable model for public administration in the 21st century by embedding internet-based technologies to ensure smooth interactions between the government and its citizens, solving the most socially important problems, enabling internal communication between public servants, and delivering public services to the entire population regardless of age or gender. In addition, we show that stakeholders and policymakers should foster the development of an adequate and non-discriminatory environment for e-government through regulatory frameworks, policy guidelines, and government guarantees. Our study is based on the results of our own survey that was administered using a snowball and quasi-random sample of 400 respondents (aged 19–26 years; 56.2% females and 43.8% males) from the Czech Republic (N = 136) and the Russian Federation (N = 264), of whom 58% were women and 42% were men (M ± SD = 45.53 ± 11.46, median age 44). Our results show that the e-government enhancement concept has been perceived as an effective tool for fostering economic prosperity, tackling corruption, and helping to avoid uncertainty. Based on the theories of customer-focus and relationship marketing, this study suggests that the most significant factor influencing the success of e-government projects is citizen orientation, followed by channel and channel orientation, and technology orientation. We show that the governments of developing countries should prioritize e-government applications in their requests for international assistance and cooperation, as well as international financial support. Moreover, we argue that digital transformation should become the key element of the changing business and market needs in the post-COVID era.

Keywords: economic development; e-government; information systems; sustainability; prosperity; information and communication technologies

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1. Introduction

In today's post-COVID world, the widespread dissemination of data and information systems as well as the deployment of the Internet of Things (IoT) can navigate governments worldwide to better target development and resilience efforts to improve living conditions, simplify service delivery, and respond to key development challenges, such as minimizing the spread of disease and responding to climate change (Trencher and Karvonen 2019; Caldera et al. 2022). The recent COVID-19 pandemic has highlighted these priorities (Iverson and Barbier 2021; Korneeva et al. 2022). All of these create a need for the global

knowledge economy that was obvious in the pre-COVID era and is even more acute today (Un and Rodríguez 2018; Ashilova et al. 2022). In addition, the systems and processes that are the foundation of digital governance (also known as e-governance) need to be better coordinated with each other in order to develop a comprehensive platform for public services, minimize duplication between different government departments, and encourage cross-departmental sharing of opportunities (Camboim et al. 2019; Ibrahim 2022). With all that, it appears that data and information systems have become an important key to sustainable economic development. For example, the use of contextual data indicators can enable the government to have a deeper understanding of local issues and accurately measure public concerns (Liang et al. 2018).

As demonstrated in a recent survey conducted in Europe by the United Nations (UN) E-Government Subgroup C7 on Sustainable Development and the Institute for Sustainable Governance and Development, quality of life is directly related to the level of e-government services and associated opportunities in ICT (Khoshnava et al. 2019; Ziolo et al. 2022). This further demonstrates the important role of e-government in bridging the digital divide and in developing a just and citizen-centered digital society (Saylam and Yıldız 2021).

Figure 1 outlines the four main stages of the development of e-government: from catalogue through transactions and vertical integration, to horizontal integration that allows the creation of the so-called "one-stop shop" to provide citizens with all possible public services. The complete integration also ensures full integration across different functions and systems.

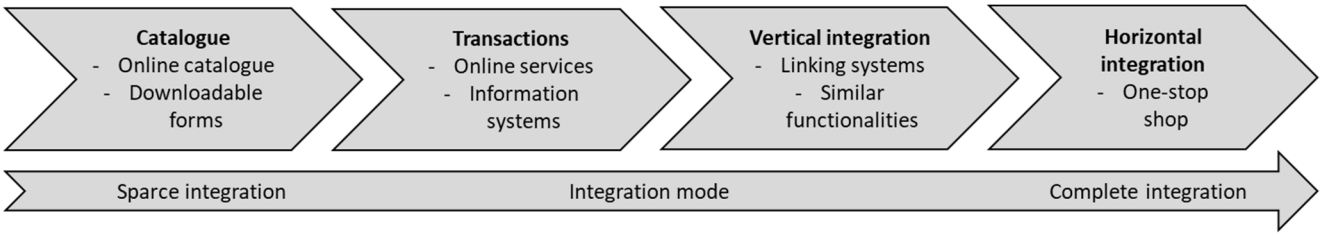

Figure 1. Stages of the e-government development (from sparce to complete integration). Source: Own results.

As it becomes apparent from Figure 1, this integration process proceeds from the sparce integration to the complete integration in four simple steps that any government needs to take into account if it wishes to build e-governance systems that would be appealing and acceptable for its citizens.

The creation of an effective e-government can be achieved through the establishment of direct communication channels with each citizen through digital tools, enabling the government to uniquely respond to the needs of each citizen and develop tailor-made plans on all levels (Møller et al. 2019; Vilkaite-Vaitone and Povilaitiene 2022).

The importance of state IT systems for the development of society continues to grow and is likely to gain more importance in the nearest future. Therefore, governments must play a leading role in the creation and implementation of accessible e-services and understandable ICT content (Estevez and Janowski 2013; Chiabai et al. 2014). The emergence of these different sets of topics is suggested by the sample of publications containing the studies related to e-government that have different focus. The most frequently cited keyword is e-government itself, which sits at the center of a group of keywords on similar topics, including ICT (suggesting that the focus is on transforming governance in general). It appears that 2007 and 2012 were the most fruitful years in terms of the number of e-government initiatives that discussed these four topics. However, it is surprising that participation was the least discussed: only about 20% of e-government initiatives discuss this issue every year (Dias 2019). The largest group of keywords covers issues such as "stakeholders", "citizens", "acceptance", and "influence". This is related to other important keywords in the core of the larger cluster (as previously described) and the cluster with more references to government

services, public sector, and organizational issues. Innovation is also part of this cluster, which could mean that these are publications with a greater focus on transformation in specific areas.

In addition to the conceptualization and the review of the research literature, our paper features the empirical models that is based on our own survey carried out in the Czech Republic and Russian Federation, which are the two distinct countries that yield very similar (a socialistic Soviet past and the difficult path of economic transition), but also relatively different results in geopolitical, economic, and technological terms (especially at the present day with the Russian Federation facing unprecedented sanctions imposed by the West (Zenchenko et al. 2022). According to our opinion, such a comparison constitutes an interesting approach and might provide useful lessons for the other economies in transition, either those belonging to the European Union (EU) or those part of the Eurasian Economic Union (EAEU).

The main goal of this paper is to elicit motivation to accept the e-government enhancement as an effective tool for fostering economic prosperity, tackling corruption, helping to avoid uncertainty, and increasing the value of the human capital during and immediately after the COVID-19 pandemic.

Our study has certain limitations that we need to acknowledge: First of all, we used data that were collected almost two years ago (September 2020–March 2021). However, this is due to the fact that in our study, we attempted to collect information on the immediate impact of the COVID-19 pandemic on the digitalization and e-government services, and the timing was important. Second, we employed case studies of the Czech Republic and the Russian Federation, two seemingly different countries (both in terms of socio-economic and technological development) which may raise some eyebrows. Nevertheless, we think that these case studies of the two countries (that had similar starting positions in the early 1990s but underwent quite different developmental paths) might provide a large amount of interesting food for thought with regard to our paper's topic.

