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CHALLENGES AND OPPORTUNITIES OF DIGITAL TRANSFORMATION IN THE PUBLIC SECTOR IN TRANSITION ECONOMIES: EXAMINATION OF THE CASE OF UZBEKISTAN

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Abstract

The purpose of this paper is to examine the evolutionary stages and current state of e-government in post-Soviet transition countries, shedding light on Uzbekistan as a case study. The previous literature on e-government in developing countries emphasized the considerable positive impact of e-government, including enhanced state services provision, controlled corruption, and more transparent and inclusive governance. The paper claims that there are a number of challenges in transition economies of post-Soviet countries that prevent them from reaping the potential benefits of digital transformation in the public sector.

A multidimensional framework, which includes socioeconomic and political factors of technology-enabled public sector reforms, was employed in order to analyze the current state of the e-government system, challenges, and opportunities. Data were collected from several sources: an online user experience survey of 94 citizens from Uzbekistan; 10 structured and semi-structured interviews with central, local, and civil society organizations; and a review of legislative and policy documents, as well as observation of e-government websites.

The research finds that despite achieving a noticeable improvement in e-government indicators of the UN and other international organizations, with much emphasis being laid on technological progress, there is a design-reality gap in digitizing public services: a little has been attained in terms of e-government infrastructure and the interoperability of different government authorities. Transactional services are still in their infancy, and greater citizen engagement is still limited. The study also develops possible policy options to overcome barriers in digital transformation in the public sector, by drawing a broader implication from the outcomes in other post-Soviet country contexts.

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1. INTRODUCTION

The most recent landscape of the world is characterized by intensive use of technologies, which has transformed almost all aspects of life, to a certain extent in a disruptive way. But admittedly, blended with information flow it has enabled high efficiency and productivity, and led to a high level of connectivity among countries, organizations, businesses, and individuals. It should be highlighted that these trends are regarded as the signs or features of so-called "information society," a concept that was at the center of a number of studies that primarily shed light on the effects of information and communication technology (ICT) in all aspects of life, including economy, education, health, finance, and governance. The ability to use and manipulate information, and the rise of human capital with cognitive skills paired with spatial, technological, and occupational changes are the key markers of an informational or network society (Bell 1974, 437; Castells 1996).

A new trend of easily accessible information and cost reductions through automation and computerization initially triggered changes in the nature of competition and demand for skilled labor force (from physical to cognitive) in the profit-driven private sector (Ndou 2004a; OECD 2017). The public sector, not keeping up the same pace as the private sector in terms of ICT applications, has recently started recognizing the potential of digital initiatives in revitalizing their responsiveness to the changing needs of citizens, efficiently using limited public resources, and most importantly encouraging more just and inclusive governance, or participatory democracy (Tappscott and Caston 1993, cited in Ndou 2004a). So, apart from the fact that the recent technological advances can bring managerial efficiency in the public sector, it has also become obvious that citizens with a new "digital mind" are more informed than ever, networked with each other, conscious about their rights, and more demanding than before, thereby forcing the public sector to adopt ICT to improve their transparency and accountability, and their interaction with the government. So, in recognizing the transformative potential of ICT in public administration to increase efficiency, transparency, and citizen engagement, including the provision of public services to end users and communities, more and more countries are being encouraged to adopt and invest in the concept of e-government by international organizations, or democracy observers.

Yet, the pattern of the digital shift in the public sector, such as motives for, and purposes of, adopting this concept, is highly dependent on the context of countries globally. In Western democracies, the shift to digital governance occurs with having a transparent, open, and accountable government already in place, predominantly with the purpose of optimizing public service delivery and empowering citizen participation (Tapscott and Agnew 1999). However, the rise of a networked society with ICT advancements in developing countries has provoked extra burdens and challenges that might delay the anticipated outcomes of e-government in terms of openness, accountability, and citizen engagement. On the other hand, another group, so-called "transition developing economies," are forced to synchronize reforms of the core public management system (usually with high corruption levels and bureaucracy) with digital governance (Khodjaev 2004), as they are on the way to transforming from a centrally planned system to free-market reforms. Johnson and Kolko (2010) observe that e-government is likely to involve the manipulation of digital technologies to strengthen the government's central power rather than facilitating dialogue between different domains of the society in authoritarian or less democratic governments. In particular, the last line of the observations (ibid.) is interesting to explore by virtue of the fact that digitization of public services has earned massive popularity in the transition

economies of eastern and central Europe, as well as in central Asia in recent years. Also, many political and economic changes have taken place in these countries since the study was conducted, which is why it is reasonable to investigate the previous assertion about digital transformation in authoritarian regimes.

Therefore, this work aims to explore the directions of electronic government reforms in post-Soviet transition countries through the case of Uzbekistan, one of the developing economies in the central Asian region that has set e-government strategies as a priority in recent public administration reforms. Under the clear hypothesis drawn from previous studies (Ndou 2004a; Siddiquee 2016) stating that ICT-enabled reforms bring administrative efficiencies, more involved public participation, and an overall increase in service quality if successfully implemented, we intend to evaluate the current status of e-government development, then identify challenges in the ICT-led development in the public sector. Subsequently, we try to recommend potential policy interventions. Specifically, the research questions this work seeks answers for are the following:

- How is e-governance defined by transition economies, and what are the preconditions for digital transformation in the public sector implementation stages?

- Does increased online presence of e-government mean better delivery of public services, better trust, and transformation?

- What are the issues prevailing in the implementation of digital technologies in the public sector and what are the potential ways to intervene for successful realization?

Based on the debates on, and conceptual grounds of, ICT applications in public administration, a multidimensional framework has been developed to explore the above-mentioned research questions. The multidimensional framework, which includes a number of aspects such as socio-economic and political components of the e-government phenomenon, was employed in a study on the e-government development of Kazakhstan (Kassen 2019). Because in transition post-Soviet countries the e-government phenomenon has become one of the top priorities in reforming the public sector, the research in this direction is still in its infancy. So, there is a need for a holistic approach to evaluate the current development stage of e-government, and a multidimensional framework provides the opportunity to have a complex look at digital transformation in transition countries through observation and policy analysis.

While previous research has mainly focused on policy analysis and examination of the legal and institutional framework, this research is the first of its kind as it employs multidimensional analysis that is aimed at learning about e-government as a whole system. The main practical implication of this paper is that it attempts to demonstrate the true value of e-government from different perspectives, both socioeconomic and political. There is a high chance that countries might only focus on bringing ICT-enabled transformation into public service delivery without paying much attention to how services are designed and what ultimate impact this digital shift might have in terms of user experience, improved accountability and openness, or the so-called "social value of digital government."

We intend to investigate the above-mentioned research questions through reviewing the literature on ICT application in the public sector, as well as opportunities and challenges that are presented by e-government in general, and the theoretical background of ICT-led public sector initiatives, particularly in developing countries, in section 2. The next section provides an overview of analytical lenses and the methodology and justifications for choosing particular methods to explore the

questions. Section 4 is comprised of discussions and analysis of the findings according to the tasks set by the research agenda in the previous sections. Specifically, this section attempts to analyze the case of Uzbekistan and its experience of e-government implementation with reference to empirical evidence. We also aim to explore the existing challenges in e-government implementation, synthesizing them in the last subchapter of the discussion, and present possible policy recommendations to overcome barriers in the ICT-led public sector reforms. In the conclusion, we aim to draw the broader implication of the results into other post-Soviet transition contexts.

2. THEORETICAL BACKGROUND AND CONCEPTUAL FRAMEWORK

2.1 Definitions of Electronic Government

A clear trend of ICT application in the public sector, both in developing and developed countries, can be observed in the light of the recent technological transformations and shifts towards a knowledge-based economy (UNECE 2003). Studies exploring digitalization in the public sector lie in the cross section between investigations of public administration and studies on information and communication technologies for development. There is an ongoing debate on the research of the true purpose and clear definitions of e-government: Is an ICT-driven public sector a tool for achieving better governance or is the digitalization of public services itself the final objective for governments? International development organizations such as the United Nations (UN), the World Bank (WB), the Asian Development Bank (ADB), the Organisation for Economic Co-operation and Development (OECD), the Inter-American Development Bank (IADB), and other development organizations have identified good governance as one of the dimensions of major development issues, binding it into their strategy documents (World Bank 1992, 83). The potential of ICT for transforming governance in terms of administrative efficiency (Heeks 2000), transparency, and accountability (Ghere and Young 1998; Heeks 1998; Yildiz 2007) and its implications for democratic transformations and trust (Bannister and Connolly 2011) have been recognized worldwide by scholars, institutions, and governments. So, implications of ICT for public sector transformations emerged as a popular new direction to explore.

Since definitions of electronic government vary considerably depending on perspectives and the context of a particular country, international research on e-government still does not have a universally applied and standardized approach to defining a digital government. Some define e-government as a new, digitally enabled way of engaging between government authorities and citizens in the provision of public services, whilst others indicate that e-government is beyond a technical shift in governance. According to evidence (Heeks 2003b; Stanforth 2007), e-government initiatives do not bring expected outcomes in a number of countries due to a lack of understanding of its concepts, its narrow definition, and failure to accept it as a complex system. A narrow definition of e-government restricts the opportunities it may bring to the public sector. A summary of the definitions of e-government by different literature is presented in Box 1.

Box 1: Definitions of Electronic Government.

Tapscott (1996) describes e-government as an Internet-based government which internally connects new technologies with a legal system and externally connects government information infrastructure with individuals and entities such as tax payers, businesses voters and other institutions.

UNPA and ASPA (2001, 8) indicates that "e-government is the public sector's use of the most advanced and innovative ICT, like Internet to deliver citizens improved public services, reliable information, and greater knowledge in order to facilitate access to governing process and encourage citizen participation.

Randeep (2005, 79) defines electronic government (e-government) as "the use of ICTs by government to enhance the range and quality of government information and services provided to clients in an efficient, cost-effective and convenient manner, while making government processes more accountable, responsive and transparent.

European Commission (2003, 7) defines e-government as "the use of information and communication technologies in public administrations – combined with organizational change and new skills – to improve public services and democratic processes and strengthen support to public policies."

World Bank (2005) states that e-government is a system of information and communication technologies owned by government aim of which is to transform relations with citizens, public and private organizations in order to empower citizen participation, strengthen transparency, and accountability, enhancing service delivery by government authorities.

Since e-government definitions might differ depending on the context and purposes of ICT implementation in a certain country, it is reasonable to outline the definition of electronic government from Uzbekistan's perspective. The Law of the Republic of Uzbekistan "On electronic government" (2015, Article 3) states that "Electronic government is a system of technical tools, administrative and legal measures on providing electronic coordination between organizations and rendering public services by government authorities to individuals and entities through applying ICT." The Law outlines the main purposes and principles of e-government, and also defines the duties and responsibilities of certain institutions in implementing e-government projects. According to the law on electronic government, transparency in government authorities, equal rights for users in e-government services, standardization of document systems, information security, and constant improvement of online public services are the main principles of the e-government system of Uzbekistan (ibid., Article 4).

All of the definitions of e-government outlined above suggest one commonality: E-government is the electronic provision of government services, enabled by the latest communication technologies, usually through the internet, aimed at transforming and improving public administration, operations, and interaction within organizations, and providing better public services. Randeep (2005) asserts that it is not "technology" that lies at the core of electronic government, but rather it is "government" that is expected to be the central point in the concept of a digitized public service system. The World Bank considers ICT to be one of the driving forces or tools of development. The World Bank (2005, 15) argues that the "success of ICT-led development (or e-development) should not be measured by the diffusion of technology, but by advances in development itself: economic growth and, ultimately, achievement of the Millennium Development Goals."

In analyzing the domains of e-government, e-administration, e-services, and e-democracy are highlighted as the constituents of the e-governance process according to the literature and handbooks from international organizations (Ndou 2004b; UNPA and ASPA 2001, 61; Sakowicz 2003, 2–3).

E-administration or an online public administration refers to automation and computerization of administrative operations through balancing the needs of external (citizens or corporate customers) and internal (public sector staff or administrative back office) groups. More specifically, e-administration includes organizational activities, policy development, and knowledge management within public authorities in implementing an e-government system (UNPA and ASPA 2001, 61).

E-services is the domain that involves delivery of online state services, including e-health, e-education, e-taxation, and so on. It covers all levels of public or private bodies under agreement: local, regional, and national governments rendering services that range from giving general information to managing transactions and payments (Ndou 2004b, 6; Perri 2004, 15).

E-democracy can be described as e-governance in which e-government contributes to a higher level of transparency and accountability by public authorities, and thus improved civic engagement in policymaking and democratic processes. E-democracy, according to Perri (2004 15–16), is not only online voting for representatives or legislative changes by citizens or entities, but it is also managing a system of consultation, and satisfaction surveys between public authorities and citizens. This domain of e-government is considered to be a higher stage or relatively mature level of e-government. We will look more closely at e-government maturity stages later in the literature discussion.

