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DEVELOPMENT OF COMPETITIVE ADVANTAGES OF DOMESTIC TOURISM ALONG THE KAZAKHSTANI SECTION OF THE GREAT SILK ROAD

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Development of competitive advantages of domestic tourism along the Kazakhstani section of the Great Silk Road

Abstract. The article examines the competitive advantages of domestic tourism along the Kazakhstani section of the Great Silk Road (GSR). The study aims to identify opportunities for expanding domestic tourism along the GSR Northern Corridor, develop an infrastructural and logistical model of a tourist route, and propose an econometric approach to estimating gross value added (GVA) in the tourism industry. The study applies systemic and factor approaches, comparative analysis, and econometric modeling using official statistical data of Kazakhstan for 2015–2025 and international statistics. A tourist route covering Khorgos–Zharkent–Almaty–Taraz–Sairam–Shymkent–Otrar–Sauran–Turkistan was developed, with its key infrastructural and logistical parameters identified. The study also proposes digital solutions and route performance indicators. A multivariate econometric model was developed to assess the relationship between tourism GVA and tourist flows, expenditure, investment, and accommodation infrastructure. The proposed route, performance indicators, and econometric approach can inform measures aimed at developing domestic tourism and enhancing the attractiveness of the Kazakhstani section of the GSR.

Key words: domestic tourism, competitive advantages, Great Silk Road, tourist route, econometric model, gross value added, tourism infrastructure.

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Ұлы Жібек жолының Қазақстандық бөлігіндегі ішкі туризмнің бәсекелестік артықшылықтарын дамыту

Аңдатпа. Мақалада Ұлы Жібек жолының (ҰЖЖ) қазақстандық бөлігіндегі ішкі туризмнің бәсекелестік артықшылықтары қарастырылады. Зерттеудің мақсаты – ҰЖЖ-ның Солтүстік дәлізінде ішкі туризмді кеңейту мүмкіндіктерін анықтау, туристік маршруттың инфрақұрылымдық, логистикалық моделін әзірлеу және туризм саласының жалпы қосылған құнын (ЖҚҚ) бағалаудың эконометрикалық тәсілін ұсыну. Зерттеуде жүйелік және факторлық тәсілдер, салыстырмалы талдау және эконометрикалық модельдеу әдістері қолданылып, Қазақстанның 2015–2025 жылдардағы ресми статистикалық деректері мен халықаралық статистика пайдаланылды. Қорғас–Жаркент–Алматы–Тараз–Сайрам–Шымкент–Отырар–Сауран–Түркістан бағыты бойынша туристік маршрут әзірленіп, оның негізгі инфрақұрылымдық және логистикалық параметрлері анықталды. Сондай-ақ цифрлық шешімдер мен маршрут тиімділігінің көрсеткіштері ұсынылды. Туризм саласының ЖҚҚ мен туристік ағындар, шығындар, инвестициялар және орналастыру инфрақұрылымы арасындағы өзара байланысты бағалауға арналған көпфакторлы эконометрикалық модель әзірленді. Ұсынылған маршрут, тиімділік көрсеткіштері және эконометрикалық тәсіл ішкі туризмді дамытуға және ҰЖЖ-ның қазақстандық бөлігінің туристік тартымдылығын арттыруға бағытталған шараларды әзірлеу кезінде пайдалануы мүмкін.

Түйін сөздер: ішкі туризм, бәсекелестік артықшылықтар, Ұлы Жібек жолы, туристік маршрут, эконометрикалық модель, жалпы қосылған құн, туристік инфрақұрылым.

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Развитие конкурентных преимуществ внутреннего туризма на казахстанском участке Великого Шёлкового пути

Аннотация. В статье рассматриваются конкурентные преимущества внутреннего туризма на казахстанском участке Великого Шёлкового пути (ВШП). Цель исследования – определить возможности расширения внутреннего туризма на Северном коридоре ВШП, разработать инфраструктурно-логистическую модель туристского маршрута и предложить эконометрический подход к оценке валовой добавленной

стоимости (ВДС) туристской отрасли. В исследовании применены системный и факторный подходы, сравнительный анализ и эконометрическое моделирование с использованием официальных статистических данных Казахстана за 2015–2025 гг. и международной статистики. Разработан туристский маршрут Хоргос–Жаркент–Алматы–Тараз–Сайрам–Шымкент–Отар–Сауран–Туркестан, определены его основные инфраструктурные и логистические параметры. Также предложены цифровые решения и показатели эффективности маршрута. Разработана многофакторная эконометрическая модель для оценки взаимосвязи ВДС туристской отрасли с туристскими потоками, расходами, инвестициями и инфраструктурой размещения. Предложенные маршрут, показатели эффективности и эконометрический подход могут быть использованы при разработке мер, направленных на развитие внутреннего туризма и повышение привлекательности казахстанского участка ВШП.

