FROM NOMADS TO DIGITAL LEADERS: KAZAKHSTAN'S DIGITAL TRANSFORMATION

A Journey of Modernisation and Innovation

Berk Sürücü
0324190001

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Introduction

Digitalisation has become a norm rather than a novelty starting with mid-2010s, and perhaps peaked during and after the Covid-19 pandemic. (OECD, 2023) What started as a more individualistic or business level transformation shortly after became an important policy area for governments to take into consideration. However, as much as it is a wide-spread phenomena, the way it has to be implemented into different regions of the world is quite diverse. This diversity could be interpreted both on a cultural and on an economic and infrastructural level.

Kazakhstan is rather one of the more interesting cases to be studied under such a perspective. One of the latest regions that transformed into sedentary life, the nomadic culture and heritage creates quite a compelling framework to work within. With the addition of the Soviet period and its direct and profound effects on the social and political culture, the case study of Kazakhstan continues to provide an intricate and multi-faceted area to be discovered and analysed.

This paper will aim to briefly explore the historic heritage that comes into play for the attempts of digitalisation in Kazakhstan, then will continue to lay down the major initiatives

that has been taken to undergo the digital transformation while providing several comparisons with other cases that can be evaluated on similar terms.

The Historic Heritage: Nomadic Culture Meets Soviet Structures

Late Sedentarisation of Kazakhstan

Central Asia is one of the biggest examples of a region that embodied nomadic lifestyle for long periods. The Eurasian Steppe alongside with a significantly wide range of geographic, natural, and climactic conditions provides an environment that is and has to be significantly fragmented in terms of the lifestyle preferences of the inhabitants. In other words, as much as nomadism can be considered as an integral part of Central Asian Culture as a whole, it still is dependent on the subregions and their characteristics. Since this paper aims to focus on specifically the digitalisation process, it will not provide an in-depth historical understanding of the region. In this regard, it is sufficed to state that the southern parts, of course with certain exceptions, has transformed or at least started to transform into sedentary life way earlier compared to the northern parts. Such a process can be observed and tracked through the economic and cultural hubs throughout the history. As for Kazakhstan, being mainly placed on the Eurasian Steppe, the process has been significantly longer and different. The sedentarisation of Kazakhstan was still an ongoing process into the mid-20th century, which has significant implications on the modern-day Kazakh culture. These implications are especially important elements to be considered in order to profoundly understand the digitalisation of Kazakhstan. (Sultanbayeva, 2020)

The Forced Collectivisation period in the Soviet Era during 1930s could be considered as the main shift into sedentary life. However this process was just as uneven as the natural conditions of the regions, which led to significant disparities in terms of infrastructural developments and investments. This situation evolved into a legacy that could still be found within modern-day Kazakhstan where access to resources is highly dependent on the city that an individual lives in. Two of the most prominent examples are Almaty and Astana, two major urban centres, where development has occurred rapidly and well rounded, which is a direct projection of the history of the region and concentration of resources in specific areas. This substantial rural and urban divide that has been established for a long time creates further challenges for the digitalisation process.

Is It Only Challenges: The Positive Outcomes of the Nomadic Heritage

So far, the nomadic heritage can be evaluated mainly as a major contributor to the modern problems Kazakhstan is facing in the world of technology and digitalisation. However, what also makes Kazakhstan an interesting case study is that there are tangible positive links between the nomadic culture and digital requirements of the contemporary times.

First of all, it is an accepted fact that digitalisation on a country level, in other words on a large scale, requires strong centralised initiatives. This is in stark contrast with the nomadic heritage and the uneven developments of the regions which leads to quite a decentralised cultural structure. This is an evident issue to tackle while implementing nationwide policies for digital transformation. However, this "decentralised" culture also offers a valuable qualification that is in complete unity with digital developments. Most digital concepts and innovations that became the baseline of digitalisation are quite "decentralised" technologies, blockchain being perhaps the most obvious example out of all. As much as decentralised structure that has been embedded into the developments of different regions create a variety of policy making challenges, it also comes along with an innate solution that benefits from new developments. This still requires the expenditure of digital infrastructures to rural areas, but it points out to a very distinguished and effective path that can be followed, which is highly inclusive and flexible, after the infrastructural issues have been tackled.