Figure 1: E-government Domains
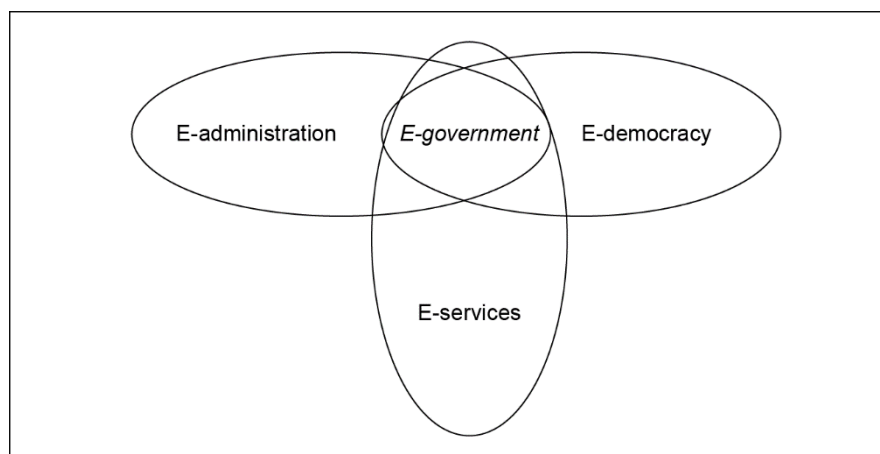
Source: Reproduced by the author from Ndou (2004b, 6), UNPA and ASPA (2001, 61), and Sakowicz (2003, 2–3).

These distinct domains or areas of e-government are interlinked with each other, and this interrelationship within domains takes the form of government to government (G2G) or government to businesses (G3B) or government to citizens (G2C) (Ndou 2004b; Yildiz 2007; Sakowicz 2003).

As noted above, the studies on electronic government lie in the spectrum of studies from innovations in public management to studies on ICT for development (Yildiz 2007). The next subchapter explores the academic studies on ICT-led public sector transformations and their trends brought into traditional governance, and also sheds light on the implications of digital transformation for the public sector of a developing world.

2.2 Paradigm Shift in Public Services Delivery: Opportunities of E-Government

Since the technological and informational explosion in the second half of the 20th century, researchers of public administration and digital government have been exploring the impacts of the digital revolution on the private sector, followed by its influence on the functions and performance of governments. As suggested by a number of studies, a new digital shift caused traditional centralized departmentalization, hierarchical structures, and strict internal rule-based organizations to change to networked, flexible, innovative entrepreneurship and horizontal integration, and to adopt customer-centric strategies (Kaufman 1977; Tapscott and Agnew 1999; Tat-Kei Ho 2002; Ndou 2004b). These profound technological advancements and the easily available information sharing system in turn resulted in paradigm shifts in the public sector as well, which took place later than the private sector's ICT penetration (see Table 1).

It is now widely accepted by scholars of public administration (Moon, Lee, Roh 2012) and digital government (Gil-García, Romon, Pardo 2005) that applying ICT in the private or public sector offers a wide range of opportunities and benefits. A number of studies identified the areas of investigation in ICT for governance and suggest bringing research together and integrating studies on public management and digital government (Yildiz 2007). In particular, topical and methodological suggestions to improve research on e-government made by Yildiz (2007.) deserve particular attention, as he highlights the true challenge and nature of e-government research, which is expressed in its complexity and context specificity. E-government is, admittedly, a problematic study area as it covers governance and policymaking, challenged by and blended with a new way of thinking such as innovation and ICT, thus creating chaos in identifying a certain pattern in the development of e-government (Yildiz 2007.).

In an effort to learn about patterns in e-government development and transformational areas of ICT application to the public sector, several frameworks and models have been developed (see Appendix A). One approach to framing e-government implementation is analyzing evolutionary or maturity stages of e-government in local, municipal, national, or regional contexts. These stagist or evolutionary models of e-government, proposed by different researchers, present similarities with a few distinctions. In general, the establishment of an online presence by government authorities, preparing regulatory and legal grounds for e-government, is considered to be the basic or online presence stage. The next stage is the increase in the number of state online services, which is characterized by an ability to make basic transactions on e-government platforms such as registration or the ability to file an application for certain public services. According to UNPA and ASPA (2001) and Laynee and Lee (2001), a mature level of e-government presents horizontal integration across government authorities; as widespread two-way transactions between users and the government through e-government platforms prevail, citizens are engaged in a democratic decision-making process through online voting, thereby interacting with public officials. So the above-mentioned models assume that mature e-government

is expected to contribute to open government and democratic processes in which e-government turns into one single system connecting all domains and levels, which include G2C, G2G, and G2B.

Table 1: Paradigm Shift in the Public Service Delivery in the Information Age

	Bureaucratic Paradigm	E-government Paradigm
Orientation	Production cost-efficiency	User satisfaction and control, flexibility
Process organization	Functional rationality, departmentalization, vertical hierarchy of control	Horizontal hierarchy, network organization, information sharing
Management principle	Management by rule and mandate	Flexible management, interdepartmental teamwork with central coordination
Leadership style	Command and control	Facilitation and coordination, innovative entrepreneurship
Internal communication	Top-down, hierarchical	Multidirectional network with central coordination, directed communication
External communication	Centralized, formal, limited channels	Formal and informal, direct and fast feedback, multiple channels
Mode of service delivery	Documentary mode, and interpersonal interaction	Electronic exchange, nonface-to-face interaction (so far)
Principles of service delivery	Standardization, impartiality, equity	User customization, personalization

Source: Tat-Kei Ho 2002, 437.

However, stagist approaches to e-government implementation have faced serious questioning by a number of scholars (Yildiz 2007; Coursey and Norris 2008) as evolutionary assessment has not been able to demonstrate the existing patterns of e-government development in certain countries. In practice, e-government initiatives in some countries do not necessarily follow this linear order, because separate analysis of online public services has shown that individual services might be in different stages simultaneously (ibid.). Also, the study of e-government practices of many developing countries has shown that those emerging economies in particular are able to quickly adopt the best practices of successful cases and develop several online services simultaneously, which partly undermines the practical validity of the evolutionary model (Yildiz 2007). However, we argue that a maturity-level framework is still a helpful tool for setting standards for e-government development levels and having an overall understanding of its state, which is why this framework is widely referred to in evaluating the status quo of e-government initiatives (Khodjaev 2004; Makoza 2016; Kassen 2019).

If we elaborate more on the link between these broad thematic areas or transformational aspects of governance with the evolutionary stages, it has been indicated by some studies (OECD 2009; Johnson and Kolko 2010) that political and legal effects of digital transformation tend to take place in the more mature stages of e-government, and mostly prevail in Western democracies. As Johnson and Kolko (2010) argue, in transition or authoritarian contexts technological advances rather facilitate more routine interactions such as access to information or registration and application between government and users, while having a less notable effect on the political participation of citizens in decision-making. We question these findings during our analysis of our case from one of the transition economies. The following subsection thus offers some contextual insights into e-government implementation in transition economies, possible benefits of a technology-enabled shift in the public sector, and existing barriers to their e-government initiatives.

2.3 Opportunities for, and Challenges of, E-Government Implementation in Transition Economies

When we discuss the promises of e-government in terms of enhanced services delivery, effectiveness, and cost-efficient public administration and improved citizen participation, one cannot ignore the fact that the extent of these effects depends considerably on the context and enabling environment in the country of interest. Since we aim to discuss the implications of e-government for transition economies, it should be made clear what "transition economies" or "economies in transition" mean.

According to the International Monetary Fund (IMF 2000) and UN (2018a) classification, transition economies comprise around 30 countries of eastern and central Europe and Central Asia that during the 1990s chose the course of moving from centrally planned economic regimes towards a market-oriented economy in order to raise their efficiency and achieve better economic growth. What makes the transition economies interesting, despite starting their journey at the same time under very similar economic and political conditions, is that they have reached quite varying levels of economic development and political systems. In most transition countries, the shift in economic system has been followed by political transformations that include moving towards a multiparty parliamentary democracy and abandoning the one-party authoritarian system (IMF 2000, 90). Countries within this typology require comprehensive analysis as many of them can be placed into more than one category depending on different economic and political characteristics (UN 2018a). In particular, transition economies of central Asia (CA) (Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan) can also be categorized as developing countries according to their per capita income levels. So, the focus of this study is placed on transition economies in CA, which currently have a similar economic development pattern and governance system.

E-government implementation in transition economies of CA has not been sufficiently explored yet (Johnson and Kolko 2010; Bershadskaya, Chugunov, Djusupova 2013a; Bershadskaya, Chugunov, Trutnev 2013b; Kassen 2019), whilst ICT-driven public-sector reforms generally in developing (Ndou 2004a; Brown 2005; Stanforth 2007; Bwalya and Mutula 2014; Makoza 2016; Siddiquee 2016) and developed countries (Tapscott 1996; Tapscott and Agnew 1999; Tat-Kei Ho 2002; Brown 2005) have attracted a large number of scholarly groups. Most of the studies undertaken in economically developed countries and policy analysis by research institutes (OECD 2009, 2017) indicate that Western democracies set a high level of citizen and government online interaction, cross-border mobility, and interoperability as the priorities of e-government initiatives, as they clearly see the potential in digital government to maintain a more socially just and democratic society (Gil-García, Romon, Pardo 2005). Perceptions on the application of ICT in the public sector in developing countries, including transition economies, have, however, a different landscape from that of developed countries, and many studies (Ndou 2004b; Siddiquee 2016) assert that the potential of e-government still remains underutilized. In contrast, some scholars are doubtful about the positive democratizing effects (Johnson and Kolko 2010) of e-government in authoritarian or less democratic countries around the world, claiming that digitalization in the public sector strengthens monopoly power further.

Table 2: Opportunities and Benefits of Technology-Enabled Public Service Delivery in Developing and Transition Economies

E-government Opportunities for Developing and Transition Countries	Examples	Benefits for Whom?
Cost reduction and efficiency	• Solution for shortage of personnel and inadequate facilities (Bwalya and Mutula 2014; Makoza 2016); • Decrease of document processing cost (Ndou 2004a); • Cost and efficiency for citizens and other users (Madon 2009).	Supply and demand side
Improved transparency, accuracy, accountability	• Facilitation of information transforming between government and customers (Alshehri and Drew 2010); • Decreased corruption (Lupu and Lazăr 2015; Nam 2018)	Supply side
Network and community creation	• Network and interoperability between different levels and departments of government and improved decision-making (Alshehri and Drew 2010; Bwalya and Mutula 2014); • Forums, and network between users (Ndou 2004a).	Supply and demand side
Improved democratic processes	• Increased citizen participation through voting, organizing campaigns, and fundraising events online (Netchaeva 2002; Brown 2005).	General benefit for the society
Social benefits	• Access to healthcare, education, employment opportunities, funding sources, etc., thus achieving poverty reduction in communities (Makoza 2016).	Demand side

Source: Own elaboration based on different sources.

Some studies focusing on the innovative public sector reforms in the former Soviet socialist states of central and eastern Europe also show that these countries, having started public sector reforms under similar conditions to those in CA in the 1990s, have achieved an extremely high level of digital development in the public sector. Specifically, Estonia and Poland have set examples for other developing countries in effectively utilizing the potential of ICT in the public sector and achieving a high coverage of the population with public services through digitization (Kattel and Mergel 2018). For example, Estonia has been recognized as a leading post-Soviet European country in digital government, consecutively ranking in the top 20 on the UN E-Government Development Index in recent years. However, analysis of the e-government implication for democratic processes indicates that the majority of transition economies are still yet to achieve much progress in terms of citizen engagement, transparency, and democratic governance (Kattel and Mergel 2018; Knox 2019; Johnson and Kolko 2010).

According to the existing literature, opportunities that ICT application is expected to bring to public service delivery tend to be similar for developed, decompiling, and transition countries. In this work we synthesized from the literature the benefits or opportunities of e-government initiatives in developing and transition contexts both on the supply side (benefits for government authorities) and the demand side (citizens and other users of state online services) and the overall benefits of electronic government. These opportunities create motivation for governments to adopt ICT in public service delivery and reap technology-enabled benefits (Table 2).

Nevertheless, e-government initiatives do not always revolutionize public service delivery unless an enabling environment is created and certain implementation principles are maintained (Bwalya and Mutula 2014). The success and failure of ICT-led public sector reforms in developing and developed countries were thoroughly analyzed through government and user surveys, observations, and content analysis of government websites (Heeks 2003b; Stanforth 2007; Madon 2009). Heeks (2003b, 6)

demonstrates that among observed e-government projects in developing countries, 30% were not successful, 50% suffered partial failure, and only 15% became successful. To understand the causes of failure, the author suggests considering the "reality to design gap" between seven dimensions of e-government projects, such as information, process, technology, objectives, management, skills, time and money. These dimensions also present barriers, risks, or challenges in transforming the public sector through ICT application, especially for developing or transition economies as they lack the necessary resources and skills. The challenges and problems that prevail in developing and transition economies in e-government implementation can be summarized as shown in Table 3.

In summary, the literature review indicates that e-government is an attractive strategy that comes with a number of opportunities for public service delivery. Yet there is accumulated evidence showing that ICT driven development also poses serious challenges to governments in implementing e-government programs. To mitigate the risks and challenges, a digital shift in the public sector should be seen as a wide governance reform agenda that takes historical, socioeconomic, and cultural contexts into account to achieve the expected positive outcomes from digital transformation rather than blindly copying examples from other cases. The next subsection sheds light on the socioeconomic profile of Uzbekistan, the country that has been selected as the case for e-government analysis in transition or post-Soviet countries to understand the underlying reasons for adopting digital government reforms and the objectives of this change.

