

A. RIZAKHODZHAYEV², B. AGNIYAZOV¹, U. TAGMANOV¹, E. ALZHANOVA¹

¹International University of Tourism and Hospitality, (Kazakhstan, Turkistan)

²Central Asian Innovation University

(Kazakhstan, Shymkent), e-mail: agniyazov.birzhan@iuth.edu.kz

AUGMENTED REALITY AS A TOOL FOR TRANSFORMING THE TOURIST EXPERIENCE IN MUSEUMS AND AT HISTORICAL AND CULTURAL HERITAGE SITES

Abstract. Digital technologies are gradually transforming the ways in which tourists engage with cultural heritage by complementing traditional museum and guided-tour formats with interactive means of interpretation. One of the most promising tools is Augmented Reality (AR), which enables digital objects, images, three-dimensional reconstructions, textual information, and audiovisual content to be integrated directly into the physical environment perceived by visitors. The aim of this study is to systematize the main applications of augmented reality in museums and at historical and cultural heritage sites and to identify the mechanisms through which AR influences the tourist experience. The methodological framework combines theoretical analysis, comparative analysis of international practices, content analysis of academic publications, and systematization of the functional capabilities of AR in cultural tourism. The findings indicate that the value of augmented reality for cultural tourism lies not primarily in its technological novelty but in its capacity to bridge the interpretative gap between a tangible heritage object and its historical meaning. Six functional areas of AR application are identified: reconstructive, contextual-informational, narrative, navigational, gamified, and personalized. Their contribution to the tourist experience is shown to operate through interconnected cognitive, emotional, spatial, interactive, and memory-related dimensions. A conceptual model is proposed to explain the transition from the digital interpretation of a heritage object to the formation of a meaningful and memorable tourist experience. The study also considers limitations associated with the historical accuracy of digital reconstructions, technological overload, accessibility, development costs, and the potential weakening of visitors' perception of authentic heritage objects. Finally, prospects for the application of augmented reality at historical and cultural heritage sites in Kazakhstan are identified.

Keywords: augmented reality, AR, cultural tourism, tourist experience, museum, cultural heritage, historical and cultural heritage sites, digital interpretation, interactive technologies.

Introduction

A visit to a museum or historical site involves interaction not only with a physical space but

*Бізге дұрыс сілтеме жасаңыз: Rizakhodzhayev A., Agniyazov B., Tagmanov U., Alzhanova E. Augmented Reality as a Tool for Transforming the Tourist Experience in Museums and at Historical and Cultural Heritage Sites // Bulletin of the International University of Tourism and Hospitality. – 2026. – No3(13). – Б. 254-266. <https://www.doi.org/10.62867/3007-0848.2026-3.18>

*Cite us correctly: Rizakhodzhayev A., Agniyazov B., Tagmanov U., Alzhanova E. Augmented Reality as a Tool for Transforming the Tourist Experience in Museums and at Historical and Cultural Heritage Sites // Bulletin of the International University of Tourism and Hospitality. – 2026. – No3(13). – P. 254-266. <https://www.doi.org/10.62867/3007-0848.2026-3.18>

also with the meanings preserved within that space. Archaeological remains, architectural fragments, museum artefacts, and historical landscapes possess cultural value, yet they are not always capable of independently communicating the circumstances of their origin, their original appearance, or their role in historical processes. Consequently, an interpretative gap emerges between the physically preserved object and the historical context it represents.

Traditionally, this interpretative function has been performed by tour guides, museum labels, information panels, printed guidebooks, and audio guides. However, these tools are constrained by the formats through which information is delivered. The limitation becomes particularly apparent at archaeological and historical architectural sites where contemporary visitors can observe only a fraction of the original structure. To imagine missing walls, decorative elements, interiors, or historical events associated with the location, visitors must mentally reconstruct the past on the basis of textual or verbal descriptions.

Augmented reality introduces a different principle of interaction with heritage. Unlike Virtual Reality (VR), which immerses users in an artificially created digital environment, AR preserves direct perception of the real-world setting while superimposing an additional digital layer onto it. Visitors continue to observe an authentic artefact, building, archaeological structure, or landscape while simultaneously accessing its reconstruction, supplementary imagery, animation, textual explanations, or representations of historical events.

The significance of AR in cultural tourism should therefore be understood as more than the introduction of another digital service. The technology changes the very principle through which cultural objects are interpreted: information no longer exists separately from an exhibit or monument but can be spatially integrated with it.