Ключевые слова: внутренний туризм, конкурентные преимущества, Великий Шёлковый путь, туристский маршрут, эконометрическая модель, валовая добавленная стоимость, туристская инфраструктура.

Introduction. Tourism is an important and dynamically developing sector of the global economy, contributing to regional development, employment, investment, and the preservation and promotion of cultural and natural heritage. Kazakhstan possesses considerable potential for tourism development due to its diverse natural landscapes, historical and cultural heritage, and geographical location. The country has cultural and natural heritage sites included in the UNESCO World Heritage List [1]. The tourism infrastructure has also expanded considerably: the number of accommodation establishments increased from 165 in 2001 to 4,505 in 2025, while the number of four- and five-star hotels increased from 5 to 78 [2].

The development of tourism is identified as one of the priority areas of national economic policy. The Concept for the Development of the Tourism Industry of the Republic of Kazakhstan for 2023–2029 provides for the development of priority tourism areas, improvement of tourism infrastructure and tourist safety, digitalization of services, expansion of international accessibility, and measures to stimulate domestic tourism [3].

The competitiveness of tourism destinations depends not only on the availability of natural and cultural resources but also on transport accessibility, infrastructure, service quality, investment, digital solutions, and the ability to integrate individual attractions into competitive tourism products. At the same time, the assessment of tourism development in Kazakhstan is complicated by methodological issues related to tourism statistics and the classification of different categories of visitors [4]. These circumstances highlight the need for a comprehensive approach to assessing tourism competitiveness and the economic effects of tourism development.

In this context, the Great Silk Road (GSR) represents an important resource for the development of domestic cultural and historical tourism in Kazakhstan. Its historical routes connect numerous heritage sites and destinations and

provide opportunities for developing integrated tourism products combining cultural, pilgrimage, event, educational, and other forms of tourism. International interest in the Silk Road as a cultural and tourism corridor was strengthened by UNESCO's Silk Roads: Roads of Dialogue initiative launched in 1987. Subsequent international initiatives have promoted the preservation of Silk Road heritage and its integration into contemporary cultural, transport, and tourism networks.

The Kazakhstani section of the GSR has considerable potential for domestic tourism due to the concentration of historical and cultural heritage sites and the possibility of linking them within a single tourism corridor. However, the availability of tourism resources alone does not ensure the competitiveness of a destination. Their effective use requires coordinated route planning, transport and service infrastructure, digital interpretation of heritage sites, and mechanisms for assessing the socio-economic effects of tourism development. This creates a need to identify the competitive advantages of the Kazakhstani section of the GSR and determine how these advantages can be transformed into an integrated domestic tourism product.

The purpose of the study is to identify opportunities for expanding domestic tourism along the Kazakhstani section of the Great Silk Road (Northern Corridor), develop an infrastructural and logistical model of a tourist route, and propose an econometric approach to estimating gross value added (GVA) in the tourism industry.

The objectives of the study are: to assess the current development and competitiveness of Kazakhstan's tourism industry; to identify the tourism potential and competitive advantages of the Kazakhstani section of the GSR; to develop the infrastructure framework and logistics of the proposed route; to identify opportunities for integrating digital and innovative elements into the tourism product; to propose route performance indicators; and to develop an econometric model for

assessing the relationship between tourism GVA and selected tourism industry indicators.

Materials and methods. The competitiveness of the tourism industry is considered in this study as a multidimensional characteristic determined by the interaction of tourism resources, infrastructure, investment, institutional conditions, innovation and digitalization, as well as the economic, social, and environmental effects of tourism development. The methodological framework combines systemic and factor approaches, comparative analysis, route modeling, and econometric modeling.

To provide a comprehensive assessment of tourism competitiveness, the study integrates six complementary approaches: resource, performance-

based, institutional, innovation and digitalization, cluster, and sustainable development approaches (Figure 1). The resource approach focuses on natural, investment, infrastructure, and labor resources; the performance-based approach considers the economic, social, and financial effects of tourism; the institutional approach addresses the regulatory environment and government support mechanisms; the innovation and digitalization approach assesses the level of digitalization, online accessibility, and technological development of tourism services; the cluster approach considers the concentration and cooperation of tourism organizations with related sectors; and the sustainable development approach incorporates environmental and social parameters [5].