Generation differences are another aspect to be considered. The traditional methods of knowledge and skills that come through nomadic heritage can be hard to integrate into a digitalised framework. This, then sets another requirement for policy implementation where cultural and generational elements should be evaluated, and policies should be adapted in accordance. On the other hand, the nomadic heritage provides a very fundamental and progressive mind and skill set for the region: adaptability. Nomadism is based on adapting to constant changes and tackling different challenges with a wide variety of solutions. This cultural legacy is one of the most essential necessities for a proper digital transformation. The capacity to be flexible and adapt constantly is one of the main features of going digital, and it could be claimed that Kazakhstan has this capacity embedded into the society through nomadic heritage.

As it can be seen, the nomadic history and heritage is too complex and intricate to be confined into simple categorisations as either beneficial or problematic. While it is certain that it has been creating several challenges, it cannot be denied that it also offers interesting and valuable opportunities that can help Kazakhstan flourish through the digitalisation process.

Perhaps, a unique and outstanding synthesis that could possibly bridge the gap between heritage and modernization is a vivid goal to be achieved for Kazakhstan.

Kazakhstan as a Regional Pioneer for Digitalisation

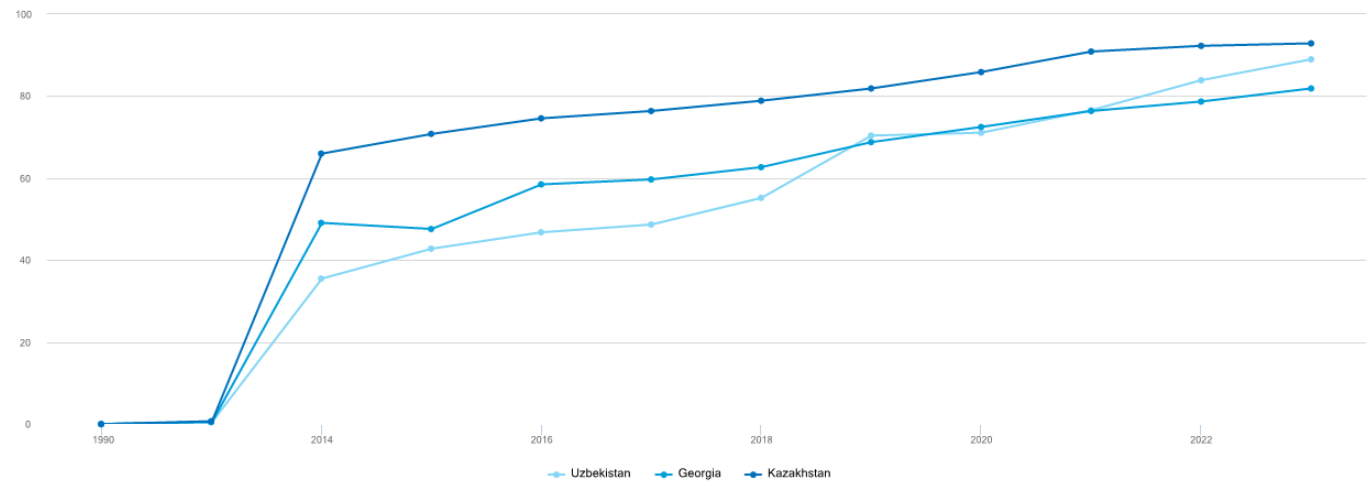
To develop a well-rounded understanding of any given country and their digitalisation process, it is crucial to approach the topic in a global perspective while also evaluating the economic conditions. For this purpose, this section of the paper will focus on comparisons with countries that found themselves in similar conditions during 1990s, in other words with several other "post-Soviet" societies. The chosen countries for comparison are Georgia and Uzbekistan. All three of these countries had been suffering the economic turmoil Soviet Union created in its last years, and the challenges continued to grow even more after the dissolution of the Union. Such a conjecture allows us to find common grounds between the comparing examples. This framework also allows to consider the different parts of the Union after the dissolution, as in Central Asia and Caucasus. Another possible addition could be Estonia and the Baltics. However, the comparison with Estonia will not be addressed in this paper due to their overall success and being ranked in the upper sections of indexes and research in nearly all possible areas. A comparison with an already successful country is perhaps more efficient and logical after realising the commonalities between countries that are in the middle of their digitalisation process.

