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DIGITAL TRANSFORMATION OF CONSULAR SERVICES: INTERNATIONAL PRACTICE AND LESSONS FOR THE REPUBLIC OF KAZAKHSTAN

Abstract. This article examines the use of e-government and the impact on consular services. The main goal is to analyze the implementation of digital tools in the work of the consulate to study international experience, and it was revealed that some of this experience is applicable to the Republic of Kazakhstan. Justifying the comparative analysis and review of regulatory documents, the case study examined the experience of Estonia, South Korea, Singapore, the United Arab Emirates, Germany and the United States in the framework of digitalization of consular and visa technical procedures. It is worth noting that the transformation implements three elements: electronic visas, biometric verification, and multi-level electronic automated application processing. This article substantiates the implementation of consular digitalization in Kazakhstan, in the context of international guidelines, and identifies gaps. The study is guided by step-by-step recommendations in practice that allow us to take into account the country's institutional capabilities, as well as the legal framework and geopolitical rationale, as well as the need for national strategies for digitizing consular activities.

Keywords: digitalization; consular services; e-government; electronic visas; biometric identification; the Republic of Kazakhstan; international experience; online government services.

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КОНСУЛДЫҚ ҚЫЗМЕТТЕРДІҢ ЦИФРЛЫҚ ТРАНСФОРМАЦИЯСЫ: ХАЛЫҚАРАЛЫҚ ТӘЖІРИБЕ ЖӘНЕ ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ҮШІН ҚОРЫТЫНДЫЛАР

Аннотация. Мақалада электрондық үкімет технологияларын пайдалану және олардың консулдық қызметтер көрсету саласына ықпалы қарастырылады. Зерттеудің негізгі мақсаты – консулдық қызметке цифрлық құралдарды енгізудің халықаралық тәжірибесін зерделеу және оның Қазақстан Республикасында қолдануға болатын бағыттарын айқындау. Салыстырмалы талдау, нормативтік-құқықтық құжаттарды зерделеу және кейс-стади әдісі негізінде Эстония, Оңтүстік Корея, Сингапур, Біріккен Араб Әмірліктері, Германия және Америка Құрама Штаттарының консулдық және визалық рәсімдерді цифрландыру тәжірибесі қарастырылады. Жүргізілген талдау цифрлық трансформацияның негізгі бағыттары ретінде электрондық визаларды енгізуді, биометриялық сәйкестендіруді және өтініштерді көпдеңгейлі автоматтандырылған электрондық өндеуді бөліп көрсетуге мүмкіндік береді. Мақалада халықаралық тәжірибе аясында Қазақстандағы консулдық қызметтерді цифрландырудың қазіргі жай-күйі қарастырылып, осы саладағы олқылықтар айқындалады. Зерттеу нәтижесінде елдің институционалдық мүмкіндіктерін, қолданыстағы құқықтық базаны және геосаяси факторларды ескере отырып, консулдық қызметті цифрландырудың ұлттық стратегиясын қалыптастыруға бағытталған кезең-кезеңімен іске асырылатын ұсынымдар жасалады.

Түйінді сөздер: цифрландыру; консулдық қызметтер; электрондық үкімет; электрондық визалар; биометриялық сәйкестендіру; Қазақстан Республикасы; халықаралық тәжірибе; онлайн мемлекеттік қызметтер.

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ЦИФРОВАЯ ТРАНСФОРМАЦИЯ КОНСУЛЬСКИХ УСЛУГ: МЕЖДУНАРОДНАЯ ПРАКТИКА И ВЫВОДЫ ДЛЯ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация. В данной статье рассматривается использование электронного правительства и его влияние на консульские услуги. Основная цель – проанализировать внедрение цифровых инструментов в работу консульства,



изучить международный опыт, выявить, что из этого опыта применимо для Республики Казахстан. В ходе сравнительного анализа и обзора нормативных документов в тематическом исследовании был рассмотрен опыт Эстонии, Южной Кореи, Сингапура, Объединенных Арабских Эмиратов, Германии и Соединенных Штатов Америки в рамках цифровизации консульских и визовых технических процедур. Стоит отметить, что трансформация реализует три элемента: электронные визы, биометрическая верификация, многоуровневая электронная автоматизированная обработка заявок. В данной статье обосновывается реализация консульской цифровизации Казахстана в контексте международных установок, выявляются пробелы. Исследование определяет пошаговые практические рекомендации, которые позволяют учесть институциональные возможности страны, а также правовую базу и геополитическое обоснование в свете необходимости национальных стратегий цифровизации консульской деятельности.