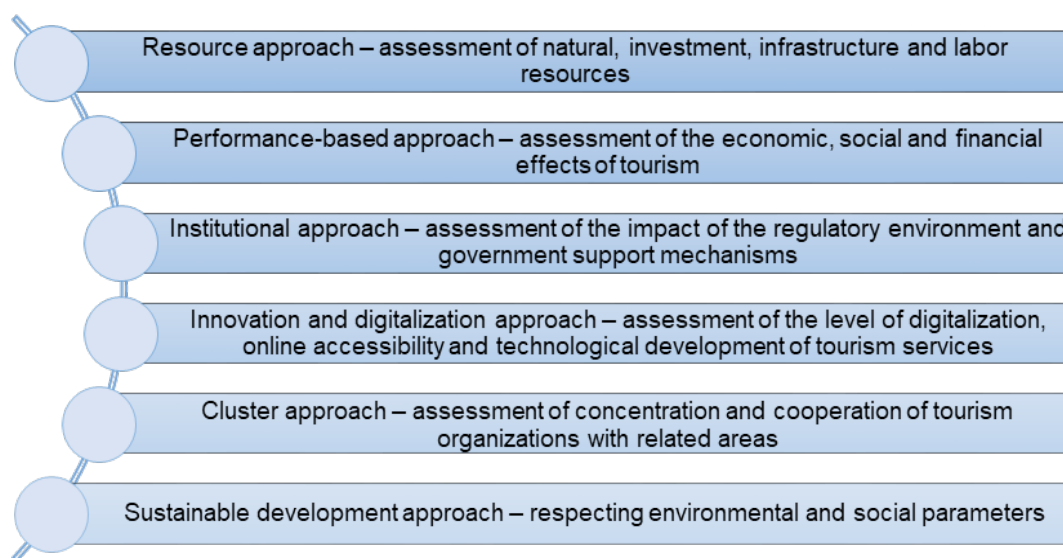


Figure 1 – Approaches to assessing the competitiveness of the tourism industry [5]

Note: Compiled by the authors

The empirical basis of the study comprises official statistical data of the Republic of Kazakhstan for 2015–2025 and international statistical data; the tourism GVA value for 2025 is preliminary. The analysis uses indicators characterizing domestic and foreign tourist flows, tourist expenditure, tourism investment, small-scale accommodation facilities, and the international competitiveness of Kazakhstan's tourism industry.

Route modeling included the identification of key destinations and tourism sites, transport connections, route distances and travel times, infrastructure requirements, and logistics. Based on the historical geography of the Great Silk Road (GSR) and the spatial distribution of tourism resources, the

following route was developed: Khorgos - Zharkent – Almaty – Taraz – Sairam – Shymkent – Otrar – Sauran – Turkistan. The route combines historical and cultural, pilgrimage, event, and educational tourism and provides opportunities for integrating digital technologies, including AR/VR solutions, interactive guides, mobile applications, and QR navigation.

To complement the assessment of tourism competitiveness with quantitative economic analysis, a multivariate econometric model was developed with gross value added (GVA) in the tourism industry as the dependent variable. The explanatory variables include domestic and foreign tourist flows, domestic and foreign tourist expenditure, tourism investment, and the number of small-scale accommodation

facilities. The model is used to examine the relationship between tourism GVA and selected tourism industry indicators. Given the limited number of observations and potential multicollinearity among the explanatory variables, it is treated as an analytical tool rather than as a direct estimate of the economic effect of the proposed GSR route. Thus, the research design combines a multidimensional assessment of tourism competitiveness, spatial and infrastructural route modeling, identification of innovative elements and route performance indicators, and econometric analysis of tourism industry data.

Results. According to the World Economic Forum's Travel & Tourism Development Index, Kazakhstan ranked 52nd among 119 economies in 2024, compared with 66th position in the previous ranking [6, 7]. Kazakhstan's strongest position was recorded for price competitiveness, where the country ranked 2nd. Relatively high positions were also observed for health and hygiene (12th), natural resources (30th), human resources and labour market (43rd), tourism services and infrastructure (47th), and cultural resources and business travel (48th) (Table 1).

Table 1 – Kazakhstan's performance in the Travel & Tourism Development Index, 2024

<i>Indicators</i>	<i>Score</i>	<i>Place</i>
Tourism Competitiveness Index, including:	3.7	52
Business Environment	4.7	49
Safety and Security	5.6	56
Health and Hygiene	6.5	12
Human Resources and Labor market	4.7	43
Information and Communication Technology Readiness	5.0	50
Prioritization of travel and tourism	4.0	71
International openness	2.5	73
Price competitiveness	6.1	2
Environmental sustainability	3.8	78
Air transport infrastructure	2.7	55
Land and port infrastructure	2.9	67
Infrastructure Tourism Service	3.4	47
Natural Resources	2.6	30
Cultural resources and Business tourism	1.7	48
Note: compiled on the basis of [6]		

Recent statistics indicate positive dynamics in Kazakhstan's domestic and inbound tourism. In 2025, the country received 15.7 million international visitors, while the number of domestic tourists exceeded 10 million. The accommodation infrastructure also continued to expand, reaching 4,315 establishments with a total capacity of approximately 226,000 beds [2, 8]. These trends have been supported by government measures aimed at stimulating tourism development, including subsidies for tour operators, reimbursement of

selected infrastructure and equipment costs, support for the acquisition of tourist buses, and the Kids Go Free program. Priority areas of tourism development include historical and cultural tourism in Turkistan, MICE tourism in Astana, beach tourism in Mangystau and the Lake Balkhash area, the Bayanaul resort area, and the Baikonur tourism zone [2, 8].