Georgia, Uzbekistan, and Kazakhstan

On top of sharing similar economic conditions after the dissolution, Uzbekistan also shares major similarities in terms of the historic and cultural heritage due to their geographic positionings. On the other hand, Georgia provides a good set of different conditions to observe the different circumstances and how they affect future developments. Its geographic positioning and also being significantly smaller both in population and in land offers valuable insights for the purpose of this paper. Surface area and population are both important elements to consider due to the relevance of the "decentralised" technological structure that is becoming a norm. As discussed before, the nomadic culture can be utilised and adopted for this new structure. However, since the initialisation still requires a centralised organisation, having larger populations with dire economic conditions proves to be another layer of problems that require solutions.

	1990	2000	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Uzbekistan	0.0	0.5	35.5	42.8	46.8	48.7	55.2	70.4	71.1	76.6	83.9	89.0
Georgia	0.0	0.5	49.1	47.6	58.5	59.7	62.7	68.8	72.5	76.4	78.7	81.9
Kazakhstan	0.0	0.7	66.0	70.8	74.6	76.4	78.9	81.9	85.9	90.9	92.3	92.9

Table 1 (Group, 2023)



Series : Individuals using the Internet (% of population)
Source: World Development Indicators
Created on: 01/06/2025

Chart 1 (Group, 2023)

Yet again, the data presents us with an interesting reality to analyse. (Group, 2023) As it can be seen on Table 1 and Chart 1, all three countries were in similar positions in early 2000s. However, after a decade, Kazakhstan starts to have a significant upper hand despite having the largest surface area. In other words, Kazakhstan requires more infrastructural investments due to having bigger land and less population density that is spread across a larger area, was able to spread internet access better compared to Georgia who has the least land and population. As for Uzbekistan, while it is true that there is a major population gap and Uzbekistan has to reach out to more individuals, since the population density is way higher, it could be argued that Uzbekistan had an advantage of reaching more individuals with less infrastructure, yet again Kazakhstan was better in terms implementing internet access. This is an extremely important indicator, which will be a crucial element in the upcoming sections where several indexes will be presented.

Country	2000 Population	2024 Population	Land Area (KM^2)	Density (/KM^2)
Kazakhstan	15,501,100	20,592,600	2.7M	8
Uzbekistan	24,787,100	36,361,900	440.6K	83
Georgia	4,328,360	3,807,670	69.5K	55

Table 2 (Affairs, 2024)

Another important aspect to analyse is the population growth. This indicates two different concepts. First of all, how to sustain and adapt the infrastructure in accordance with population change, and secondly how to educate the population depending on its increase or decrease, in line with the technological needs for a fully integrated digitalisation transition. As it can be seen on Table 2, Georgia was surpassed by both countries in terms of internet penetration even though there has been a major population decline. Considering that Georgia has also been benefitting from several EU based agreements and funds, this creates a relatively huge success story for both of the Central Asian countries. On the other hand, Uzbekistan has experienced a significant population increase, and was able to maintain their growing penetration rates throughout time, whereas for Kazakhstan this ratio has been rather steady after 2021. This could be interpreted as an indicator for the rural-urban divide that still exists and has not been fully addressed yet. Overall, since the very notion of digitalisation starts with internet access, Kazakhstan portrays a strong background for future adaptation.

Kazakhstan's policies – e-governance, digital Kazakhstan, smart cities

In light of the regional comparison of Kazakhstan, their policies and initiatives beyond internet penetration should be put into an analysis. Perhaps it could be a beneficial step to divide the digitalisation process into several timelines and layers.