This paper is structured as follows: Section 2 describes the concept of the digital state based on the digitalization of elements. Section 3 introduces and analyzes the three main provisions of e-government. Section 4 contemplates over the implications for the digitalization of e-government from the COVID-19 pandemic. Section 5 presents the research methodology, the survey and the data collected via this survey carried out in the Czech Republic and Russian Federation. Section 6 features an empirical model of the e-government enhancement, effectiveness, and efficiency. Section 7 provides the discussion of results. Finally, Section 8 concludes the paper with some final remarks, outcomes, and implications for the relevant stakeholders.

2. Digital State Based on the Digitalization of Elements

The digitalization of public services calls for expanded dimensions of digital organizational skills that affect the ability of companies to innovate in the current environment where technological platforms play an important role. It appears that the development of talent and skills in an organization, which is a key action for traditional transformation, is one of the most important success factors in digital change efforts. The first key is to use digital tools to make information within the organization more accessible, which more than doubles the likelihood of a successful transformation (Strielkowski et al. 2017; Loonam et al. 2018). The second is the introduction of digital self-service technology for the employees, business partners, or both. When organizations or public institutions do this, the likelihood of a successful transformation doubles. The other two keys involve the recruitment of specific roles for integrators and technology innovation managers to bridge the potential gap between traditional and digital businesses. A company should essentially allow employees play the role of integrators (employees transform and integrate new digital methods and processes into existing work methods to help connect the traditional and digital parts of the enterprise) to support the transformation. Here is when energy policy can be used as an example. An important part of this work is to ensure that energy policymakers have

access to a workforce with digital skills. Energy policy makers need to fully understand the latest developments in the digital world, its terminology, trends, and the ability to influence various energy systems (short-term and long-term). As policymakers formulate a series of energy policies, they must provide sufficient flexibility to respond to new developments in digital and communications technology because they often develop rapidly in unpredictable ways (Jones 2017). As our paper shows, it is impossible to predict with certainty how specific digital technologies will interact with specific energy system applications, especially in the complex real world involving multiple policy goals and uncertain (and sometimes unexpected) feedback. The currently accepted mode of digital transformation means that the construction of the global digital infrastructure needs to create favorable conditions for the formation of a new mass market for traditional information and communication technologies and microelectronics industries, as well as digital platforms and artificial intelligence technologies (Ganichev and Koshovets 2021).

It now becomes clear how companies should make the technological change that differentiates successful digital transformation from the rest. While digital transformation will vary widely based on the specific concerns and requirements of organizations, there are some persistent and common themes among existing case studies and published charts that all business and technology leaders should consider when embarking on digital transformation (Wessel et al. 2021). This paper calls for expanded dimensions of digital organizational skills that affect the ability of companies to innovate in the current environment where technological platforms play an important role. The results of many studies conducted on the representative samples of respondents in various countries around the world confirm that the development of talent and skills in an organization, which is a key action for traditional transformation, is one of the most important success factors in digital change efforts (Hakanen et al. 2019). The first key is to use digital tools to make information within the organization more accessible, which more than doubles the likelihood of a successful transformation. The second is the introduction of digital self-service technology for use by employees, business partners, or both. When organizations do this, the likelihood of a successful transformation doubles. The other two keys involve the recruitment of specific roles for integrators and technology innovation managers to bridge the potential gap between traditional and digital businesses. Employees can play the role of integrators (employees transform and integrate new digital methods and processes into existing work methods to help connect the traditional and digital parts of the enterprise) to support the transformation. An important part of this work is to ensure that energy policymakers have access to a workforce with digital skills. Policymakers need to fully understand the latest developments in the digital world, its terminology, trends, and the ability to influence various integrated systems (short-term and long-term). As policymakers formulate a series of policies, they must provide sufficient flexibility to respond to new developments in digital and communications technology because they often develop rapidly in unpredictable ways (Forge and Vu 2020). As this paper shows, it is impossible to predict with certainty how specific digital technologies will interact with specific energy system applications, especially in the complex real world involving multiple policy goals and uncertain (and sometimes unexpected) feedback.

The currently accepted mode of digital transformation means that the construction of global digital infrastructure needs to create favorable conditions for the formation of a new mass market for traditional information and communication technologies and microelectronics industries, as well as digital platforms and artificial intelligence technologies (Lu 2019). The predominance of legacy technologies in corporate IT continues to limit the ability of the chief information officers (CIOs) to successfully embark on a digital transformation strategy. If companies want to keep up with the fast pace of digital change today, they must work to improve efficiency through technology where possible. As technology plays a vital role in the ability of organizations to evolve with the marketplace and continually add value to customers, CIOs continuously play a key role in digital transformation. Technology is, of course, an important element of digital transformation

(Papagiannidis et al. 2020). Hence, the digital transformation is the process of using digital technologies to create new or change existing business processes, cultures, and customer experiences in response to changing businesses and market needs. However, in a broad sense, digital transformation is often defined in the literature as the integration of digital technologies across all areas of the business which leads to fundamental changes in how companies and governments operate and how they benefit customers and citizens (Kraus et al. 2021; Van Veldhoven and Vanthienen 2022). Each is necessary but not sufficient for the next, and more importantly, digitization is mostly technology-related, while digital transformation is not. The benefits of digital transformation are numerous. For one, it can lead to increased efficiency and productivity. By automating tasks and processes, businesses can reduce the amount of time and resources required to complete them. This can free up employees to focus on more strategic tasks, such as developing new products or services, or improving customer experiences. In addition, digital transformation can also lead to better customer experiences. By integrating digital technologies, companies can provide customers with more personalized and convenient experiences. For example, a company may use data analytics to better understand customer preferences and tailor their products and services to meet those preferences. Additionally, companies and public organizations can use digital technologies to provide customers with faster and more efficient service, such as through chatbots or other forms of automation (Kalbaska et al. 2017; Agarwal et al. 2022).

However, digital transformation is not without its challenges. It requires significant investment, both in terms of financial resources and in terms of time and effort. It also requires a change in mindset and culture, as employees must be willing to adapt to new ways of working and new technologies. Additionally, the pace of technological change means that companies must be constantly vigilant and adaptable to keep up with the latest developments.

The digital revolution is based on growing opportunities for the creation and use of data, information, and knowledge and, ultimately, to support innovative decision-making, science, and policy. While interdisciplinary collaboration is essential to the success of digital development itself, it also creates opportunities for the integration of cutting-edge digital solutions across industries, whether it is using geospatial analytics to improve disaster risk management, the introduction of Wi-Fi-enabled sensors for remote crop monitoring or the use if Big Data from mobile devices to develop better public transport networks (Hercog et al. 2020). The spread of digital technologies can enable the poor to access information, employment opportunities, and services that improve their standard of living. Digitization has affected economic growth through inclusive finance, allowing individuals with insufficient funds to complete procedures through retail electronic payment platforms and technology platforms that provide credit and virtual savings. In general, digitalization enables entrepreneurs and companies to rethink business models to become more efficient and sustainable as well as to be associated with other economic sectors. Recently, mobile technology and services have created 1.7 million direct jobs (formal and informal), contributed USD 144 billion in economic value (accounting for 8.5% of sub-Saharan Africa's GDP), and contributed enormous amounts of money to the to the public sector through taxation (Brookings 2020). Information flow is essential to economic growth and job creation. The new growth model of the digital economy that emerged during the current crisis is actually through the creation of a mass market, a significant increase in the consumption of the ICT service sector, and the redistribution of a large portion of resources from others.