Despite the positive dynamics, the economic contribution of tourism in Kazakhstan remains relatively limited. According to the data used in the

study, tourism accounts for 4.4 % of Kazakhstan's GDP, compared with higher reported shares in several tourism-oriented economies [9]. This indicates the importance of strengthening the economic performance and competitiveness of the national tourism industry. In this context, the development of integrated domestic tourism products based on the historical and cultural resources of the Kazakhstani section of the Great Silk Road represents one of the opportunities for expanding tourism activity and enhancing the economic contribution of the sector.

The Kazakhstani section of the Great Silk Road includes numerous historical, archaeological, and cultural heritage sites associated with the long-term exchange of goods, knowledge, technologies, and cultural traditions between East and West. The concentration of these resources provides a basis for developing an integrated cultural and historical tourism route across southern and southeastern Kazakhstan.

The proposed route along the Kazakhstani section of the Great Silk Road connects key cities and historical and cultural sites in southern and southeastern Kazakhstan: Khorgos – Zharkent – Almaty – Taraz – Sairam – Shymkent – Otrar –

Sauran – Turkistan [10, 11]. The route begins in the Khorgos – Zharkent area of the Zhetysu Region near Kazakhstan's border with China and continues through major historical centers associated with the GSR. It incorporates archaeological sites, mausoleums, religious monuments, and other cultural heritage attractions and combines historical and cultural, pilgrimage, ethnographic, educational, and event tourism. Digital technologies, including AR/VR solutions, interactive guides, mobile applications, and QR navigation, are proposed as complementary elements of the tourism product.

The thematic components of the route include historical and cultural heritage, pilgrimage and spiritual tourism, festivals, and cultural events. The Mausoleum of Khoja Ahmed Yasawi in Turkistan represents one of the key heritage sites of the route. Proposed innovative elements include AR-based visualization of historical sites, interactive interpretation tools, light installations designed to preserve the integrity of heritage sites, and opportunities for interaction with local artisans. The geography, key attractions, recommended duration of stay, and principal modes of transport for each destination are presented in Table 2.

Table 2 – Geography and logistics of the proposed Great Silk Road route

Location	Main objects	Time of stay	Main modes of transport
Khorgos	International Border Cooperation Center of Kazakhstan and China	Starting point	-
Zharkent	Historical trading city on the eastern section of the Silk Road	0.5 days	Bus
Almaty	The largest metropolis, transport and tourist hub, many natural parks	1 day	Bus/minivan within the city; railway or bus to Taraz
Taraz	Mausoleums of Aisha-Bibi, Babaji-khatun, Karakhan, Taraz Archaeological Park	1 day	Bus/minivan, railway or bus (3 hours to Sairam)
Sairam (ancient Isfijab)	Islamic architectural monuments; Karashash Ana Mausoleum; historical minting site	1 day	Bus/minivan
Shymkent	Ethnoaul, large arboretum and zoo, open-air museum, gallery of modern sacred art	1 day	Bus/minivan within the city; bus/minivan to Otrar
Otrar	Archaeological Museum, ruins of an ancient city, Arystan-Bab mausoleum. Birthplace of Al-Farabi	1 day	Bus/minivan (2.5 hours from Shymkent)
Sauran	Capital of the White Horde in the 14th century. Remnants of fortress walls, mosque, caravanserai, observation deck	0.5 days	Transfer from Otrar (30-40 min)
Turkestan	Khoja Ahmed Yasawi Mausoleum, Aziret Sultan Museum complex, Rabia Begim Sultan Mausoleum, historical center	1 day	Bus/minivan to Turkestan, inside the complex-on foot or by electric car
Note – developed by the authors			

Based on the proposed itinerary, the total duration of the route is approximately seven days, including stays at the main destinations. The route is expected to be most suitable for travel from April to October due to favorable climatic conditions and the concentration of cultural events during this period. Road and rail transport provide the principal connections between the destinations, while air transport can be used to access or leave the main gateway cities.

The total route length is approximately 1,290 km, with an estimated cumulative travel time of about 18 hours, excluding time spent at the destinations (Table 3). The individual sections range from the 15-km Sairam–Shymkent segment to the 500-km Almaty–Taraz segment. The route terminates in Turkistan, from where travelers can continue their journey using available road, rail, or air connections.

