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IMPACT OF THE DIGITAL ENVIRONMENT OF THE MEGAPOLIS ON THE DEVELOPMENT OF TOURIST AND EXCURSION ACTIVITIES: POSSIBILITIES AND LIMITATIONS

Abstract. *In today`s world, the use of digital technology has become a necessary attribute of megacities development. Several studies show that a city`s effort to create a digital environment are closely correlated with its ability to enhance its competitiveness and the attractiveness of its urban environment among tourists.*

The relevance of this study stems from the need to understand the specifics of digital environment development in Kazakhstani cities in today's reality and identify factors that can create new strategic opportunities for the development of tourism and excursion activities. The authors also focused on specific aspects of digital environment development in domestic megacities that could negatively impact the development of the urban environment's tourist image.

The aim of this study is to examine the impact of the digital environment on the tourism sector in the Kazakh cities of Astana, Almaty and Shymkent. The methods used include a phenomenological approach, analysis, synthesis, and experimental research based on official data and analytical publications. The results demonstrate that digital technologies significantly improve the effectiveness of tourism services through personalization and accessibility of information, but require a careful balance to preserve the uniqueness of urban spaces and prevent overcrowding of tourist routes.

Keywords: *Digital environment, tourist and excursion activities, metropolis, urban tourism, tourist services, excursion routes.*

Introduction

Today, the digital environment of modern megacities is becoming a key factor determining the development of tourism and excursion activities in the urban environment. The intensive development of innovative technologies and the active implementation of smart technologies in the infrastructure of modern cities are creating entirely new conditions for tourists' interaction with the urban space.

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Recent research shows that digital tools expand tourist flows [1], personalize experiences [2], and promote destinations through social media [3, 4], shaping sustainable tourist preferences. Online platforms, mobile apps, and geolocation systems make travel planning more convenient and tailored to individual needs. Furthermore, digitalization contributes to increased tourist satisfaction and economic growth, stimulates innovation, and strengthens cultural activity among the population [3, 5, 6].

The processes associated with the formation of an active digital environment in the urban environment have a dual effect. On the one hand, they stimulate the consumption of tourism products and increasingly involve new technologies in excursion services [7, 8]. On the other hand, they lead to oversaturation of tourist areas, loss of authenticity, threats to privacy, and digital inequality [9].

The digital environment of a metropolis in the context of tourism is understood as a set of technologies integrated into urban infrastructure, aimed at improving the quality of interaction between tourists, the city, and the local community. Key elements of this environment include intelligent transport systems, mobile applications, online booking, augmented and virtual reality technologies, geolocation services, and big data analysis resources [1, 2, 6]. The need to define an algorithm for the interrelationship of key elements in the organization of tourist and excursion services, the order of their involvement in the provision of tourist services, as well as the need to identify the extent of digital technology's influence on tourist behavior, requires the attention of experts and the scientific community. Furthermore, to date, the impact of the digital environment on the development of tourism in large Kazakhstan metropolitan areas, where innovative and smart technologies are creating entirely new conditions for the consumption of tourist and excursion services, has remained virtually unexplored. This aspect determines the relevance of this research topic.

The authors' study of the impact of the digital environment of a metropolis on the development of tourism and excursion activities is based on an explanatory hypothesis: the digital environment of a metropolis increases the effectiveness of tourism and excursion activities through personalization of the experience and accessibility of information, but simultaneously creates risks of oversaturation, loss of authenticity, and digital inequality. The content of this hypothesis, as well as the need to test its validity, led to the following goal of the study: to study the impact of the digital environment of a metropolis on the development of tourism and excursion activities and to identify its potential and limitations for sustainable tourism development.

The objectives of the study are to analyze the definition of the «digital environment of a metropolis» and identify its key functions within the organization of tourist and excursion services in the urban environment; to assess the positive effects of digitalization of tourist and excursion activities on the city's economy and the social life of the local community; and to identify the risks and limitations to the development of sustainable tourism arising from the active digitalization of the urban environment.

Based on the study's findings, the authors presented the key mechanisms by which the digital environment influences tourism activity and attempted to identify ways to optimize digital tools for sustainable tourism. The scientific significance lies in clarifying the concept of digital tourism and the role of the metropolis in its development, while the practical significance lies in the potential use of the results for strategic planning and the digital modernization of Kazakhstan's tourism infrastructure.

Materials and methods

The study is based on E. Husserl's phenomenological approach [10], which establishes that the digital environment of the modern city defines new conditions for the organization and implementation of tourist and excursion activities. New conditions associated with new technologies, smart applications, and devices compel tourists, guides, and tour organizers to rethink and perceive urban space. As a result, in the worldview of many participants in the local tourism market, the digital environment is evolving from a simple set of applications and programs into a way of perceiving the surrounding environment. It is noteworthy that the phenomenological approach was operationalized through the interpretation of empirical findings and statistical analysis. In processing the empirical data, the authors focused on such phenomena as the tourists experience with digital resources, the perception of the urban environment through digital interfaces, and the nuances of the semantic construction of tourism space via digital platforms. To date, the use of digital resources shapes diverse impressions and consumption experiences for city visitors. However, in current scholarly literature, these impressions and experiences have not yet been exhaustively studied or classified; consequently, the authors categorize these aspects as distinct phenomena.