**Table 3: Challenges and Problems of E-Government Reforms
in Developing Countries**

Category	Challenges or Problems
Technical and infrastructural	• Low levels of ICT infrastructure (lower penetration of electronic devices and the internet among population); • Poorer quality of information and overall e-government platforms; • Absence of sound privacy and information security system; • Low levels of computer literacy within population.
Institutional or managerial	• Lack of clearly identified institutional approach to manage e-government (centralized or decentralized); • Lack of financial resources to manage widescale e-government projects; • Lack of leadership skills in technology-led reforms in the public sector; • Prevalence of doubt and resistance to change in traditional governance; • Absence of policy guidelines; • Lack of qualified and skilled personnel to work with ICT.
Legal and regulatory	• Lack of ability to create new legal and regulatory framework for e-government in protecting privacy, and restricting online crime.
Environmental context	• Reluctance to accept new technologies by individuals due to certain cultural and social factors (educational and cultural background, including social structure, language, religion, and economic and political ideology); • Lack of inclusiveness due to geographic and demographic context (geographically dispersed population, and large territories sometimes make ICT infrastructure difficult to access).

Source: Own elaborations based on literature review (UNPA and ASPA 2001; Ndou 2004b; Gil-García, Romon, Pardo 2005; Rakhmanov 2009; Bwalya and Mutula 2014; Siddiquee 2016; Knox 2019).

2.4 Context of the Analysis: Socioeconomic and Political Profile of Uzbekistan

Uzbekistan is a central Asian republic (CAR) that became independent from the Soviet Union in 1991. Geographically, it is a double landlocked country (landlocked with one other country – Lichtenstein), bordering with Kazakhstan, the Kyrgyz Republic, Tajikistan, and Turkmenistan, and it is the fourth-largest country by area among the Commonwealth of Independent States (CIS).[1] The government system is unitary, and administratively the country consists of 12 provinces and one autonomous republic.

As for its demographic profile, Uzbekistan is the most densely populated CAR (32 million), with over 50% of the population living in urban areas. With regard to its cultural profile, there are over 130 ethnic groups, with Uzbeks comprising the majority, i.e., 80%; Russians 5.5%; Tajiks 5%; Kazakhs 3%; Karakalpaks 2.5%; and other groups representing less than 1%. Religion- and belief-wise, the majority of the population are Muslims (88%) (SCS 2019).

After the dissolution of the Soviet Union in 1991, Uzbekistan faced the dilemma of developing all sectors of the economy from scratch, and reforming the public sector from a new perspective in line with its new policy priorities. Uzbekistan abandoned its centrally planned economic regime and set off with a new economic system is based on private property and free-market forces. Previously, the country had been a resource-based economy, being heavily specialized in cotton production and agriculture during the Soviet period for over 70 years. As the ties with processing and manufacturing companies broke in 1991, Uzbekistan was left in tough economic disorder and a transition recession. The country could not immediately liberalize currency and trade freely with the outside world, instead it adopted the approach of gradualism in all sorts of reformations (Tsereteli 2018). Despite these economic challenges, the country has taken major steps to restructure state-owned enterprises and the financial sector, promoting private small and medium-size businesses (SMEs), introducing land reforms, and reforming public sector institutions.

The post-Soviet economic, institutional, and political circumstances were reflected in the governance structure and public administration practices as well, characterized by the centralized and hierarchical nature of decision-making in Uzbekistan (Adams and Rustemova 2009; Johnson and Kolko 2010). Therefore, many scholars adopt a positive approach in studying the potential opportunities presented by digital technologies to democratize the public sector, particularly in authoritarian countries. Johnson and Kolko (2010) undertook a research on the implications of e-government for transparency in authoritarian regimes, with a focus on CARs in exploring the nature of e-government initiatives in nondemocratic countries. The authors conducted a comprehensive content analysis of national-, regional-, and local-level government websites of Kazakhstan, the Kyrgyz Republic, and Uzbekistan and concluded that in less democratic or highly centralized countries, the online presence of government does not necessarily represent a more accountable, transparent, or responsive government (ibid.). Also, it has been highlighted as a conclusion that city- or local-level e-government tends to be more responsive and citizen oriented then their national-level counterparts (ibid. 37). However, we argue that the study was conducted before 2010 and reflects the situation of that period, therefore a study reflecting the influence of recent or ongoing changes is needed to evaluate the potential implications of e-government for Uzbekistan.

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[1] The Commonwealth of Independent States is a regional integration of ten Eurasian countries formed following the collapse of the Soviet Union.

As a conclusion to the section, existing literature on digital reformations in the public sector suggests that e-government offers a wide range of opportunities for both developed and developing states, including managerial efficiency, improved public services, and better transparency and accountability. In particular, there is a consensus among researchers that ICT-enabled public sector reforms might considerably encourage democracy and citizen participation in transition economies. However, there are also claims by scholars that increased online presence of authoritarian governments does not necessarily represent improved democratic processes, because developing transition economies encounter a number of challenges and barriers triggered by their socioeconomic contexts, which in turn might hinder the desired outputs of e-government reforms.

3. ANALYTICAL FRAMEWORK AND RESEARCH METHODOLOGY

This section presents the framework of analysis for investigating the questions and tools or methods to be used to evaluate each domain of our framework. In addition, descriptions of survey data collection and the limitations of the research are also provided in the section.

3.1 Analytical Framework

The literature overview shows that there is insufficient research on e-government development in Uzbekistan as e-government itself is a fairly recent policy tool that has been introduced recently in the public sector reforms. Among the prominent works exclusively on e-government development in Uzbekistan we can highlight the work of Khodjaev (2004) done for the project by the UNDP to develop an e-government system in Uzbekistan. Another work worth noting on the current status and challenges of digital transformation in Uzbekistan was conducted by Rakhmonov (2009). Reports by international organizations on ICT development and e-governance (UNDP 2013; UN 2018b; OECD 2019) and the works on innovative public sector reforms in CA carried out by Adams and Rustemova (2009), Johnson and Kolko (2010), Brimkulov and Baryktabasov (2018), and Kassen (2019) have served as references in developing the framework, setting a number of assertions and proposals in this work.

However, investigations solely reflecting the recent e-government progress in Uzbekistan are rare, and related data are limited, which also prevents having a holistic and comprehensive overview of the e-governance of the country. In addition, there is hardly any work among existing literature that sheds light on the recent developments in terms of the open data, civic engagement, and transparency dimensions of recent e-government initiatives in Uzbekistan. Therefore, we decided to build a multidimensional analysis (Kassen 2019) of the digital transformation in the public sector of Uzbekistan with available sources and analytical materials. The analytical framework is grounded in line with the approaches taken in previous studies related to the digital transformation in governance of CARs and other post-Soviet republics as we can draw a number of similarities in terms of the historical aspects of the development and governance structure, in spite of considerable differences in the current state of the socioeconomic profile. Our multidimensional framework has been developed to address the following research questions:

1. What are the objectives and the status quo or the current stage of e-government in Uzbekistan as being one of the transition economies?

2. What are the key challenges and progresses that have been faced in e-government implementation?

3. What progress has been achieved in terms of transparency and citizen engagement since the introduction of ICT-driven public sector reforms?

4. How can these challenges be tackled to reap the benefits of e-government?

All things considered, the framework for analysis is built on the case study of Uzbekistan's digital reforms in the public sector. A separate conceptual framework (case study, maturity framework, user experience) was used to analyze each domain and was integrated into the given comprehensive framework (Figure 2).

Figure 2: Multidimensional Framework for Analysis
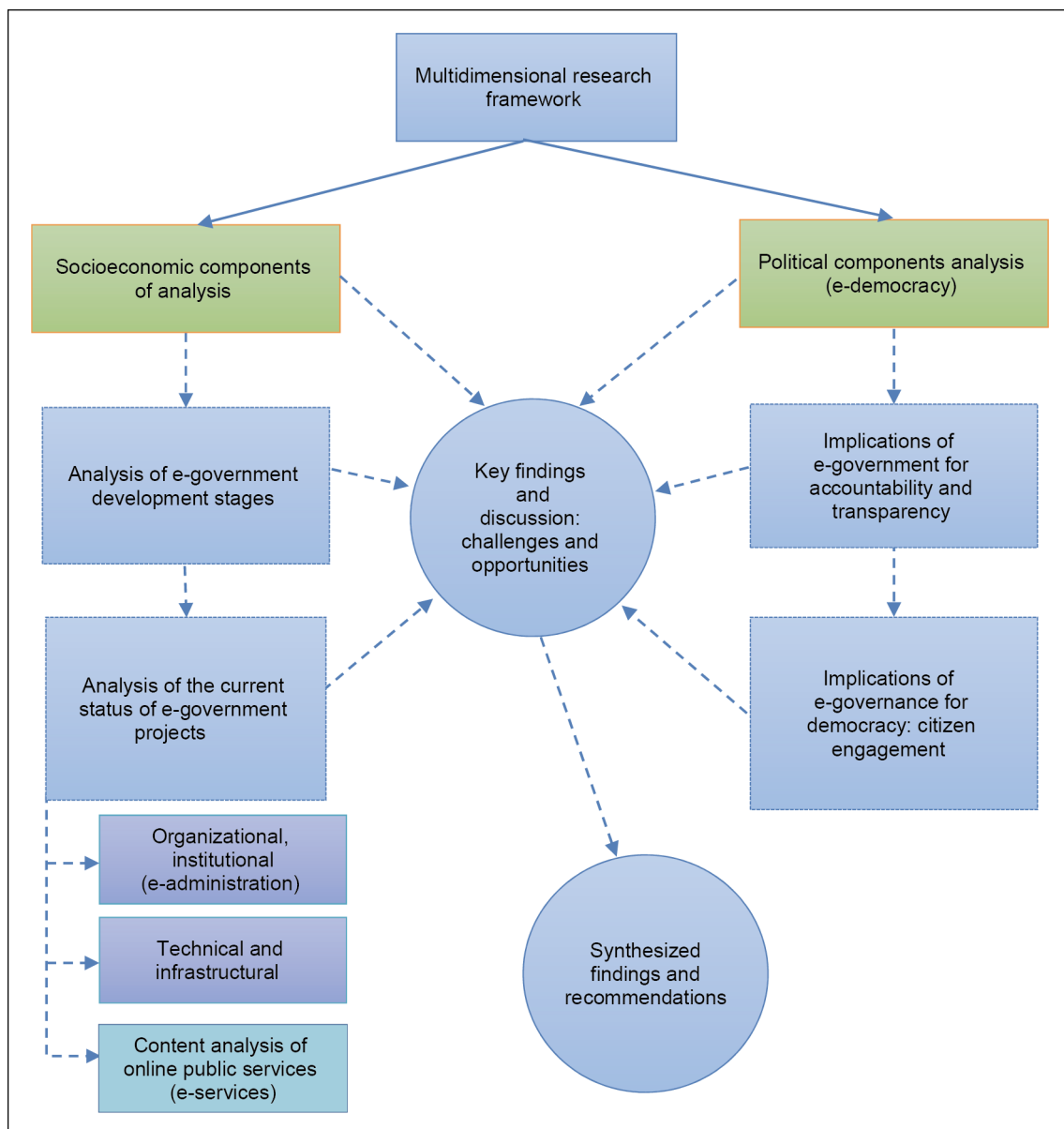
Source: Elaborated by the author based on Kassen's framework (2019).

3.2 Research Methodology

In line with the research questions and the framework, the current work is mainly based on the following secondary and primary data sources:

1. The academic literature and studies on ICT-led public sector reforms;

2. Legislative and policy documents published by the Republic of Uzbekistan, as well as reports by international development organizations such as the UN, the World Bank, and the OECD;

3. Observation of the websites of national-, local-, and city-level public agencies through which the majority of online public services are offered.

It is important to conduct analysis of the **socioeconomic contexts of the country** to understand the enabling environment for e-government, and its implications for the need for innovations in public administration.

There is accumulated evidence from the literature that the success or failure of certain e-government strategies is highly dependent on the context of a particular country (Bwalya and Mutula 2014, 15; Kassen 2019).

Further, **retrospective analysis** is conducted with the purpose of identifying the key development stages and prerequisites of ICT reforms in the public sector of Uzbekistan, and is undertaken from three different perspectives:

• Development of legal framework for e-government through legal acts and regulatory documents;

• Analysis of e-government actors and institutional architecture through reports and websites;

• Changes in the overall progress of e-governance assessed by observation of government reports, the UN E-Government Survey (UN 2018b), and other ICT development indicators through government statistics.[2]

Analysis of the current status of government websites is conducted to assess the progress of e-government development through the following lenses: current **institutional, technical, environmental, and service quality** (G2C, G2B, and G2G) perspectives. The first three aspects are analyzed through secondary data such as government regulations and policy documents, as well as reports by international organizations. The quality-of-service analysis is evaluated through three methods: the first is observation of selected government websites through a maturity framework; the second is user experience survey results; and the third is previous literature on e-government. Unlike the content analysis of national- and local-/city-level government service from a transparency perspective conducted by Johnson and Kolko (2010), this work intends to undertake national-level content analysis of recently upgraded and relaunched government websites. Given the fact that Uzbekistan's e-government projects are of a centralized nature and are implemented by higher levels of government, it is reasonable to analyze selected e-government platforms through an evolutionary framework (presence, interaction, transaction, horizontal integration) as it is a fairly straightforward and simple way to analyze (Khodjaev 2004).

