Digital Innovations in Public Services in Kazakhstan: Impact on Citizens' Trust and Perception

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ABSTRACT

The digital transformation of public services has become a cornerstone of public administration reform globally, aiming to enhance efficiency, transparency, and citizen satisfaction. Using a mixed methods design this article explores the impact of digital innovations in Kazakhstan's public service sector on citizens' trust in government and their perceptions of service quality. The analysis draws on empirical data from sociological surveys conducted between 2016 and 2024 by Kazakhstan's Agency for Civil Service Affairs, as well as a historical overview of the country's digitalization efforts from 2003 to 2024. The findings demonstrate that the introduction of e-government initiatives in Kazakhstan has significantly improved service accessibility and citizen satisfaction, with over 80% of users reporting positive experiences by 2024. However, the effects on public trust remain nuanced. While digital services and reduced bureaucratic burdens have the potential to foster greater trust in government institutions, ongoing challenges-such as digital inequality, limited digital literacy, and concerns over data security-continue to constrain the full benefits of digitalization. Comparative international experience underscores that a citizen-centric approach is vital to translating service satisfaction into broader institutional trust. When consistently implemented through the expansion of electronic and proactive services, infrastructure development, and the refinement of legal frameworks-such an approach can foster public trust even amid infrastructure limitations, unequal access, and the so-called «paradox of digital expectations».

Key words: digital transformation, SDG 9 (Industry, Innovation and Infrastructure), public services, citizen-centricity, citizen satisfaction

Introduction

The digital transformation of public services has become a cornerstone of innovation in the public sector worldwide, promising more efficient, transparent, and accessible service delivery. When effectively implemented, e-government initiatives offer citizens greater convenience and flexibility in accessing public services while simultaneously streamlining administrative operations and enhancing service quality for public institutions (Mourtada, Littig and Carrasco, 2021). These innovations are justified not only by gains in efficiency but also by their potential to strengthen citizens' trust in government through improved transparency and accountability (Bertot, Jaeger, and Grimes, 2010). Nevertheless, despite these advancements, trust in government continues to decline in many countries, prompting the search for new strategies to restore it (Parent, Vandebeek and Gemino, 2005). In this context, digitalization is increasingly seen as a means of renewing the social contract between citizens and the state, fundamentally reshaping their interaction (Tolbert and Mossberger, 2006).

Kazakhstan provides a compelling case for examining the relationship between digitalization and public trust. The country has made notable progress in developing e-government, ranking 24th in the UN E-Government Development Index as of 2022 (United Nations, 2022). This places Kazakhstan among countries with a «very high level of e-government development» reflecting substantial investments in online services and ICT infrastructure. This achievement is particularly significant given the country's unique geographic and demographic characteristics: Kazakhstan is the ninth-largest country in the world by area yet has a population density of just seven people per square kilometer (World Bank, 2025). Low population density presents serious logistical challenges for the provision of in-person services, making digital channels essential for ensuring access across vast distances. As of July 1, 2025, Kazakhstan's population was 20.39 million, with a territorial area of 2,724,900 km² (Bureau of National Statistics, 2023, 2025). At the same time, this geographic scale increases the capital and operational costs associated with building both fiber-optic and mobile communication networks.

Despite this progress, a fundamental question remains: has the digitalization of public services in Kazakhstan translated into greater public trust in government? The research problem lies in the evident gap between the technical sophistication of digital services and citizens' subjective perceptions of the reliability and effectiveness of public institutions. Previous studies offer mixed findings on the relationship between e-government development and trust in government. On the one hand, evidence shows that citizens who actively use high-quality e-services tend to exhibit higher levels of trust, owing in part to increased satisfaction and a greater sense of governmental responsiveness (Tolbert and Mossberger, 2006; Welch, Hinnant and Moon, 2005). Efficient digital services can signal competence and reliability, while digital platforms can enhance transparency and reduce opportunities for corruption (Bertot, Jaeger, and Grimes, 2010), both of which are important drivers of institutional trust.

On the other hand, trust is a multifaceted and context-dependent phenomenon, and digitalization does not automatically result in increased trust. If citizens encounter barriers to service use, harbor concerns about data privacy, or feel that their needs are inadequately addressed, their trust may be eroded or their engagement with digital platforms limited (Bélanger and Carter, 2008). This is particularly relevant in post-Soviet contexts such as Kazakhstan, where public perceptions of state institutions are shaped by historical and cultural legacies, and where direct application of findings from other countries may not be appropriate.