In their study, the authors relied on both theoretical and empirical research methods. The primary theoretical research methods employed were analysis and synthesis. The combination of these two methods allowed the research team to identify key characteristics of the development of tourism and excursion activities in the context of the rapidly evolving digital environment in urban agglomerations. It is worth noting that, using the synthesis method, the organization of tourism and excursion activities in urban settings was examined in conjunction with the key characteristics of the emerging digital environment. As a result, the authors determined that, in today's urban environment, elements of tourism and excursion activities do not incorporate elements of the digital environment, but rather converge.

Several points in this paper were formulated using analogy and comparative analysis. For example, the study of the development of tourism and excursion activities in one Russian metropolitan area was compared with the development conditions of another urban agglomeration. This allowed the authors to identify best practices and develop recommendations for other Russian cities interested in developing tourism and excursion activities.

Based on the specific research methods, the algorithm for studying the development of tourism and excursion activities in the context of digitalization included a number of techniques aimed at identifying reliable data that could be used to confirm or reject the previously accepted hypothesis. The main stages of the study are presented in Figure 1.

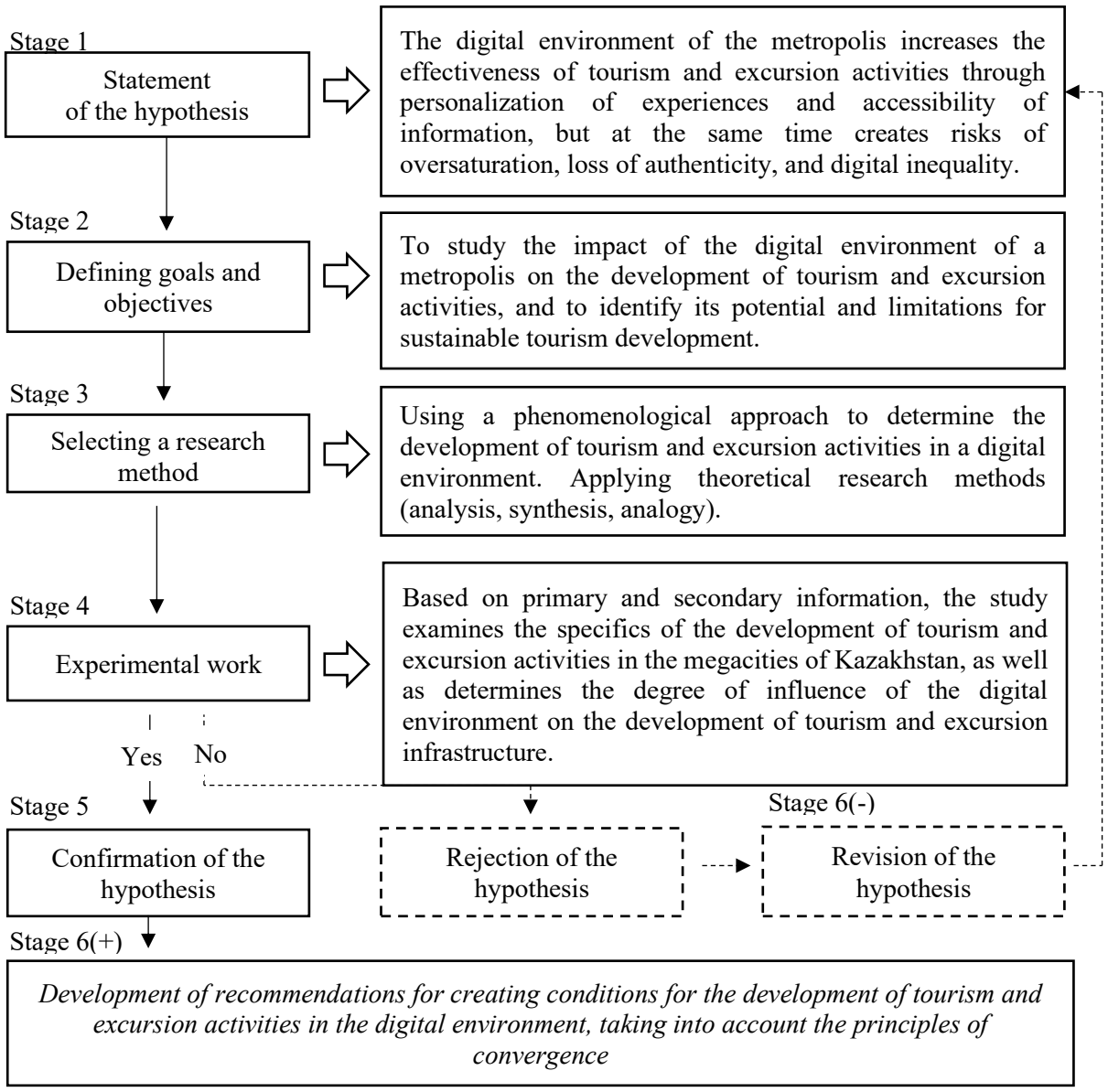

Figure 1 – Research algorithm

(+) – if the hypothesis is confirmed, (-) – if the hypothesis is rejected

Note: compiled by the authors

The choice of the megacities of Astana and Almaty as the study sites was driven by their key role in Kazakhstan's tourism system, as well as the high degree of digital transformation of their urban environments. Both megacities form a representative model for analyzing how digital infrastructure influences tourism product perception and consumer behavior in a rapidly changing digital landscape.