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[2] The United Nations E-Government Survey is conducted every two years to assess the progress of e-government development at the national level among 193 countries. It measures the progress through the E-Government Development Index (EGDI), which is a composite index calculated through the weighted average of three indices: the Telecommunications Infrastructure Index (TII), the Human Capital Index (HCI), and the Online Service Index (OSI).

Political components of analysis are a relatively new area of study in the e-government of Uzbekistan. This subpart features two-way analysis: evaluation of the transparency, anti-corruption, and accountability effects of e-government projects on the one hand, and e-government's contribution to an increased participatory process in the policymaking through improved civic engagement. Reviewing indicators such as the E-Participation Index[3] and Human Capital Index of the UN, along with observation of website contents and the results of the survey serve this purpose.

3.2.1 Survey Data Collection Method

In this research, a user-experience survey is employed in order to gain further understanding about the content of online services, as well as obtaining an overview of citizen engagement in decision-making Appendix F). In previous studies, user satisfaction surveys were mostly utilized to evaluate the "design-reality gap" (Heeks 2003a), or to analyze user experience in order to identify the actual usefulness of online government services (Bwalya and Mutula 2014; Makoza 2016). In this work, the results of the survey are analyzed or given as evidence throughout the discussion in the relevant part.

The questionnaire was built through Google Survey and consists of 13 closed and open-ended questions in the local (Uzbek) language, and is divided into three sections. Splitting the survey into three parts helps us understand three patterns: Section 1 – overall satisfaction of users with e-government services; Section 2 – their access to ICT; and Section 3 – demographic characteristics. Individuals and entities from both urban and rural settings were invited to take part in the survey through a link randomly sent via Telegram, Facebook, and WhatsApp, which are widely used social media platforms in Uzbekistan. Overall, 94 responses were received within the period of July–August, 2019. The results were analyzed using descriptive statistics generated through Google spreadsheets, automatically imported from Google Survey.

It should be noted that conclusions cannot be drawn only from the survey results. Yet it is a useful source of information in terms of evaluating gaps between reality and the expectations of users from e-government projects, as well as examining the level of citizen engagement in public policy.

4. FINDINGS AND DISCUSSION: THE CASE OF E-GOVERNMENT IN UZBEKISTAN

This section is dedicated to the analysis of digital transformation in the public sector of Uzbekistan. In accordance with the multidimensional framework, first of all, the evolution of e-government is discussed to nurture understanding about the current state and nature of e-government in the country. Further, discussions from organizational, infrastructural, content, and political perspectives are presented to identify challenges and possible solutions for e-government development.

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[3] E-participation is a measurement introduced by the UN in 2001, an indicator that evaluates citizens' access to information and their involvement in decision-making (https://publicadministration.un.org/egovkb/en-us/About/Overview/E-Participation-Index).

4.1 Analysis of E-Government Development Stages in Uzbekistan

Retrospective examination or analysis of the evolution of e-government (Kassen 2019) allows us to understand development patterns such as how and for what purpose the reforms in the public sector were initiated, the extent to which the country has achieved progress in predefined goals over the last few years, and where the e-government is now heading, all of which provide important insights in making recommendations for further e-government development. The retrospective analysis in this work is conducted from the perspective of e-government strategy and policy planning through acquaintance with historical government documents, regulations, and reports by international organizations. An important point to note is that according to a careful observation of the materials, digital initiatives and e-government strategies in Uzbekistan are considered to be part of wider public sector reform, and digitalization itself is not the final target.

The Foundational Stage (1999–2002)

The base and enabling environment for ICT-driven public reform were initiated with the adoption of the "Program of Modernization and Development of National Data Transmission Network of the Republic of Uzbekistan for the Period 1999–2003."[4] The following were the main objectives of this program (UNECE 2003):

- To create the foundational requirements for building a national data transmission network;

- To develop a single system for centralized linkage of a data transmission network of the country, identifying major stages of technological and information modernization;

- To determine the sources for financing technical modernization of ICT systems, ways of attracting foreign investment, and formulation of state funds.

So in short, initial efforts in the movement towards digitalization in the country were started by establishing technical and other infrastructural bases for a national strategy for ICT development.

The First Phase (2002–2011): Building the Infrastructure and Legal Base of E-Government

Phase 1, which was a comparatively longer period, was mainly marked by building foundations for an information society, or an enabling environment for e-government,[5] including a legal and institutional landscape, developing ICT infrastructure. Implementation of ICT reforms in the public sector in Uzbekistan set out in 2002[6] as a part of the national information and communication technology strategy when the presidential decree on ICT and computerization was passed (UNECE 2003; Khodjaev 2004; Rakhmanov 2009; ADB 2012). E-government initiatives in Uzbekistan became a

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[4] Resolution of the Cabinet of Ministers № 193, 22 April 1999.

[5] According to the UN UNPA and ASPA (2001). Benchmarking E-government: A Global Perspective/ Assessing the Progress of the UN Member States. UNPA and ASPA, the key areas of enabling environment for e-government are *institutional capacity*, *cultural and human resources conditions*, *ICT strengths*, *and political commitment. These are the core areas that* governments need to evaluate the progress and opportunities, and identify challenges.

[6] Presidential decree on the development of computerization and introduction of information and communication technologies (UP-3080, issued 30 May 2002).

major step in the country's attempt to transform public authorities' performance, namely reducing pressure and workload, increasing efficiency, and reducing costs. At the World Summit on the Information Society in 2003, the Deputy Prime Minister of Uzbekistan announced the aspiration of the country to build an information society that was people oriented and would enable members of communities to freely search for, receive, and share information, which was a major commitment by the country to adopting ICT-enabled development in all spheres of life, including in the public sector (Aripov 2003).

A major policy project in e-government at this stage was the adoption of Introduction of Electronic Technologies into Governance for 2003–2010[7] by the national government, which was aimed at introducing electronic circulation in government authorities. The other major policy papers that laid down the legal base were the following:

Laws:

1. No. 822-1 "On Telecommunications," 20 August 1999;

2. No. 560-II "On informatization," 11 December 2003;

3. No. 562-II "On electronic digital signature," Tashkent, 11 December 2003;

4. No. 611-II "Electronic Document Management," 29 April 2004;

5. The concept of creating an integrated information system for state bodies, 2006.

As can be seen from the policy documents, the initial stage of digital transformation in the public sector started with binding informatization and introduction of ICT into the legal system. So the creation of an institutional framework, the preparation of e-government preliminary legal conditions, and pilot projects in implementing software and hardware in public administration were the main highlights of the first phase.

The Second Phase (2012–2014): Furthering Development of ICT Infrastructure and Creation of Integrated System

The next stage of digital reform in the public sector is characterized by setting out to achieve realization and implementation of the strategies set in the initial phase through presidential decrees and other state documents such as an e-government master plan on integrating ICT into the public sector and other broad areas such as the real sector of the economy. Among the most important changes in terms of creating an enabling environment for ICT-driven public sector reform, the following achievements can be highlighted:

- Introduction of the action plan, which was a huge progress in the development of a national strategy for e-government: Program on Development of National Information and Communication System of the Republic of Uzbekistan for 2013–2020 (Rakhmanov 2009; UNDP 2017);

- Formation of institutional framework for ICT-enabled reform of public policy: Namely, an agency exclusively responsible for shaping the strategy, capacity building, and technical expertise – E-Government Development Center – was established in 2013;

- An initial step in creating nationwide government and public interaction was taken through introducing single portal of interactive public services on "single window" principle: Namely, www.my.gov.uz was introduced, where public

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[7] Available at: http://lex.uz/acts/973556 (in Russian).

services in taxation, education, healthcare, pension system, etc. were made accessible from a single platform (EECA 2014);

- Formation of communication and service portals of certain government organs, such as portal of housing and communal services (ek.uz), national education portal (Ziyonet), and national information search system (www.uz) (ibid. 9);

- Also, initial political and legal measures were taken in terms of transparency and accountability through passing the law "On Transparency of Government Bodies," 2014.

In summary, the second stage of the public sector reforms is marked by a significant shift towards the formation of a national e-government system, in which managerial, political, and technical domains of digital government also started to emerge and be integrated into a single system.

The Current Phase (2015–2020): Creation of New Landscape of E-Government with Political Implications

The third phase of the e-government implementation is characterized by practical steps taken to realize the tasks set in the master plan for ICT development for 2013–2020, which included a broad range of spheres in terms of public sector reforms: Namely, major efforts were made towards open government that have implications for increasing data sharing among government authorities, between the government and citizens, and between the government and businesses. In particular, the following transformations have taken place in the recent phase:

- Launch of open data portal www.data.gov.uz, which has political as well as economic impacts on overall development if managed successfully. Specifically, the UNDP (2017; Press_Service 2019) stresses that open data initiatives are crucial for realizing the potential of e-government, particularly enhancing the transparency of government agencies, providing an opportunity to make evidence-based policy through data, and boosting the investment climate through improving the country's attractiveness.

- Open law making or legislation initiative by introducing the platform www.regulation.gov.uz, which is publicly open and monitored for evaluating legal projects and regulations.

- Launch of a wide range of e-government platforms such as public participation and dialogue portals to file appeals, or petitions, or propose projects (https://meningfikrim.uz/, http://jamoatfikri.uz/uz).

- Introduction of the concept of developing "E-Government in the Republic of Uzbekistan" in March 2019 (UZDaily 2019). This policy project includes assessment of the major challenges and opportunities of the digital reforms in the public sector, as well as determining further steps of action.

In short, the current phase of e-government development in Uzbekistan is a distinct stage in e-government policy formulation, which has laid a solid base for a new landscape of digital transformation through huge content upgrading and the introduction of government initiatives to employ ICT-driven government reforms for promoting open data and transparency.

Summary of the Retrospective Analysis

All development stages of digital government in Uzbekistan discussed above can be summarized in Figure 3. According to Gartner's model of evolutionary stages (Noman and Hebbar 2016, 119)[8] one can draw the following initial conclusion: Uzbekistan's current e-government development is still in the interaction stage, and is expected to pass along not an easy path as digital governance reforms are being implemented in parallel with the reforms in the core public administration (fight with bureaucracy, improving transparency, accountability of government organs). Also, the country is systematically moving towards scaling up transaction-enabled public services for citizens and businesses (NAPM 2019b), as emphasized in national documents and reports. However, the conclusion on the current maturity level of Uzbekistan's e-government should be drawn after analyzing the content of the services, backed up with the user-experience survey results in the next subsections.

Figure 3: Stages of Digital Transformation in the Public Sector in Uzbekistan
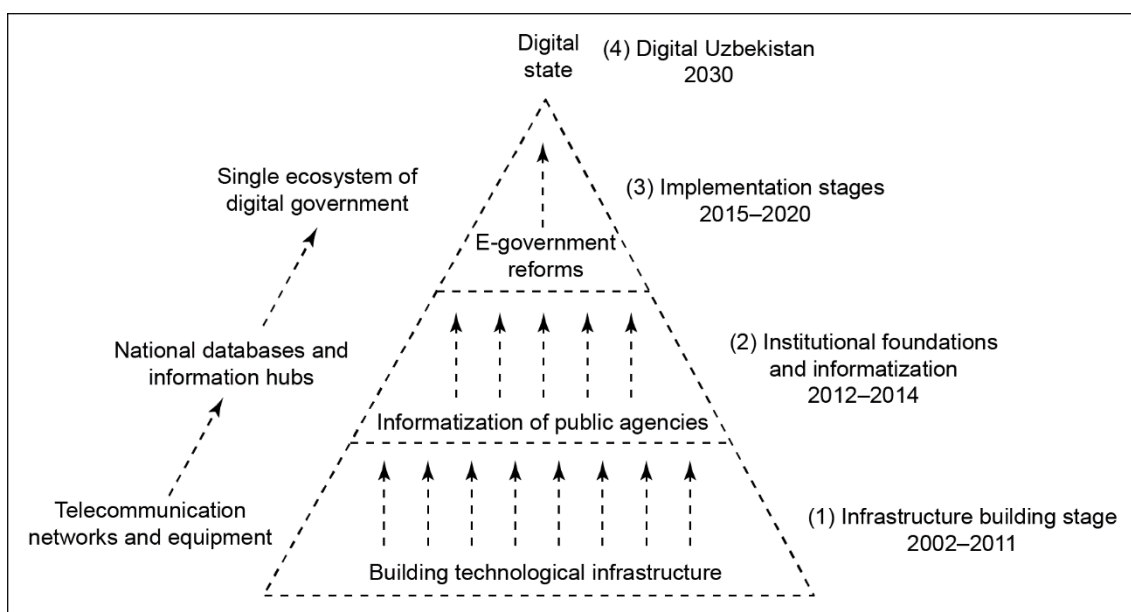
Source: Visualization by the author.