The relevance of this issue is further reinforced by changing tourist behaviour. Contemporary visitors interact with digital environments before, during, and after a trip. Recent studies consider AR and other immersive technologies as tools for information provision, visualization, learning, engagement, and personalization of the tourist experience [1–4]. At the same time, accumulated research evidence suggests that the technological sophistication of an application alone does not guarantee a high-quality visitor experience. The relevance of content, usability, historical accuracy, aesthetic consistency between digital and physical environments, and the capacity of technology to facilitate understanding of cultural objects are equally important [3; 5].

Against this background, the research problem addressed in this study concerns how augmented reality transforms tourists' interaction with tangible cultural heritage and under what conditions digital augmentation actually enhances the quality of the tourist experience.

The aim of the study is to systematize the principal applications of augmented reality technologies in museums and at historical and cultural heritage sites and to reveal the mechanisms through which they influence the formation of the tourist experience.

The following objectives were formulated:

1. to examine the specific characteristics of AR as a tool for interpreting cultural heritage;
2. to systematize the main functions of augmented reality within museum and historical-cultural environments;
3. to analyse international practices of AR implementation;
4. to identify the dimensions of the tourist experience affected by augmented reality;
5. to determine the limitations associated with the technological mediation of cultural heritage;

6. to identify promising directions for the application of AR at cultural tourism sites in Kazakhstan.

Materials and Methods

This study adopts a theoretical and analytical research design. Unlike approaches primarily focused on the technical characteristics of individual AR applications, the present analysis is structured around the functional relationship “cultural heritage object – digital interpretation – visitor perception – tourist experience.”

The information base of the study comprises academic publications addressing augmented reality, museum communication, cultural heritage, and tourist experience. Priority was given to recent studies examining AR directly in the context of museums, archaeological sites, and cultural heritage destinations. Earlier publications were also considered where they represented significant practical cases or conceptual developments in the application of augmented reality.

Four interrelated methods were employed. Theoretical analysis was used to clarify the nature of augmented reality and its position among digital heritage interpretation tools. Content analysis made it possible to identify recurring functions of AR reported in the reviewed studies. Comparative analysis was applied to examine differences in the use of AR across various types of cultural heritage environments. At the final stage, the identified functions were systematized and integrated into a conceptual model explaining the influence of augmented reality on the tourist experience.

This approach makes it possible to examine augmented reality not as an isolated technological solution but as an intermediary between tangible cultural heritage and the visitor.

Augmented Reality and the Challenge of Cultural Heritage Interpretation

Cultural heritage has a distinctive characteristic: the part of a heritage object physically accessible to tourists does not always correspond to the full range of cultural and historical information embodied in it. The more extensively an object has changed over time, the more pronounced this discrepancy becomes.

An archaeological foundation may represent a palace that once stood on the site; an isolated architectural fragment may have belonged to a complex structure; and a museum artefact may acquire meaning only when understood in relation to the environment in which it was originally used. Cultural tourism must therefore provide not only physical access to heritage but also the conditions necessary for understanding it.

It is in this context that the fundamental advantage of AR becomes apparent. A digital reconstruction can be spatially aligned with surviving physical elements. Instead of viewing an abstract illustration of what a structure may once have looked like, tourists can observe a digital model directly within the location in which the historical structure originally existed.

A similar mechanism applies within museum environments. An additional digital layer may reveal the original colouring of an artefact, demonstrate how it functioned, restore missing elements, connect an exhibit with its place of discovery, or visualize the way in which it was historically used.

The function of AR can therefore be described as contextual restoration. This does not refer to the physical restoration of a monument but to the temporary digital reconstruction of those contextual elements required for visitors to interpret the surviving heritage object.

Such an understanding also changes the criteria by which AR effectiveness should be evaluated. The number of 3D models, animated effects, or interactive features should not be regarded as the primary indicator of quality. A more important question is whether a digital element enables visitors to perceive and understand something that would otherwise remain unclear.

Functional Applications of AR in Cultural Tourism

The analysis of existing practices makes it possible to classify the use of augmented reality in cultural tourism into six major functional areas.

Table 1 – Functional Classification of AR in Cultural Tourism

Area	Main function	Example of digital content	Effect on visitors
Reconstructive	Restoration of lost visual context	3D models of buildings, interiors, or artefacts	Ability to visualize the original appearance
Contextual-informational	Linking objects with additional information	Annotations, archival images, diagrams	Deeper understanding of the object
Narrative	Interpretation of heritage through storytelling	Historical characters, events, animated scenes	Emotional engagement
Navigational	Spatial orientation	AR routes, directions, points of interest	Greater convenience during visits
Gamified	Encouraging active participation	Quests, tasks, object searches	Increased interaction and motivation
Personalized	Adapting content to individual visitors	Language, topic, and information-depth selection	Individualization of the tourist experience

Note – Compiled by the authors based on the analysis of academic literature.