The empirical basis of the study was formed by official statistical data, analytical publications, and data posted on digital tourism platforms. Data from online aggregators, providing up-to-date information on tourists' digital interactions with Smart City services and booking platforms, was also used. In this regard, it should be noted that the primary online aggregators examined in the study included the national tourism portal Kazakhstan.travel, Kazakhstan Born Bold, as well as the platforms Visit Astana, Visit Almaty, and Tourism Online, among others. The authors also analyzed user reviews available on major service aggregators such as Booking.com, 2GIS, and Yandex Maps.

The selection of data was guided by several criteria: the timeliness of information (with particular attention given to content published within the past two years), the availability of user-generated reviews and data related to digital tourist routes, and the overall accessibility and relevance of the data for analytical purposes.

Representativeness of the data was ensured by using official sources covering a range of national and regional indicators. The timeframe of the statistical data was selected to reflect the post-pandemic dynamics of the digital transformation of the tourism industry and its impact on the development of excursion activities.

Throughout the study, the authors strictly adhered to the principles of academic ethics, including the correct citation of sources, verification of statistical data, and compliance with the legal norms of the Republic of Kazakhstan regarding the protection of personal data. Particular attention was paid to analyzing the legal aspects of the use of biometric technologies (Face ID, ID cards) at tourist sites, in accordance with the Law of the Republic of Kazakhstan «On Personal Data and Their Protection» [11]. All data presented are generalized and do not contain personalized information. The study was conducted in compliance with the principles of reliability and objectivity.

It's worth noting that the authors acknowledged a number of limitations in their study that must be taken into account when interpreting the results. Firstly, the geographical limitations of the sample, which stems from the focus on two metropolitan areas-Astana and Almaty, while the peripheral regions of Kazakhstan are characterized by a different degree of digitalization and tourist activity. Secondly, the limited statistical data available from official sources regarding the digitalization of a number of tourism-related facilities is significant. Thirdly, the different goals of digitalization (logistics efficiency versus recreational focus) require caution when generalizing the results, as the findings primarily reflect the experience of megacities with a developed technological environment. These limitations do not diminish the scientific value of the study, but they highlight the need for further study of the digital transformation of tourism at a regional level, as well as an analysis of the impact of the digital divide on the development of the tourism industry.

Literature review

In scientific literature, the digital environment of a metropolis is defined as an integrated ecosystem of data, digital infrastructure, and network interaction that shapes communications, governance, and the daily practices of city residents and tourists. Modern megacities are extremely complex and dynamic systems, the functioning of which requires constant monitoring, flexible strategic planning and adaptive management of resources and processes [12, 13].

The development of a comprehensive digital environment in megacities, encompassing infrastructure, services, and the population, is currently creating unique conditions for the organization and provision of tourism and excursion services. More and more businesses are becoming involved in a bipolar environment, where some tourists prefer to consume traditional services, while others are increasingly using digital technologies and placing entirely new demands on tourism service providers as they engage in tourism activities. Consequently, contemporary literature is developing diverse perspectives on the formation and development of the digital environment in megacities and its impact on tourism activities.

Theoretical understanding and empirical mapping of the interaction between the digital environment of a metropolis and the development of urban tourism is a relevant and fundamental research problem [14, 15].

The digital environment cannot be reduced solely to a set of technologies; it is a complex, constantly managed sociotechnical system. This definition emphasizes the imperative of considering not only the technical reliability and performance of infrastructure, but also its social impact, user interactions, and urban development processes, including in the field of tourism. It is worth noting that the core of this environment is formed by a comprehensive digital infrastructure, including hardware, software solutions, sensor networks and high-speed data networks. Information and data systems are fundamental to the development and functioning of any digital environment. For example, to the concepts of smart city and digital urbanism focus on sustainable development, and at the same time they are based on technologies aimed at data management and the formation of values between participants in the tourism market [14, 16].

In modern literature, the interaction of digital technologies and tourist and excursion activities is interpreted as a multi-level process of digital transformation that encompasses all stages of the tourist experience – from planning and booking to perception and post-trip interaction. Western researchers view this interaction primarily through the prism of the concepts of «smart tourism» and digital urbanism. D. Buhalis [17] was one of the first to develop the concept of eTourism and Smart Tourism Destinations, according to which digital technologies are becoming the basis for creating shared value between tourists, businesses, and urban systems. In this case, he emphasizes that the digital environment is shaping a new «smart tourist» who actively participates in the creation and exchange of tourist experiences.

R. Lowe focuses on the integration of big data and digital intelligence in tourism. He believes that the use of big data analytics enables destinations to make predictive management decisions, which increases marketing effectiveness and the sustainability of the sector [14, 18].

Other researchers [19], having studied the impact of digital media technologies, virtual and augmented reality, have determined their significant influence on tourists' perceptions of destinations and their behavior. In other words, digital technologies are radically transforming the tourist imagination, creating new forms of engagement in which travelers become co-authors of digital content.