4.2 Analysis of the Current State of E-Government in Uzbekistan

International development organizations, human right institutions, and scholars of ICT for development research suggest that recent technological advances offer significant benefits for overall development, especially in emerging or developing countries. In particular, the potential of ICT in revolutionizing public sector efficiency and improving the quality of services, and consequently nurturing participatory democracy and open governance, is stressed in almost all policy documents of the UN, WB, ADB, and other development institutions. In particular, the UN launched benchmarking for assessing e-government development in 2001, and introduced the complex indicator the

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8 Gartner's maturity model of e-government is quite similar to that of the UN's evolutionary framework, which also includes presence, interaction, transaction, and transformation stages of e-government development.

E-Government Development Index (EGDI), which has been measured through the biannually conducted United Nations E-Government Survey since 2003.[9] There are also a number of subindicators, such as ICT infrastructure, human capital, and the level of innovation, which help us understand the state of the enabling environment of e-government. So, the current section aims to examine the progress achieved by Uzbekistan in terms of e-government development since the government's initiatives took off in 2001 through these indicators, state statistics, and other analytical materials.

One can see that the national reports and analytical materials are positive about what has been achieved so far in terms of creating a legislative base, and the overall increase in the quality and number of government services in Uzbekistan. However, when analyzed through the EGDI, which compares countries' performance rather than assessing the absolute progress of e-government, Uzbekistan's performance remains in the middle range, ranking 87 among 193 countries (UN 2020). Interestingly, a neighboring country Kazakhstan is acknowledged as being the regional leader since 2003 (Brimkulov and Baryktabasov 2018; Kassen 2019), having been ranked 39th and managing to deliver half of the government services online in 2018 (Kazakh-tv 2019).

Figure 4: Comparison of EGDI Ranking Dynamics of Kazakhstan and Uzbekistan, 2003–2020

Source: UN E-Government Survey, historical data (https://publicadministration.un.org/egovkb/en-us/Data-Center).
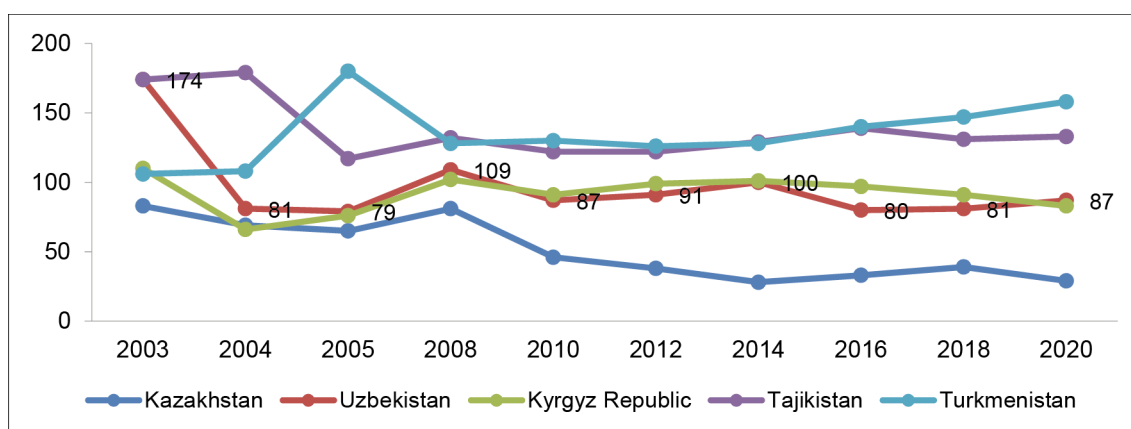
Uzbekistan was mentioned in many reports as a country with serious impediments with respect to ICT development (UNECE 2003; ITU 2014), which can also be observed in Figure 5. Among the three subindices of the EGDI (Appendix C), namely Telecommunications and Infrastructure (TII), Online Services (OSI), and Human Capital Indices (HCI), Uzbekistan was performing poorly, particularly with respect to ICT infrastructure (TII), which diverges widely from that of Kazakhstan. Both countries have shown a high level of human capital and a similar level of medium-quality online services. The reason for the limited Telecommunications and Infrastructure capacity over the years can be partly explained by the geographical and demographic conditions of the country. In comparison to other CARs and eastern and central Europe, Uzbekistan has the largest population, a sizable territory, and a geographic location with no direct access to the sea, all of which have implications for the country's overall income level and state budget for infrastructure, as well as a limited capacity to provide remote parts of the country with infrastructure.

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[9] For the framework see https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2003.

Yet, the above indices alone cannot provide a full overview of the current state of e-government development. For example, Knox (2019) discussed a paradox concerning e-government in Kazakhstan, arguing that despite hitting the leading position in CIS countries in terms of e-government, Kazakhstan lacks in the true value of online public services, which has been discovered through interviews and surveys. Therefore, we also assert that there is a need for an in-depth examination of e-government domains, or in other words, an enabling environment such as an institutional framework, infrastructure, and the quality of the services themselves, in the following sections.

4.2.1 Organizational Landscape of E-Government of Uzbekistan

Institutional analysis indicates that from the beginning, the Uzbek national government has been the initiator, implementer, and controller of the performance of all national strategies and programs in Uzbekistan, including ICT reforms, due to the centralized nature of governance inherited from the Soviet system. The law "On e-government" of Uzbekistan, which was enforced in June 2016, provides an overview of the responsible government bodies in the creation and implementation of e-government projects, as well as insight into the nature of governance in the country, which is evidence of the centralized approach in e-government implementation policy. According to the document, the following are the main bodies that participate in the formulation, implementation, and delivery of the national e-government strategy (2015):

- **The Cabinet of Ministers**, the body responsible for overseeing the implementation of the single state policy on e-government;

- **The Ministry for the Development of Information Technologies and Communications of the Republic of Uzbekistan (MITC):** an authorized body responsible for realizing and implementing the unified policy for ICT and e-government, developing and proposing ICT projects, etc. (MITC 2019);

- **State Unitary Enterprise E-Government and Digital Economy Project Management Center (EGDC)**, which was established under the National Agency for Project Management (NAPM). The Center is responsible for managing e-government projects as a part of the "Digital Uzbekistan 2030" program, conducting expert reviews of projects and regular monitoring of the progress of projects, and advancing proposals (NAPM 2019a);

- **Local ministries;**

- **UZINFOCOM** is a unified integrator for creating content, software, or platforms for government services;

- **UNICON** is a think tank that develops regulatory and legal frameworks in the sphere of ICT, as well as a unitary company that develops interagency interoperability software, with a guarantee of information security.

Among the above-mentioned institutions, the exact tasks and responsibilities of UNICON are blurred and not clearly identified (UNDP 2017). Once we had visited the website of the unitary company, we realized that the website does not function fully, and has missing links and descriptions about the operation.

Another point about institutions is that the responsibilities and tasks of local authorities in e-government implementation are not stated or clearly defined in the law "On e-government." According to Johnson and Kolko (2010), e-government services are more efficient when implemented at a city or local level, since online services rendered by lower levels of public agencies better represent the needs of citizens or businesses. Based on this logic, it is reasonable to promote and pay broad attention to the

development of local- and city-level e-government services. However, our observation shows that in Uzbekistan this aspect is still in its infancy, and local public authorities are not yet given much freedom to take the lead and initiate e-government projects.

Further, there is a lack of collaboration between responsible institutions of the e-government system. At present, a body that efficiently coordinates with a good knowledge of the ICT-enabled government reform is missing from the organizational system (Figure 5). Despite the fact that the Cabinet of Ministers is the central body that controls the implementation of projects, other ministries have reported that none of the institutional e-government bodies cooperate efficiently with each other or are coordinated efficiently. For example, the EGDC remains the only body that is fully responsible for developing and proposing e-government projects, as well as working on funding plans without enough capacity to handle such massive responsibilities. There is a need for another independent body that will be responsible for overseeing compliance and monitoring the progress and implementation of digitalization (EGDC 2018). Another finding from the organizational aspects of e-government is the lack of qualified government personnel with ICT skills. The subcomponent of the ICT Development Index (IDI)[10] also confirms that Uzbekistan's tertiary education enrollment rate was just 9%, whereas the world and CIS regional average was 40% and 50%, respectively in 2018 (Appendix D).

Figure 5: Institutional Ecosystem of E-Government Strategy.
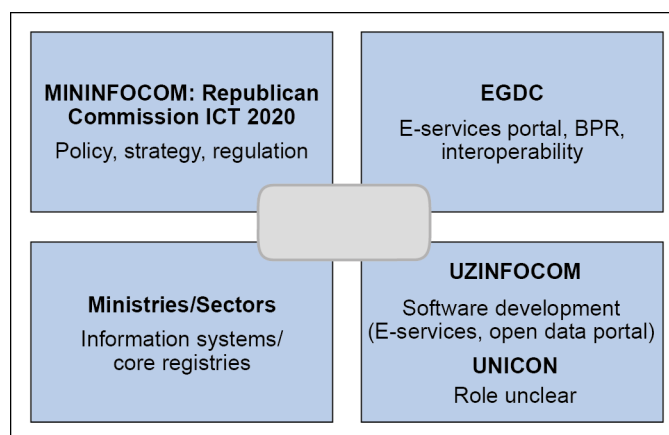
Source: UN e-government technical assistance.

Moreover, currently a unified and standardized system for recruiting government personnel does not exist. There is no system for monitoring the qualifications of government officials working in e-government projects (EGDC 2018).

Despite the fact that centralized governance might facilitate efficient implementation of national scope programs in theory, Uzbekistan's digital government programs are facing challenges such as the unclear roles of e-government bodies, a lack of collaboration among institutions, absence of the same voice, and a lack of skilled professionals with ICT literacy.

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[10] For the IDI framework see https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2017/methodology.aspx).

4.2.2 Technical and Infrastructural Dimensions of E-Government

Infrastructure and technical preconditions are important requisites for ICT-led public sector reforms that will inspire a major turnaround in all spheres of life leading to a knowledge-based society. The initial stage of e-government development in most developing countries, including Uzbekistan, was the establishment of technological capacity and infrastructure (UNECE 2003; Kassen 2019).

If we look at the historical data on ICT penetration in Uzbekistan through the UN's TII, which is a composite index of active mobile, computer, and internet users, and the rate of fixed or wireless broadband usage (Appendix C and D), the country's performance has increased threefold, reaching nearly 0.3 in 2018 starting from zero in 2002. According to the ICT Development Index (IDI) (Appendix D), which is similar to the UN's TII, Uzbekistan ranked 95th among 195 countries in 2017, showing just 11% in terms of fixed broadband internet penetration, which is well below the regional (13.5%) and world (20.7%) average. The majority of the population access the internet through mobiles, since the mobile subscription rate is notably high (74 per 100 inhabitants), but still lagging behind other CIS countries, for instance Kazakhstan, where a person owns 1.5 cellular phones. Nearly 90% of the survey respondents have access to the internet either on mobiles or other electronic devices (PC, laptop, internet cafe). The mobile broadband internet subscription rate is 56 per 100 habitants, which is similar to the world and regional average. However, the percentage of households with a computer remains low, at 45%, which also inhibits access to online services, as the majority of e-government platforms are desktop based. Also, residents of remote or rural areas barely have access to the internet, and if they do, they suffer poor connection quality, which is evidenced by the Speedtest Global Index.[11] The latest data show that Uzbekistan is ranked 136th, below the world average, and in particular 112th in terms of fixed broadband out of 175 countries, which clearly indicates that measures should be taken by telecom companies to update the infrastructure.

Figure 6: Length of FOL in Km
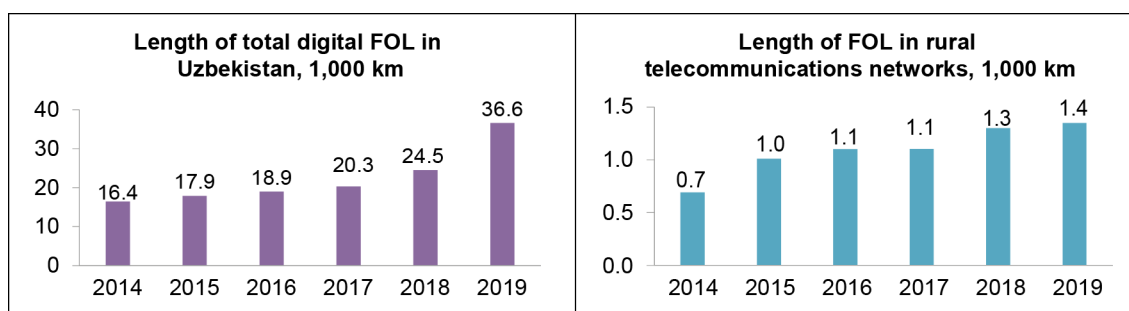
Source: MITC, 2019.

Nevertheless, the MITC is positive about current trends in improving infrastructure, stressing the fact that fiber-optic line (FOL) provision into rural areas has increased, and tariff reductions for internet plans at the time of using public services were introduced (Figure 6). However, the figures show that rural FOL provision makes up only 5% of overall FOL and has undergone only a very tiny increase over the years. Even though 20 million (60%) people in the country use smartphones, which increases the potential of expanding the government's online services (Ahmedkhadjaev, MITC

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[11] The Speedtest Global Index compares internet speed data from around the world on a monthly basis (https://www.speedtest.net/global-index/about).