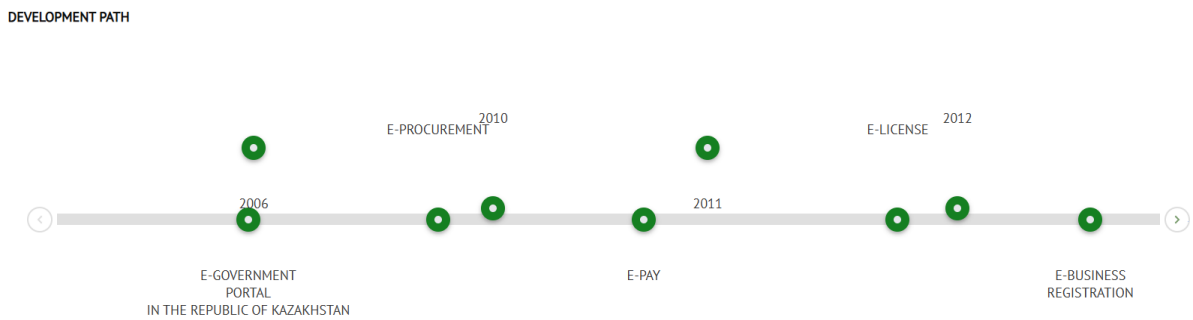


Image 1 (e.gov.kz)

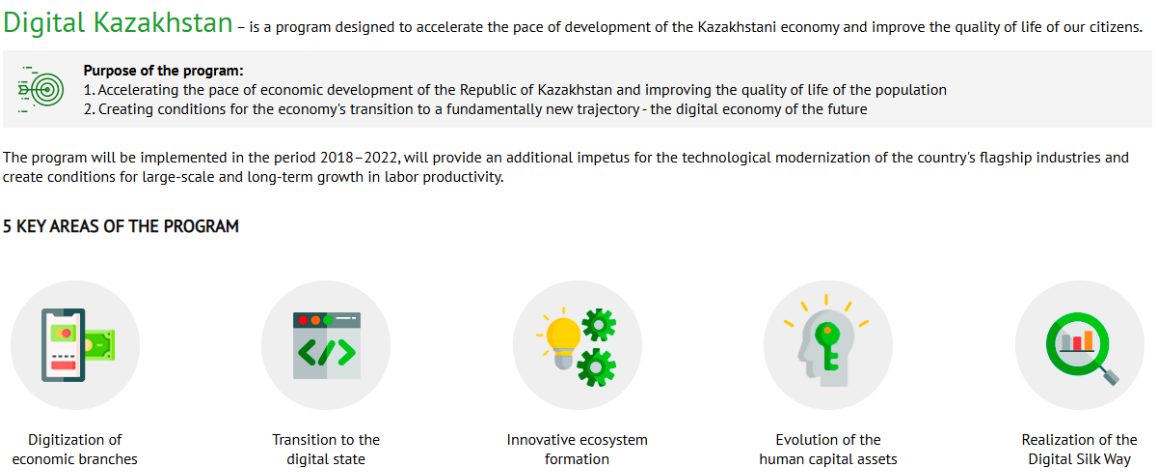


Image 2 (e.gov.kz)

The above images are extracted from the official "egov.kz" website. As it can be seen, prior to the Digital Kazakhstan initiative in 2018, the steps that were taken by the governments were basic e-governance transitions that were implemented throughout time. Taking into consideration that the internet penetration rate has been high in Kazakhstan, it could be said that these fundamental steps were utilised effectively and the foundations for a proper digital transition was established.

The second and perhaps the core digitalisation process was initiated with the Digital Kazakhstan program. This program was oriented around improving general quality of life among citizens while also reshaping and transforming the economy so that it could become what is to be coined as a "digital economy." In other words, the digitalisation that started with e-governance was now continuing with other spheres of life. This, regardless of the outcomes of the program, is an important frame of mind since it recognises how digitalisation is not confined to a few areas or only to a few interfaces, it is rather a complete transformation that shapes and changes the structures of not only the government but daily life through economy and emergence of new social spheres. Such a perspective can be observed among the "5 key areas of the program" which can be seen in Image 2. A clear and direct focus on human capital shows that citizens are realised as a part of this holistic transformation, and without their own individual transformations the process is simply a futile effort of superficial technological advancements. Secondly, the notion of "digital state" is presented, which creates a valuable amalgamation of the past decentralised culture with the new centre-led steps that are being taken. Perhaps, through these two key aspects, both the public and political sphere are being included as both a part and also the end goal of the program.