Ключевые слова: цифровизация; консульские услуги; электронное правительство; электронные визы; биометрическая идентификация; Республика Казахстан; международный опыт; государственные услуги онлайн.

Introduction. Public administration is being reshaped, by digitalization across the board, and consular activity is no exception. The traditional model built around in person visits and paper files is steadily giving way to digital platforms, automated processing, and biometric identity checks. This shift is driven both from the outside, by the broader push to digitize the public sector, and from the inside, by consular offices own need to work faster and more transparently¹.

Several developments make this topic timely.

First, growing international mobility has pushed consular workloads up sharply: the International Organization for Migration reported more than 272 million international migrants and 1.5 billion annual tourist trips even before 2020².

Second, the COVID-19 pandemic exposed how fragile paper-based consular services really are: offices that had not digitized effectively stopped functioning. Third, competition for foreign investors and tourists is pushing governments to cut red tape, including by moving visa procedures online³.

The question is especially relevant for Kazakhstan because of ongoing state digitalization and economic diversification efforts. UN data place Kazakhstan 28th (up one position) in the E-Government Development Index and 8th in the Online Services Index. Of the 1208 government services, 92% are available electronically. Of these, 484 are offered only online, while 724 can be accessed both online and in traditional formats. This progress is supported by e-government infrastructure that includes core databases, sectorial information systems, and data exchange platforms such as the e-government gateway and Smart Bridge. It is further complemented by services such as the government portal, eLicense, Smart Data Ukimet, the Digital Family Card and eOtinish projects and the eGov mobile⁴.

Even if, a systematic look at international experience in consular digitalization specific to a national context is largely missing from the literature. Research on e-government and digital diplomacy is already fairly extensive. However, there is still little work that specifically examines how consular services are being transformed in different national contexts. Scholars such as Sinchuk and Kashirina [1] and Abbas [2] have looked at individual country models, but a full cross country comparison has not yet been conducted.

This study aims to systematize international experience in consular digital transformation and use it to develop recommendations for Kazakhstan. It has several objectives: to compare consular digitalization models in leading countries; to identify the main technological and institutional

¹ E-Government Survey 2022: The Future of Digital Government. – New York: United Nations Department of Economic and Social Affairs (UNDESA), 2022. – 238 p. [Electronic resource]. – Access mode: <https://desapublications.un.org/sites/default/files/publications/2022-09/Web%20version%20E-Government%202022.pdf>.

² World Migration Report 2022. – Geneva: International Organization for Migration (IOM), 2022. – 502 p. [Electronic resource]. – Access mode: <https://file:///C:/Users/Пользователь/Downloads/WMR-2022-EN.pdf>.

³ World Tourism Barometer. Statistical Annex. – Madrid: World Tourism Organization, 2025. – Vol. 23. Issue 1. – 40 p. [Electronic resource]. – Access mode: <https://hotelespormexico.org/wp-content/uploads/2025/02/2025-world-tourism-barometer-and-statistical-annex-january-2025.pdf>.

⁴ Об утверждении Концепции цифровой трансформации, развития отрасли информационно-коммуникационных технологий и кибербезопасности на 2023-2029 годы: постановление Правительства Республики Казахстан от 28 марта 2023 г. № 269 [Electronic resource]. – Access mode: <https://adilet.zan.kz/rus/docs/P2300000269#z55>.



components involved; to assess the current state of Kazakhstan's consular services; and to propose practical steps for digital transformation and its legal regulation.

The scientific novelty of the research consists in three aspects. First, it proposes the Consular Services Digital Maturity Index (CSDMI), a comprehensive indicator that allows you to compare the digitalization of consular offices in different countries. Secondly, as far as the authors are aware, this is the first study in which such an indicator is applied simultaneously to six leading countries and Kazakhstan. Third, the recommendations are based on differences in the level of parameters identified during this comparison, rather than on general considerations.