The most apparent area is the reconstructive application of AR. It is particularly relevant to archaeological sites and partially preserved architecture. Research on AR implementation at the ancient city of Alexandria Troas demonstrates the possibility of using digital models directly within an archaeological site to visualize architecture for visitors [6]. A similar approach was applied in the digital reconstruction of the Mausoleum at Halicarnassus, where mobile AR has been considered a means of visually restoring a lost historical structure within its original physical environment [7].

The contextual-informational function does not necessarily require sophisticated three-dimensional reconstruction. In some cases, highlighting particular details of an exhibit, displaying additional images, or positioning explanatory information directly alongside a relevant part of an object may be more useful. Projects associated with the Acropolis Museum have explored possibilities such as reconstructing the original appearance of exhibits, showing their original locations, highlighting specific details, and supplementing museum objects with visual narratives [8].

The narrative function transforms a visit from the reception of isolated pieces of information into engagement with a coherent historical story. Digital characters, reconstructed events, and route-based narrative episodes make it possible to present a heritage object as part of a broader historical process. Narrative interpretation is particularly valuable where surviving material remains alone are insufficient for visitors to reconstruct the events associated with a site.

The navigational function integrates interpretation with movement through space. AR directions and geolocation-based elements can guide tourists between points of interest while simultaneously explaining the significance of each location. At large archaeological complexes and historical urban areas, this approach can facilitate a transition from fixed guided-tour sequences to more flexible and individualized routes.

The gamified function involves the integration of tasks, object searches, quizzes, challenges, and other game elements. Studies of cultural heritage AR applications demonstrate the increasing use of gamification and narrative mechanisms, particularly in projects aimed at encouraging active visitor

participation [9]. However, gamification is most appropriate when game-based activities contribute to understanding the heritage object rather than distracting visitors from it.

Finally, the personalized function enables content to be adapted according to language, age, interests, route preferences, or desired depth of information. This feature fundamentally distinguishes interactive digital systems from conventional museum labels: different visitors can engage with the same physical object while receiving different levels and forms of interpretation.

From Observation to Interaction: Changing the Structure of the Tourist Experience

Traditional museum visits are often organized around the sequence of “observe – read – listen.” Augmented reality adds another action: interact.

Interaction, however, should not automatically be equated with a high-quality tourist experience. Research involving visitors to the Liangzhu Museum has shown that satisfaction with AR experiences is associated with factors including technological novelty, trust, aesthetics, educational value, and perceived authenticity. At the same time, some technological characteristics did not independently demonstrate the expected direct effect [3].

This suggests that the influence of AR on the tourist experience is a multi-stage process.

The present study identifies five dimensions through which this influence may occur.

Cognitive Dimension

AR reduces the amount of mental reconstruction required to understand complex heritage objects. Visitors do not necessarily have to mentally transform the plan of an ancient structure into a three-dimensional image, as the digital model performs part of this interpretative work.

This function is particularly important at archaeological sites. The fewer visually recognizable elements that have survived, the greater the importance of interpretative tools.

A meta-analytic review of AR and VR applications in museum learning has demonstrated positive effects of these technologies on both learning outcomes and perceptions of museum-based learning [10]. Entertainment should therefore not be considered the sole benefit of immersive technologies.

Emotional Dimension

Information acquires a different significance when a historical event is spatially connected to the location where it occurred. Visitors do not merely learn a historical fact; they associate it with the surrounding physical environment.

The emotional dimension can be strengthened through historical storytelling, audio accompaniment, reconstructed characters, and visual transitions between the contemporary and historical states of a site.

Spatial Dimension

AR links information to a specific location. This represents one of its major differences from an ordinary mobile information guide.

A digitally reconstructed wall appears where the physical wall once stood; a historical character is displayed in the location associated with a particular event; and explanatory content is attached directly to the relevant architectural or museum detail.

This produces a form of spatially anchored knowledge in which information is perceived through the heritage object rather than separately from it.

Interactive Dimension

Visitors gain greater control over the depth and sequence of their engagement with cultural content. They may select particular objects, activate additional information, change the viewing angle of a reconstruction, complete tasks, or construct an individual route.

Tourists therefore move, at least partially, from the role of passive recipients of a predefined

narrative to active participants in the interpretation process.

Memory-Related Dimension

The combination of place, action, visual imagery, and emotional response creates conditions conducive to longer-lasting memories of a visit. From the perspective of tourism, the amount of information transmitted is therefore less important than the technology's capacity to create a distinctive experience that remains meaningful after the visit has ended.