At this point, another key element can be defined as “striking” and “unique.” As it has been mentioned in previous sections, this paper aims to evaluate the linkages between the historic background of Kazakhstan alongside analysing its current digital developments. A key aspect of the program being chosen as “Realisation of the digital Silk Way” provides an incredible opportunity to observe such connections from the past. Silk Way or the Silk Road, up until it became obsolete or ineffective, was one of the essential parts of Central Asian economy and economic life. Its existence, collapses, and re-emergences throughout history has influenced not only the economic outcomes but also the social and political spheres of the regions that it had passed and connected. Obviously, in the modern day and time, such trade routes has lost their significance long ago, and Silk Road has been accompanied by other trade routes that outlived itself. However, the global market through digitalisation offers a different set of possibilities and creates new “virtual” paths to build and explore. As it can be seen through this very specific key element of the Digital Kazakhstan program, this has been realised, and a step to revitalise a reformed and modernised Silk Road has been initiated. This effort not only portrays vibrant links from the history to contemporary times and even perhaps to the future, but also connotates that Kazakhstan has carefully and effectively assessed their circumstances and potentials while taking the necessary steps to evolve this realisation into a pragmatic and fast paced initiative. All this positive outlook brings us to another major step regarding digitalisation, which is significantly more visible and also more demanding in terms of necessary infrastructure.

Smart cities are one of the hot topics and rising trends among new technological advancements. On one hand, it is a separate concept and path of innovation than digitalisation since it can be achieved with limited digitalisation at least on a basic level. However, it is also intertwined with it while also nourishing from digitalisation on a broad spectrum. As stated by the official website, a smart city prioritises “safety, transport, housing and communal services, education, health care and city management.” (Kazakhstan) As it can be seen, all these are important sphere of life which are highly regarded and demanded by the citizens. In a way, achieving a fully functioning smart city is both an outcome of the digitalisation process, and also a necessity to meet the demands of modern-day individuals. However, establishing a smart city requires significant amount of infrastructural investment and well developed short and long term planning. This once again brings us to the major problem of “urban-rural” divide.

Internal rating of the RK for «Smart cities» by the end of the year 2020

PLACE	CITY	RATING
1	Almaty	70,4%
2	Nur-Sultan	64%
3	Karagandy	64%
6	Atyrau	64%
7	Oskemen	61%
8	Aktobe	61%
4	Oral	61%
5	Kyzylorda	61%
9	Taldykorgan	61%
14	Kokshetau	60,8%
10	Kostanay	60,8%
16	Shymkent	60,8%
11	Turkistan	60,8%
12	Petropavl	57,6%
15	Taraz	57,6%
17	Aktau	54,4%
13	Pavlodar	54,4%

Table 3 (Kazakhstan)

As it can be seen from Image 3, apart from 3 cities, the targeted "optimal" transformation has not been achieved. If further analysed, the distinction behind successful and unsuccessful cities can be traced back to the urban-rural divide and the significant differences in infrastructural investments. This remains as an important challenge and a problem to be solved by Kazakhstan. A broader view can be observed from the map below.

