

DIGITIZATION AND VIRTUALIZATION PROCESSES IN MODERN MUSEUM STUDIES

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Abstract:

This article examines the origin and historical development of museums, the etymology of the term "museum", and the formation of museum systems in the world and Uzbekistan. Special attention is paid to the digital transformation of museums and the growing importance of virtual museums in preserving cultural heritage. The article analyzes the experience of the State Museum of History of Uzbekistan and the Center of Islamic Civilization of Uzbekistan in implementing digital technologies. It also discusses the advantages and challenges of museum digitalization based on international experience and highlights the role of virtual museums in education, scientific research, cultural heritage preservation, and tourism development.

Keywords: Museum, virtual museum, digitalization, cultural heritage, digital technologies, 3D modeling, Google Arts & Culture, Center of Islamic Civilization, State Museum of History of Uzbekistan, museology, virtual tour, digital heritage.

Introduction

ZAMONAVIY MUZEYSHUNOSLIKDA RAQAMLASHTIRISH VA VIRTUALLASHTIRISH JARAYONLARI

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Annotatsiya

Mazkur maqolada muzeylarning vujudga kelish tarixi, "muzey" atamasining kelib chiqishi, dunyo va O'zbekistonda muzeylar tizimining shakllanishi hamda zamonaviy muzeysunoslikda raqamlashtirish va virtuallashtirish jarayonlarining ahamiyati tahlil qilingan. Shuningdek, O'zbekistondagi tarixiy ahamiyatga ega muzeylar, xususan O'zbekiston tarixi davlat muzeyi va O'zbekistondagi Islom sivilizatsiyasi markazida amalga oshirilayotgan raqamlashtirish ishlari yoritilgan. Jahon tajribasi asosida virtual muzeylarning afzalliklari va kamchiliklari tahlil qilinib, ularning madaniy merosni asrash, ilmiy tadqiqotlar olib borish, ta'lim va turizmni rivojlantirishdagi o'rni ochib berilgan.

Kalit so'zlar: muzey, virtual muzey, raqamlashtirish, madaniy meros, raqamli texnologiyalar, 3D modellash, Google Arts & Culture, Islom sivilizatsiyasi markazi, O'zbekiston tarixi davlat muzeyi, muzeysunoslik, virtual ekskursiya, raqamli madaniy meros.



Аннотация

В данной статье рассматриваются история возникновения музеев, происхождение термина «музей», а также процесс становления музейной системы в мире и в Узбекистане. Особое внимание уделено вопросам цифровизации и виртуализации музеев как одному из важнейших направлений современного музееведения. Освещены работы по внедрению цифровых технологий в Государственном музее истории Узбекистана и Центре исламской цивилизации Узбекистана. На основе мирового опыта проанализированы преимущества и недостатки виртуальных музеев, раскрыта их роль в сохранении культурного наследия, развитии научных исследований, образования и туризма.

Ключевые слова: музей, виртуальный музей, цифровизация, культурное наследие, цифровые технологии, 3D-моделирование, Google Arts & Culture, Центр исламской цивилизации Узбекистана, Государственный музей истории Узбекистана, музееведение, виртуальная экскурсия, цифровое культурное наследие.

Introduction

The rapid development of information and communication technologies in the 21st century is causing profound changes in all spheres of social life. This process also directly affects the system of preserving cultural and historical heritage, leading to the formation of new approaches to the activities of museums. While traditional museums have long performed the task of preserving and displaying historical and cultural treasures, today digital technologies are taking their activities to a new level. In particular, the possibilities of digitizing museum collections, creating virtual tours, 3D modeling, and presenting exhibits to the general public through online platforms are increasingly expanding.

Digitization of museums is not only a modern way to preserve cultural heritage, but also an important means of transmitting it to future generations. Virtual museums provide millions of users with the opportunity to get acquainted with historical exhibits, regardless of geographical distance, time, and other limitations. Therefore, the issue of virtualization of museums is recognized today as one of the current directions of world museology.

Literature analysis and methodology. The term "museum" comes from the ancient Greek word "Mouseion" (Μουσεῖον), meaning "Abode of the Muses" or "Temple of the Muses." In ancient Greek mythology, the Muses were nine goddesses who were revered as patrons of art, literature, history, music, astronomy, and other sciences. Initially, "Mouseion" was used to mean a place where scientists, philosophers, and poets engaged in science and creativity worked. Over time, this term began to refer to institutions specializing in the collection, preservation, study, and exhibition of objects of historical, cultural, and scientific significance.

The oldest museum recognized by the scientific community today is the Ennigaldi-Nanna Museum. It was founded in the ancient Mesopotamian city of Ur (now Iraq) around 530 BC. The founder of this museum was the high priestess Ennigaldi-Nanna, daughter of the last ruler