Scholars from CIS countries and Russian researchers examine the interaction of digital technologies and tourism through the lens of regional development, platform economies, and sustainability. For example, O. Kononova [15] and her colleagues analyze the digital tourism ecosystem in Russia and note that the introduction of digital technologies facilitates the formation of integrated tourism platforms that unite businesses, government agencies, and users into a single digital infrastructure. However, the authors point to existing problems, such as insufficient data standardization and the weak integration of Russian solutions into international digital networks.

Polukhina A. et al. [20] consider the digitalization of tourism as a tool for sustainable development and emphasize that digital solutions increase the efficiency of tourism destination management, helping regions with transition economies to adapt to global technological and social trends.

Kazakh researchers are also actively developing the topic of digitalization of tourism, focusing on the implementation of technologies in tourism management and increasing the competitiveness of destinations. Musina K., Mamraeva D., and Lemanovich M. [21] note that digitalization of tourism in Kazakhstan is a key area of economic modernization, as it contributes to increased market transparency, improved quality of tourism services, and the development of domestic tourism.

B. Shilibekova and R. Plokhikh [22], having studied the main barriers to digitalization in Kazakhstan's tourism industry, determine that successful transformation is only possible with the simultaneous development of infrastructure, digital literacy of personnel, and improvement of the regulatory framework. The researchers emphasize the need to implement a national digital platform to coordinate all tourism market participants and ensure real-time data exchange.

A number of domestic researchers are studying the digitalization of the urban environment from an economic perspective. Thus, Omarova A., Borbasova Z., and Ulakov S. [23], examining the digital transformation of tourism, indicate that the introduction of digital tools increases productivity, reduces transaction costs, and enhances Kazakhstan's role as a transit and cultural and educational destination in Central Asia.

A literature review reveals that most scholars currently examine the role and impact of digital technology on the development of tourism infrastructure in urban environments. However, the scientific literature, in practice, has paid scant attention to clarifying the terminology. A consistent consensus on the term «digital environment» remains elusive. We believe that clarifying the meaning of this term will enable us to define the core and key components of a space that functions and develops through the interaction of participants through the active use of digital technology. Based on this, the authors of this study conceptualize the «digital environment» as a dynamic infrastructure of a location, including an urban environment, built on the close interaction of technological, information, and communication technologies with market participants, ensuring the desired perception of tourism services and creating a unique digital consumer experience.

Results and discussion

The development of modern tourism today depends on a number of factors, the impact of which significantly intensifies competition both internationally and regionally, leading to a fundamental change in the rules of the market. Under these conditions, Kazakhstan is demonstrating positive growth in tourism, including within the country's major metropolitan areas. In 2024, accommodation facilities in the country served more than 9,119,300 people, a 12% increase compared to 2023 (Table 1). The main drivers of this growth include: increased tourism activity in Kazakhstan's major metropolitan areas; increased interest from international visitors in the country's tourism resources and simplification of visa-free travel regulations with a number of countries; an increase in the number of direct flights, resulting in an increase in visitors from China, India, Turkey, and other countries; improved transport accessibility to a number of domestic destinations, etc.

Data shows that the country's major metropolitan areas are among the leaders in terms of visitor service at their accommodations. For example, Astana served over 1,493,200 people in 2024, Almaty served 2,340,300, and Shymkent served 507,900. Compared to the pre-COVID baseline, the growth rate in these cities averaged 183.5%. This explosive growth provides a favorable foundation for the development of tourism infrastructure in these metropolitan areas and the implementation of digital technologies in tourist services.

Table 1 – Number of visitors served in accommodation facilities for 2019-2024 (thousand people)

Regions	Years						Growth rate in 2024 compared to the base period (%)
	2019	2020	2021	2022	2023	2024	
Republic of Kazakhstan	6266.6	3581.3	5474.9	7335.2	8139.3	9119.3	145.5
Abai	-	-	-	269.4	333.9	261.3	-
Akmola	394.9	237.7	327.8	443.2	504.5	533.4	135.1
Aktobe	133.4	85.1	145.0	186.6	185.3	248.3	186.1
Almaty	834.2	482.9	609.0	354.8	408.1	507.6	60.8
Atyrau	249.8	84.5	46.3	160.1	171.8	156.5	62.6
West Kazakhstan	108.5	41.5	76.2	101.3	166.5	172.3	158.9
Zhambyl	144.0	94.5	127.2	135.7	156.6	199.1	138.3
Jetysu	-	-	-	325.7	269.1	303.1	-
Karaganda	319.7	199.9	272.3	305.2	362.3	384.9	120.4
Kostanay	237.6	142.0	215.7	228.5	221.1	232.4	97.8
Kyzylorda	71.7	50.7	94.4	100.5	116.8	169.2	236.1
Mangistau	222.5	160.5	291.9	310.2	390.3	462.7	207.9
Turkestan	174.4	103.7	206.4	253.5	272.9	302.8	173.6
Pavlodar	163.5	71.8	137.0	191.7	213.1	241.7	147.9
North Kazakhstan	144.5	102.6	154.3	146.2	154.0	143.4	99.4
Ulytau	-	-	-	25.7	31.0	31.3	-
East Kazakhstan	612.7	352.4	483.5	360.3	370.1	427.8	69.8
Astana	871.9	421.1	751.1	1178.4	1324.0	1493.2	171.3
Almaty	1334.2	737.3	1220.0	1809.4	2038.4	2340.3	175.4
Shymkent	249.3	213.4	316.8	448.8	449.1	507.9	203.7
Note: compiled by the authors based on the source [24]							