Materials and methods. The study combines several complementary methods. A systems approach is used to map how the technological, legal, and organizational components of consular digital transformation relate to one another. Comparative analysis covers six countries recognized as leaders in digitalizing national services Estonia, South Korea, Singapore, the UAE, Germany, and the United States and the case-study method is used to examine specific consular digitalization systems and programs in detail [3; 325].

The theoretical basis of the study draws on Gale and Liddle's description e-government [4; 157], the United Nations model of digital public service maturity, and the OECD framework for digital transformation of public administration⁵. For consular service specifically, study relies on the typology proposed by Charalabidis, Loukis, Alexopoulos and Lachana, which identifies 3 generations of e-government services: information portals, transaction platforms, and integrated intelligent systems [5; 4].

The evidence base includes Kazakhstan's legal documents on e-government, namely the Digital Code of the Republic of Kazakhstan dated January 9th, 2026, No. 255 VIII ZRK, which comes into force in June 2026, and the state program "Digital Kazakhstan". It also uses official reports and rankings on digital governance from the OECD, the United Nations, and the World Bank; the official websites of the consular services of the countries studied; and peer reviewed publications from 2015 to 2024.

To assess the level of digitalization of consular services, the study applies an original analytical matrix based on five parameters: the availability of online appointment booking, e-visa coverage, the level of automation in application processing, the integration of biometric technology, and the degree of interagency digital cooperation. Each parameter is scored from 0 to 4, and the results form a composite Consular Services Digital Maturity Index (CSDMI) with the maximum score of 20 points.

The index is calculated as an unweighted sum of estimates for five parameters: $CSDMI = P1 + P2 + P3 + P4 + P5$, where P1 is online appointment, P2 is electronic visa coverage, P3 is automation of application processing, P4 is integration of biometric technologies and P5 is interagency digital cooperation. Each parameter is estimated as an integer from 0 to 4, so the CSDMI index varies from 0 to 20. Equal weights are used + there is no consensus in the literature about the relative importance of these components, and a simple sum makes the index transparent and reproducible.

A common five-level ordinal scale is applied to each parameter: 0 no function; 1 initial or fragmented implementation (only providing information, pilot projects or isolated solutions); 2 partial implementation (for some services, categories of applicants or missions); 3 extended implementation (for most services, but with limited functionality or a mandatory full-time stage); 4 full implementation (comprehensive, covering all or almost all services and applicants). The points were awarded by the authors as an expert assessment based on the above-mentioned documentary sources, based on the year 2023.

To interpret the final data, the CSDMI scale is divided into five maturity levels with four points each: 0-4 initial; 5-8 basic (information portals and limited transactional capabilities); 9-12 developing (transactional services with partial automation); 13-16 advanced (integrated services); and 17-20 leading

⁵ OECD Digital Government Policy Framework: Six Dimensions of a Digital Government. – Paris: OECD Publishing, 2020 [Electronic resource]. – Access mode: https://www.oecd.org/en/publications/the-oecd-digital-government-policy-framework_f64fed2a-en.html.



(final integrated automated and intelligent services). Summary scores of this kind correspond to the logic of multi-criteria country ratings used in comparative studies of digital transformation [3].

Results, discussion.

1. Global trends in consular digital transformation. International practice shows the digital transformation of consular services moving along several connected tracks.

One is the shift toward electronic visa documents and away from physical visa stickers, in formats such as eVisa, ETA, and ESTA. By 2024, electronic visa systems were operating in 70 countries and handling over 40% of global visa traffic⁶.

The second area of focus is biometric identification and identity verification. These systems strengthen border control security and make consular procedures simpler and more convenient, because biometric data collected once can be reused for the entire period of validity of the document. ICAO reports that by 2023, biometric e-passports were being issued in 157 countries⁷.

A third focus is the development of unified national consular portals that give citizens 1 stop access to services by combining appointment booking, document submission, fee payment, and status tracking in a single platform. A fourth is extending digitalization to notarial services, civil registration, and document issuance for citizens abroad. A fifth is using artificial intelligence for document verification and risk assessment [6; 163].