This highlights the importance of adopting a citizen-centric approach in digital public service delivery-an approach that emphasizes active citizen involvement in the design, implementation, and evaluation of digital services (Sundberg and Holmström, 2024). Citizen-centric strategies prioritize usability, equitable access, and responsiveness to public needs. They are increasingly recognized as critical for building trust and legitimacy in government innovations (Meijer, 2015). Considering the above, this study aims to analyze the extent to which the digitalization of public services in Kazakhstan has influenced citizens' trust in public institutions.

Research question: How do digital innovations, when implemented through a citizen-centric approach, affect citizen satisfaction in government in Kazakhstan?

By examining Kazakhstan's experience, this study contributes to the global understanding of the trust-building potential of digital innovation and identifies the conditions under which the digital transformation of public services can meaningfully enhance citizen satisfaction. The findings may offer valuable insights for policymakers and experts engaged in public service reform initiatives.

Literature Review

In recognition of the growing consensus that technology alone is insufficient to improve the quality of public services, this literature review systematically explores how digital innovations influence citizen satisfaction. Particular attention is given to theoretical models and empirical findings regarding the key factors that contribute to the success of e-government initiatives, with a focus on the importance of citizen-centric strategies in maximizing public value.

Digital Innovations in Public Services

Innovation in the public sector is a complex, multi-dimensional process involving the introduction of new ideas, technologies, and methodologies aimed at enhancing governance and service delivery (Bekkers, Edelenbos and Steijn, 2011; Hartley, 2005; OECD, 2015. In recent decades, digital innovation-particularly the use of information and communication technologies (ICTs)-has become the dominant vehicle for transforming public administration.

Digital innovations encompass the development of government portals, mobile applications, automated service systems, open data platforms, and other tools that fundamentally reshape the interaction between citizens and the state. Research has shown that digital transformation involves not only the implementation of technology, but also the reorganization of administrative processes and the development of new competencies within public institutions (Mergel, Edelmann and Haug, 2019). The overarching goal, as articulated by Dunleavy et al. (2006), is to realize «digital-era governance» which integrates services, aligns them with citizen needs, and promotes widespread digitalization.

Empirical studies have documented the wide-ranging benefits of digital innovation: increased efficiency in processing requests, reduced wait times, and lower operational costs in public service delivery (Amanbek et al. 2020). Moving services online eliminates physical and bureaucratic barriers, enabling citizens to engage with public services at any time. Digital platforms also enhance transparency and mitigate opportunities for corruption through improved documentation and traceability of transactions (Bokayev et al. 2021). Moreover, digitalization expands access to public services for remote and less mobile populations. The integration of agency databases reduces administrative fragmentation and facilitates the creation of «one-stop shops» for service delivery (Sigwejo and Pather, 2016). Many e-government initiatives are thus driven by digital innovations that enhance public sector performance and support broader administrative reform (Uloli and Lahusin, 2023). However, the successful development of e-government is often challenged by technical barriers, financial constraints, and shortages of skilled personnel (Amartina, Rahmanto and Naini, 2024; Mu and Wang, 2020).

When implemented effectively, digital innovations form the foundation for improving the convenience, speed, and transparency of public service delivery – key drivers of increased citizen satisfaction (Pham et al., 2023, study of Vietnam). However, as emphasized in United Nations reports, the successful implementation of these technologies depends not only on infrastructural availability, but also on cultural and organizational transformations within public institutions (UNDP, 2020). Achieving meaningful innovation in public administration requires a careful balance between technological tools and human resources. Government agencies must invest in digital skills development for both their employees and the broader population to foster confidence in and effective use of digital platforms (UN DESA, 2020). For example, Finland's experience shows that sustained uptake requires public investment in population-wide digital skills, including targeted support for older adults (Seniorsurf, 2024, Korpela, Pajula, and Hänninen, 2024).

Ultimately, the success of digital reforms is contingent upon a range of factors, including political leadership, sufficient investment in infrastructure and human capital, and effective interagency coordination. Numerous studies point out that technological solutions introduced without consideration of user needs often fail to achieve widespread adoption (Amanbek et al., 2020). Accordingly, recent research underscores the critical importance of adopting a citizen-centric approach in the design and implementation of digital public services (OECD, 2020).

Citizen Satisfaction in the Digital Era

Citizen satisfaction reflects the degree to which public service delivery meets or exceeds expectations (Zhang et al., 2022). In the context of e-government, satisfaction depends on factors such as service availability, ease of use, system reliability, and demonstrable improvements in service quality. Research indicates that the use of user-friendly digital services is positively associated with both citizen satisfaction and trust in government (Welch, Hinnant and Moon, 2005). Recent studies confirm that key elements such as interface simplicity, data security, and the ability to accomplish tasks efficiently play a critical role in shaping a positive user experience (Pham et al., 2023).