Tourism development is a strategic priority for the Republic of Kazakhstan. The government has set a goal of increasing the tourism industry's contribution to the country's GDP to 15% within a five-year period. Achieving this target, which was 6.2% in 2021, requires not only organic but also structural growth, entailing a significant increase in revenue, average tourist spend, and length of stay. The potential of the country's megacities, such as Astana, Almaty, and Shymkent, is the primary driver of the development of the domestic tourism sector.

From this perspective, the development of the digital environment of megacities and the adaptation of tourist services to these conditions is one of the key elements in developing the tourism industry's competitive advantages. However, to fully adapt tourist services in these cities to the emerging digital environment, it is necessary to thoroughly define the key characteristics of their tourism potential.

Today, the potential of Astana, Almaty, and Shymkent is mixed. Astana, for example, demonstrates the highest average annual growth rate of approximately 32.3%. Astana's successful and ambitious strategy to attract business and event centers (MICE) has borne fruit, as this indicator clearly demonstrates. The city has moved beyond purely political and business functions,

transforming itself into a dynamic cultural and events hub. This transition underpins the expected increase in tourist traffic to 1.7 million visitors by the end of 2025.

In 2024, the largest share of international visitors will come from countries such as China, Turkey, Russia, India, South Korea, Germany, and the United States. Successful cooperation with Western partners such as the United States and Germany confirms that the capital has become an integral part of highly profitable business routes. Furthermore, the attraction of tourists from Russia and China is driven by both geographical proximity and a simplified visa regime, ensuring a stable base flow.

Despite impressive growth rates, Astana faces significant infrastructure challenges. Research shows that rapid traffic growth (14% by 2024) is occurring against a backdrop of underdeveloped supporting infrastructure in some regions. If Astana aspires to strengthen its status as a competitive destination for business and individual travelers, it must not only continue to attract major events but also address its infrastructure gap. Failure to address this gap risks overheating and a decline in service quality, which could undermine efforts to attract business travelers who value high levels of service and logistical accessibility. Integrating tourism strategy with sustainable development principles is critical to maintaining international competitiveness.

Almaty maintains its status as a major tourist magnet, generating the largest absolute volume of traffic. The expected increase in tourist flow to 2.5 million people by 2025 makes Almaty a prime investment target, as it accounts for half of all visitor traffic to major cities. Despite its already developed tourism infrastructure, Almaty's growth is the most significant in absolute terms, reaching 1.76 million people over a five-year period.

Almaty, as a cultural capital, is the undisputed leader in tourist traffic, with a projected 2.5 million visitors by the end of 2025. Maintaining this leadership is ensured by major investments in the development of the mountain cluster. Almaty's strategic positioning is focused on transforming the mountain cluster into an international hub for year-round tourism in Central Asia. To achieve this goal, 697.4 million tenge is planned for 2025 for the development of mountain and urban infrastructure.

Plans call for the creation of new mountain routes with navigation and the development of camping areas equipped with solar panels in hard-to-reach areas. Reconstruction of the Alma-Arasan thermal spring is also underway. In 2024, improvements to 10 mountain routes were completed, and 367 information signs, gazebos, and benches were installed. These infrastructure investments are strategically important, as they diversify the tourist offer. The development of hiking and ecotourism reduces Almaty's dependence on seasonality, ensuring a high summer season and attracting active tourists who typically stay longer. A key indicator of the success of Almaty's strategy is the attraction of large-scale private investment. To date, the total volume of private capital invested in major ski projects exceeds 316 billion tenge.

Shymkent, the third city of national significance, is demonstrating moderate but steady growth. Its trajectory is less dependent on global MICE trends and more focused on regional mobility and spiritual tourism. The city's key characteristic is the dominance of domestic and regional tourism.

In 2024, Shymkent received over 507,000 tourists, 93% of which (471,510) were domestic tourists, while international visitors accounted for only 36,390. Shymkent has historically been associated with a powerful spiritual tourism magnet–the Mausoleum of Khoja Ahmed Yasawi in Turkestan. However, the relatively low number of international visitors indicates that the potential of spiritual tourism has not been fully realized, and Shymkent often functions as a transport or logistics

hub en route to Turkestan. Shymkent's role as the «Southern Gateway» of Kazakhstan is clearly confirmed by data from its main inbound markets: at the beginning of 2024, Uzbekistan, Russia, and China led the way. Nearly 10,000 Uzbek tourists entered Shymkent in the first three months of 2024, demonstrating the city's close interdependence with the economic and cultural ties of Central Asia. To enhance its appeal, Shymkent is taking active steps to improve its transport infrastructure and promote its image. The number of accommodations in the city has increased to 148. Developing air travel is key to transforming Shymkent from a transit point into a destination. The city currently serves 12 domestic flights and 5 international destinations (Moscow, Istanbul, Dubai, Antalya, and Kutaisi), and work is underway to further expand air travel.