<i>Country</i>	<i>Online booking</i>	<i>E-visas</i>	<i>Automation</i>	<i>Biometrics</i>	<i>Interagency integration</i>	<i>CSDMI (max 20)</i>
Estonia	4	4	4	4	4	20
Singapore	4	4	4	4	3	19
South Korea	4	4	3	4	3	18
UAE	4	4	3	4	3	18
Germany	3	3	3	4	3	16
USA	4	4	3	4	2	17
Kazakhstan	2	2	1	2	1	8

Table 1. Level of digitalization of consular services in selected countries (CSDMI, 2023)

Source: compiled by the authors

2. Case analysis

Estonia. Estonia's e-government model is widely seen as the global standard. It is built on the X-road digital identity system, which allows secure data exchange between more than 900 government information systems. In consular services, X-Road enables Estonian citizens abroad to use a full range of government services online, including consular registration, notarial services, and voting [7; 3]. The

⁶ Africa Visa openness Report 2023. – Geneva: IATA, 2023. – 62 p. [Electronic resource]. – Access mode: https://www.visaopenness.org/fileadmin/uploads/afdb/Documents/AVOI_2023_Final_R18_7dec23.pdf.

⁷ Doc 9303. Машиночитываемые проездные документы. Издание восьмое, 2021 [Electronic resource]. – Access mode: https://www.icao.int/sites/default/files/publications/DocSeries/9303_p1_cons_ru.pdf.



e-Residency program, launched in 2014, had attracted more than 100,000 non-residents from 170 countries by 2023 giving them access to Estonia's digital ecosystem without visiting a consulate.

South Korea. The Korean Integrated Alien Management System digitizes the entire process for foreign nationals from start to finish, including visa applications, residence registration and work permit issuance. It is connected to the databases of 22 ministries and agencies, which allows applicant information to be checked automatically across multiple registries at the same time⁸. Roughly 60% of visa applications are processed automatically, and standard processing time has fallen from five business days to 1.5.

Singapore. Singapore's Immigration & Checkpoints Authority (ICA) system brings entry regulation, immigration registration, and residence-permit issuance together on one platform. A distinctive feature is its use of machine learning to assess visa risk: an algorithm reviews more than 200 application parameters and produces a recommendation for the consular officer⁹. Since 2022, the SG Digital Consulate system has let citizens obtain consular services through a single portal without visiting a consulate.

United Arab Emirates. The UAE is one of the fastest countries in the Middle East in digitalizing public administration. Its General Directorate of Residency and Foreigners Affairs (GDRFA) system fully digitizes visa and immigration procedures, and blockchain technology is used to verify education and employment documents¹⁰. The UAE Golden Visa program uses an automated system for long term visas for investors and specialists, with applications usually processed within 2-5 business days.

Germany. Germany's model is distinctive for aligning national legislation with EU consular service standards. The Visa Application Centre (VAC) portal and the APS system serve as a centralized intake point for Schengen visa applications. Since 2023, the pilot Digital Visa Application project has allowed applications to be submitted entirely remotely⁶ without visiting a visa application centre. Germany is also a leading participant in the EU's effort to build a single digital visa system, the EU Digital Travel Credential.

The United States. The U.S. Consular Electronic Application Center (CEAC) processes online applications for most visa categories. Its Electronic System for Travel Authorization (ESTA), operating since 2008, is one of the largest consular automation systems in the world: it handles more than 25 million applications per year, and approximately 98% are approved automatically¹¹. The Automated Passport Control (APC) system at airports has cut average passport-control time by 40-50%.

<i>Function / Country</i>	<i>Estonia</i>	<i>South Korea</i>	<i>Singapore</i>	<i>UAE</i>	<i>Germany</i>	<i>USA</i>
Electronic visa (eVisa)	yes	yes	yes	yes	yes	yes
Online booking, no queue	yes	yes	yes	yes	yes	yes

⁸ International Migration Statistics in 2023 [Electronic resource]. – Access mode: https://mods.go.kr/board.es?mid=a20101000000&bid=11745&tag=&act=view&list_no=431900&ref_bid=.

⁹ SG Arrival Card (SGAC) with Electronic Health Declaration [Electronic resource]. – Access mode: <https://www.ica.gov.sg/enter-transit-depart/entering-singapore/sg-arrival-card>.

¹⁰ The UAE Digital Government Strategy 2025 [Electronic resource]. – Access mode: <https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/government-services-and-digital-transformation/uae-national-digital-government-strategy>.