Digital platforms create favorable conditions for improving the quality of public service delivery and encouraging greater citizen engagement (Kim, Jang and Hwang, 2023; Lolaeva, 2021). However, satisfaction with digital services is influenced by a combination of technical factors (e.g., usability, security) and socio-institutional ones (e.g., trust in government, regulatory environment, and digital literacy).

For example, a poorly designed interface, lack of support in the native language, or an overly complex authentication process can reduce satisfaction even when citizens are otherwise well-informed. Studies suggest that citizens evaluate not only the outcome of service provision (e.g., receiving a certificate) but also the overall process, including how easy and fast it was to complete (Sigwejo and Pather, 2016).

From a sociocultural standpoint, factors such as the level of digital literacy, widespread access to mobile devices, and public habits and expectations regarding e-services also shape satisfaction outcomes (UN DESA, 2022).

Overall, the literature identifies a broad range of determinants influencing citizen satisfaction: the quality of online services, awareness, confidentiality and security, trust, accessibility (Thao et al., 2021); perceived usefulness, ease of use, and readiness to adopt digital technologies (Chen and Zhang, 2012); transparency through performance data (Noda, 2020); user-centered design principles (Verdegem and Verleye, 2009); regular measurement of satisfaction (Berzani and Koxhaj, 2019); and the implementation of mobile applications (Wang and Ma, 2022).

These findings suggest that public authorities and software developers must carefully align technical and organizational decisions to ensure satisfaction with the quality of service delivery. In this context, a citizen-centric approach in public administration involves designing and delivering services based on the needs, preferences, and capabilities of users. This includes involving citizens in service development, simplifying procedures, collecting regular feedback, and improving services accordingly (Janssen, Chun, and Gil-García, 2009).

Research demonstrates that a user-focused strategy increases satisfaction, promotes more active service use, and fosters public trust (Al-Khouri, 2011). Conversely, the absence of a user-oriented approach can undermine the effectiveness of even technically well-executed digital initiatives.

Public Services in Kazakhstan

Public services constitute a multifaceted concept that encompasses various definitions and interpretations. Broadly, they refer to government-provided goods and services aimed at meeting the needs of citizens, regardless of their ability to pay (Farnham and Horton, 1996). Lutsiv (2021) defines public services as compulsory legal actions undertaken by competent government bodies to implement the rights of individuals or legal entities. Guarino (2017) offers a unified definition, describing public services as activities that fulfill a governmental obligation to provide services to private individuals, businesses, or other public bodies. Horton (2008) identifies four meanings of public service: civil servants, publicly funded services, any service delivered to the public, and a normative commitment to advancing public welfare.

A distinguishing feature of public services in Kazakhstan is the existence of a specific legal registry of services, separate from general public functions such as education or healthcare. This registry is governed by a dedicated law aimed at standardizing and organizing service delivery processes and procedures.

The creation of this registry enabled a more focused effort on the optimization and automation of service provision. Since its initial approval in 2013, the number of registered public services has increased from 647 to 1,381 as of January 2025. Of these, the share of services available electronically grew from 331 (51%) to 1,270 (95%). According to the Agency for Civil Service Affairs of the Republic of Kazakhstan (2024), more than 274 million services were delivered in 2024, of which 93% – or 256 million – were provided in digital format.

The Public Service Centers, which operate as multifunctional one-stop shops for state services, play an important role in service delivery. These centers previously served as the main physical access points for citizens seeking public services, embodying the «one-stop shop»

principle. Together with the national e-government portal, they constitute the front office of Kazakhstan's service delivery system, ensuring a standardized user experience.

In the era of digitalization, PSC centers have undergone technological transformation. Many basic services are now offered through self-service terminals, while staff assist citizens in navigating electronic platforms. This model contributes to digital inclusion – especially for vulnerable populations who may lack regular internet access or digital literacy skills.

Methodology

This study employed a mixed-methods research design, combining quantitative and qualitative approaches. The primary data were drawn from annual sociological surveys of public service recipients conducted by the Agency for Civil Service Affairs of the Republic of Kazakhstan between 2016 and 2024. Additionally, the study incorporated retrospective analysis of digitalization initiatives and supplementary open data sources, including official reports, administrative statistics, and international indices.