Taken together, these dimensions suggest the following mechanism:

Tangible heritage object → digital augmentation → contextualization → interaction → cognitive and emotional engagement → meaningful tourist experience → memory of the heritage object.

This sequence differs fundamentally from a technology-centred approach. AR is not treated as an end in itself but as an intermediary connecting cultural resources with visitor perception.

International Practices and Different Models of AR Application

International practices demonstrate that the same technology may serve fundamentally different purposes depending on the nature of a cultural heritage site.

Table 2 – Comparative Practices of AR Application in Cultural Heritage

Site / context	Type of application	Main function
Acropolis Museum, Greece	Reconstruction of original appearance, location, and details of exhibits	Interpretation of museum artefacts
Alexandria Troas, Türkiye	AR visualization of architecture directly at the archaeological site	Spatial reconstruction
Mausoleum at Halicarnassus, Türkiye	Visualization of a lost historical structure	Restoration of lost historical context
Liangzhu Museum, China	Use of AR devices in heritage interpretation	Education, aesthetics, authenticity
Indonesian Postal Museum, Indonesia	Digital information superimposed on physical exhibits	Learning and engagement
Museum of the Macedonian Struggle, Greece	AR integrated into a gamified museum route	Gamification and active learning

Note – Compiled by the authors based on sources [3; 6–8; 11–12].

The comparison demonstrates that there is no universal AR model suitable for every cultural heritage environment. An archaeological site preserved only in fragments primarily requires reconstruction. A museum with a rich collection of physical artefacts may benefit more from contextual information and visualization of the original functions of exhibits. Game-based mechanisms may be more appropriate for younger visitors, while navigation and spatial storytelling may be particularly relevant to historical urban areas.

Consequently, the selection of technology should begin not with the question “What AR features can be introduced?” but rather “What interpretation problem associated with this particular heritage object needs to be solved?”

This principle has practical significance because it helps prevent the introduction of technology merely for the sake of technological modernization.

The Question of Authenticity: Augmentation or Replacement?

One of the most complex issues associated with AR in cultural heritage concerns the relationship between digital content and authenticity.

Tourists visit historical sites precisely because such places maintain a tangible connection with the past. If the digital layer becomes visually dominant, attention may shift away from the authentic environment: visitors may begin to perceive the screen rather than the architecture, animation rather than the artefact, and a virtual character rather than the historical space itself.

The paradox is that a technology designed to explain heritage may, when used excessively, distance visitors from that heritage.

High-quality AR interpretation should therefore follow the principle of digital subordination: the virtual layer should complement the tangible heritage object without becoming its competitor.

The historical accuracy of reconstruction presents another significant challenge. A three-dimensional model creates an impression of visual certainty. Archaeological and historical evidence, however, may allow several plausible interpretations. If a hypothetical reconstruction is presented without indicating its degree of certainty, visitors may perceive a scholarly hypothesis as an established historical fact.

It is therefore advisable to distinguish between:

- elements supported by documentary or archaeological evidence;
- reconstructed elements with a high degree of scholarly justification;
- hypothetical elements;
- artistic visualization.

Such differentiation is particularly important when interpreting heritage sites of national or international significance.

Limitations of Augmented Reality

Alongside its advantages, augmented reality presents a number of limitations that should be considered when designing cultural tourism products.

Table 3 – Major Risks of AR Application and Approaches to Their Mitigation

Risk	Possible consequence	Mitigation approach
Information overload	Reduced attention to the physical heritage object	Limit the volume of digital content
Inaccurate reconstruction	Distorted historical understanding	Expert verification of content
Technical failures	Disruption of the visitor experience	Testing and offline functionality
Complex interface	Exclusion of some visitor groups	Intuitive design
Dependence on personal devices	Digital inequality	Rental or museum-provided devices
Excessive gamification	Heritage becomes merely a backdrop for entertainment	Link game tasks to heritage content
Rapid technological obsolescence	Increased maintenance costs	Modular application architecture
Dominance of the digital layer	Weakened perception of authenticity	Principle of digital subordination

Note – Compiled by the authors.

Technological limitations include positioning accuracy, the quality of three-dimensional models, mobile-device performance, lighting conditions, internet connectivity, and the need for

ongoing technical support.

Organizational constraints are associated with the cost of initial development and subsequent updates. Unlike a conventional information panel, a digital product requires regular maintenance, compatibility with new operating-system versions, and adaptation to evolving devices.