As organizations embrace digital technology, which in this context means computers and other information technology, people's work are changing. Indeed, for many people, digitization primarily refers to such processes. In this example, the implementation of the technology underlying such an online platform does not in itself constitute a digitization step but transfers the business process to that platform. Thus, it seems that Gartner's definition of the digitalization of business operations is correct, since such operations consist of business processes that can be digitally transformed. Therefore, we finally digitize information, digitize the processes and roles that make up the company, and

digitally transform the company and its strategy (Bednar and Welch 2020). Based on the assertion that DE really means the establishment of a global digital infrastructure, we will continue to analyze the current opportunities for the ICT and microelectronics industry to drive high growth rates, as well as new mechanisms for using platform technology and artificial intelligence to expand and create markets. These are included in South Asia's ambitious efforts, which will also include a deeper study of South Asia's informality and the impact of digital technology and digital business models, especially digital platforms.

In addition, digital development components are increasingly being incorporated into projects in various sectors such as transport, education, health, agriculture, and public sector management. The World Bank's actions in the digital domain are based on in-depth research and analysis (Wamba-Taguimdje et al. 2020). Therefore, the digital agenda is mobilizing a wide range of experts from organizations and institutions such as the World Bank, the International Finance Corporation, and the Multilateral Investment Guarantee Agency. At the same time, they foster research collaboration between the business and public sectors and help transform innovation. They also include innovations that rely heavily on the use of ICTs for their development or implementation. They include innovation in products or processes that involve ICT (the product itself can be a form of digital goods or service).

Table 1 above shows the comparison of the progress in digitalization and e-government development in the Czech Republic and Russia. As it has been previously explained in the Introduction, both countries have been selected for the comparative analysis carried out in this paper due to their similarity (socialist past and unstable path of economic transition) and, at the same time, differences (Czech Republic becoming a European Union member in 2004 and Russian Federation molding its own geopolitical agenda such as the Commonwealth of the Independent States (CIS) or the Eurasian Economic Union (EAEU)).

Table 1. Digitalization and e-government in the Czech Republic and Russia: a comparison (2003–2022).

	Czech Republic				Russian Federation			
Year	**E-Government Development Index**	**Rank**	**E-Participation Index**	**Rank**	**E-Government Development Index**	**Rank**	**E-Participation Index**	**Rank**
2022	0.8088	45	0.6023	57	0.8162	42	0.6023	57
2020	0.8135	39	0.7262	65	0.8244	36	0.8690	27
2018	0.7084	54	0.7084	92	0.7969	32	0.9213	23
2016	0.6454	50	0.5593	76	0.7215	35	0.7458	32
2014	0.6070	53	0.2549	122	0.7296	27	0.6863	30
2012	0.6491	46	0.2632	56	0.7345	27	0.6579	19
2010	0.6060	33	0.1286	86	0.5136	59	0.1286	86
2008	0.6696	25	0.2045	60	0.5120	60	0.0909	98
2005	0.6396	29	0.2063	47	0.5329	50	0.1429	61
2004	0.6214	28	0.2131	41	0.5017	52	0.2131	41
2003	0.5417	36	0.2414	45	0.4426	58	0.0517	91

Source: United Nations (2022).

Based on Table 1, it is apparent that while Russia was lagging in both initiatives in the beginning of the 2000s, it has quickly caught its pace and is now yielding remarkable results in terms of e-participation and e-government digitalization. Many useful features have been introduced and the whole system has been further reinforced by the COVID-19 pandemic that has brought COVID passes and QR codes to the attention of nearly every single citizen (see the empirical models in Section 4 for more details).

3. Main Provisions of the E-Government

The definition of the digital government, also known as e-government or virtual government, refers to a form of governance conducted using the incorporation of the internet and other information technology devices (IT). If performed well, an information-driven approach will help extract the best information and make it widely available in a variety of useful formats, thereby increasing the coverage and value of public services (Chung and Kim 2019). The main goal is to examine their expectations of the government

and public service roles as well as the nature of the relationship between the governor and the governed.

With regard to the taxonomy in terms of the stages of e-government development and their position in the literature, Janowski (2015) describes the digital government and the need for policymakers, government executives, and researchers to understand and predict changes in this area. The author argues that the concept of digital government is becoming more complex and specialized, similar to how cultures and societies evolve, and proposes a four-stage digital government evolution model, which consists of digitization, transformation, engagement, and contextualization stages.

Digital government, which is sometimes called e-government, as explained above, should provide a painless way to overcome bureaucracy, manage government services more efficiently, introduce the principles of sustainable economic development, and save money (Durkiewicz and Janowski 2021). Thus, this study of the literature theorizes a descriptive and multidimensional framework that can improve our understanding of the public value of e-government from different perspectives and the intersection between them in real-life e-government projects and implementations. A systematic review of articles, book chapters, and conference materials on public administration and informatics can be carried out using the Web of Science (WoS) electronic library and materials from specialized conferences on electronic government, such as the Digital Government Society and electronic government conferences. Education has been shown to be related to increase demand for public information, government services, and a willingness to participate more actively in the management of public affairs (Kumar and Nanda 2019). It should also make the government more transparent by providing citizens with more access to government data and more information, and ensure a better control over government activities. However, questions remain to be resolved regarding the means with which to transform government operations, preserve the privacy of personal data, and make the best use of emerging information technologies. The overall goals of these examples are similar: officials focus on improving public–government interaction on the internet. Digital technology can change the way citizens feel about the government, but it can also change how governments feel about themselves. The power of digital government lies in making all the data that the government collects and generates, such as crime rates and education spending, available to both government officials and the public (Mergel et al. 2019). In the first stage, cataloging, governments provide citizens with access to information online. Thus, e-government is not only about improving customer service when communicating with the government. Digital communication between the government and citizen, G2C, defines "citizens" as individuals and companies. The countries with the least opportunity were predominantly African countries that did not have widespread access to the internet or even electricity to make e-government possible.

3.1. E-Government as a Technical Tool for Provision of Public Services

During the 1990s, many government agencies began to assimilate operations, work, and business processes as well as their interactions with the public into an online environment in order to simplify and integrate information and services. The essence of e-government should be in adding value to stakeholders through transformation and using technology to improve access to and delivery of public services for the benefit of citizens, business partners, and employees. Government consumers and citizens (G2C) include initiatives to promote people as consumers of government services and citizens to interact with the government. Through digital services, the government can provide citizens with information and services anytime, anywhere, on any platform or device (Korneeva et al. 2021).

E-government scholars have learned how modern information and communication technologies are spreading around the world through innovation in the public and private sectors and used by governments as tools to deliver and organize services. We should empower governments to transform the way government services are delivered through a

new generation of tools. These tools come in several forms, including agencies that offer e-services, agencies that create information websites that allow us to search for and use existing services, and virtual government portals that provide access to the services of many agencies. E-government is often used to refer to everything from online government services to the electronic exchange of information and services with citizens, businesses, and other branches of government (Twizeyimana and Andersson 2019).

3.2. E-Government as an Interactive Form of Mutual Cooperation

E-government is the application of information technology in the provision of government services, information exchange, communication transactions, government-to-citizen (G2C), government-to-business (G2B), government-to-government (G2G) integration of various autonomous systems, the back-office processes and interactions between the government and employees (G2E), and the entire government structure (Setiawan and Yulianto 2018). E-government is the electronic provision of information and services to citizens, businesses, and governments. The e-government system can transform relationships among citizens, businesses, and the government, which can serve a variety of purposes.