Quantitative Methods

The main quantitative instrument was a large-scale public survey assessing citizen satisfaction with the quality of public service delivery (Agency for Civil Service Affairs of the Republic of Kazakhstan, 2025). The surveys were conducted annually by a non-governmental organization selected through open competitive tenders. Sampling prioritized districts, cities, and regions with higher observed service prevalence and followed a multimode protocol consistent with the Agency's methodological guidance: time – location «exit» intercepts at service-delivery points (e.g., agencies/ public service centers), list-assisted telephone callbacks to recent service users, and limited snowball referrals to reach underrepresented groups. Eligible participants were adult recipients of public services during the reference period, and questionnaires were administered in both paper and online formats. Services were selected for inclusion based on high levels of use, social salience, demand, and known delivery issues. Satisfaction was measured on a five-point Likert-type scale; all responses were anonymous, and the data were released in de-identified form. Nonresponse rates were not reported by the provider; we therefore treat this as a limitation. Average satisfaction scores were computed for each service.

In the most recent 2024 wave, the survey was conducted using both offline (13,786 respondents) and online (12,507 respondents) formats. In addition to general satisfaction, the questionnaire included related dimensions such as ease of access and overall service quality, allowing for a more nuanced analysis of citizens' perceptions of digital services. The survey also accounted for different service delivery channels – distinguishing between services accessed through government agencies, public service centers, the national e-government portal and digital services.

Qualitative Component: Focus Groups, In-Depth Interviews, and the "Mystery Shopper" Method

To complement the survey data and gain deeper insights into the factors influencing citizen satisfaction, qualitative methods were employed. According to the Results of Public

Monitoring of the Quality of Public Service Delivery (Agency for Civil Service Affairs of the Republic of Kazakhstan, 2025), the qualitative fieldwork included moderated focus-group discussions, in-depth interviews with service users, and mystery-shopper exercises. Focus groups – typically involving participants from diverse socio-demographic backgrounds – and semi-structured one-on-one interviews enabled in-depth exploration of positive and negative service experiences, identification of problem areas in service delivery, and the collection of detailed feedback not available through standardized questionnaires. The authors had no access to direct identifiers; materials provided for analysis were de-identified (names and other identifying details were removed or masked by the provider).

The «mystery shopper» method involved trained researchers posing as ordinary citizens to anonymously request public services, allowing for direct observation and evaluation of service quality, efficiency, and staff courtesy under real-world conditions.

These qualitative activities were conducted in parallel with the quantitative surveys, thereby enriching the overall analytical framework. In 2024, the qualitative component included 65 in-depth interviews, approximately 98 citizens participating in 10 focus group discussions nationwide, and 20 service assessments using the mystery shopper approach. The resulting qualitative data were documented and subjected to content analysis to identify recurring themes, patterns, and potential inconsistencies with survey results. Triangulating these insights with quantitative findings provided a more comprehensive understanding of the citizen experience and the drivers of satisfaction with public services.

Retrospective Analysis and Supplementary Data

In addition to primary data collection, a retrospective analysis was conducted to examine the evolution of e-government initiatives and the digitalization of public services in Kazakhstan over the period under study. This included a review of the development stages of digital government platforms and relevant policy frameworks between 2016 and 2024, with emphasis on key milestones in the digital transformation that may have influenced satisfaction levels.

To support this analysis, publicly available data were used, including annual government reports, publications by the Agency for Civil Service Affairs, statistical records, and international indicators such as the UN E-Government Development Index (EGDI). For comparative purposes, three international benchmarks were selected: Estonia, the Republic of Korea, and the Russian Federation. Estonia represents a global frontrunner in digital governance within a small-population context, offering a useful counterpoint to Kazakhstan’s large territory and dispersed population. The Republic of Korea consistently ranks at the top of UN e-government indices, serving as a global benchmark for best practices. The Russian Federation, as a neighboring post-Soviet state with a comparable historical and institutional background, provides a relevant regional comparator. This combination allows for meaningful cross-national comparison by including both global leaders and a regional counterpart. This historical and secondary data provided essential context for interpreting the primary findings and allowed for correlation of satisfaction trends with broader administrative reforms (e.g., the launch of new service portals or enhancements in service procedures).

By triangulating survey results and qualitative findings with retrospective and supplementary data, the study ensured that interpretations of citizen satisfaction were situated within the broader context of digital innovation and reform in Kazakhstan's public sector.

Overall, the combination of large-scale survey data, field-based qualitative methods, and retrospective analysis produced a comprehensive picture of how digital innovations influence public perceptions. Comparing quantitative ratings of satisfaction and usability with qualitative feedback and institutional developments enabled a robust generalization of key patterns based solely on collected and verified empirical data – without introducing new hypotheses beyond the study's evidence base.