Accessibility is equally important. AR implementation should not result in a situation in which meaningful interpretation of cultural heritage becomes available only to visitors who own modern smartphones. Digital modernization should broaden rather than restrict access to cultural content.

Prospects for AR Application at Historical and Cultural Heritage Sites in Kazakhstan

Kazakhstan possesses considerable potential for AR implementation due to the diversity of its cultural heritage. Archaeological complexes, mausoleums, ancient settlements, historical urban areas, ethnographic collections, and museum exhibitions create different scenarios for digital interpretation.

The greatest potential exists at sites where the original historical context has been lost or is difficult for contemporary visitors to perceive.

At archaeological sites, spatial reconstruction can be applied. By pointing a mobile device at surviving foundations or fragments of walls, visitors could view the estimated original volume of a building, its height, internal structure, and functional zones.

Within museums, object-context AR represents a promising approach. An archaeological artefact can be presented not merely as an isolated object but as part of a reconstructed environment in which it was originally used. For example, a digital model could demonstrate how an ornament was worn, how a household object functioned, or where an archaeological find was originally located within a broader complex.

Turkistan offers particular potential for the development of historical-spatial AR routes. In such a model, technology could connect several attractions not only through navigation but also through a shared historical narrative. Visitors could observe transformations in the urban environment over time, compare contemporary spaces with historical plans, access biographies of individuals associated with particular places, and receive multilingual explanations.

AR can also contribute to the interpretation of intangible cultural heritage. Digital layers may demonstrate traditional craftsmanship, musical performance, rituals, or everyday practices directly alongside relevant museum artefacts or historical environments.

For the systematic implementation of augmented reality, a four-level model is proposed.

Level 1 – Digitization and scholarly verification.

Three-dimensional models, digital copies, historical maps, and a database of verified information are created.

Level 2 – Interpretative design.

Rather than beginning with a list of technological effects, this stage identifies aspects of the heritage object that are difficult for visitors to understand without additional explanation.

Level 3 – AR interaction.

An appropriate instrument is selected: reconstruction, storytelling, navigation, animation, gamification, or personalization.

Level 4 – Integration into the tourist route.

AR becomes part of the broader destination experience and is linked with museums, heritage sites, tourist navigation, and information infrastructure.

The implementation logic should therefore follow the sequence:

Heritage → interpretation problem → digital content → AR tool → interaction → understanding → emotional response → memorable tourist experience.

Such a sequence preserves the priority of cultural content over technology.

Discussion

The analysis indicates that the influence of augmented reality on the tourist experience cannot be reduced to the effect of technological novelty. As AR becomes more widespread, the mere possibility of viewing digital objects superimposed on physical space will gradually cease to be unusual. The long-term value of the technology will therefore increasingly depend on the quality and relevance of its content.

Systematic reviews of contemporary cultural heritage AR projects demonstrate a broad range of objectives, including education, tourism, gamification, conservation, and visitor engagement [1; 2]. At the same time, considerable methodological diversity remains in the development and evaluation of such systems. This reinforces the need to move beyond the question of whether technology is present and instead assess the quality of the interpretation it provides.

Based on the findings, this study proposes the concept of AR interpretative effectiveness, defined as the capacity of a digital layer to reduce the distance between the visible state of a cultural heritage object and visitors' understanding of its historical meaning.

This approach provides an alternative criterion for evaluating the success of digital solutions. A relatively simple application containing a single academically substantiated reconstruction may have greater interpretative effectiveness than a technically sophisticated system offering numerous functions that are only weakly connected with the heritage object itself.

The second major finding concerns authenticity. AR does not necessarily conflict with authentic heritage perception. On the contrary, existing research demonstrates the importance of authenticity in shaping satisfaction and subsequent behavioural intentions among users of museum AR systems [3]. A positive effect, however, is more likely when digital content restores missing context rather than replacing the physical object.

The third issue concerns the changing role of visitors. In a conventional guided-tour model, the route and amount of information are largely determined by the museum or tour guide. An interactive digital environment enables tourists to select the sequence, depth, and form of their engagement with content. AR therefore supports a transition from standardized interpretation toward more flexible and individualized interaction.

Finally, the potential of AR extends beyond the museum visit itself. Recent studies examine AR and VR across the pre-trip, on-site, and post-trip stages of the tourist experience [13]. For cultural tourism, this creates opportunities to establish a coherent digital ecosystem: preliminary interaction with a heritage site may stimulate interest before the journey; AR can support interpretation during the physical visit; and retained digital content can reinforce memories and encourage continued engagement with cultural material after the trip.