Recently, the governments of many countries across the globe reaffirmed the importance of developing classification systems and retention programs prior to implementing an electronic records management system. Since government agencies do not have classification systems, initiatives to develop them depend on the availability of experts to carry out the required work. Traditionally, government services have been delivered in person, by separate departments at different locations, and often using paper forms. Unfortunately, an effective e-government has not been easy to achieve, given the unique challenges governments face in collecting, managing, and providing access to information and services electronically. Web 2.0 and social media have only exacerbated these challenges, and governments have been slow to adapt to these new paradigms of openness, interaction, and influence. However, as information becomes available on the internet and becomes more persuasive, the ability of the public to interact with the government without intermediaries increases. However, as the advent and development of the digital age changed the way citizens communicate and interact, the government has not followed suit in many ways. Attitudes and expectations about government services are changing in part because of people's experiences with online services, and governments have already begun to assess the impact, benefits, and challenges of these new forms of interaction (Darr et al. 2019).

Encouraging an online presence is essential for state governments to meet the goals of wider use by citizens, businesses, as well as government agencies. Likewise, citizens expect to be able to communicate with their government through the same cutting-edge digital channels. Citizens expect direct access to the data and information they need, and this information should be provided to them in real time.

There has always been a difficult separation between citizens and the government, as well as between consumers and businesses. The government has for many decades been considered as foreign land, and citizens who needed to interact with the government needed intermediaries. This has partly been because government agencies may be under less pressure to change due to the fact that their interactions with citizens are less frequent and not as long as their interactions with businesses. In spite of all this information, we cannot be sure that the government will ever become more efficient, although it is certainly beneficial to be able to conduct business with a government agency over the internet. Such close relationships with finance departments indicate that perhaps e-government is still in the process of providing online services for operations such as renewing a driver's license or filing a tax return. While e-government is often implemented as a measure of efficiency and cost-saving (for example, by reducing the need for employees to perform certain routine tasks, such as customer service), actual monetary savings are not always achieved by states (Malodia et al. 2021). It is difficult to measure the return on investment in e-government without knowing the use and rate of adoption of online services and applications. In the first stage, cataloging, governments provide citizens with access to

information online. The second stage, transaction, involves the introduction of interactive processes between government and citizens, which leads to an increase in the efficiency of service delivery. The third and fourth stages, vertical integration and horizontal integration, relate to the transformation and rethinking of public services; for example, such changes can take place through a portal where citizens can access services from different governments, and therefore require the cooperation of governments at different levels.

Some authors identify complementary citizen-oriented information technology value categories in public administration (fundamental/efficiency, policy formulation, democracy, services, internal, and external). In the context of e-government, researchers define values as behaviors that are generally accepted as correct, and argue that they are at the heart of all forms of transformation (Bannister and Connolly 2020). We are developing a different, but related, emphasis on values which reflect the ultimate goal of predicting how information technology benefits good governance or increases influence. These predictions (rarely mentioned in the public administration literature) can be characterized as a technological framework. Within the context presented above, leadership is defined as the willingness of political leaders, management, and line staff to support the implementation of an e-government as a strategy for delivering e-government services to government clients (Sagarik et al. 2018). If the program aims to strengthen the delivery of electronic services using the media and various technologies, it should function as a focal point for coordinating the efforts of various ministries and institutions, and develop plans for the provision of electronic and standard government services and transactions, as well as for the provision of expert knowledge.

3.3. E-Government as a Relationship between Government and the Public

When it comes to e-government as a relationship between the government and the public, the main goal of this process is to help both knowledge developers and stakeholders improve the quality of e-government services and create the social value that will lead to the success of an e-government (McBride et al. 2019). The focus of this framework is to show the vital role of information technology in managing shared knowledge resources. These stakeholders should act in accordance with the guiding principles within the commitments made under the Tunis Agenda for the Information Society. ICT applications, the implementation of e-government strategies, promoting transparency in governance, and democratic processes are all important aspects of the overall vision and guiding principles (Matheus et al. 2021). Adopting an integrated and citizen-centered approach can motivate governments to increase equal opportunities in the use of ICTs. Collaboration between e-government stakeholders such as central governments, local governments, the private sector, academia, civil society, and international organizations is key. Thus, e-government is created to create a useful system of public administration that meets the individual interests of each citizen through participation through ICT in the government decision-making process. E-government helps streamline processes and makes government information more accessible to government agencies and citizens. Consequently, e-government can be characterized as a reorganization of the provision of information to citizens by the state administration in order to obtain added value.

According to the World Bank, e-government is the use of information and communication technologies (ICT) to improve business operations and service delivery by government agencies (World Bank 2015). The growth of e-government depends on various factors such as information technology, human resource management, legislative will, infrastructure, and public trust. E-government promotes citizen participation in government, increases citizens' awareness of government programs, increases transparency in government decisions, and reduces corruption (Koudelková et al. 2015; Sabani 2020). The success of e-government projects depends on many factors, such as infrastructure, civil servants, citizens, and governments (Glyptis et al. 2020). Thus, the introduction of e-government can imply a better society if organizations take this into account and consider the associated risks. Advances in e-government can lead to increased public access to ICTs, as well as an increase in

skills and training in the use of e-government networks (including the social networks that can be used for communication with citizens, as Hubert et al. (2020) demonstrate). The application of these technologies in public administration can lead to several positive results, such as improved delivery of public services, better interaction with various organizations (for example, businesses and associations), promote citizen empowerment, and ensure commitment by facilitating access to information. The increased use of ICTs in public and administrative affairs has led to a new way of delivering public services. In e-government platforms, public services are not only provided by the state, but also include citizen participation made possible by the development of ICT (Piderit and Jojozi 2017). The service is aimed at using digital technologies, creating an electronic government to improve the efficiency of public services, ensure the availability of public services, and improve a country's standard of living. Through the e-government portal, citizens can use a plethora of electronic services by multiple government agencies. The Electronic Government and Information Technology Authority (E-Gov), led by the Chief Information Officer of the federal government, develops and provides guidelines for the use of internet technologies to facilitate interactions with citizens and businesses of the federal government, save taxpayer money, and make citizen participation easier. This case study shows how Human Resources Management (OPM) used enterprise architecture to create a national human resource management (HR) model, including the creation of shared service centers for human resources. The introduction of various new applications in e-government have contributed to improving and increasing the efficiency of services provided to citizens and businesses. This new form is in relation to the implementation, development, and application of IT tools, such as information and communication technology. Other theorists believe that this change is deeper, expands beyond the technological aspect, and focuses on changes that are characteristic of society and the government itself. Other definitions move away from the idea that technology is an object and define e-government simply as an assistant or tool and focus on specific changes in government issues. The most frequently cited keyword is e-government itself, which sits at the center of a group of keywords on similar topics, including ICT (suggesting that the focus is on transforming governance in general). This relates to other important keywords underlying the larger cluster (as previously described) and the cluster with more references to government services, public sector, and organizational issues; innovation is also part of this cluster, which could mean that these are publications with a greater focus on transformation in specific areas. The emergence of these different sets of topics suggests that there is ongoing research in this sample of e-government- and FTA-related publications that has a significantly different focus. The study explores what people value, what worries them the most, and how they view the technological advances that are affecting our lives. The main goal is to examine their expectations regarding the role of government and public services and the nature of the relationship between those who govern and those whom they govern. Therefore, this literature research theatricalizes a descriptive and multi-dimensional framework that can improve our understanding of the public value of e-government from different perspectives and their intersections in real e-government projects and implementation. E-government research led by government officials is not as common as research led by citizens.