2019), the low rate of internet penetration does not allow online service coverage to be extended, which has unfavorable implications for the inclusiveness of government services.

The roots of the problem of internet penetration can be partly explained by the operation of a few telecommunication providers that compete with each other within the country; they are discouraged from investing in rural areas, where the population density is not high, thus making them concerned about low return on investment. Further, a lack of willingness to communicate and cooperate among existing mobile telecommunication providers is another cause of low efficiency in ICT infrastructure development, which has a direct impact on e-government development in Uzbekistan (MITC 2018). An oligopolistic approach with a lack of cooperation is causing a waste of financial resources as the investment in ICT infrastructure is being unevenly made across the regions without being well informed about each other's projects.

Furthermore, insufficient growth in the ICT sector and a scarcity of IT professionals as a whole are further challenges slowing down the progress in ICT infrastructure. Specifically, the share of ICT companies in the services sector is still 3.3%, and the share of IT professionals in the total labor force is less than 1%. Also, it is known that a few of the big companies operating in the real sector of the country have not yet taken serious measures to integrate ICT into their operation (MITC 2018). Uzbekistan's position in the Global Innovation Index (GII)[12] also shows that the sectors in the country have not yet embraced innovative solutions to a satisfactory extent (Appendix E) compared to the neighboring countries. All these factors have an influence on the level of innovations and the cost of technologies in Uzbekistan.

To sum up, ICT infrastructure has received government attention as a priority since 2002, and has been the subject of a number of government programs to increase ICT investment, education, and research. However, telecommunications infrastructure needs further intervention with respect to the internet penetration (rural and urban), new ways of financing ICT projects that are not only dependent on public finance, and government programs that support upskilling or developing IT professionals.

4.2.3 Content Analysis of Online Public Services

The content or quality of online public services, and efforts by government to promote them and increase people's awareness, are other crucial factors of reaping the opportunity offered by digital innovation in the public sector. Content analysis of Uzbekistan's e-government platforms is conducted through observation of government websites, policy and analytical documents, and outcomes of the first section of the user-experience survey (Appendix F).

Actions recently taken to upgrade the quality of online services are one of the highlights of the current stage of the e-government reforms in Uzbekistan. In particular, the launch of a single interactive portal of state services www.my.gov.uz has enabled all applications from users to be collected and distributed to the relevant public authorities, offering benefits both for the users and processing agencies in terms of time and cost. Specifically, government agencies receive the applications in a simplified way, which allows them to process them in a timely manner and save costs as well.

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[12] The GII is comprised of two subindices: the Innovation Input Sub-Index and the Innovation Output Sub-Index. They are built on seven key pillars. Input Index: 1) Institutions, 2) Human capital and research, 3) Infrastructure, 4) Market sophistication, and 5) Business sophistication; Output Index: 6) Knowledge and technology outputs, 7) Creative outputs (https://www.globalinnovationindex.org/about-gii#framework).

Nevertheless, there is room for further upgrading and expanding of the content and usage of the interactive government portal at present. Uzbekistan's single interactive portal includes more than 140 online services provided by public authorities, with more than 60,000 registered users (EGDC 2018), with around 40% of the applications coming from individuals, and 60% from legal entities (Brimkulov and Baryktabasov 2018). For comparison, the regional leader in e-government Kazakhstan's single interactive portal has 165 types of government services, and more than 8.5 million registered users, with 80% of government services being delivered online (Kazakh-tv 2019). This might indicate a relatively low performance by e-government in Uzbekistan, bearing in mind that the country's population is twice as large as that of Kazakhstan.

According to Section 1 of the survey (Appendix F), which concerns the perceived quality of online public services, slightly more than one fifth of those surveyed have never used any of the given websites. Three government portals were found to be the most popular among users: the interactive single portal – www.my.gov.uz; the legislative database portal – www.lex.ux; and the state committee of statistics website – www.stat.uz. The majority reported that they rarely complete transactions through government web portals; rather they frequently download forms, access information and legal regulations, complete basic registering, or file an application (Appendix F, question 2).

Reports and observations from government agencies also confirm that most of the recently introduced electronic services of the G2C and G2B categories do not satisfy the real needs of users (MITC 2018). Among the respondents, 47% believe that the most widely used government portals lack in the online services relevant to a local context, which refers to the online services provided by local- or city-level government agencies. Slightly more than one third (36%) of those surveyed find online portals complicated or not that simple to use. Other than these aspects, most of the selected portals now provide the content in both local languages (Russian and Uzbek) and update regularly.

With respect to user perception of the possible benefits of e-government, more than 50% of those surveyed believe that online services save time and cost, and ensure better quality than the traditional way of receiving public services (question 6, Appendix F). Around 30% of the respondents are not familiar with the benefits of receiving services online even though there are updates in the quarterly reports about optimized public services that simplify procedures in terms of time and required documents (Appendix G). In addition, recently the NAPM has released a survey [13] among individuals and legal entities to identify new public services they are willing to receive in an online form, which listed more than 400 services in the single interactive portal. It is not certain whether the survey might bring expected results as we noticed that channels for spreading these surveys have a limited audience.[14]

Another obvious issue with the use of online services seems to be insufficient promotion of online public services among the population – not least the rural population, who are almost excluded from online public services due to infrastructural deficiencies or a lack of knowledge about e-government, while just under half of the respondents from urban contexts had very limited awareness, with more than 50% not being aware of any programs, training, or campaigns for using online services. Some

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[13] The survey can be accessed at: https://napm.uz/uz/press_center/adverts/siz-qaysi-davlat-xizmatlaridan/.

[14] The Telegram page of EGDC "Digital Uzbekistan," which promotes and informs about e-government projects, has only 156 subscribers; similarly, the Facebook page under the same name has only 370 followers, which is quite limited compared to 32 million population of Uzbekistan.

70% (66/94) of the participants expressed a willingness to join training sessions or use educational programs to learn how to use online government services. This indicates that there is not enough promotion or a wide enough campaign by government to introduce or encourage online services, even among the city population who have better access to ICT infrastructure.
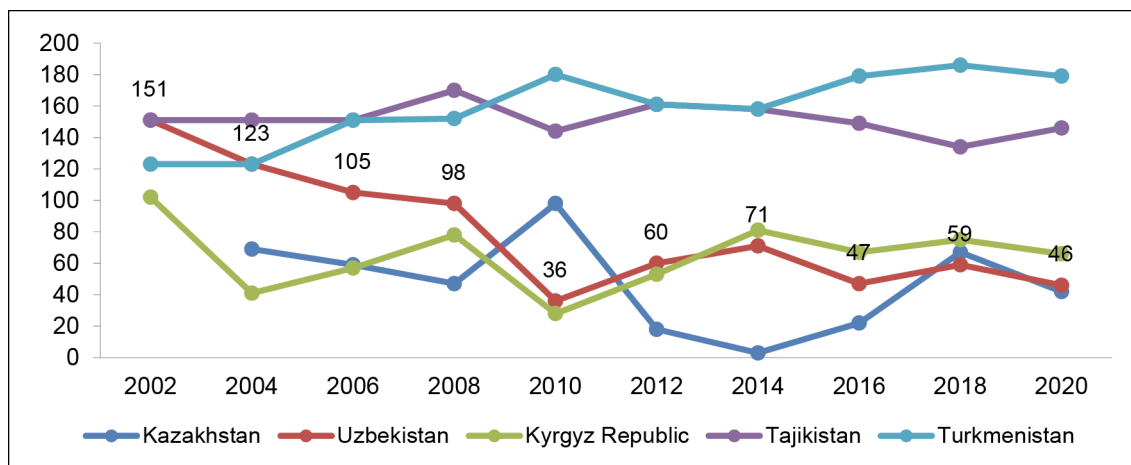
Our analysis implies that even though Uzbekistan's e-government system is currently at the initial stage of e-government development (Rakhmanov 2009; NAPM 2019b), one can see that there are transactional services available in a number of government portals (payment for communal services through single interactive portal, websites of the state tax committee, its local branches, and other web portals). However, the survey reveals that many e-government initiatives are still at the level of the interagency scope without broad expansion to actual use by citizens or businesses. The quality of online services might depend on a set of other factors, such as the lack of ICT skills of the users themselves, or a lack of enough promotion or campaigns that make it more popular and more user-friendly.

4.3 Implications of E-Government for Open Governance and E-Participation in Uzbekistan

This subsection is dedicated to the analysis of e-government from a political perspective, namely the implications of ICT-led public sector reforms for open governance, open data, transparency, citizen engagement, and participatory democracy in Uzbekistan, which is not only a new dimension of digital governance but has also become a target by democracy observers such as the UN, Freedom House, and other institutions in recent years.

If we look at the United Nations' E-Participation Index dynamics for Uzbekistan, which provides a glance at the overall trend in terms of citizen engagement in democratic processes, the country's performance increased 2.5-fold, boosting its ranking from 151st to 46th out of 193 countries in 2020, which was closer to the regional leader Kazakhstan (Figure 7). The change in the ranking started to become obvious from 2014.

Figure 7: E-Participation Index Dynamics of Kazakhstan and Uzbekistan, 2003–2020

Source: UN E-Government Survey, historical data (https://publicadministration.un.org/egovkb/en-us/Data-Center).

As mentioned earlier, Johnson and Kolko (2010), who provided insights into post-Soviet countries' e-government from the perspective of transparency and democracy, strongly argued that digital government in authoritarian or less democratic contexts might serve to expand the government's centralized power further, because all content and the platforms are still built, monitored, and controlled by government, and this does not contribute to citizen engagement or more democratic decision-making.

Interestingly, in Uzbekistan's case, we observed trends of serious commitment to achieving democracy and transparency and open governance through the tool of e-government, as the country let the world know that it was shifting towards an open society and more public value-oriented policy in late 2016 (NAPM 2019b).

Recent political changes with a new presidency are broadly discussed and expected to open a path for more open, less corrupt (OECD 2015, 2019), and democratic principles-driven governance (Bowyer 2018), which in turn has also been reflected in the recent trends of e-governance and e-participation. One of the directions in the newly introduced development agenda is the Administrative Reform Project,[15] which proclaimed strategies for introducing effective, more open government that is able to reliably protect rights and freedom in the society, and advance the competitiveness of the country at an international level. The open governance concept in Uzbekistan is being developed in three directions, which also corresponds to the three-dimensional model of open government described by Kassen (2019), including open data, open law making, and open dialogue.

One of the notable shifts in the e-government of Uzbekistan has been the launch of an open data portal (https://data.gov.uz/), which holds more than 60,000 data sets from 134 organizations. In comparison with the results obtained by Johnson and Kolko (2010), noticeable upgrades in the structure and content of the portal were observed in terms of expansion of the target audience (legal entities, ordinary citizens, and other agencies), the type of information available, the availability of the content in local languages (Russian and Uzbek), the existence of feedback and suggestion sections, and sources of data and contacts (Appendix H). Moreover, the Uzbek government is currently running a nationwide survey to discover user satisfaction and further strengthen the portal.

The open legislation and open dialogue dimensions of open governance are other critical aspects of increasing the transparency and responsiveness of government agencies, which is believed to allow citizens to participate in law and decision-making. An open law-making portal www.regulation.gov.uz has recently been launched to enable law and regulatory projects for open discussion, observation of the progress in the adoption of projects, and presentation of proposals. The web portal www.jamoatfikri.uz was created to ensure effective and transparent implementation, and establish public control over the execution of acts or state regulations by the population, government officials, business entities, and nongovernmental organizations.

When these websites were analyzed, low participation of citizens was found in discussions on law projects and legal acts, as well as projects on economy, education, healthcare, and other sectors. Uzbekistan implemented the practice of parliament considering proposals or petitions if a project accumulated a certain number of votes (10,000) on a number of open dialogue portals (jamoatfikri.uz, maningfikrim.uz).

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[15] The Decree of the President of Uzbekistan "On approval of the concept of administrative reform in the Republic of Uzbekistan," 8 September 2017.

We observed a relatively passive nature among citizens involved in online discussions or forums presenting their proposals or projects (Appendix I) regardless of the type of topic or sphere. Another point to mention is that results of consideration or responses by public agencies to petitions are missing in these websites. One might argue that the observed passive trend of public participation might be due to the novelty or recent development of these open dialogue portals. The survey data also show that the percentages of respondents using meningfikrim.uz, regulation.uz, and jaoatfikri.uz to participate in decision-making or express their voice turned out to be 21, 11, and 7 %, respectively (Appendix F, question 2), in comparison with the users of lex.uz (73%) and my.gov.uz (76%), the portals of legal acts and the set of interactive services. Also, the majority of those surveyed who use government portals rarely participate in online discussions or forums, and very rarely interact with state officials or community leaders through online platforms or emails (Figure 8).