Results

The implementation of digital innovations in Kazakhstan's public services has resulted in significant improvements in service delivery and user engagement. The country has established itself as a regional leader in e-government development, as confirmed by international rankings. As previously noted, according to the UN E-Government Survey 2024, Kazakhstan ranked twenty-fourth globally in the E-Government Development Index (EGDI), placing it among countries with a «very high» level of e-government development. Notably, Kazakhstan ranked tenth globally in the Online Service Index (OSI) (UN DESA, 2024), which benchmarks how far national portals and core ministry sites deliver end-to-end digital public services. The OSI aggregates indicators on service coverage and transactionality (apply–pay–receive online), user participation/feedback, content, and technology/governance – so higher scores indicate broader availability and more mature delivery. This placement puts Kazakhstan alongside high performers such as Japan, Denmark, and Estonia.

These external evaluations are supported by national statistics: approximately 90% of all public services in Kazakhstan have been digitized and made available via electronic platforms. Over 14 million citizens-out of a total population of 19 million – are registered on the national e-government portal (eGov.kz), representing about 73% of the population (National Information Technologies JSC, 2024). User engagement suggests that digital channels have become a primary mode of interaction between citizens and the state.

Empirical data from sociological surveys conducted between 2016 and 2024 indicate high and steadily increasing levels of citizen satisfaction with the quality of public services (Agency for Civil Service Affairs of the Republic of Kazakhstan, 2025). As shown in Table 1, satisfaction levels rose from 72.8% in 2016 to 87.7% in 2024.

The 2017 decline may reflect year-over-year changes in the set of evaluated services. As noted in the 2017 monitoring report (Agency for Civil Service Affairs of the Republic of Kazakhstan, 2018), the mix likely shifted toward more complex or weakly integrated procedures, reducing the share of top-box ratings even as the mean score remained broadly stable. A second, plausible contributor could have been the 2016 introduction of a statutory prohibition on requesting documents from citizens that were already available in government information

systems. Dissatisfaction may have arisen where providers were perceived not to comply (e.g., when they continued to request such information or documents) (Republic of Kazakhstan, 2015).

Table 1: Dynamics of Sociological Survey Results on Public Service Quality (2016–2024)

Year	Number of Services Studied	Sample Size	Average Score	Satisfaction Level
2016	50	9,082	4.59	72.8%
2017	55	9,517	4.57	65.9%
2018	60	10,000	4.66	72.4%
2019	65	14,500	4.73	74.8%
2020	70	9,181	4.58	75.1%
2021	95	23,217	4.59	75.4%
2022	415	32,572	4.70	81.2%
2023	423	62,823	4.75	81.3%
2024	434	26,293	4.81	87.7%

It is important to note that rising levels of citizen satisfaction often elevate expectations, potentially resulting in the expectation paradox: as digital service quality improves, user expectations rise, so even minor frictions can depress reported satisfaction despite objective gains (UN DESA, 2022; Zhang et al., 2022).

In Kazakhstan, sustaining growth in satisfaction required continuous efforts to improve service quality and to meet the evolving expectations of service users. Notably, the number of public services included in the national registry – and therefore subject to evaluation – also increased steadily, from 739 in 2016 to 1,330 in 2024. This expansion broadened the scope of service quality assessment and placed new demands on administrative performance.

Survey data also reveal a strong correlation between the convenience and accessibility of digital public services and citizens' trust in government. Trust increases not solely due to technical improvements, but when citizens perceive the state as responsive to their individual needs. This finding underscores the central importance of adopting a citizen-centric approach in the development and delivery of public services.

Understanding the phased trajectory of Kazakhstan's digital transformation is essential to contextualize current levels of citizen satisfaction and trust. The country's e-government progress has unfolded through structured stages, each contributing to the broader digital transformation of the public sector (Table 2).

Table 2: Development of Public Service Delivery in Kazakhstan (2003–2024)

Period	Key Stages and Initiatives	Results: EGDI and OSI Rankings*
2003–2006 Foundational Phase	1. Adoption of Kazakhstan's first digitalization laws: *On Informatization* and	- Kazakhstan entered the UN EGDI ranking in 2003 at **83rd place** - By 2005:

Period	Key Stages and Initiatives	Results: EGDI and OSI Rankings*
	On Electronic Documents and Digital Signatures (2003); 2. Launch of the *Electronic Government Formation Program* (2004); 3. Establishment of the first four Public Service Centers based on the «one-stop shop» model (2005); 4. Launch of the national e-government portal *eGov.kz* as an informational platform (2006)	**65th place**, EGDI: **0.48** - OSI remained low at **0.19**, reflecting limited functionality (informational services only)
2007–2010 Interactive Services	1. Approval of the first *National Registry of Public Services* (132 services); 2. Introduction of online certificate requests and transactional services (e.g., online payment of state duties); 3. Implementation of core infrastructure: citizen and legal entity databases, *eLicensing* portal	- EGDI: **46th place** (2010) - OSI: **0.53**, with over **40%** of core services available electronically
2011–2013 Transparency and Participation	1. Launch of open government initiatives: open data portals, budget transparency, and blogs by top officials; 2. In 2012, Kazakhstan ranked among the top 3 globally in the *UN E-Participation Index*	- EGDI: **38th place** (2012), score: **~0.68** - OSI: **0.78**, reflecting improved user orientation and participatory tools
2014–2016 Integration and Optimization	1. Establishment of the *Government for Citizens Corporation*, consolidating service delivery and unifying registries; 2. Introduction of composite (integrated) services under the «one request» principle	- EGDI: **28th place** (2014), **33rd** (2016) - OSI: approximately **0.75**, marking the beginning of a systemic citizen-centric transition
2017–2019 Digital Transformation	1. Launch of the *Digital Kazakhstan* program (2017); 2. Introduction of proactive services, *eGovMobile* app, and major investments in infrastructure and digital literacy	- EGDI: **39th place** (2018), score: **0.76** - OSI: **0.87**, positioning Kazakhstan as a digital leader in the CIS region
2020–2021 Pandemic-Driven Acceleration	1. Rapid digitization in response to COVID-19; 2. Launch of remote digital signature issuance and biometric identification services; 3. Expansion of mobile service channels	- EGDI: **29th place** (2020), score: **0.8375** - OSI: **0.92** - Citizen satisfaction rose from **72.4% (2018)** to **75.4% (2021)**
2022–2024 Leadership and Maturity	1. Transition to *eGov 3.0* model; 2. Introduction of biometric authentication and QR-code-based digital signatures; 3. Expansion of composite and proactive service offerings	- EGDI: **24th place** (2024), score: **0.9009** - OSI: **10th place** - **92%** of public services delivered

Period	Key Stages and Initiatives	Results: EGDI and OSI Rankings*
		online, contributing to rising citizen trust

Note. EGDI stands for E-Government Development Index, OSI stands for Online Service Index. Source: UN E-Government Knowledgebase, 2025.

Compared with Estonia, the Republic of Korea, and the Russian Federation (see Appendix A), Kazakhstan demonstrates a steady long-term improvement in the E-Government Development Index (EGDI), showing a clear convergence toward the leading countries. The trajectory of the Online Service Index (OSI), however, appears less linear. The decline observed in 2016 across both indicators most likely reflects a transitional period of technical restructuring in online service systems rather than a genuine regression. By the 2020s, Kazakhstan had surpassed most regional peers and significantly narrowed the gap with Estonia and the Republic of Korea. Taken together, the data presented in Appendix A suggest that further progress will depend primarily on the qualitative dimensions of service design – such as transactional depth, personalization, and citizen participation mechanisms – rather than on baseline infrastructure expansion.

In addition to Estonia and the Republic of Korea, other global leaders such as Singapore and Denmark consistently occupy the top positions in both the EGDI and OSI rankings (UN DESA, 2022; 2024). Their experience shows that advanced levels of digital maturity are typically accompanied by comprehensive institutional reforms, strong citizen-engagement frameworks, and inclusive governance strategies. While Kazakhstan's recent progress places it close to these countries in terms of overall EGDI scores, a noticeable gap remains in aspects related to public trust and participatory practices.

The relatively lower EGDI score of Kazakhstan, despite its strong OSI performance, can be partly attributed to structural and demographic constraints associated with a vast national territory, dispersed population, and higher infrastructure costs per capita. These geographic factors make universal access to high-quality digital infrastructure more challenging than in compact states such as Singapore, Denmark, or Estonia. However, geography alone does not determine the outcome. Persistent disparities in digital literacy, uneven rural-urban development, and comparatively lower per-capita investment in information and communication technologies also limit Kazakhstan's position. These challenges suggest that further advances in Kazakhstan's digital government are likely to rely less on physical infrastructure and more on strengthening human capital, citizen-centered service design, and participatory feedback systems.

Discussion

The findings of this study demonstrate that digital innovations in Kazakhstan's public service delivery have had a positive impact on citizens' perceptions. This aligns with international evidence (Welch, Hinnant and Moon, 2005; UNDP, 2020), which suggests that the convenience and transparency of digital channels contribute to enhanced trust in public institutions.

Kazakhstan's trajectory – from being among the first countries in Central Asia to launch e-government initiatives in 2003 to becoming a global leader in this field by 2024 – is clearly reflected in both national performance and global rankings. The United Nations' E-Government Development Index (EGDI) and Online Service Index (OSI) serve as internationally recognized benchmarks for assessing e-government maturity. Kazakhstan's advancement from 83rd place with a score of 0.39 in 2003 to 24th place with a score of 0.90 in 2024 illustrates a consistent and successful digital transformation (UN DESA, 2022; 2024).