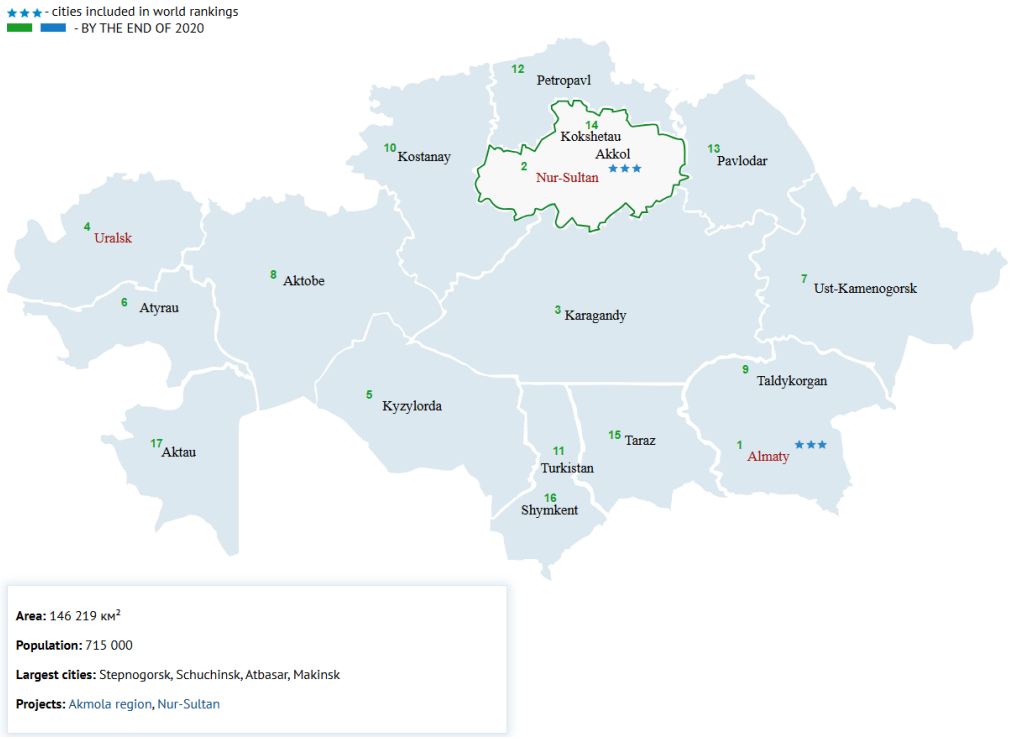


Image 3 (Kazakhstan)

Only Nur-Sultan and Almaty have achieved qualifications that allows them to be ranked withing an international index. However, they are also relatively in lower ranks of the indexes, Almaty being ranked 177th among 231 cities in the Mercer's Quality of Living, Nur-Sultan (Astana) being ranked 467th and Almaty 414th out of 500 cities in the Innovation Cities Index as stated in the official website. This brings in some serious criticisms and points out to the long road that awaits for Kazakhstan to actually achieve what they have been envisioning. Furthermore, in some of the more recent indexes a decline in some respects can be found, underlining that there are also issues about feasibility and continuity. Yet again, on the brighter side, Almaty was ranked 29th out of 100 cities in the UN Local Online Service Index of 2020, which proposes that there are also some successful developments that were in accordance with global qualifications and requirements, perhaps offering a glimpse of hope to continue on such a path. Speaking of global qualifications, this brings us to the point where a general evaluation of Kazakhstan's digitalisation within the international arena should be made to develop an actual understanding of their progress.

Global Rankings and Indexes

Image 4 (e.gov.kz)

Top 3 Countries by region

Africa	Arab States	Asia & Pacific	CIS	Europe	The Americas
1. Mauritius (60)	1. United Arab Emirates (28)	1. Singapore (2)	1. Russian Federation (41)	1. Finland (3)	1. United States (1)
2. Seychelles (71)	2. Saudi Arabia (35)	2. Korea, Rep. (5)	2. Kazakhstan (61)	2. Sweden (4)	2. Canada (11)
3. South Africa (72)	3. Qatar (38)	3. Japan (12)	3. Armenia (66)	3. Netherlands (6)	3. Brazil (44)

Image 5 (Index, 2024)

The above indexes, which are shown through images extracted from the official website, puts forward a very positive situation. UN international ranking on the e-government development index focuses on features such as online services quality, telecommunication infrastructure quality, and human capital. Having a high placement like 29th place in such an index has strong connotations of development and concrete outcome. Another important

index, the Network Readiness index, is a ranking system that holds information about how prepared a country is in terms of its network capabilities, which is a core necessity for any digital realisation. It also establishes a regional perspective, and as it can be seen from Image 5, Kazakhstan is in the second play within its respective region, only behind Russian Federation. This simply proves and confirms that Kazakhstan has actually become a pioneer of digitalisation in its neighbourhood and has been stepping up for this role.

It cannot be denied that these indexes are important assets to consider while analysing Kazakhstan's digitalisation, and they have been carried out by some of the most trusted and prominent international institutions that have access to best quality data collecting methods and mediums. However, such indexes should also be evaluated with a certain level of scepticism and further research should be done to see how accurate to these rankings and indexes reflect the reality. In other words, some sort of reality check is necessary to have meaningful reflections of the data and statistics.