Figure 8: For What Purposes Do You Use Uzbek E-Government Websites?
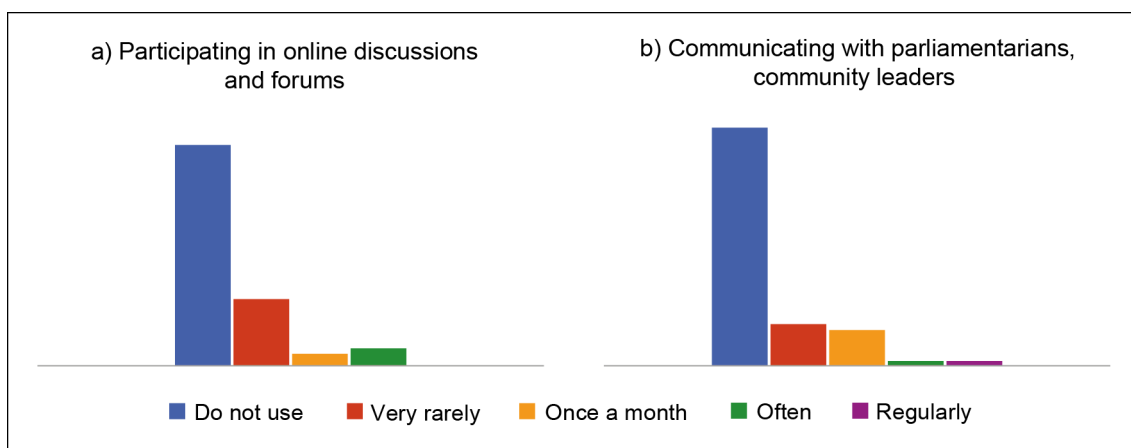
Source: Extracted from user experience survey results (Appendix F), Section 1, question 3.

It has become clear that relentless technological advances and the increased worldwide promotion of classic governance that is open, transparent, and citizen oriented by default have laid new challenges for the Uzbek government to reinforce the public sector with ICT. Despite the noticeable interventions made, the country's e-government is in its initial stage, as the interventions to attain a more transparent, efficient, and citizen-empowered public sector through ICT-driven governance are still ongoing and challenged by a number of barriers that need to be addressed to maintain a smooth development.

4.4 Synthesized Findings: Challenges of E-Government in Uzbekistan and Recommendations

In light of the above discussion, this subsection is dedicated to summarizing the findings, synthesizing the challenges in each aspect discussed above, and developing policy interventions in e-government implementation in Uzbekistan and drawing broader implications for other post-Soviet transition countries (Table 4).

Table 4: Summary of Findings: Challenges of E-Government in Uzbekistan and Policy Recommendations

Aspects of E-government		Challenges	Recommendations
Socioeconomic aspects	Institutional	**Organizational:** • Unclear roles of key stakeholders, sometimes overlapping roles by authorities in e-government realization (EGDC 2018); • Lack of integration, collaboration between different levels of government; • Absence of prudent expertise of e-government projects, strong technical control over their realization (ibid.).	• Clear definition of each authority involved in e-government implementation needs to be fixed in legal documents, which is important for accountability of government organs; • Introduction of currently missing central body in e-government landscape might increase coordination between other authorities that also conduct expertise and control over realization of the projects. • Giving more autonomy and support to local-level government authorities to develop their e-government systems might lessen the burden of national agencies.
		Financial: • Uzbek e-government system is financed mainly from the budget of central government and from recently established e-government fund, which is reported not to be sufficient for projects (EGDC 2018; MITC 2019).	• Encouraging public-private partnerships (PPPs) for e-government projects would solve financing and service quality problems as private sector is assumed to have more resources and funding capacity. Since PPPs are a recent practice for Uzbekistan,[a] this path might be realized in the long run.
	Technical and online service quality	**ICT infrastructure:** • Slow rates of ICT market development; • Insufficient share of innovation in the sectors of the economy; • Slow expansion of telecom infrastructure into rural areas of the country; • Existence of few players in the telecommunication industry, which has monopoly power over tariffs for internet and investment.	• In private investment for ICT companies, projects should be encouraged through preferential stimulus in terms of finance or regulations; • Investment for innovations in the ICT sector and R&D should be encouraged; • Encouragement of more telecommunication providers to compete might bring competitive operation, investment, and pricing for ICT infrastructure; • Incentive schemes for communication providers who invest in remote or rural areas.
		Information and data (service quality): • The majority of government websites are still just for information access, without the option of completing online transactions; • According to a UN report, and the EGDC, Uzbek e-government portals lack consultations with end users; • There are still a large number of required forms to submit by citizens or business entities, which invalidate and complicate online services as well; • Content of the online portals is complicated for ordinary users.	• The creation of more comprehensive services with online transaction options is highly dependent on other factors such as strengthening the system of online payment gateways, privacy and user information, legislation in these aspects *(based on "User experience survey" results, Appendix F, Section 1, Q3)*; • Each responsible body for e-government should design surveys for end users, additionally these surveys should be expanded and promoted among a wider audience, which is crucial to identify the usefulness of the online services *(based on "User experience survey" results, Appendix F, Section 1, Q5)*;

Table 4 *continued*

Aspects of E-government		Challenges	Recommendations
			• Consideration given by government agencies to further simplification in terms of administrative forms and procedures, coming up with simplified online forms *(based on "User experience survey" results, Appendix F, Section 1, Q4)*; • Strengthening the system of privacy and online data sharing through involving research think tanks or universities.
	Policy and legal aspects	• Law on "Electronic commerce" is still under consideration, which impedes development of online payments; • It takes time until laws "On online crime," and data protection laws are reflected in further legal and normative acts, since these legal projects are still under consideration.	• Updating and advancing regulatory and monitoring framework in line with digital development, changes in systems and needs of target audiences; • Effective monitoring of implementation of legal acts in e-government system; • Strengthening the system of privacy and online data sharing through involving research think tanks, universities, or other research centers.
Political aspects	Open governance and participatory democracy	• Absence of a single body that monitors open governance dimensions in the country. Currently the EGDC is overseeing open data portal, however the agency has a very broad set of responsibilities, which undermines its capacity to manage all directions; • Open data portal is still under reinforcement, and has not integrated data sets from large group of authorities; • Data sets in the open data portal, mainly, have agencies as a targeted audience, rather than citizens. Further, the data are in technical form, which requires prior processing; • Low level of awareness by population of open data, law making, and open dialogue portals, thus resulting in less citizen participation.	• Observation of institutional landscape shows that there is a need for a single responsible body for open governance and open data portal, which would facilitate the burden of the EGDC, and ensure quality compliance and implementation of open governance; • Greater responsiveness and regular interaction are required by government agencies, particularly in their work with citizens through open dialogue and open law-making portals to gain trust and increase transparency *(based on "User experience survey" results, Appendix F, Section 1, Q3)*; • Educational and promotional efforts are needed to increase knowledge of population about policymaking and boost their involvement in decision-making; Educational contents such as videos or guidance materials can be channeled through widely used social media platforms such as Telegram or Facebook, or via text messages *(based on "User experience survey" results, Appendix F, Section 1, Q4)*.

[a] PPPs are a relatively new practice for Uzbekistan even in traditional areas such as education, healthcare, and infrastructure projects. The country passed the law on "Public Private Partnerships" on 10 May 2019.

Source: Developed by the author.

So, this section has outlined major challenges drawn from analyzing the e-government development of Uzbekistan from two perspectives as described in our analysis framework: socioeconomic and political dimensions. The main conclusion from the section is that success in overcoming these challenges of e-government in Uzbekistan is highly dependent on the performance and leadership potential of national government agencies due to the centralized nature of the governance structure in the country, which needs to take the lead in implementing these policy interventions.

5. CONCLUSION

This research has been conducted to contribute to the analysis of digital reforms in the public service delivery in post-Soviet republics, through the case of Uzbekistan. We have been able to identify the initial purpose of e-government initiatives and how it progressed over the years, and what level of e-government has been achieved.

Having been referred to a country where governance is based on top-down principles and high centralization after the collapse of the Soviet Union, Uzbekistan and other fellow CARs have made serious commitments to adopt the path of a democratic civil society. In addition to the fact that the countries initially started e-government development reforms with a willingness to optimize the performance of the public sector institutions, at a later stage, they made significant steps to achieve open governance, participatory democracy, and an inclusive society, firstly moving these elements to the agenda of administrative reforms.

Empirical evidence and observation of e-government websites of Uzbekistan showed that e-government development in transition or developing countries does not necessarily follow the maturity stages of theoretical digital government. Rather in these countries existing government services are characterized by being at different stages, ranging from informative to transaction and active interaction stages. And there is a trend that the best practices of e-government are being customized and followed at a fast pace by developing countries. One of the most important conclusions on e-government infrastructure and content analysis is that a better online presence represented by international indicators or better portal structures do not necessarily represent better public services. This is mainly due to the fact that high ICT penetration or digitalization is not the target, but the broader implications, such as extending the public value of the services and letting citizens or other entities present their voice, thus ensuring a more just and equitable society, are the core objectives of digital initiatives in governance.

Uzbekistan has clearly targeted these broader implications of ICT reforms in the public sector. Yet the prevalence of a number of challenges, including both institutional and infrastructural ones, a lack of experience in generating online public services with high end user value, as well as other underlying causes such as the structure of the economy and the overall income level, and geographic and demographic conditions, are hindering successful implementation of the digital reforms in the public sector. Out of the aforementioned barriers to e-government implementation, the legal framework is the area that needs systematic and immediate address as it lays the legal base for further actions. As for the institutional aspect, even though the centralized governance structure might seem to be a better approach to managing the whole e-government strategy in a systematic and coherent manner, as well as in determining the budget and finance for digital reforms, partnership with the private sector, civil organizations, and NGOs would provide a wider range of sources for new ideas and financing projects.

Other aspects require further actions, and special attention needs to be given to further development of open governance aspects of the e-government system, particularly in transition countries by strengthening the role of a regulatory body for quality control. Citizen participation through online platforms is a relatively new experience for citizens of Uzbekistan. Therefore, the promotion of open governance platforms and other online services among users, as well as programs to increase the awareness of the population about participation in open data portals and dialogues, would clearly define the level of citizen participation. So, the achievement of all possible outcomes of

e-government could transform the traditional government in Uzbekistan, not only from the perspective of administrative efficiency, but also with respect to broader implications such as a more open and accountable, citizen-empowered government in the future if the tasks are accomplished.

Due to the comprehensive nature of the e-government phenomenon itself, as well as the topic's relative novelty in the context of transition economies, it is challenging to adopt a certain conceptual framework to analyze e-government development (Heeks 2000; Brown 2005; Yildiz 2007). As regards the limitations of this research specific to the case of Uzbekistan, insufficient research and data, conducting the study from a distance coupled with time constraints have prevented our investigation from being more comprehensive. In particular, institutional and organizational aspects of e-government normally involve face-to-face interviews with government officials, which could give a more holistic overview of the current institutional landscape and challenges in e-government. Thus, there is scope for further in-depth research built on systematic user-oriented surveys and interviews with all stakeholders in a sufficient time frame to comprehensively understand the e-government phenomenon in Uzbekistan. Further up-to-date research on the impacts of wider systematic issues such as corruption, governance style, and the institutional landscape on e-government, and divergent paths of the post-Soviet world in e-government development, would boost our understanding of the root causes of why some digital initiatives succeed while others do not.

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APPENDIX A: EVOLUTIONARY OR MATURITY STAGE MODELS OF E-GOVERNMENT IMPLEMENTATION

	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Layne and Lee (2001)		Catalogue	Transaction	Vertical integration	Horizontal integration	
Baum and Di Maio (2000)		Presence	Interaction	Transaction	Transformation	
Ronaghan (2001)	Emerging presence	Enhanced presence	Interactive	Transactional government	Seamless	
Hiller and Bélanger (2001)		Information dissemination	Two-way communication	Integration	Transaction	Participation
Wescott (2001)	E-mail and internal network	Enable interorganizational and public access to information	Two-way communication	Exchange of value	Digital democracy	Joined-up government

Source: Coursey and Norris 2008, 524.

APPENDIX B: LIST OF POLICY PAPERS ON ICT DEVELOPMENT IN THE SECOND PHASE OF E-GOVERNMENT IN UZBEKISTAN

1. No. P-2126, 2 December2014, "On measures to organize the activities of the national mobile operator";
2. No. PP-2058, 30 October 2013, "On approval of the updated structure of the State Committee for communications, information and telecommunication technologies of the Republic of Uzbekistan";
3. No. PP-2053, 22 October 2013, "On Improvement of management and use of radio spectrum"; Uzbekistan – ICT environment, innovation policies and international cooperation EECA CLUSTER 14
4. No. PP-2045, 25 September 2013, "On measures for implementation of the investment project 'Development of national geographic information system'";
5. No. PP-2042, 20 September 2013, "On measures to further enhance the stimulation of domestic software developers";
6. No. PP-1843, 30 October 2012, "On measures to further improve the efficiency of information and communication system of the State tax service of the Republic of Uzbekistan";
7. No. PP-1730, 21 March 2012, "On measures for further implementation and development of modern information and communication technologies";
8. No. PP-1729, 20 March 2012, "On measures on organization of a National library of Uzbekistan named after Alisher Navoi – Information resource center".

Source: EECA 2014.