Overall, despite existing challenges in the development of tourism infrastructure in Astana, Almaty, and Shymkent, there has been a steady positive trend in the growing interest in these cities' resources from both international and domestic tourists. In 2024, the total volume of services provided by accommodation facilities in Astana, Almaty, and Shymkent totaled 173,452.3 million tenge, accounting for 57.8% of the total volume of services provided by accommodation facilities in the Republic of Kazakhstan (Figure 2).

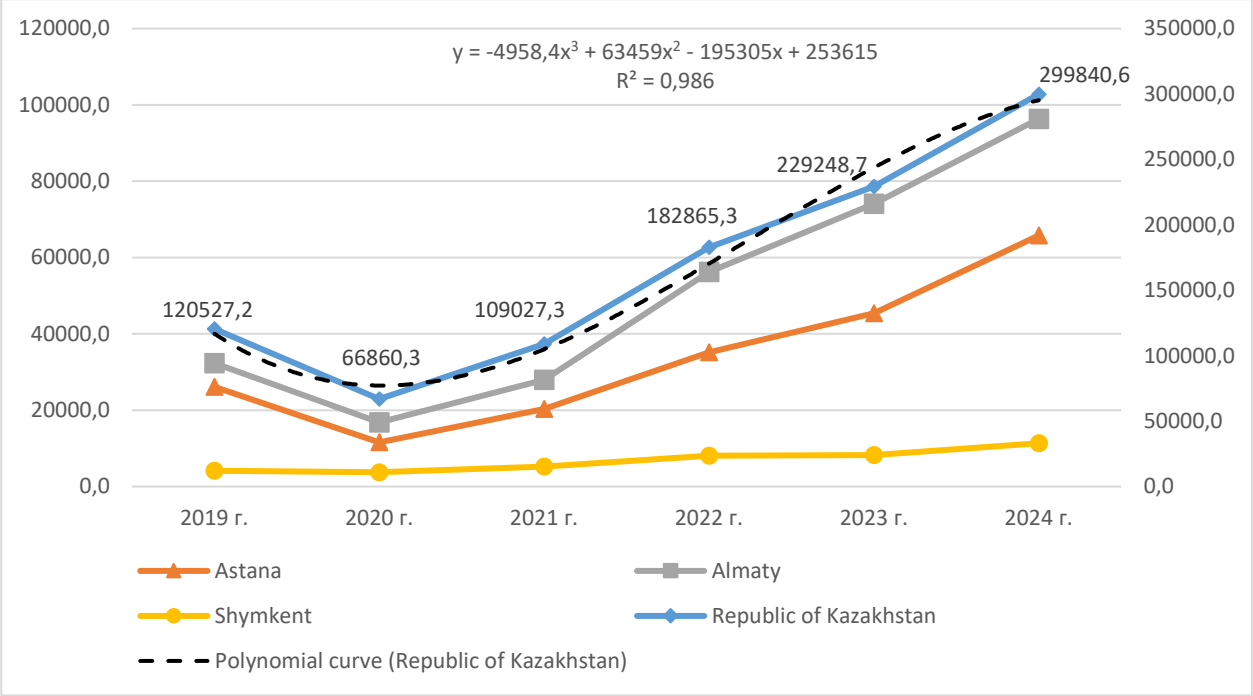

Figure 2 – Volume of services provided by accommodation facilities in 2019–2024 in the Republic of Kazakhstan and cities of national significance (million tenge)

Note: compiled by the authors based on the source [24]

The successful transformation of Kazakhstan's megacities–Astana, Almaty, and Shymkent – into competitive tourist destinations directly depends on their ability to integrate advanced digital technologies, such as artificial intelligence (AI), cloud computing, augmented reality (AR), and virtual reality (VR), into urban and tourism infrastructure.

Today, digital transformation is primarily associated with end-user markets, where improving the consumer experience is an essential requirement for competition. Companies operating in the tourism and excursion industry are actively developing new services and digital channels for

interacting with customers. Digitalization is leading to a fundamental paradigm shift in the tourism infrastructure of megacities. Modern infrastructure is no longer solely a physical complex (hotels, roads, attractions); it is an integrated complex of both physical and digital assets. In this context, the minimum prerequisite for successful modern urban tourism is easy access to information, booking services, and navigation, all enabled by digital tools.

As part of a study to determine the potential for tourism and excursion development in the context of digitalization in metropolitan cities, an SNW analysis of the urban environment was conducted in the context of digital transformation (see Table 2). The analysis yielded recommendations for improving the tourism sector in the new digital environment. At the same time, a long investment cycle is observed in business-oriented infrastructure resources, which slows the return on investment necessary to ensure flexibility and scalability, especially as tourist flow increases. Tourism and excursion activities, as a sector based on providing unique customer experiences, are a key area for digital innovation. In a highly competitive environment, market participants are required to continuously improve the consumer experience through personalization of products and services. The use of digital tools that provide immersive, interactive, and personalized approaches defines the development strategy of the tourism industry.