In this context, we need to determine what impact and what role does e-government play in bridging the digital divide. It involves the use of information technology, in particular the internet, to facilitate communication between the government and its citizens. Based on our familiarity with the infrastructure required for such programs, the knowledge management practices of government agencies will open opportunities for the success of e-government. The e-democracy in this stream can be accepted as citizens' electronic participation in activities that partially dissipate government power, which allows citizens to directly influence the decision-making process of public affairs. It emphasizes that e-democracy (also known as e-participation and digital democracy) includes the accessibility of civil servants and archives, as well as citizens' participation in public interest affairs through information and communication technology. According to some researchers

(Sánchez-Torres and Miles 2017), a review of publications confirmed that the cluster was used to prioritize issues such as strategy, actual and expected impact, and the relevance of specific components of e-government initiatives.

4. Implications from the COVID-19 Pandemic

The COVID-19 pandemic brought the harsh reality of deaths and suffering, but it also helped to promote the e-government and the digitalization of administrative services worldwide. Very soon after the first shock from the pandemic and lockdowns subdued, many governments have begun to develop and implement COVID-19 certification systems, including the EU COVID-19 Digital Certificate (formerly the EU Digital Green Certificate). Local administration has started to actively track, test, and isolate patients, and the national vaccination strategies have started to be implemented at the local levels.

In most cases, vaccination campaigns against the coronavirus disease are led by national governments. However, their implementation is often coordinated with local governments and health agencies to better consider local needs and population differences (e.g., local governments, regions, and municipalities are responsible for critical aspects of containment measures and the implementation of the vaccination campaign, health care, social services, economic development, and public investment, which places them at the forefront of crisis management). The government must determine which features should be operational and which ongoing operations require new protocols based on COVID-19. The medical system also needs to assess the financial position of hospitals and health insurance plans and provide financial support to assess revenue losses due to COVID-19. Numerous health challenges are more likely during the recovery phase, including monitoring possible "second wave" infections and working with companies to develop, approve, and distribute new tests, treatments, and vaccines against the virus. Medical science will also be asked to quickly identify those who have achieved immunity—through illness, vaccination, or otherwise—to ensure safe gatherings of people as soon as possible. This will require clear guidelines for implementing COVIDPass technology, which allow businesses and locations to prepare for another possible outbreak. Hence, the distribution of the COVIDPass, which restricts access to certain locations based on vaccination status, a recent negative test result, or evidence of recovery from COVID-19 in the past six months, must be carefully planned and executed. This will require proof of vaccination or recovery and testing through a mobile phone app to allow travel within the EU and gain access to accommodation and activities. This should include vaccination status in preparation for widespread access to the vaccine. Most of the countries in the world have their versions of COVID passes available since spring 2021 (with the EU issuing similar certificates according to the same template and technology), allowing people to access a QR code containing information about the vaccines and their vaccination status. In addition, various verifier apps that allow on-site staff to quickly scan a person's COVID certificate and see immediately whether it is valid are also available for download.

The QR codes are issued in accordance with the requirements of the country's digital health system and is intended to be integrated into the digital green certificate system. The certificate will ensure mutual recognition of the results of what it shows—a minimum set of data—in every country. The goal of the system is to help people to regain freedom of movement in a safe, responsible, and trustworthy way. The changes it will support will include personal data collected for a digital green certificate that will be processed for other purposes if there is a legal basis in accordance with national law and the scheme will have a fixed duration of 12 months and will not expire as the WHO announces the end of the international public health emergency due to the COVID-19 pandemic.

An interesting issue with regard to the COVID passes and QR codes (the use of which was mandatory in the Russian Federation to control the movement of people in spring 2020, during the peak of the pandemic) is that despite all their useful purposes for which they were primarily designed for, they also helped many people to embrace the concept of e-government and to become acclimatized to the digitalization of their everyday

agenda. In this way, the COVID-19 pandemic helped to further enhance the digitalization of e-government tools and features and to promote its effectiveness and efficiency.

5. Materials and Methods

5.1. Research Methodology

Our study aims to assess the influence of e-government on economic prosperity, e-participation, anti-corruption, human capital development, and uncertainty using the findings from the above literature review and methodological discussion. The research hypothesis is that the COVID-19 pandemic has increased the acceptance and usage of e-government tools and facilities, which has positively impacted these areas. Our methodology follows similar studies (e.g., those by Nam (2019), who evaluated the impact of e-government maturity on government effectiveness worldwide, or by Strielkowski et al. (2022), who studied the relationships between the emotional creativity and motivations to conduct new business during the COVID-19 pandemic) and uses a dataset compiled from our own data sources for each country, analyzing variables such as e-government maturity, online service delivery, and user-centricity. The findings of this research can provide insights for policymakers to better understand the role of e-government in modernizing public administration, improving service quality and user satisfaction, and achieving better economic and social development. Theoretical literature highlights the benefits of e-government, including increased efficiency, decentralization, accountability, and improved resource management. Effective e-government implementation can lead to improved information quality and supply, reduced process time and administrative burdens, cost reduction, and economic growth and social development. Our study aims to identify which variables are significant in explaining the relationship between e-government enhancement and effectiveness and efficiency. The results of this study can guide policymakers in leveraging e-government to achieve their development goals.

For this research, we have chosen a case study of the Czech Republic and Russian Federation. This selection has not been made at random: both the Czech Republic and the Russian Federation have been shaped by their respective histories, and this has had a significant impact on their culture, politics, and economy. The Czech Republic and the Russian Federation have undergone significant changes in recent years following the fall of communism in the early 1990s. The Czech Republic has transitioned from a planned economy to a market-oriented economy and is now considered to be one of the most developed countries in Central and Eastern Europe (CEE). The Russian Federation, on the other hand, is still in the process of transitioning from a planned to a market-oriented economy and is one of the largest economies in Europe. Despite these similarities, there are still significant differences in the economic structures of the two countries, with the Russian Federation relying heavily on its natural resources, such as oil and gas, while the Czech Republic has a more diversified economy. Politically, both the Czech Republic and the Russian Federation have unique political systems. The Czech Republic is a parliamentary republic with a multi-party system, while Russia is a federal semi-presidential republic. The two countries have different political ideologies and systems of government, and this has had a significant impact on their political and economic stability. For example, the Czech Republic is widely considered to be one of the most stable and democratic countries in Europe (see, e.g., Kim 2020; Voda and Havlík 2021; or Hloušek and Kaniok 2021), while Russia is often criticized for its lack of political freedom, autocracy, and media censorship (see, e.g., Litvinenko and Nigmatullina 2020; Bodrunova et al. 2021; or Ermoshina et al. 2022).