APPENDIX C: SUBINDICES OF EGDI FOR KAZAKHSTAN AND UZBEKISTAN, 2003–2018

	2018	2016	2014	2012	2010	2008	2006	2004	2002
Online Services Index (OSI)									
Kazakhstan	0.86	0.77	0.74	0.78	0.52	0.32	0.45	0.39	0.18
Uzbekistan	0.79	0.69	0.44	0.49	0.37	0.27	0.27	0.23	0.00
Telecommunications Infrastructure Index (TII)									
Kazakhstan	0.57	0.56	0.57	0.35	0.17	0.13	0.063	0.06	0.06
Uzbekistan	0.33	0.24	0.23	0.20	0.08	0.03	0.05	0.04	0.05
Human Capital Index (HCI)									
Kazakhstan	0.83	0.84	0.86	0.91	0.96	0.97	0.93	0.92	0.92
Uzbekistan	0.73	0.69	0.72	0.82	0.88	0.90	0.91	0.91	0.91

Source: UN E-Government Survey, historical data.

APPENDIX D: ICT DEVELOPMENT INDEX AND SUBINDICATORS COMPARISON, 2017

Indicators	World Average	CIS Average	Uzbekistan
IDI 2017 (rank)	–	–	95
IDI 2016 (rank)	–	–	103
IDI ACCESS SUB-INDEX	5.59	6.6	5.24
Fixed-telephone subscriptions per 100 inhabitants	13.57	20.7	11.34
Mobile/cellular telephone subscriptions per 100 inhabitants	101.53	141.2	77.33
International internet bandwidth per internet user (Bit/s)	74,464	59,000	5,682.64
Percentage of households with computer	46.61	67.4	43.87
Percentage of households with internet access	51.46	68	75.40
IDI USE SUB-INDEX	4.26	4.79	3.93
Percentage of individuals using the internet	45.91	65.1	46.79
Fixed (wired)-broadband subscriptions per 100 inhabitants	12.39	15.8	9.13
Active mobile-broadband subscriptions per 100 inhabitants	52.23	59.7	55.89
IDI SKILLS SUB-INDEX	5.85	7.47	6.17
Mean years of schooling	8.52	11.6	12.00
Secondary gross enrollment ratio	84.00	98.7	95.92
Tertiary gross enrollment ratio	38.69	50.5	9.09

Source: ITU 2017 (https://www.itu.int/net4/ITU-D/idi/2017/index.html#idi2017comparison-tab).

APPENDIX E: DYNAMICS OF GLOBAL INNOVATION INDEX (GII) IN UZBEKISTAN AND KAZAKHSTAN

Year	Uzbekistan GII		Kazakhstan GII (regional leader)	
	Innovation Ranking	Innovation Index	Innovation Ranking	Innovation Index
2018	n/a	n/a	74	31.42
2017	n/a	n/a	78	31.50
2016	n/a	n/a	75	31.51
2015	122	25.89	82	31.25
2014	128	25.20	79	32.75
2013	133	23.87	84	32.73
2012	127	23.90	83	31.90

Source: World Intellectual Property Organization (WIPO) https://www.globalinnovationindex.org/analysis-indicator.

APPENDIX F: SAMPLE OF USER EXPERIENCE SURVEY (THE ORIGINAL SURVEY WAS IN UZBEK LANGUAGE)

Link for Google Survey: https://forms.gle/NNgYU6zfswcmEekG6

Section 1. User experience of e-government

1. Have you ever visited or used e-government websites and applications?

☐ Yes (please go to Q2)

☐ No (please go to Q4)

2. If yes, which e-government websites have you visited?

☐ https://my.gov.uz/ru - Single interactive government services portal

☐ https://pm.gov.uz/uz#/ - Virtual reception of the President

☐ https://regulation.gov.uz/uz - Discussion of draft regulatory legal documents

☐ https://meningfikrim.uz/ - Platform for civil proposals

☐ https://e-visa.gov.uz/main - Electron visa portal

☐ http://www.cbu.uz/uz/ - Central Bank

☐ https://business.gov.uz/ - Portal for entrepreneurs

☐ https://lex.uz/uz/ - Database of legal documents

☐ https://uzimei.uz/ - Portal for mobile device registration

☐ http://jamoatfikri.uz/uz - Platform for monitoring law enforcement

☐ http://stat.uz/ - the State Committee of Statistics

☐ https://data.gov.uz/uz/ - Open data Portal

☐ https://www.minjust.uz/ - Ministry of Justice

☐ other (specify please)

3. For what purposes do you usually use Uzbekistan e-government websites?

Purposes of using e-government websites	Mark where appropriate				
	Do not use	Very rarely	Once a month	Often	Regularly
Retrieving and printing online forms					
Participating in online discussions and forums					
Electronic applications, e.g., passports, licenses, etc.					
Information search for government services					
Accessing government policy documents					

Purposes of using e-government websites	Mark where appropriate				
	Do not use	Very rarely	Once a month	Often	Regularly
Presenting petitions, proposals, or concerns					
Finding information about social care, employment, or education through government portals					
Making online utility payments					
Paying taxes online					
Communicating with parliamentarians, community leaders					
Others (_____)					

4. Do you agree with the following potential barriers or issues while using Uzbekistan e-government websites and online services?

Potential challenges in using online public services	Mark where appropriate				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Internet speed is poor					
Internet is not affordable					
There are not sufficient online services relevant to local context					
There are not sufficient user-friendly e-government platforms (the content is too complex)					
ICT infrastructure (electronic devices) is not sufficient					
Personal fear about information safety and data privacy					
I do not trust in responsible authorities in processing online services					
My ICT skills are not good enough					
I am not aware of e-government services					
Online services are not available in my native language					
Other barriers (_____)					

5. To what extent are you familiar with e-government initiatives in Uzbekistan?

Please indicate your level of familiarity with the following	Mark where appropriate				
	Not aware at all	Slightly aware	Somewhat aware	Moderately aware	Fully aware
e-government websites of city councils and websites of other local authorities in Uzbekistan					
Services and benefits of e-government portals in Uzbekistan					
Educational and training programs on overall features of e-government portals in Uzbekistan					
Campaigns or promotions about use of online government services in Uzbekistan					

6. Do you agree with the following statements on the value or usefulness of e-government portals?

	Mark where appropriate				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
e-government websites allow/could allow me to fulfill tasks quickly					
e-government websites allow/could allow me to quickly obtain government information					
e-government websites enable/could enable me to accomplish tasks with no or less cost					
It is faster and more comfortable to obtain public services online than via traditional methods					
e-government websites have a wider selection of public services compared to interactions with physical government					
Other values (_____)					

Section 2. Access to, or usage of, ICT

7. All questions in this section are about your access to electronic devices and the internet.

	Yes	No
I have access to a computer (PC, laptop, tablet) at home	❏	❏
I have access to a computer (PC, laptop, tablet) only at work or school	❏	❏
I have access to a computer (PC, laptop, tablet) only at a cybercafe	❏	❏
I have access to a landline telephone	❏	❏
I have access to a mobile telephone	❏	❏
I do not have any access to any computer technology (e.g., mobile phone, desktop, laptop, tablet, etc.)	❏	❏
I have access to an uninterrupted electricity supply	❏	❏
I have access to the internet at home	❏	❏
I have access to the internet only at work or school	❏	❏
I have access to the internet only at a cybercafe	❏	❏
I have access to the internet only on my mobile telephone	❏	❏

Section 3. Demographic information

8. Please select an appropriate category for the area you are currently residing in:

☐ Urban/City

☐ Rural/Countryside

9. What is your gender?

☐ Female

☐ Male

10. What is your age range?

☐ 18–25

☐ 26–35

☐ 36–45

☐ 46–55

☐ 56–65

☐ over 65

11. What is your highest level of education?

☐ Doctorate level

☐ Master's degree

☐ Bachelor's degree

☐ Secondary specialized education diploma (academic lyceum or technical college)

☐ Primary and secondary school education

☐ Not formally educated

☐ Other (please specify)

12. What is your current employment status?

☐ Employed (full-time)

☐ Employed (part-time)

☐ Employer (business or a company)

☐ Unemployed

☐ Retired

☐ Student

13. What is your income level?

☐ low income

☐ medium

☐ high income

Thank you for your participation in the survey.

APPENDIX G: LIST OF OPTIMIZED PUBLIC SERVICES THROUGH DIGITALIZATION, 2018

Public Service	Outcomes: Reduction in the Number of Documents or Time
Military registration	Document: 4 -> 2
Submission of an electronic application for admission of children in a state preschool educational institution	Time: 15 -> 1 day
Obtaining a certificate of state registration of rights to a land plot	Time: 20 -> 7 days
Obtaining a decision on transfer of residential premises to the nonresidential category	Time: 11 -> 8 days Documents: 4 -> 3
Obtaining a license to provide medical activities	Time: 30 -> 20 days
Obtaining a new license for design, construction, operation, and provision of telecommunication network services	Time: 20 -> 16 days Documents: 10 -> 6
License for the production of jewelry and other products from precious metals and precious stones	Time: 15 -> 10 days Documents: 5 -> 1

Source: MITC 2018.

APPENDIX H: OPEN DATA PORTAL OF THE REPUBLIC OF UZBEKISTAN

Source: https://data.gov.uz/en.
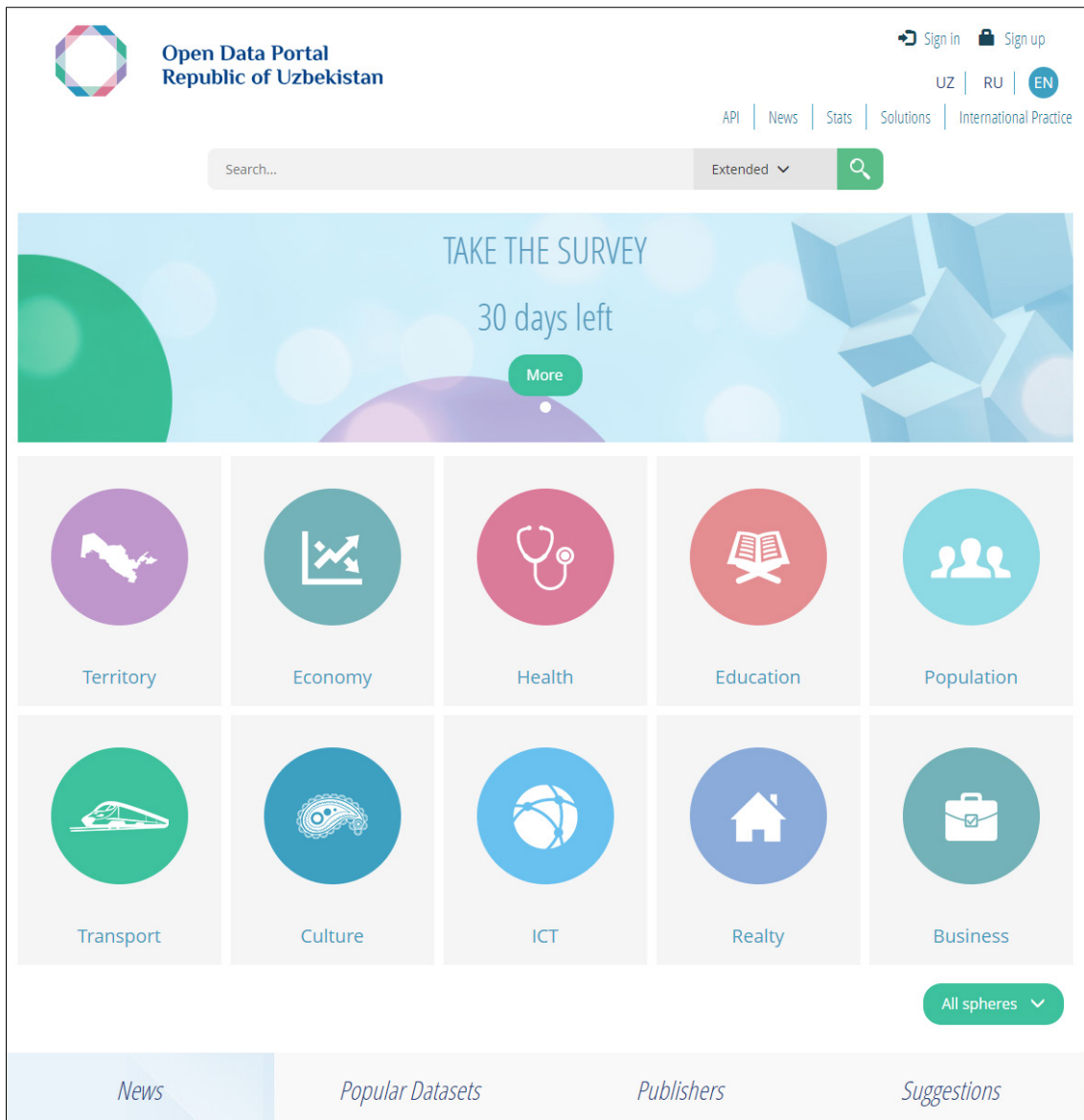
APPENDIX I: PORTAL OF OPEN DIALOGUE MENINGFIKRIM.UZ, FEATURES OF CITIZEN PARTICIPATION IN EXAMPLE OF ONE OF THE MOST POPULAR[1] PETITIONS ON EXPERTISE OF VEHICLES

Source: https://meningfikrim.uz/uz/petitions/view/3007.

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[1] The most popular petitions are shown by the website.