Table 3 – Distance and estimated travel time along the proposed Great Silk Road route

Route Section	Distance, km	Travel time
Khorgos-Zharkent	35	30 minutes
Zharkent-Almaty	300	4 hours
Almaty-Taraz	500	7 hours
Taraz-Sairam	160	2 hours
Sairam-Shymkent	15	20 minutes
Shymkent-Otrar	150	2 hours
Otrar-Sauran	90	1.5 hours
Sauran-Turkestan	40	40 minutes
Total	1,290	18 hours
Note: Compiled by the authors based on geographical and route data		

The proposed route corridor includes a range of tourism and transport infrastructure, such as hotels and guesthouses, roadside service facilities, filling stations, catering establishments, tourist information centers, railway stations, and international airports. The route also provides access to diverse natural and geographical areas, including the foothills of the

Trans-Ili Alatau, the valleys of the Ili, Chu, and Syr Darya rivers, and the steppe, desert, and semi-desert landscapes of southern Kazakhstan. Several major natural and cultural attractions are located within or near the route corridor, including Altyn-Emel National Park, the Tamgaly petroglyphs, Charyn Canyon, and the Aksu-Zhabagly Nature Reserve (Figure 2).

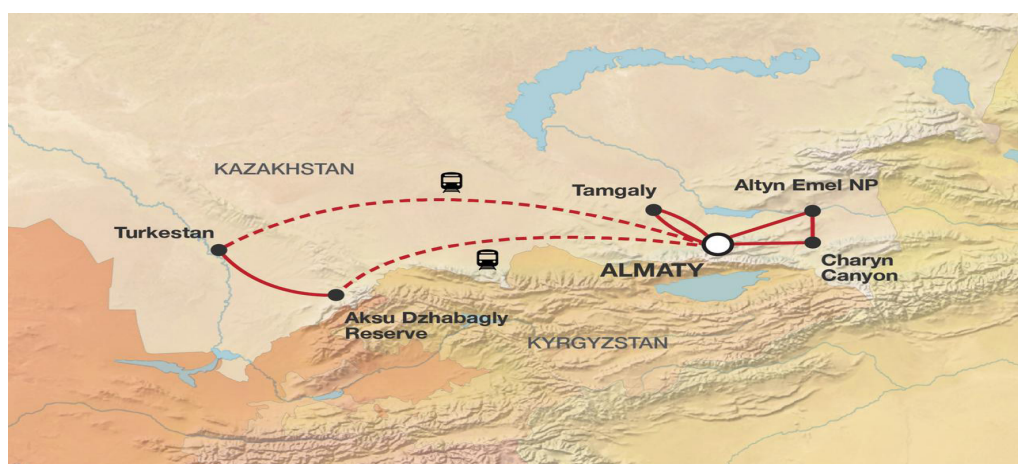


Figure 2 – Major natural and cultural attractions in the vicinity of the proposed GSR route

Note: Compiled by the authors based on geographical data

Figure 3 presents a schematic visualization of the proposed Great Silk Road route across southern and southeastern Kazakhstan. It shows the sequence of the principal destinations, transport connections, distances between the

main route points, major geographical features, and the approximate elevation profile. The diagram complements the logistical parameters presented in Tables 2 and 3 by providing a spatial representation of the route.



Figure 3 – Visual diagram of the proposed Great Silk Road route across Kazakhstan
Note: The diagram was compiled by the authors based on scientific and statistical data

Based on the characteristics of the proposed route and the tourism resources of the destinations included in it, four thematic components are proposed: pilgrimage tourism, historical and cultural interpretation, event tourism, and local community-based activities.

Pilgrimage tourism can be developed around the major religious and cultural heritage sites of Turkistan, Arystan-Bab, and Otrar. The proposed tourism product may include a digital certificate confirming completion of the route and an online audio guide incorporating historical materials, information on Sufi traditions, and selected content related to the Diwan-i Hikmet.

Historical and cultural interpretation may incorporate AR-based reconstructions of architectural and archaeological sites in Sauran and Otrar. Mobile applications could provide visitors with access to 3D visualizations of historical buildings, caravanserais, and architectural elements. Another proposed component is an open-air “living history” format recreating selected aspects of caravan travel, traditional crafts, and trade.

Event tourism may complement the route through festivals and cultural and educational events associated with the historical identity of individual destinations. Potential formats include a cultural and spiritual music festival in Turkistan, historical reconstruction and crafts events in Otrar, architecture and poetry events in Taraz, and thematic lecture tours focusing on the architectural and religious heritage of ancient Isfijab (Sairam). These formats are proposed as possible components of the route rather than as existing events.

Local community-based activities may include digital-skills training for local guides and artisans, development of locally produced souvenirs, and gastronomic tours incorporating traditional cuisine, tastings, and master classes. These activities could strengthen the participation of local communities and small businesses in the tourism value chain.

The proposed innovative elements supporting these thematic components are summarized in Table 4.