¹¹ Report of the Visa Office 2023 [Electronic resource]. – Access mode: <https://travel.state.gov/content/travel/en/legal/visa-law0/visa-statistics/annual-reports/report-of-the-visa-office-2023.html>.



AI document verification	yes	yes	yes partial	pilot	-	yes
Biometrics submission	yes	yes	yes	yes	yes	yes
Blockchain verification	yes	pilot	yes	yes	-	yes
Remote notarial services	yes	yes partial	-	-	-	-
Interstate data exchange	yes	yes	yes	yes	yes (EU)	yes

Table 2. Comparison of key functions across digital consular systems

Within the EU Digital Visa pilot project. Source: compiled by the authors.

3. The current state of consular digitalization in the Republic of Kazakhstan

Measured against the international leaders reviewed above, Kazakhstan's consular services show a considerable gap. On the Consular Services Digital Maturity Index, the country scores 8 out of a possible 20 the second of five maturity levels in the UN model, characterized by basic information portals and limited transactional capability, with no end-to-end digitalization of processes.

Digital initiatives already in place include the unified e-government portal eGov.kz, which gives access to a range of consular services; the ConsulPro consular-registration system for citizens abroad, launched in 2019; an electronic visa system covering citizens of 67 countries, launched in 2022; and biometric digitalization of passport and visa documents (ePassport).

A number of systemic problems, however, limit how effective this digitalization has been: fragmented, poorly integrated information systems across the Ministry of Foreign Affairs, the Ministry of Internal Affairs, and civil-registration authorities; limited e-visa coverage, partly due to the absence of an automated risk assessment system; weak mobile application functionality; a shortage of qualified staff to support digital systems; and a narrow legal basis for remote notarial services and consular certification of documents¹².

The Digital Kazakhstan program, adopted in 2017, aims for 80% of government services to be provided electronically by 2025. However, as of 2023, only 30-35% of consular services were available electronically, and many of those still require ~~on~~ later in person visit to present original documents¹³.

¹² Основные итоги деятельности Министерства иностранных дел Республики Казахстан за 2023 год [Electronic resource]. – Access mode: <https://travelpress.kz/article/useful/osnovnie-itogi-deyatelnosti-ministerstva-inostrannih-del-respubliki-kazakhstan-za-2023-god-150?ysclid=mt78ptzpr327884788>.

¹³ Об утверждении Концепции цифровой трансформации, развития отрасли информационно-коммуникационных технологий и кибербезопасности на 2023-2029 годы: постановление Правительства Республики Казахстан от 28 марта 2023 г. № 269 [Electronic resource]. – Access mode: <https://adilet.zan.kz/rus/docs/P2300000269#z553>.



Gap in consular digitalization: Kazakhstan vs international leaders

<i>Indicator</i>	<i>Kazakhstan (actual)</i>	<i>Target</i>	<i>Benchmark (leader)</i>	<i>Gap</i>
CSDM (0–20)	8	15 (by 2027)	20 (Estonia)	-12
Share of e-visas,	35%	70%	95(Singapore)	-60
Automated processing,	10%	50%	~60 (South Korea)	-50
Visa processing time in days	5-7	3	1,5 (South Korea)	+3,5-5,5
Online notarial coverage	none	partial	full (Estonia)	critical
Interagency systems integration	partial	high	full (Estonia)	important

Table 3. Comparison of key functions across digital consular systems

4. Barriers and success factors in consular digital transformation

International experience points to a recurring set of factors behind successful (or stalled) consular digitalization.

On the institutional side, success tends to depend on a clear political mandate for digitalization at the level of head of state or government, a centralized coordinating body for digital development, and a phased approach with well-defined KPIs [3; 327].

Technologically, the main success factors are a reliable digital identity infrastructure that serves as the foundation for the broader ecosystem of e-services, the adoption of open standards and API architecture to keep systems interoperable, and sustained investment in cybersecurity and data protection. According to Mueller and Rant, countries that first built a comprehensive digital public goods architecture and then transformed their consular systems digitalized 2.3 times faster than countries that pursued isolated, point solutions [4; 158].