Conclusion

Augmented reality creates a new space of interaction between tourists and cultural heritage. Its defining feature is that digital information does not necessarily isolate visitors from a physical heritage object but can instead be spatially and contextually integrated with it.

The systematization conducted in this study identified six functional areas of AR application: reconstructive, contextual-informational, narrative, navigational, gamified, and personalized. Each addresses a specific interpretative task; however, the greatest value is achieved when the selection of a digital instrument is determined by the characteristics of a particular heritage object and the specific difficulties visitors face in understanding it.

The influence of augmented reality on the tourist experience occurs through cognitive,

emotional, spatial, interactive, and memory-related dimensions. AR can therefore do more than increase the volume of available information. It can change the way information is perceived by connecting knowledge with place, physical objects, and visitor action.

At the same time, technological intensity should not be regarded as an independent indicator of the quality of a cultural tourism product. An excessive volume of digital content may lead to information overload, divert attention from authentic heritage, and transform cultural sites into backgrounds for technological entertainment.

On this basis, the study proposes the principle of digital subordination, according to which technology should strengthen the perception and understanding of heritage while remaining a supporting instrument rather than becoming the primary object of attention. Scholarly transparency is an additional requirement: digital reconstructions should clearly distinguish between historically verified and hypothetical elements.

For Kazakhstan, augmented reality offers particular potential at archaeological complexes, museums, and historical urban areas where significant parts of the original cultural context can no longer be directly perceived by tourists. Promising applications include spatial reconstruction of historical architecture, visualization of the original context of museum artefacts, multilingual interpretation, historical storytelling, and interconnected AR-based cultural routes.

The strategic value of augmented reality in cultural tourism therefore lies not in its capacity to replace conventional museum or heritage experiences, but in its ability to make invisible historical contexts perceptible, complex cultural meanings understandable, and tangible heritage objects meaningfully connected with the historical periods and cultural environments they represent.

BIBLIOGRAPHY/REFERENCES

1. Ramtohl A., Khedo K.K. Augmented reality systems in the cultural heritage domains: A systematic review // *Digital Applications in Archaeology and Cultural Heritage*. – 2024. – Vol. 32. – e00317. DOI: 10.1016/j.daach.2024.e00317.
2. Chatsiopolou A., Michailidis P.D. Augmented Reality in Cultural Heritage: A Narrative Review of Design, Development and Evaluation Approaches // *Heritage*. – 2025. – Vol. 8, No. 10. – Article 421. DOI: 10.3390/heritage8100421.
3. Chen Y., Wang X., Le B. et al. Why people use augmented reality in heritage museums: a socio-technical perspective // *Heritage Science*. – 2024. – Vol. 12. – Article 108. DOI: 10.1186/s40494-024-01217-1.
4. Shafiee Roodposhti M., Esmaeelbeigi F. From pre-trip to post-trip in improving the Tourist Experience (TE) with AR and VR in cultural heritage tourism // *Digital Applications in Archaeology and Cultural Heritage*. – 2026. – Vol. 40. – e00503. DOI: 10.1016/j.daach.2026.e00503.
5. Zhu C., Io M.U., Ng H.F.B., Peralta R.L. Interpreting the impact of augmented reality on heritage tourism: two empirical studies from World Heritage sites // *Current Issues in Tourism*. – 2024. – Vol. 27, No. 23. – P. 4374–4388. DOI: 10.1080/13683500.2023.2298349.
6. Anay H., Özten Ü., Ünal M., Öztepe E. Augmented Reality for the Presentation of Cultural Heritage: On-Site Application and Evaluation of a Model // *ICONARP International Journal of Architecture and Planning*. – 2023. DOI: 10.15320/ICONARP.2023.244.
7. Yazıcı Yılmaz S., Kayar G. Developing a Mobile Augmented Reality Application for Destroyed Historical Sites // *Selcuk Tourism and Information Technology Research Journal*. – 2023. – No. 4.
8. Keil J., Pujol L., Roussou M., Engelke T., Schmitt M., Bockholt U., Eleftheratou S. A Digital Look at Physical Museum Exhibits: Designing Personalized Stories with Handheld

Augmented Reality in Museums // 2013 Digital Heritage International Congress. – IEEE, 2013. – P. 685–688. DOI: 10.1109/DigitalHeritage.2013.6744836.

9. Towards participatory activities with augmented reality for cultural heritage: A literature review // Multimodal Technologies and Interaction / Digital heritage research. – 2023.

10. A meta-analytic review on incorporating virtual and augmented reality in museum learning // Educational Research Review. – 2022. – Vol. 36. DOI: 10.1016/j.edurev.2022.100454.