Table 4 – Proposed innovative elements of the GSR route

Type of innovation	Description	Proposed application
AR/VR technologies	Digital visualization and reconstruction of historical and architectural sites	3D visualization of selected sites in Sauran and Otrar through a mobile application
Gamification	Digital tags, points, and route-completion mechanisms encouraging visitors to explore tourism sites	Digital route passport, badges, or certificates for visiting selected destinations
Green mobility	Use of environmentally oriented transport solutions within individual destinations	Bicycle routes and electric transport in suitable sections of the route
Smart content	Multilingual digital interpretation integrated with navigation services	Multilingual audio guides, QR-based information, and integration with digital maps
Digital storytelling	Interpretation of heritage through narratives based on local history, archaeology, and community knowledge	Digital stories about archaeological sites, historical figures, local residents, and cultural traditions
Note: Compiled by the authors		

The analysis identifies several competitive advantages of the proposed GSR route: the concentration of historical and cultural heritage sites within a single tourism corridor; the possibility of combining cultural, pilgrimage, educational, event, and other forms of tourism; transport connectivity between the principal destinations; opportunities for digital interpretation of heritage; and the potential involvement of local communities and tourism businesses. Together, these characteristics provide a basis for positioning the Kazakhstani section of the GSR as an integrated domestic tourism product.

Discussion. The results of the study indicate that the tourism potential of the Kazakhstani section of the Great Silk Road can be strengthened by integrating historical and cultural heritage sites into a single tourism route supported by appropriate transport infrastructure, digital technologies, and complementary tourism products. This approach is consistent with previous studies emphasizing the historical significance of the Silk Road as a network connecting regions, cities, and cultures. Frankopan [12] considers the Silk Road in the broader context of historical interaction between East and West and emphasizes the role of Central Asia in these processes. Studies of historical cities and archaeological sites along the Silk Road also demonstrate the importance of individual destinations as components of a wider cultural corridor [13]. Buxorov et al. [14] similarly emphasize the long-term role of the Great Silk Road in cultural and economic interaction between different regions. These studies provide a historical basis for considering Silk Road heritage as a resource for contemporary tourism development.

The present study extends this perspective by focusing on the practical integration of heritage sites into a domestic tourism product. The proposed route connects Khorgos, Zharkent, Almaty, Taraz, Sairam, Shymkent, Otrar, Sauran, and Turkistan and combines cultural, pilgrimage, educational, event, and other tourism activities. Digital interpretation represents one of the proposed mechanisms for enhancing the tourism experience along the route. Previous research has demonstrated the potential of AR/VR technologies for the interpretation and visualization of Silk Road heritage [15]. In the proposed route, such technologies could be applied to the digital reconstruction and interpretation of archaeological and architectural sites, particularly in Otrar and Sauran.

Transport accessibility is another important condition for transforming geographically dispersed heritage sites into an integrated tourism product. Research on Central Asian railway corridors demonstrates the importance of transport connectivity for regional development [16], while studies of economic relations in Central Asia emphasize the role of logistics and regional cooperation [17]. These findings are relevant to the proposed route, for which the present study identifies the sequence of destinations, distances, estimated travel times, and principal transport connections.

Contemporary infrastructure initiatives also influence the wider environment in which Silk Road-related transport and tourism connections are developing. Sahakyan [18] considers China's Belt and Road Initiative in the broader context of infrastructure development and regional connectivity

in Central Asia. Although this perspective extends beyond the specific objectives of the present study, it illustrates the continuing relevance of transregional connectivity associated with the Silk Road concept. At the tourism-product level, the importance of technological interpretation is further supported by Zeng [19], who highlights the potential of AR and VR technologies to enhance visitor experience and contribute to the interpretation and preservation of cultural heritage.

The broader regional context is also reflected in studies of the Belt and Road Initiative and its implementation in Central Asian countries [20]. Historical research, in turn, demonstrates that the Silk Road facilitated long-term economic, commercial, and cultural interaction among the peoples of Central Asia [21]. In the context of the present study, these findings support the development of a multi-destination route in which individual heritage sites are linked not only geographically but also through a common historical and cultural narrative.

At the same time, the study identified an important limitation in assessing the economic

performance of the proposed route. Available statistical data do not provide sufficiently detailed information on domestic and foreign tourist flows specifically along the Kazakhstani section of the GSR, tourist expenditure at individual destinations, the use of tourism services, or tourism-related revenues of local businesses. Therefore, the actual economic effect of the proposed route cannot be directly estimated on the basis of the currently available route-level data. Further assessment would require systematic collection of destination- and route-level information, including visitor numbers and structure, length of stay, tourist expenditure, accommodation use, tourism-related SME revenues, and local community participation.