This upward trajectory has placed Kazakhstan in the «very high EGDI» category, reflecting compliance with the three critical pillars of e-government development: the availability of online services, the quality of telecommunications infrastructure, and human capital. Moreover, the country's entry into the OSI global top 10 in 2024 confirms that its digital services are not only extensive but also accessible, user-friendly, and citizen-oriented.

Crucially, these structural achievements have translated into citizens' everyday experiences. The increase in satisfaction with public services indicates a favorable public perception of Kazakhstan's digital transformation. In the field of public administration, citizen satisfaction is widely considered a core indicator of successful digital reform (Kim, Rho and Teo, 2024). Earlier research observed that Kazakhstan's initial digitalization efforts followed a largely top-down, process-centric model, focusing on administrative efficiency rather than user experience. However, recent improvements in satisfaction scores and Kazakhstan's rise in e-participation rankings suggest a clear shift toward a more citizen-centric approach.

A prominent example is the introduction of proactive, life-event-based services under the Digital Kazakhstan initiative – for instance, integrated service packages for the birth of a child. This approach is in line with academic recommendations to design digital services around the concrete needs of citizens (Bokayev et al., 2021).

Kazakhstan's experience also aligns with the Technology Acceptance Model (TAM), which posits that perceived usefulness and ease of use are critical to the adoption of digital technologies (Davis, 1989). High satisfaction with the usability of the national e-government portal and clarity of service procedures reinforces this framework. Similarly, the study's findings correspond with the Unified Theory of Acceptance and Use of Technology (UTAUT), which emphasizes performance expectancy and effort expectancy as key determinants of user behavior.

Viewed through e-government maturity models, Kazakhstan shows features consistent with the integration stages and, in Andersen and Henriksen's extension of the model, a cautious trajectory toward higher maturity. Under Layne and Lee's four stages – catalogue *(online presence)*, transaction *(two-way digital interactions)*, vertical integration *(linking processes across levels of government)*, and horizontal integration *(end-to-end cross-agency integration)* – the consolidation of services via the eGov.kz portal and its mobile application indicates movement within the integration stages (Layne & Lee, 2001). In Andersen & Henriksen's Public Sector Process Rebuilding framework – cultivation *(activity-centric back-office integration and process mapping)*, extension *(customer-facing expansion across channels and wider reuse of back-office data)*, maturity *(seamless cross-organizational process flows and greater*

transparency), and revolution *(deeper re-engineering, including proactive/automated services)* – Kazakhstan appears to be progressing from extension toward maturity, with localized elements approaching revolution in selected domains (Andersen & Henriksen, 2006). These tendencies also resonate with digital-era governance, which emphasizes reducing bureaucratic redundancies and integrating service-delivery systems (Dunleavy et al., 2006).

In parallel, the development of digital citizen participation platforms – including e-Otinish; the Open Government suite (Open Dialogue, Open Data, Open Budgets, Open Legal Acts); the national e-petitions service, and participatory budgeting initiatives – signals a shift beyond service provision toward citizen engagement in governance. This shift is consistent with the e-government literature, which treats participatory mechanisms as key indicators of mature digital governance (Bertot, Jaeger and Grimes, 2010; Criado, Sandoval-Almazán and Gil-García, 2013). Going forward, it will be essential to assess the extent to which citizen feedback meaningfully informs decision-making processes.

Nevertheless, the phenomenon known as the paradox of digital expectations merits close attention. As the quality of digital services improves, citizen expectations rise accordingly-resulting in possible declines in satisfaction even in response to minor disruptions. This highlights the need for strategic expectation management and proactive user engagement.

Kazakhstan's hybrid online + offline model has played a crucial role in enabling broad implementation of digital government without sacrificing user inclusion. In this model, Public Service Centers (PSC) have served as vital components of client-centric transformation, helping reduce administrative burdens and create a more transparent and predictable interaction environment. However, maintaining these centers nationwide imposes considerable fiscal pressure (≈ USD 106.18 million (KZT 58,142,945 thousand, [Open budgets, 2025]), raising questions about their efficiency – especially in a context where over 90% of public services are now accessible online.

A major challenge remains ensuring the sustainability of digital infrastructure and equitable access. It is essential to strike a balance between accelerated digitalization and policies that promote fairness-particularly for rural residents and vulnerable groups. Without appropriate support measures, digital transformation may risk deepening existing social inequalities.