11. Gozali A.A., Prawita F.N., Subaveerapandiyan A., Handoyo A.P.K., Assyifa C. Enhancing Museum Experience through Augmented Reality: The Case of the Indonesian Postal Museum // Jurnal INFOTEL. – 2024. – Vol. 16, No. 2. – P. 226–242. DOI: 10.20895/infotel.v16i2.1104.

12. Hybrid Guided Tours in Museums Using Augmented Reality (AR) Applications: The Case Study of the Museum of the Macedonian Struggle and Modern History of Macedonia (IMMA), Greece. – Springer, 2026.

13. Augmented reality technology in tourism and hospitality research: a review from 2010 to 2024 // Journal of Science and Technology Policy Management. – 2026. – Vol. 17, No. 4. – P. 872–898. DOI: 10.1108/JSTPM-04-2024-0136.

14. Arief F.H., Kerspati M.I., Fatur Rahman F., Maulidia S. Augmented Reality Development for Museum Leveraging Instagram Filters: Case Study of Cartographic Heritage Exhibition // Studies in Digital Heritage. – 2024. – Vol. 8, No. 2. – P. 110–131. DOI: 10.14434/sdh.v8i2.38016.

15. Al-Gurashi R., Shatwan A. Adopting Augmented Reality to Enhance Vernacular Building Preservation and Tourism: Case Study in Matbouli House Museum, Al-Balad // Journal of Architecture and Planning. – 2024. – Vol. 36, No. 4. DOI: 10.33948/JAP-KSU-36-4-1.

A. RIZAKHODZHAYEV

Candidate of Economic Sciences, Senior
Lecturer, Central Asian Innovation
University (Kazakhstan, Shymkent)
e-mail: manamolot@mail.ru
<https://orcid.org/0009-0003-9803-4646>

B. AGNIYAZOV

Lecturer, School of Hospitality,
International University of Tourism and
Hospitality (Kazakhstan, Turkistan)
e-mail: agniyazov.birzhan@iuth.edu.kz
<https://orcid.org/0000-0001-7581-6715>

U. TAGMANOV

PhD, Acting Associate Professor,
International University of Tourism and
Hospitality (Kazakhstan, Turkistan)
e-mail: urmanbek.tagmanov@iuth.edu.kz
<https://orcid.org/0000-0003-2960-9816>

E. ALZHANOVA

Candidate of Historical Sciences, Associate
Professor, Humanitarian School,
International University of Tourism and
Hospitality (Kazakhstan, Turkistan)
e-mail: alzhanova.elmira@iuth.edu.kz
<https://orcid.org/0000-0001-6429-4093>

Received 12.02.2026

Received in revised form 11.09.2026

Accepted for publication 30.09.2026

А. РИЗАХОДЖАЕВ², Б. АГНИЯЗОВ¹✉, У. ТАГМАНОВ¹, Э. АЛЬЖАНОВА¹

¹Халықаралық туризм және меймандостық университеті (Қазақстан, Түркістан)

²Орталық Азия инновациялық университеті

(Қазақстан, Шымкент), e-mail: agniyazov.birzhan@iuth.edu.kz

**МУЗЕЙЛЕР МЕН ТАРИХИ-МӘДЕНИ МҰРА НЫСАНДАРЫНДАҒЫ ТУРИСТІК
ТӘЖІРИБЕНІ ТРАНСФОРМАЦИЯЛАУ ҚҰРАЛЫ РЕТІНДЕГІ ТОЛЫҚТЫРЫЛҒАН
ШЫНДЫҚ**