Reality Check – Reflections on the Data

This section of the paper will benefit from a review that has been shared by a Republic of Kazakhstan citizen, Sanzhara Turganbay, through personal discussions and interactions. However, before proceeding to the "user's experience," a final reflection of the indexes that were mentioned in the previous sections of the paper will be made.

The first major criticism, which ignites further scepticism, is the preferred indexes in terms of when they were conducted. The majority of the indexes that are shared through the official website are from 2020 and before. In other words, they neither reflect the current state of the outcomes of Digital Kazakhstan program, nor provide insight about the program since they are dated before the initiation of the program. This presents a significant issue. Furthermore, when up-to-date version of these indexes are analysed, there has been significant decreases in some of the prominent fields of qualification. For example, in the indexes of preferred years, Kazakhstan has been listed above Türkiye nearly in all areas and rankings. However, the current indexes hold a listing quite contrary to those valuations. In other words, as much as the statistics have important reflections of Kazakhstan's progress, refraining from using current rankings where there have been major downgrades create room for tangible criticism about how effective the program has been. Furthermore, the ICT index has been discontinued after 2017 due to lack of quality and access to data in respective fields, in other words one of the preferred indexes are perhaps obsolete at this time of analysis. Considering that the

program was established for the period of 2018-2022, not having concrete data on the outcomes after 3 years of the end of the main phase portrays a problematic situation about the positive outcomes and effects of the Digital Kazakhstan program.

The review made by Sanzhara Turganbay (Turganbay, 2025) has put forward both positive and negative experiences of the e.gov.kz platform, which can be used to reflect further upon the criticisms of the aforementioned indexes. First of all, the platform and related applications are considered as convenient and time saving, which are the very essence of a positive user experience. Having access to many services through a single portal is widely appreciated and confirms the early steps of e-governance that were taken back in early 2000s were and continues to be effective and functioning.

However, there are two major negative claims, which brings an unfortunate shadow above the positive implementation of such technologies. The platform is claimed to be “glitchy” at times, which points out to a lack of proper digital infrastructure. Secondly, while there is access to many services, to be able to complete tasks or duties related to those services can still require in-person visits to certain offices or bureaus. In other words, it is not exactly possible to say that a full-scale digitalisation has been implemented in terms of e-governance. Of course this is not enough to claim that the system is ineffective, but it also points out to the fact that the very promising and positive outlook might also be a fancy façade that hides some of the problems and inadequacies of the system.