Furthermore, increases in public trust may be short-lived if digital innovation is not accompanied by institutional changes aimed at enhancing accountability, transparency, and citizen participation. In a digital society, trust is not merely a technological outcome – it is a social construct that requires long-term systemic reinforcement.

Kazakhstan's experience thus affirms key theoretical frameworks regarding the implementation of digital public services and highlights the need to further advance citizen-oriented strategies, enhance service quality, and reduce digital inequality.

Conclusion

This study has explored in depth the influence of digital innovations and the citizen-centric approach on public trust and citizen satisfaction with government services in Kazakhstan. The analysis covering 2003–2024 reveals a steady expansion of digital service delivery channels, growing satisfaction, and a gradual strengthening of public trust.

The results demonstrate a positive trajectory in citizen satisfaction and trust, closely associated with the phased introduction of digital infrastructure such as the e-government portal, mobile applications, and proactive service models. Kazakhstan achieved impressive international results-ranking 24th in the EGDI and 8th in the OSI in 2024-reflecting the effectiveness of its comprehensive, user-oriented digitalization strategy.

Key success factors include the consistent modernization of infrastructure, supportive legislation, and institutional reforms aimed at enhancing client-oriented service delivery. Innovations such as integrated mobile platforms and simplified digital identification procedures have contributed to improving the efficiency, transparency, and accessibility of public services. These outcomes are evidenced by sustained gains in user satisfaction (from 72.8% in 2016 to 87.7% in 2024; see Table 1), the broad availability of online channels (92% of services delivered digitally by 2024; see Table 2), and strong external benchmarks (Kazakhstan's OSI top-10 position in 2024). Taken together, these documented changes indicate a measurable shift toward a more citizen-centric service model.

Nonetheless, important challenges remain. One of the most pressing is the expectation paradox phenomenon in which rising service quality also raises public expectations, potentially leading to dissatisfaction over even minor disruptions or delays. This paradox underscores the need for continuous improvement, strategic planning, and anticipatory management of user expectations.

Equally important are the structural and social barriers to digital access identified in the course of the study. Despite substantial progress, equitable access to digital services remains a concern, particularly for rural populations and socially vulnerable groups. The study emphasizes that without targeted efforts to bridge the digital divide, accelerated digitalization risks reinforcing existing social inequalities. Moreover, the necessity of maintaining offline service access points, such as Public Service Centers, in response to unequal digital inclusion may reduce the overall efficiency of digitalization efforts.

Kazakhstan's experience offers practical policy insights applicable to similar contexts globally. Future research should pursue more in-depth longitudinal analysis, comparative cross-country studies, and exploration of the specific barriers faced by marginalized populations in accessing digital government services. In addition, further investigation of the expectation paradox will provide valuable guidance for refining digital governance at both national and international levels.

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Appendix A: EGDI and OSI by Country (2003–2024)*

	Kazakhstan			Estonia			Republic of Korea			Russian Federation		
Year	**EGDI**	**EGDI Rank**	**OSI**	**EGDI**	**EGDI Rank**	**OSI**	**EGDI**	**EGDI Rank**	**OSI**	**EGDI**	**EGDI Rank**	**OSI**
2003	0,39	83	0,10	0,70	16	0,76	0,74	13	0,48	0,44	58	0,05
2004	0,43	69	0,13	0,70	20	0,64	0,86	5	0,77	0,50	52	0,21
2005	0,48	65	0,21	0,73	19	0,62	0,87	5	0,87	0,53	50	0,14
2008	0,47	81	0,09	0,76	13	0,73	0,83	6	0,98	0,51	60	0,09
2010	0,56	46	0,56	0,70	20	0,69	0,88	1	1,00	0,51	59	0,13
2012	0,68	38	0,95	0,80	20	0,76	0,93	1	1,00	0,73	27	0,66
2014	0,73	28	0,76	0,82	15	0,76	0,95	1	1,00	0,73	27	0,69
2016	0,73	33	0,59	0,83	13	0,81	0,89	3	0,97	0,72	35	0,75
2018	0,76	39	0,84	0,85	16	0,91	0,90	3	1,00	0,80	32	0,92
2020	0,84	29	0,88	0,95	3	1,00	0,96	2	1,00	0,82	36	0,87
2022	0,86	28	0,81	0,94	8	0,98	0,95	3	0,94	0,82	42	0,60
2024	0,90	24	0,85	0,97	2	0,96	0,97	4	0,97	0,85	43	0,64

Notes: *EGDI stands for E-Government Development Index, OSI stands for Online Service Index.*
Source: *UN E-Government Knowledgebase, 2025. Only UN survey years are included.*