Despite the availability of a cutting-edge technological base, certain challenges remain to be overcome to ensure sustainable and inclusive tourism development. One of the most pressing issues is the digital divide between large cities and remote or small towns, limiting the use of modern location-based services on regional routes. For example, the city of Shymkent is actively leveraging its location as the «Southern Gateway» to attract spiritual tourism to Turkestan. There is also a shortage of qualified specialists to develop immersive content, hindering the rapid adoption of AR and VR technologies, which, through gamification and historical reconstruction, could significantly enrich the excursion experience.

The strengths of Kazakhstan's urban environment, based on smart city projects, create a solid technological foundation for the development of the tourism sector. The high level of digital maturity of e-government (93% of e-services provided) contributes to a stable and reliable digital environment, which is important for tourists and simplifies administrative processes. Furthermore, the development of city brands, such as Astana, as artificial intelligence hubs and local IT ecosystems enables the creation and maintenance of complex tourism services. The advanced development of big data analytics and AI in business services ensures a hyper-personalized tour experience for end users.

Artificial intelligence is becoming a driving force, automating key business processes and having a comprehensive impact on data analysis. Implementing AI helps optimize internal operations and significantly improve customer service. Common applications include chatbots and virtual assistants, which allow for rapid information provision and 24/7 customer support, thereby enhancing service quality. Automating routine requests frees up human resources to address more complex and customized tasks. Digital transformation requires embracing new technologies and redesigning business processes. Cloud platforms offer infrastructure flexibility and scalability, enabling tourism industry operators to quickly respond to market changes and implement innovations at a lower cost and in a shorter timeframe than traditional on-premises systems.

In our opinion, for Astana, which is focused on attracting high-income MICE tourism, addressing the identified infrastructure shortcomings requires not only physical investment but also the development of specialized digital platforms. Investment in analytical systems that integrate data

from platforms and IoT sensors should be the primary focus, enabling the provision of highly personalized services tailored in real time.

In Almaty, with its multi-billion dollar investment in the mountain cluster, the development of the digital environment should include the integration of augmented reality and IoT systems. This will enable not only the overlay of historical information on the surrounding environment but also the adaptation of interactive content and routes in real time, using data on traffic, weather conditions, and trail conditions. A key challenge for Almaty is the use of digital tools to monitor environmental impacts, which is critical for the long-term preservation of natural resources.

Table 2 - SNW analysis of urban environment development in the context of digitalization

Analysis criteria	**Factors**	**Characteristic**
Strengths	Integrated Infrastructure and AI Hub	High-tech data centers are being built in cities, with half of their capacity reserved for artificial intelligence tasks. The city is positioning itself as an important AI hub for Eurasia.
	Comprehensive systems integration	Integrated Smart City projects are being implemented, integrating transportation, housing and utilities, education, and security into a common situation center, which is critical for managing tourist flows (Smart Destination).
	Developed E-Government	A high level of digital maturity of government services: the share of electronic services has reached 93%, and 90.8% are accessible via smartphones. This ensures the overall reliability of the digital environment for tourists.
	Development of the local IT ecosystem	More than 60% of digital project work is carried out by local companies, which contributes to the development of the local IT ecosystem and strengthens competitiveness.
Neutral sides (Neutral)	Focus on the needs of residents	Digitalization projects are built at the request of residents, where safety and digitalization are top priorities. This is a prerequisite for success, but it requires ongoing dialogue.
	The need to consolidate efforts	Digital transformation stakeholders emphasize the importance of consolidating efforts to develop artificial intelligence, strengthen digital infrastructure, and train personnel. This is an ongoing task, not a finished product.
	Dependence on the material and technical base	The transition to advanced solutions is only possible with an updated material and technical base, which requires a corresponding restructuring of business processes.

Table 2 (continued on the next page)

Table 1. Continued on the next page

Weaknesses	Digital Divide	There is a problem of reducing the «digital divide» between urban and rural residents, especially in small and remote communities where it is technically difficult and expensive to provide communications.
	Cybersecurity risks	The need to analyze, assess, and prevent information security threats. The integration of multiple city systems into a single situation center (transportation, utilities, sensors) increases the attack surface.
	Lack of qualified personnel	The need to train personnel for the economy of the future remains a pressing issue, which hinders the rapid implementation of complex innovations such as AR/VR in excursion activities.
Note: compiled by the authors		

Shymkent's digital modernization strategy should aim to transform its transit status into a cultural and historical cluster powered by innovative technologies. The use of visual digital products will allow local guides and small tourism agencies to quickly and affordably create AR quests and VR tours of cultural heritage sites, transforming them from marketing tools into standalone digital products accessible to regional tourists.

Furthermore, all three megacities need to focus on monetizing digital services. Expanding and developing unified digital platforms and ecosystems that integrate city and tourism services will help accelerate the return on infrastructure investments. We believe this approach will ensure that long-term investments in cloud technologies and IoT immediately deliver value to customers through convenient, personalized services.