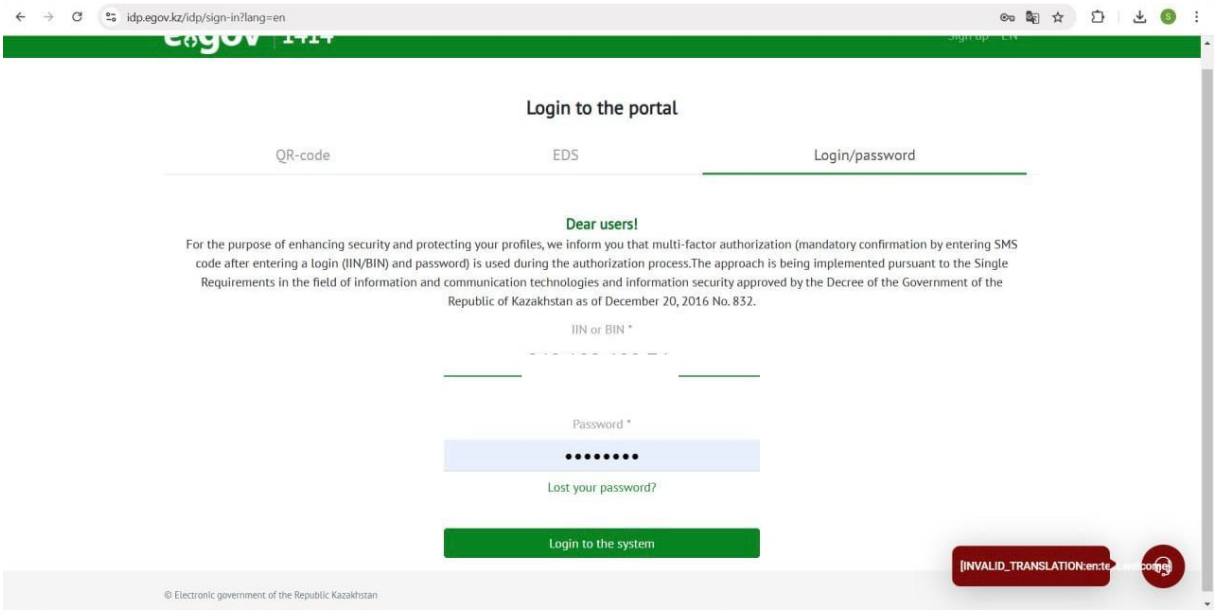


Image 6 (Turganbay, 2025)

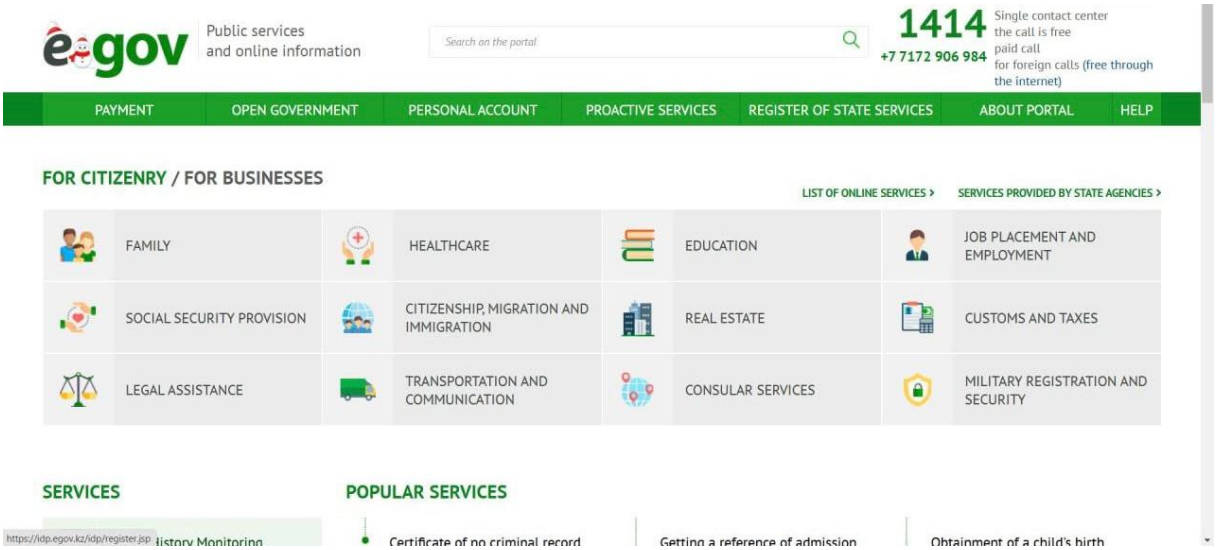


Image 7 (Turganbay, 2025)

At this point, it is also crucial to mention several other weaknesses of the system. As much as Kazakhstan's regional prominence cannot be denied, it also cannot be denied that this transformation is dependant on foreign funds, investments, supports, and perhaps direct imports of technologies. This creates a very exploitable environment if not handled carefully, which has been seen in many other cases across the globe.

Conclusion

Overall, both direct and indirect connections with the nomadic and general historic background of Kazakhstan can be observed in the digitalisation process both in terms of positive and negative impact. The analysis of the digitalisation process of Kazakhstan offers a promising outlook. However, it is also apparent that there are still compelling problems and challenges that remain to be answered and handled. It is easy to create a veil through digital technologies that covers up such inadequacies, and hence why a closer observation must be conducted to establish a concise understanding of Kazakhstan's current digitalisation state. Yet again, it cannot be denied that they are still working on improving their system, and future investments to education to better prepare the society and make them a part of the transformation leaves a positive remark on the general evaluation of Kazakhstan's digital journey. (Omirgazy, 2024)

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