For subsequent monitoring and evaluation of the proposed route, a set of performance indicators is suggested (Table 5). The indicators cover tourist flow, economic impact, digital accessibility, social engagement, and cultural activity and may provide a framework for evaluating the route after its implementation.

Table 5 – Proposed performance indicators for monitoring the Kazakhstani GSR route

Data block	Indicator	Measurement
Tourist flow	Number of visitors using the route	Visitors per year
Economic impact	SME revenue associated with tourism along the route	Annual revenue and annual growth rate
Digital accessibility	Use of the route's digital services	Number of users/downloads
Social engagement	Participation of local residents and businesses	Share of local participants, %
Cultural impact	Cultural and tourism events associated with the route	Number of events per year
Note: Proposed by the authors		

The lack of route-level statistical data currently limits the direct assessment of the economic effects associated with the proposed GSR route. Therefore, as an alternative analytical approach, this study develops an econometric model based on available tourism industry data for Kazakhstan. The model examines the relationship between gross value added (GVA) in the tourism industry and selected indicators characterizing tourist flows, tourist expenditure, investment, and accommodation infrastructure. The data used for the econometric analysis are presented in Table 6.

The data presented in Table 6 show a pronounced decline in tourism indicators in 2020. Tourism GVA decreased from 821.5 billion tenge in 2019 to 410.5 billion tenge in 2020, while the number of foreign tourists declined from 8.5 million to 2.1 million. This structural change reflects the exceptional conditions associated with the COVID-19 pandemic and should be taken into account when interpreting the results of the econometric analysis.

Table 6 – Key indicators of Kazakhstan’s tourism industry used in the econometric analysis

Year	Tourism GVA, billion tenge	Domestic tourists (D _t), million	Foreign tourists (F _t), million	Domestic tourist expenditure (Dte _t), billion tenge	Foreign tourist expenditure (Fte _t), billion tenge	Tourism investment (I _t), billion tenge	Small-scale accommodation facilities (Saf _t), units
2015	406.4	4.1	6.4	790.3	384.4	77	2,338
2016	558.4	4.6	6.5	1,109.3	587.2	127	2,754
2017	688.2	5.6	7.7	1,424.3	768.8	235	2,987
2018	784.0	5.9	8.8	1,640.2	915.8	371	3,160
2019	821.5	6.7	8.5	1,828.2	1,120.1	502	3,586
2020	410.5	4.5	2.1	807.2	233.1	629	3,514
2021	572.5	6.9	2.3	1,130.8	324.5	593	3,686
2022	1,001.1	8.6	4.7	2,087.6	804.4	513	3,811
2023	1,184.4	9.6	9.2	2,759.6	1,172.3	787	3,992
2024	1,418.4	10.5	10.4	3,162.8	1,324.9	948	4,303
2025	1,680*	11.5	15.7	3,637.5	1,497.3	1,250	4,502

Note: Compiled by the authors based on data from the Bureau of National Statistics of the Republic of Kazakhstan [22, 23].
* Tourism GVA for 2025 is based on preliminary data.

To examine the relationship between tourism GVA and selected tourism industry indicators, a multivariate regression model was specified as follows:

$$GVA_t = \alpha + \beta_1 D_t + \beta_2 F_t + \beta_3 Dte_t + \beta_4 Fte_t + \beta_5 I_t + \beta_6 Saf_t + \varepsilon_t$$

where GVA_t is tourism gross value added, billion tenge; D_t is the number of domestic tourists, million; F_t is the number of foreign tourists, million; Dte_t is domestic tourist expenditure, billion tenge; Fte_t is foreign tourist expenditure, billion tenge; I_t is tourism investment, billion tenge; Saf_t is the number of small-scale accommodation facilities, units; and ε_t is the error term.

The model is estimated using 11 annual observations and six explanatory variables. With the intercept included, seven parameters are

estimated, leaving four degrees of freedom. The small number of observations relative to the number of explanatory variables substantially limits the statistical robustness of the estimates. In addition, multicollinearity may arise because tourist flows and the corresponding expenditure indicators are conceptually and statistically related. In particular, a strong association may be expected between D_t and Dte_t , as well as between F_t and Fte_t . Consequently, the estimated coefficients should be interpreted with caution.

Based on the data presented in Table 6, the estimated regression equation is:

$$GVA_t = 895.381 + 14.830D_t + 45.930F_t + 0.478Dte_t + 0.498Fte_t + 0.585I_t + 0.391Saf_t$$

The estimated regression coefficients and their statistical significance are presented in Table 7.