The Czech Republic became a member of NATO in 1999 and the EU in 2004, while Russia co-founded BRICS in 2009 and established the Eurasian Economic Union (EAEU) in 2014. Despite these differences in their geopolitical development, both the Czech Republic and the Russian Federation have committed to pursuing the Sustainable Development Goals (SDGs) and have embraced the principles of the 2030 Agenda. The Czech Republic ranked 8th in the SDG index and integrated the SDGs into its development cooperation

strategy and daily activities. However, decarbonization and the social and welfare system present major challenges to the country's economic, social, and environmental levels (United Nations 2021). On the other hand, the Russian Federation ranked 62nd in the SDG Index, despite making notable progress in eradicating poverty, improving the quality of education, providing decent work, and promoting economic growth. The country faces difficulties in fostering cooperation among stakeholders, businesses, and the public to enhance its SDG efforts and achieve sustainable development, which was made a priority in 1996. The Russian Federation's 12 national projects aimed at modernizing and expanding the country's infrastructure and backbone, and placing a focus on sustainable development (United Nations 2020). However, logistical issues due to Russia's vastness and the country's traditional focus on exporting fossil fuels, which generate most of its income, have diverted attention from promoting renewable energy sources and achieving energy efficiency in general.

All in all, these two countries in question are similar in many ways, including their rich cultural heritage, complex history, and transitioning economies. However, there are also significant differences between these two countries, including their political systems, ideologies, and economic structures. Despite these differences, both the Czech Republic and the Russian Federation have a lot to offer and provide an interesting ground for comparing e-government development and deployment, both of which are subjects well worth exploring, and from which valuable lessons can be drawn.

5.2. Survey and Data

Our data come from our own electronic online survey administered in the Czech Republic and Russian Federation between September 2020 and March 2021, which covered the period when the world economy was mostly hit by the COVID-19 pandemic and its aftermath. The method of sampling was quasi-random and included both the elements of the snowball technique as well as the opportunity and convenience sampling. The participants were recruited both personally using social networks and online modes of communication and impersonally via the e-mail. The main reason for using this method of sampling was due to the possibility of engaging with the internet-based population which otherwise would not be reachable (see, e.g., Wright 2005; Korneeva et al. 2022; or Kaftan et al. 2023).

In order to collect our data, we utilized non-random sampling methods, specifically the snowball technique and opportunity sampling, through our contact points, or "gatekeepers." We chose this method in order to reach the younger and better-educated internet-based population who may not be reachable otherwise, and to communicate with those who may not have time for face-to-face meetings. Our sampling was based on a graduate student network with contacts at SMEs, which may have introduced some bias. However, we prepared our graduate students to approach and select respondents and obtain their answers while adhering to ethical standards.

We need to acknowledge here that our sample is skewed toward younger and better-educated respondents who might not be very objectively representative of the populations of the countries in question, and who were proficient with using the internet and all the benefits it provides before the pandemic. Nevertheless, we think that our results still provide valuable insight into the usefulness of e-government and its impacts on the socio-economic stability and sustainable development in the post-COVID era and may offer important lessons for business and economic leaders in both the Czech Republic and the Russian Federation. Our gatekeepers contacted respondents through various social networks and messenger apps or personalized emails. All respondents completed the questionnaire voluntarily and anonymously, with the assurance that their answers would only be used for academic purposes. The ethical standards in connection to the collection of the primary data used in this study have been dully observed in accordance with the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of Czech University of Life Sciences.

In total, we obtained a sample of 400 respondents from the Czech Republic (136 respondents) and the Russian Federation (264 respondents). The total sample consisted of 58% women and 42% men (M ± SD = 45.53 ± 11.46, median 44) who completed our questionnaire voluntarily and anonymously. The descriptive statistics of the respondents is provided in Table 2.

Table 2. Descriptive statistics of the respondents.

		Numbers	%
Age	18–24 years	48	12%
	25–35 years	228	57%
	36–55 years	116	29%
	56–70 years	8	2%
Gender	Female	232	58%
	Male	168	42%
Annual net personal income (in EUR)	<10,000	92	23%
	11,000–20,000	124	31%
	21,000–40,000	164	41%
	>41,000	20	5%
Area of work	Finance, accounting, and consulting	284	71%
	Information and communication	60	15%
	Education providers	44	11%
	Other services	12	3%
N = 400			

Source: Own results.

Our survey questionnaire included over 20 questions, but only several of them were used in this paper. The questions in the questionnaire included the usual socio-demographic characteristics (age, gender, level of education, area of occupation or type of work, or the annual net personal income) as well as the questions that were composed on a 5-point (Likert-type) scale ranging from 1 (strongly disagree) to 5 (strongly agree) or from 1 (weak) to 5 (strong).

The questions from the survey that were used in this paper concerned e-government enhancement and improvement ("The pandemic made me to start using e-government services (tools and facilities) for sorting out administrative and personal issues", see Table 3 below for more detailed information), e-government effectiveness ("How do you rate the degree to which e-government in your country is successful in producing desired results?"), or e-government efficiency ("How do your rate e-government in your country in being efficient in what it is doing?"), which were inspired by the Worldwide Governance Indicators (2022) and the United Nations E-government Survey (United Nations 2022). In addition, we used the measure of economic prosperity (annual net personal income), measure of e-participation (the frequency of using e-government services for administrative and personal issues measured on a scale from 1 (never) to 5 (daily)), measure of anti-corruption (the personal estimation and evaluation of the corruption control ranging from 1 (weak) to 5 (strong)), the level of development of the human capital (level of education and years of schooling), as well as the degree of uncertainty (feeling threatened by the unknown aspects introduced by e-government and trying to avoid it, as inspired by Hofstede's measurement of uncertainty (see, e.g., Minkov and Hofstede 2014)). The synopsis of the survey is presented in Appendix A.

Table 3. Motivation to use e-government services for solving everyday issues and formalities (cross-tabulations of responses by countries).

		1—Strongly Disagree [a]	2 [a]	3 [a]	4 [a]	5—Strongly Agree [a]	Total
Country	Czech Republic	9.9%	15.3%	19.9%	25.3%	29.6%	100%
	Russian Federation	18.9%	18.6%	21.5%	19.9%	21.1%	100%
Total		14.1%	17.3%	20.7%	22.0 %	25.9%	100%

Note: [a] The pandemic made me to start using e-government services (tools and facilities) for sorting out administrative and personal issues, 1—strongly disagree, 5—strongly agree. Source: Own results.

Table 3 reports the cross-tabulation of the responses by countries showing the motivation to start using e-government tools and facilities for sorting out everyday formalities.

From the cross-tabulations depicted in Table 3, it can be claimed that when it comes to our specific sample of respondents, the motivation for using e-government services during the COVID-19 pandemic (the question from our survey, "The pandemic made me to start using e-government services (tools and facilities) for sorting out administrative and personal issues") has increased in the Czech Republic considerably more than in the Russian Federation with a larger share of respondents from our sample disagreeing with e-government (even though COVID passes with QR codes were mandatory in many urban centers and regions of the Russian Federation during the worst peaks of the pandemic (spring 2020) and served as the prerequisites of the free movement of people). Higher values of the e-government development index and e-participation index that are observed in the table for the Czech Republic (see Table 1 in Section 2 of this paper) speak for themselves in that matter—the deployment and the acceptance of e-government appears to be higher in this country.

6. Empirical Model

In order to support the research hypothesis stated in the Introduction and justify our use of the regression model in this paper, we have checked pairwise correlation coefficients that were used to measure the differences in the expression. The results of the estimations reveal that there appears to be a high correlation between bivariate relationships: e-government enhancement is highly correlated with government effectiveness (r = 0.814) and government efficiency (r = 0.874). In addition to that, variables such as economic prosperity (r = 0.922), anti-corruption control (r = 0.948), and rule of law (r = 0.946) are also in high correlation with both dependent variables. At the same time, the cultural dimension variables such as the degree of uncertainty are not significantly or highly correlated with the dependent variable.