Overall, digitalization and adaptation of tourism and excursion services to these conditions requires a fundamental review of existing business models, operational processes, and value creation mechanisms. Furthermore, to improve the efficiency of tourism and excursion services development in the context of the city's evolving digital environment, it is worth paying attention to the following: providing tax incentives and support mechanisms to telecom operators to cover technically complex and small towns; expanding Smart City projects beyond metropolitan areas to ensure constant connectivity and the ability to use location-based services (AR/IoT) for regional excursions; strengthening the work of industry-specific information security operations centers specializing in the protection of critical financial and urban infrastructure; promoting the use of blockchain technologies to ensure the transparency and security of transactions in booking and payment systems for excursions and services; incorporating courses on the use of artificial intelligence and big data analysis technologies in tourism and excursion services into university curricula, etc.

Conclusion

The study confirmed that the digital environment of megacities plays a key role in transforming tourism and excursion activities, improving their efficiency and service quality. At the same time, the introduction of digital technologies creates risks associated with a loss of authenticity, overcrowding of popular routes, and a widening digital divide among tourists. To ensure sustainable urban tourism development, it is necessary to consider both the positive effects and potential negative consequences

of digitalization, implementing innovative solutions tailored to the specific needs of each city and the interests of tourists. These findings can serve as a basis for strategic planning and further research in the field of digital tourism in Kazakhstan and other megacities.

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МЕГАПОЛИС ЦИФРЛЫҚ ОРТАСЫНЫҢ ТУРИСТІК ЖӘНЕ ЭКСКУРСИЯЛЫҚ ҚЫЗМЕТТЕРДІҢ ДАМУЫНА ӘСЕРІ: МҮМКІНДІКТЕР МЕН ШЕКТЕУЛЕР

Аңдатпа. *Қазіргі таңда цифрлық технологияларды пайдалану мегаполистердің дамуының ажырамас бөлігіне айналды. Соңғы жылдардағы зерттеулер көрсеткендей, мегаполистің цифрлық ортаны қалыптастырудағы белсенділігі қаланың бәсекеге қабілеттігінің арттыру және туристер үшін оның тартымдылығын күшейтуімен тығыз байланысты.*

Бұл зерттеудің өзектілігі қазіргі жағдайдағы қазақстандық қалаларда цифрлық ортаның қалыптасу ерекшеліктерін зерттеу қажеттілігімен және туристік-экскурсиялық қызметтің жаңа стратегиялық мүмкіндіктерін айқындайтын факторларды анықтауымен түсіндіріледі. Сонымен қатар, зерттеу барысында авторлар отандық мегаполистердегі қалалық ортаның туристік имиджін қалыптастыруға кері әсер ететін цифрлық ортаның дамуының кейбір қырларына көңіл бөлді.

Жұмыстың мақсаты – Қазақстан қалалары, соның ішінде Астана, Алматы және Шымкент мысалында цифрлық ортаның туризм саласына әсерін талдау. Зерттеу әдістері ретінде феноменологиялық тәсіл, талдау, синтез және ресми деректер мен аналитикалық жарияланымдарға негізделген эксперименттік зерттеулер қолданылды. Зерттеу барысында алынған нәтижелер көрсеткендей, цифрлық технологиялар туристік қызмет көрсетудің тиімділігін айтарлықтай арттырып, ақпараттың қолжетімділігін және жекелендірілуін қамтамасыз етеді. Алайда, бұл үдеріс қалалық кеңістіктердің бірегейлігін сақтау мен туристік маршруттардың шамадан тыс жүктелуін болдырмау үшін тепе-теңдік сақтауды талап етеді.

Кілт сөздер: *цифрлық орта, туристік-экскурсиялық қызмет, мегаполис, қалалық туризм, туристік сервис, экскурсиялық маршруттар.*

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ВЛИЯНИЕ ЦИФРОВОЙ СРЕДЫ МЕГАПОЛИСА НА РАЗВИТИЕ ТУРИСТСКО-ЭКСКУРСИОННОЙ ДЕЯТЕЛЬНОСТИ: ВОЗМОЖНОСТИ И ОГРАНИЧЕНИЯ

Аннотация. *В современных условиях использования цифровых технологий стало одним из обязательных атрибутов развития мегаполисов. Ряд исследований показывают, что активность мегаполисов в создании цифровой среды достаточно тесно коррелирует с возможностями повышения конкурентоспособности города и привлекательности городской среды среди туристов.*

Актуальность исследования обусловлена необходимостью изучения специфики формирования цифровой среды в казахстанских городах в сегодняшних реалиях и определения факторов, способных формировать новые стратегические возможности для развития туристско-экскурсионной деятельности. В рамках исследования авторы также обратили внимание на отдельные аспекты развития цифровой среды в отечественных мегаполисах, которые могут оказать негативное влияние на формирование туристского имиджа городской среды.

Целью работы является изучение влияния цифровой среды на туристский сектор городов Казахстана – Астаны, Алматы и Шымкента. В качестве методов использованы феноменологический подход, анализ, синтез и экспериментальные исследования на основе официальных данных и аналитических публикаций. Результаты показывают, что цифровые технологии значительно повышают эффективность туристского обслуживания за счет персонализации и доступности информации, однако требуют аккуратного баланса для сохранения уникальности городских пространств и предотвращения перенасыщения туристских маршрутов.

Ключевые слова: *цифровая среда, туристско-экскурсионная деятельность, мегаполис, городской туризм, туристское обслуживание, экскурсионные маршруты.*