Аңдатпа. Цифрлық технологиялар дәстүрлі музейлік және экскурсиялық форматтарды интерактивті интерпретация құралдарымен толықтыра отырып, туристердің мәдени мұрамен өзара әрекеттесу тәсілдерін біртіндеп өзгертуде. Осындай перспективалы құралдардың бірі – толықтырылған шындық (Augmented Reality, AR). Бұл технология цифрлық нысандарды, кескіндерді, үшөлшемді реконструкцияларды, мәтіндік ақпаратты және аудиовизуалды контентті келушілер қабылдайтын физикалық ортамен тікелей ықпалдастыруға мүмкіндік береді. Зерттеудің мақсаты – музейлер мен тарихи-мәдени мұра нысандарында толықтырылған шындықты қолданудың негізгі бағыттарын жүйелеу және AR технологиясының туристік тәжірибеге ықпал ету тетіктерін анықтау. Зерттеудің әдіснамалық негізі теориялық талдауды, халықаралық тәжірибелерді салыстырмалы талдауды, ғылыми жарияланымдардың контент-талдауын және мәдени туризмдегі AR технологиясының функционалдық мүмкіндіктерін жүйелеуді қамтиды. Зерттеу нәтижелері мәдени туризм үшін толықтырылған шындықтың құндылығы ең алдымен оның технологиялық жаңашылдығында емес, материалдық мұра нысаны мен оның тарихи мәні арасындағы интерпретациялық ашақтықты азайту қабілетінде екенін көрсетті. AR технологиясын қолданудың алты функционалдық бағыты айқындалды: реконструктивтік, контекстік-ақпараттық, нарративтік, навигациялық, геймификациялық және дербестендірілген. Олардың туристік тәжірибеге ықпалы өзара байланысты когнитивтік, эмоциялық, кеңістіктік, интерактивтік және есте сақтауға қатысты өлшемдер арқылы жүзеге асатыны анықталды. Мұра нысанын цифрлық интерпретациялаудан мазмұнды әрі есте қаларлық туристік тәжірибенің қалыптасуына дейінгі үдерісті түсіндіретін тұжырымдамалық модель ұсынылды. Сонымен қатар зерттеуде цифрлық реконструкциялардың тарихи дәлдігіне, технологиялық шамадан тыс жүктемеге, қолжетімділікке, әзірлеу шығындарына және келушілердің түпнұсқа мұра нысандарын қабылдауының әлсіреу қаупіне байланысты шектеулер қарастырылды. Соңында Қазақстанның тарихи-мәдени мұра нысандарында толықтырылған шындық технологияларын қолданудың перспективалық бағыттары айқындалды.

Кілт сөздер: толықтырылған шындық, AR, мәдени туризм, туристік тәжірибе, музей, мәдени мұра, тарихи-мәдени мұра нысандары, цифрлық интерпретация, интерактивті технологиялар.

А. РИЗАХОДЖАЕВ², Б. АГНИЯЗОВ^{1,2}, У. ТАГМАНОВ¹, Э. АЛЬЖАНОВА¹

¹Международный университет туризма и гостеприимства (Казахстан, Туркестан)

²Центрально-Азиатский инновационный университет

(Казахстан, Шымкент), e-mail: agniyazov.birzhan@iuth.edu.kz

ДОПОЛНЕННАЯ РЕАЛЬНОСТЬ КАК ИНСТРУМЕНТ ТРАНСФОРМАЦИИ ТУРИСТСКОГО ОПЫТА В МУЗЕЯХ И НА ОБЪЕКТАХ ИСТОРИКО-КУЛЬТУРНОГО НАСЛЕДИЯ

Аннотация. Цифровые технологии постепенно трансформируют способы взаимодействия туристов с культурным наследием, дополняя традиционные музейные и экскурсионные форматы интерактивными средствами интерпретации. Одним из наиболее перспективных инструментов является дополненная реальность (Augmented Reality, AR), позволяющая интегрировать цифровые объекты, изображения, трехмерные реконструкции,

текстовую информацию и аудиовизуальный контент непосредственно в физическую среду, воспринимаемую посетителями. Цель исследования – систематизировать основные направления применения дополненной реальности в музеях и на объектах историко-культурного наследия, а также определить механизмы воздействия AR на туристский опыт. Методологическая основа исследования включает теоретический анализ, сравнительный анализ международных практик, контент-анализ научных публикаций и систематизацию функциональных возможностей AR в культурном туризме. Результаты исследования показывают, что ценность дополненной реальности для культурного туризма заключается прежде всего не в ее технологической новизне, а в способности сокращать интерпретационный разрыв между материальным объектом наследия и его историческим значением. Выделены шесть функциональных направлений применения AR: реконструктивное, контекстно-информационное, нарративное, навигационное, геймификационное и персонализированное. Установлено, что их влияние на туристский опыт реализуется через взаимосвязанные когнитивное, эмоциональное, пространственное, интерактивное и связанное с запоминанием измерения. Предложена концептуальная модель, объясняющая переход от цифровой интерпретации объекта наследия к формированию содержательного и запоминающегося туристского опыта. В исследовании также рассматриваются ограничения, связанные с исторической достоверностью цифровых реконструкций, технологической перегрузкой, доступностью, затратами на разработку и потенциальным ослаблением восприятия посетителями аутентичных объектов наследия. В заключение определены перспективы применения технологий дополненной реальности на объектах историко-культурного наследия Казахстана.

Ключевые слова: дополненная реальность, AR, культурный туризм, туристский опыт, музей, культурное наследие, объекты историко-культурного наследия, цифровая интерпретация, интерактивные технологии.