Table 7 – Estimated regression coefficients

Indicator	Notation	Coefficient	Standard error	t-statistic	p-value
Constant	β_0	895.381	369.207	2.425	0.072
Domestic tourists	β_1	14.830	27.997	0.530	0.624

Foreign tourists	β_2	45.930	15.643	2.936	0.043
Domestic tourist expenditure	β_3	0.478	0.105	4.554	0.010
Foreign tourist expenditure	β_4	0.498	0.178	2.797	0.049
Tourism investment	β_5	0.585	0.232	2.522	0.065
Small-scale accommodation facilities	β_6	0.391	0.155	2.516	0.066

Note: Authors' calculations based on the data presented in Table 6

Interpretation of the regression results

The estimated coefficients are positive for all explanatory variables; however, their statistical significance differs. At the 5 % significance level, statistically significant positive associations with tourism GVA are observed for the number of foreign tourists ($\beta = 45.930$, $p = 0.043$), domestic tourist expenditure ($\beta = 0.478$, $p = 0.010$), and foreign tourist expenditure ($\beta = 0.498$, $p = 0.049$). Holding the other variables constant, an increase of 1 million foreign tourists is associated with an estimated increase of 45.930 billion tenge in tourism GVA, while an increase of 1 billion tenge in domestic and foreign tourist expenditure is associated with increases of 0.478 and 0.498 billion tenge in tourism GVA, respectively.

Positive coefficients are also obtained for the number of domestic tourists ($\beta = 14.830$, $p = 0.624$), tourism investment ($\beta = 0.585$, $p = 0.065$), and the number of small-scale accommodation facilities ($\beta = 0.391$, $p = 0.066$). However, these coefficients are not statistically significant at the 5 % level and should therefore not be interpreted as evidence of statistically significant relationships in the estimated model.

The model has a coefficient of determination of $R^2 = 0.996$, indicating that a high proportion of the variation in tourism GVA is explained by the included variables within the analyzed sample. Nevertheless, the small sample size ($n = 11$), the limited number of degrees of freedom, potential multicollinearity among the explanatory variables, and the structural disruption associated with the COVID-19 pandemic require considerable caution in interpreting the high R^2 and the individual regression coefficients. The results should therefore be regarded as exploratory evidence of associations rather than as estimates of causal effects.

These findings suggest that foreign tourist flows and tourist expenditure are relevant indicators for assessing the economic performance of Kazakhstan's tourism industry. However, because the regression is based on national-level tourism

data, its results cannot be directly interpreted as an estimate of the economic effect of the proposed GSR route. Such an assessment would require route- and destination-level data on visitor flows, expenditure, length of stay, tourism-related business revenues, accommodation use, and other indicators identified in Table 5.

From a practical perspective, the proposed multi-destination route may contribute to diversifying Kazakhstan's domestic tourism product by integrating cultural, pilgrimage, archaeological, event, and other tourism activities. Its potential economic benefits may include longer visitor stays, increased demand for local accommodation and catering services, and greater participation of local businesses and communities. However, these outcomes represent expected effects of route development and require subsequent empirical assessment after its implementation.

Conclusion. The further development of Kazakhstan's tourism industry is closely associated with the diversification of tourism products, the development of integrated routes, and the effective use of the country's historical and cultural heritage. The study identified opportunities for expanding domestic tourism along the Kazakhstani section of the Great Silk Road (Northern Corridor) by integrating major historical and cultural destinations into a multi-destination tourism product.

A practical outcome of the study is the development of the Khorgos–Zharkent–Almaty–Taraz–Sairam–Shymkent–Otrar–Sauran–Turkistan route, including its principal destinations, transport connections, distances, estimated travel times, and infrastructure requirements. The proposed route combines cultural, pilgrimage, educational, event, and other tourism activities. Digital technologies, including AR/VR-based visualization, 3D models, digital storytelling, multilingual audio guides, QR-based information, and mobile navigation, are proposed as complementary tools for interpreting historical and cultural heritage and enhancing the visitor experience.

The study also proposed a set of performance indicators for subsequent monitoring of the route, covering tourist flows, economic impact, digital accessibility, social engagement, and cultural activity. To complement the route-level analysis, a multivariate econometric model was developed using national tourism industry data. The results indicate statistically significant positive associations between tourism GVA and foreign tourist flows, domestic tourist expenditure, and foreign tourist expenditure. However, the model should be regarded as an exploratory analytical tool rather than as a direct estimate of the economic effect of the proposed GSR route.

The study is subject to several limitations. The small number of observations, potential multicollinearity among the explanatory variables, and the structural

disruption associated with the COVID-19 pandemic limit the interpretation of the econometric results. More importantly, the lack of sufficiently detailed route- and destination-level statistics does not currently allow a direct assessment of the economic and social effects of the proposed route.

Further research should therefore focus on collecting empirical data on visitor flows, length of stay, tourist expenditure, use of accommodation and other tourism services, tourism-related business revenues, and local community participation at individual destinations. Such data would make it possible to test and refine the proposed analytical approach and assess the economic and social performance of tourism development along the Kazakhstani section of the Great Silk Road after the route is implemented.

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