Thence, to reinforce our discourse by the empirical data, we computed the regression model of the e-government enhancement and its effectiveness (the degree to which something is successful in producing a desired result) as well as its efficiency (the state or quality of being efficient) during the COVID-19 pandemic. It has to be mentioned that there are some limitations to the regression model as an estimation technique for e-government enhancement. The model assumes a linear relationship between the independent and dependent variables, which may not be accurate for all cases. Additionally, the model does not consider the impact of external factors, such as political and cultural factors, which can significantly affect e-government service quality and user satisfaction. Therefore, alternative techniques, such as structural equation modeling or fuzzy set analysis, can be used to estimate e-government enhancement and its effectiveness. These techniques can provide a more comprehensive understanding of the complex relationships between e-government service quality and user satisfaction by considering the impact of external factors and nonlinear relationships between variables. Overall, the selection of estimation techniques should depend on the specific context and research objectives.

Our formal empirical regression model can be presented in the following Equation (1):

$$e\text{-}government\ enhancement_i = \beta_0 + \beta_1 EconProsp_i + \beta_2 ePart_i + \beta_3 AntiCorr_i + \beta_4 HumanCap_i + \alpha_5 Uncertainty_i + e_i \quad (1)$$

where:

e-government enhancement—indicator of e-government enhancement and improvement ("The pandemic made me to start using e-government services (tools and facilities) for sorting out administrative and personal issues");
EconProsp—measure of the economic prosperity (annual net personal income));
ePart—measure of e-participation (the frequency of using e-government services for administrative and personal issues measured on a scale from 1 (never) to 5 (daily));
AntiCorr—measure of anti-corruption (the personal estimation and evaluation of the corruption control ranging from 1 (weak) to 5 (strong));
HumanCap—the level of development of the human capital (level of education and years of schooling);
Uncertainty—degree of uncertainty ((feeling threatened by the unknown aspects introduced by the e-government and trying to avoid it); and
e—an error term.

The results of the regression analysis are presented in Table 4 above (with *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$ significance levels and the standard errors provided in parentheses).

Table 4. Results of the regression analysis of e-government effectiveness and efficiency.

	E-Government Effectiveness	E-Government Efficiency
Economic prosperity	0.027 ***	0.123 **
	(0.009)	(0.021)
E-participation	0.472 ***	0.471 ***
	(0.062)	(0.071)
Anti-corruption	0.699 **	0.739 **
	(0.202)	(0.352)
Human capital	0.022	0.031
	(0.006)	(0.005)
Uncertainty	−0.005 **	−0.007 *
	(0.004)	(0.008)
Constant	1.269	1.393
	(5.278)	(5.522)
R^2	0.637	0.625
N	400	

Source: Own results.

Overall, it appears that during the COVID-19 pandemic, e-government enhancement has been perceived as an effective tool for fostering economic prosperity, tackling corruption, and helping to avoid uncertainty (e.g., lack of information and guidelines). The increasing usage and the quality of e-government tools have a significantly positive impact on the economic prosperity, and have helped to deal with corruption (e.g., by recording all communication with the authorities and making it easier to report the fraud). On the other hand, the effect on the human capital did not come through as decisive. Therefore, the enhancement of e-government indeed occurred during the COVID-19 pandemic, and the technological and digital surge it caused, either directly or indirectly, had many positive effects in terms of increasing transparency, improving communication, and helping to boost the economic growth that will be needed once the smoke of the pandemic lockdowns and losses clears.

Our results confirm that fostering e-government has positive effects on economic development and growth because of the optimization of services and, the more operative and faster flows of information that enables quicker decision-making, leading to seizing proper market opportunities and doing so in time. In addition, the IoT-based e-government

can also boost tax collection, improve the redistribution of wealth, and point out the drawbacks that hamper the proper development of business and economics, such as redundant administrative barriers or obstacles for the growth of small and medium enterprises that often constitute the backbone of many developed economies. It is even more important to consider that our results are based on the data from the Czech Republic and Russian Federation, which are former transition economies, but which are not at the top of the e-government penetration ranking. It might be that the results from economies with a larger role of e-government (such as, for example, Estonia or New Zealand) might be even more optimistic and inspiring.

7. Discussion of Results

In general, it appears that the basic ideas of access to public information and citizen participation in government have a long history in public administration, which may indicate that e-government reform has a more fundamental basis in public administration systems. In the 21st century, scholars have given e-government the status of a unique approach to public administration reform. However, e-government researchers clearly understand that e-government reform has a specific set of organizational principles and policies about how public administration should work. Its role and place have become especially relevant during the COVID-19 pandemic and is likely to remain the same now that the pandemic is coming to an end.

Although an e-government has put forward several new reform ideas on paper, it may still be logical to implement administrative replacement, which hides all the old defects of the past reform methods, rather than representing a new change. E-government has reliable opportunities, such as geographical adaptability, low dependence on the central government, and the participation of new political participants to avoid historical tensions and obstacles to public administration reforms. E-government reformers believe that their model of change has the potential to fundamentally change the way the public sector operates.

Another new model of civil service is what has been called new public administration, an approach that includes: the centralization of power; an increase in the number, role, and influence of personnel of political parties; personal politicization of appointments to senior positions in the civil service; and the assumption that the civil service is indiscriminately supporting the government of the day. Some critics argue that the concept of treating people as "customers" rather than "citizens" is an inappropriate loan from the private sector model, as companies view customers to an end (profit) rather than as owners. Responsibility for political decisions rests with the political members of the executive branch (those members who have been elected or appointed to establish political leadership, and, as a rule, the career civil servants). Civil servants are usually protected from public condemnation or censorship for their advice. However, the actions of their administration may be subject to special judicial scrutiny, from which no member of the executive branch can protect them. However, in some countries, especially in those unitary states where the provincial administration is part of the central government, some provincial officials are civil servants. For example, in the United States, all levels of government have their own government services (federal, state, and local), and the civil service is part of the government service that enters the exam and offers permanent office. In most countries, the civil service does not include local governments or state bodies. Public administration is the implementation of public policy, as well as an academic discipline that studies this implementation and prepares civil servants to work in public service. The importance of state IT systems for the development of society continues to grow. This digital infrastructure is needed to radically improve government services and the government machinery itself, as well as to create new opportunities such as digital civic participation, but many countries are still falling behind in that respect. Moreover, governments must recognize that software is the new infrastructure paradigm needed to support this model. Therefore, this study

outlines several potential models that are being used in e-government, which is useful for quantifying the scope of e-government research to propose a new suggestive model.

8. Conclusions and Implications

All in all, it becomes clear that fostering e-government effectiveness and efficiency represents the key measure for fostering economic prosperity, distributing the dwindling resources, tackling corruption and fraud, as well as helping to avoid uncertainty in the post-COVID world that, according to many economists, is placed on the brink of the economic recession.

Almost two years of the COVID-19 pandemic have demonstrated that e-services can save time and money, effectively convey useful information and data, as well as help to optimize many processes—from issuing COVID passes following vaccinations, to shifting to working from home (either partly or completely) for a number of occupations. E-governments should embrace all these novelties and move further by embedding them into our everyday lives to optimize, save, and enhance economic performance.