From a legal perspective, success requires recognizing the legal validity of electronic documents and digital signatures, establishing a legal basis for remote notarial services and consular certification, and developing rules for the use of biometric data in public administration. International treaty mechanisms for the mutual recognition of digital documents also play an important role [7; 4].

Common barriers include bureaucratic inertia and staff resistance to change, concerns about data security and privacy, digital inequality and low digital literacy among users, insufficient IT infrastructure, and the difficulty of justifying high upfront investment against uncertain returns [6; 164]. Case evidence suggests that countries which work through these barriers save 20-35% of consular-service costs within five to seven years.

From 2021 onward, the general direction of travel has been toward harmonizing with global standards and continuous improvement – sustained investment in digital government services, adoption



of international best practice, deployment of intelligent assistants such as chatbots and voice assistants, online consultations, and efforts to ensure equal access to services regardless of a citizen's location, via mobile apps and online platforms [7; 5].

5. Recommendations for the Republic of Kazakhstan.

Drawing on the analysis above, a three-phase roadmap is proposed for Kazakhstan's consular digital transformation.

Phase I (2025-2026) Foundation and standardization. This phase should include: developing and adopting a Concept for the Digital Transformation of Kazakhstan's Consular Services with clear KPIs; building an integrated consular data-management platform on an X-Road-type architecture (drawing on Estonia's experience) to enable secure data exchange between the Ministry of Foreign Affairs, the Ministry of Internal Affairs, the Ministry of Justice, and the Border Service; extending e-visa eligibility to citizens of at least 100 countries; and giving remote consular notarial services clear legal force [8; 41].

Phase II (2026-2028) focuses on automation and intelligent systems. This phase should include deploying a machine-learning-based automated visa risk-assessment system covering at least 50% of standard visa categories; launching the eConsul.kz mobile consular app with biometric verification; establishing a national register of consular registrations of citizens abroad; and integrating with international biometric databases under bilateral agreements¹⁴.

Phase III (2028-2030) transformation and leadership. This phase should include: reaching a CSDMI score of at least 15 (comparable to Germany); launching a Digital Consulate program to move basic consular services fully to a remote format; establishing a regional hub for consular digital services under CIS/SCO integration frameworks; and developing and promoting Kazakhstani standards for consular digitalization at the UN and OSCE level [2; 8].

Conclusions. This analysis supports several conclusions.

First, digital transformation of consular services is a genuinely global trend, cutting across countries at very different levels of economic development and administrative tradition. International experience shows clear advantages: shorter processing times, lower administrative cost, better service quality and stronger national security.

Second, among the models reviewed, South Korea's HiKorea system is the most applicable to Kazakhstan's situation, because it combines a high level of automation with the ability to handle complex cases in person. Estonia's model remains the long term strategic benchmark, although fully copying it would require large scale investment in digital identity infrastructure. The UAE's experience is most relevant for rapid digitalization within a centralized, top down administrative system.

Third, Kazakhstan already has much of what accelerated consular digitalization requires: a fairly developed ICT infrastructure, a functioning e-government system, political support for digitalization, and experience in implementing large-scale IT projects. The critical success factors going forward are interagency data integration, an adequate regulatory framework, and trained personnel.

Fourth, carrying out the three-phase roadmap proposed here would put Kazakhstan in the top third of global consular digitalization rankings by 2030, strengthening the country's appeal to foreign investors, tourists, and skilled specialists.

Fifth, none of this is achievable in full without parallel progress on an international treaty framework for the mutual recognition of digital documents which will require active diplomatic engagement through the UN, SCO, CIS, and OSCE. Kazakhstan could use this engagement to strengthen its standing in multilateral diplomatic settings more broadly.

A limitation of this study is that data on the functional details of consular information systems in several countries are not fully public, which made expert assessment necessary in places. CSDMI itself

¹⁴ The UAE Digital Government Strategy 2025 [Electronic resource]. – Access mode: <https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/government-services-and-digital-transformation/uae-national-digital-government-strategy>.



is an ordinal expert index with equal weights; a further step is to test its sensitivity to alternative weighting and independent evaluation by several experts. Promising directions for further research include a deeper look at the economic impact of consular digitalization, the cybersecurity of digital consular systems, and standards for assessing quality of electronic consular services applicable across Central Asia.

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