As the e-government continuum leads to organizational transformation, government agencies will begin to implement e-government and governance initiatives, economic performance will be improved, and service delivery will be better equipped to engage with citizens and deliver online services. Consequently, an e-society will be ideal for people with the best modalities provided by e-government using information and technology in public administration, combined with organizational change and new skills that help improve public services and democratic processes. The public must acknowledge the far-reaching potential of e-government by focusing on the use of ICTs to transform government structures, operations, and culture. The government should also prioritize online services. Where appropriate, requirements and solutions should be developed in partnership with industry to meet the needs of the government and local administrations, leveraging the power of innovation and economies of scale to deliver more valuable security and privacy products. The vast body of information held by the federal government is a national resource of tremendous potential value to the public, business owners, and our government programs. Regardless of the form, in order to maximize their value, we need to take an information-centric approach to digital services, reliably building an architecture of interoperability and openness from the outset. To do this, we need to quickly disseminate lessons learned from early adopters, leverage existing services and contracts, create multiple use cases at the same time, use common standards and architectures, participate in open-source communities, use open-source crowdsourcing, and run common government solutions using large-sized and contract equipment. To make the best use of our resources and to innovate with them, we need to share them more effectively, both within government bodies and with the public.

Moreover, governments need to provide electronic identity systems and other digital infrastructure to support these two groups through organizations other than the government and the public sector. Furthermore, the government must enhance its capabilities by providing public services and infrastructure so that individuals, communities, businesses, and the public sector can realize their potential. In addition, the government needs to create a new service delivery operation model. As the world becomes more complex, a new model of governance and policy development will be required to keep up with these changes and shape them toward the public interest. To be decisive in this modern era, today's stakeholders must use their unique position to call on the public, private, and third sectors to address national priorities, renew their approach to policymaking, and promote greater decentralization. All of this would ensure the economic prosperity and sustainable development of the world economy.

In spite of the certain limitations of our study—e.g., the fact that our sample might be biased toward individuals who are already predisposed to using the internet and e-government services regardless of the pandemic—we have been able to generate mean-

ingful results, even though they make us more cautious and less ambitious when inferring the implications and generalizing the results of our analysis.

Overall, our results demonstrate that the COVID-19 pandemic has had a profound impact on both the Czech Republic and the Russian Federation, affecting all aspects of human life, from health and well-being to social and economic development. One area where the pandemic has brought about significant changes is in the adoption and enhancement of e-government tools. E-government has been used to tackle corruption, enhance economic prosperity, and provide clarity during a time of great uncertainty, even though its deployment and acceptance varied in the Czech Republic (a more technologically advanced and sustainable development-focused country) and Russia (less technologically advanced country).

One of the most important findings of this study is that the adoption of e-government tools has a significantly positive impact on economic prosperity. The use of e-government tools has helped to streamline and improve government services, resulting in increased efficiency, reduced transaction costs, and a more business-friendly environment. These factors have contributed to the overall economic growth of the Czech Republic and the Russian Federation during the pandemic. Policymakers and stakeholders in those countries (as well as across the world) should therefore consider investing in the development and implementation of e-government tools, particularly in countries where the adoption of such tools is still low (such as the Russian Federation).

Another significant finding of this study is that e-government tools have been effective in tackling corruption. By recording all communication with the authorities and making it easier to report fraud, e-government tools have increased transparency and accountability in government transactions. This is particularly important for developing countries, where corruption is often a major obstacle to economic growth and development. Policymakers and stakeholders should therefore prioritize the implementation and use of e-government tools as a means of curbing corruption and promoting transparency.

Despite the positive impact on economic prosperity and corruption, our study found that the impact of e-government on human capital did not come through as decisive. This suggests that the benefits of e-government tools are mainly economic in nature and that policymakers and stakeholders should focus on improving the technical aspects of e-government systems rather than the human-centered ones.

Finally, it is important to note that our results confirm that the COVID-19 pandemic played a significant role in the adoption and enhancement of e-government tools in both of the countries included in our case study. The pandemic caused a surge in technological and digital innovations, which in turn led to the adoption and enhancement of e-government tools. Policymakers and stakeholders should therefore capitalize on this momentum to further enhance and develop e-government tools.

In conclusion, it is apparent that the adoption and enhancement of e-government tools have had a significantly positive impact on economic prosperity and the fight against corruption during the COVID-19 pandemic. Policymakers and stakeholders should prioritize the development and implementation of e-government tools, particularly in countries where the adoption of such tools is still low. However, the impact of e-government on human capital is less clear, suggesting that policymakers and stakeholders should focus on improving the technical aspects of e-government systems rather than the human-centered ones.

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Appendix A

Survey synopsis

"Perception of e-government as a key to the economic prosperity and sustainable development in the post-COVID era"

Dear colleague.

We would like you to participate in a study conducted by the XXXXX. The purpose of the study is to obtain data on your perception of e-government as the key to economic prosperity and sustainable development in the post-COVID era.

We ask you to fill out a questionnaire, which will take about 10–15 min. The questionnaire is anonymous. Therefore, your personal information is not going to be published anywhere. The information received will be used solely for scientific purposes. The ethical standards in connection to the collection of the primary data used in this study have been dully observed in accordance with the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of XXXXXX. The results will be presented to the professional public or anonymously published in the professional literature. If you find any question too personal, you do not need to answer it.

By filling out the questionnaire, you confirm that you were informed about the objectives of the study and agree to fill out the questionnaire and agree to the anonymous processing of the data received. Your participation will make a significant contribution to the development of knowledge in online science and education.

Thank you very much for your cooperation,

The Research Team

Part 1: Socio-demographic characteristics

Please provide us with the answer to the following questions: Please tell us your age: Please tell us your gender: What is your highest level of education? What is your area of occupation or type of work? Your country and city: Your annual net personal income: Use of internet:

Part 2: Using e-government tools and facilities

Please provide us with the answer to the following questions: Are you aware/informed about the offer of e-government tools and facilities in your village/city/town? Have you ever used e-government tools and facilities in your life? Please tell us for which purposes have you used e-government tools and facilities? Have you been satisfied with e-government tools and facilities you have used? Would you recommend using e-government tools and facilities to others? What would you improve in the offer of e-government tools and facilities?

Part 3: E-government enhancement and improvement

Please answer the following questions using a 5-point (Likert-type) scale ranging from 1 (strongly disagree) to 5 (strongly agree) (or from 1 (weak) to 5 (strong)): The pandemic made me to start using e-government services (tools and facilities) for sorting out administrative and personal issues: from 1 (strongly disagree) to 5 (strongly agree); How do you rate the degree to which e-government in your country is successful in producing desired results? from 1 (very inefficient) to 5 (very efficient); How do your rate e-government in your country in being efficient in what it is doing? from 1 (very inefficient) to 5 (very efficient); How

frequently do you use the e-government services for administrative and personal issues? On a scale from 1 (never) to 5 (daily); What is your personal estimation and evaluation of the corruption control in your country ranging? On a scale 1 (weak) to 5 (strong); Do you feel threatened by the unknown aspects introduced by the e-government and try to avoid it? On a scale from 1 (very threatened) to 5 (Not threatened at all); Do you try to avoid using the e-government whenever possible? On a scale from 1 (always try to avoid) to 5 (try to use it whenever possible).

Thank you for your cooperation!

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