of the Neo-Babylonian kingdom, Nabonidus. Archaeologist Sir Leonard Woolley discovered the remains of this museum during his excavations in Ur in 1925. Research has shown that the museum contains sculptures, stone objects, religious objects and other historical relics dating back even earlier, and the exhibits are accompanied by ceramic descriptions written in three languages. This indicates that the tradition of scientific interpretation of museum exhibits existed three thousand years ago. Another place that played an important role in the history of museums is the Alexandrian Mouseion. It was founded in the early 3rd century BC, approximately between 295 and 290 BC, in Alexandria, Egypt, on the initiative of Ptolemy I Soter, and was further developed during the reign of his successor Ptolemy II Philadelphus. The Alexandrian Museum served as a scientific academy and research center rather than a museum in the modern sense. It operated together with the famous Library of Alexandria and played an important role in the development of mathematics, astronomy, geography, medicine, and philosophy. Many great scientists, such as Euclid, Eratosthenes, Aristarchus of Samos, and Callimachus, worked in this scientific center. The formation of modern museums in Europe dates back to the late 17th century. The Ashmolean Museum, one of the first modern public university museums in the world, was opened in Oxford, England, in 1683. The museum was founded on the basis of rich collections donated to Oxford University by the English scientist and collector Elias Ashmole. These collections consisted of exhibits collected over many years by the naturalist and traveler John Tradescant (father) and John Tradescant (son). The Ashmolean Museum went down in history as one of the first modern museums, combining the principles of scientific research, education and openness to the public. In the 18th century, museums began to be state-owned and opened to the general public. In particular, the British Museum was founded in 1753 by an act of the British Parliament and began receiving visitors on January 15, 1759. Its foundation was the personal collection of the English physician and naturalist Sir Hans Sloane, consisting of more than 71 thousand exhibits. Shortly thereafter, on August 10, 1793, the Louvre Museum (Musée du Louvre) in France was opened to the public. The Louvre, formerly a royal palace, was transformed into a national museum after the French Revolution and became one of the largest centers of world cultural heritage. Thus, museums initially emerged as religious and scientific centers, and later became institutions serving to preserve historical and cultural treasures, conduct scientific research, develop education, and meet the cultural and educational needs of society. By the 21st century, as a result of the development of information and communication technologies, museum activities reached a new level, and digital and virtual museums were formed alongside traditional museums, becoming a modern means of preserving and promoting historical and cultural heritage.

Discussion

The development of museum communication, expansion of audience visits, and on this basis, increase in its income are considered the basis of museum tourism. According to their communicative function, museums are not only of historical importance, but also serve the active participation of modern man in socio-cultural processes, ensuring harmony with society.



Expanding the range of museum activities increases the demand for cultural tourism resources and expands the opportunities for employment not only for museologists, but also for art managers, designers, artists, and art historians. In this regard, it is appropriate to note the opinion of the President of the Republic of Uzbekistan Sh. Mirziyoyev that “We must also use the great potential for tourism development to solve the problem of population employment. For this purpose, the recently established Tourism Committee should direct its funds and foreign investments to the development of infrastructure that meets international standards.” For this purpose, under the leadership of the Tourism Committee, in coordination with the Ministry of Economy and Finance, the Academy of Sciences and the Academy of Arts, in cooperation with art managers, designers, artists, art historians, and programmers, QR3 codes and other projects have been developed for entering objects of material and cultural heritage. These innovative developments have shown their importance in cultural tourism activities and are being implemented in the practice of the Oybek House Museum, the Museum of the History of Applied Arts and Crafts of Uzbekistan, and the Karakalpakstan State Museum of Arts named after I.V. Savitsky.¹

According to the Statistics Agency, as of January 1, 2024, the number of museums in Uzbekistan was 140, and they were visited by 5,711.2 thousand people during 2023.

The top 5 museums in our country with the most visitors:

Registan Ensemble - 1,010.8 thousand people;

Samarkand State Museum Reserve - 1,006.6 thousand people;

State Museum of Glory as part of the Victory Park Memorial Complex - 648.5 thousand people;

Khiva Ichan-Kala State Museum Reserve - 448.4 thousand people;

Bukhara State Museum Reserve - 390.3 thousand people².

Historical records indicate that museological work in Turkestan was actively carried out in the second half of the 19th century, and the first museums were established in 1876 (now the Museum of the History of Uzbekistan). Also, during this period, the activities of the Samarkand Folk Museum (now the A. Ikromov Museum of the History of the Peoples, Culture and Art of Uzbekistan) and the Fergana Folk Museum (now the Fergana Regional Museum of Local Lore) were initially established in the republic in 1896. The establishment of museum work in the southern regions of Uzbekistan at the beginning of the 20th century is certainly due to factors such as the rich history of this oasis, which dates back to ancient times. If we pay attention to historical data, the history of our oasis, which has the oldest urban culture (Sopollitepa, Jarkuton) and the history of statehood (Bactria), is being studied with great interest by world scientists today.

Also, the establishment of several new museums in our country shows how much attention has been paid to the museum sector during the years of independence. In particular, on August 14, 1996, the Cabinet of Ministers adopted resolutions “On the establishment of the Museum of

¹ QR-kod (inglizcha. Quick Response Code — tez ma'lumot beruvchi kod; QR code qisqartmasi.) — matrik shtrix kodlar belgilari umumlashtirilgan. Denso-Wave Yaponiya kompaniyasi tomonidan 1994 yildan amaliyotga joriy etilgan. (<https://ru.wikipedia.org/wiki/QR>).

² www.stat.uz



Olympic Glory”, on January 24, 1997, “On the establishment of the State Museum of the History of the Temurids”, and on November 8, 2002, the Cabinet of Ministers adopted resolutions on the organization of the activities of the Museum “Memory of Victims of Repression”. In 1991-1994, there were 73 museums in our country³.

During the years of independence, the preservation, scientific study and dissemination of historical and cultural heritage in Uzbekistan became one of the priority areas of state policy. As a result, the republic's museums began to turn not only into places storing historical exhibits, but also into modern scientific and educational centers serving the development of scientific research, cultural diplomacy, tourism and education. In particular, in recent years, special attention has been paid to digitizing museum activities, creating interactive expositions, organizing virtual tours and introducing multimedia technologies. This significantly expands the possibilities of not only preserving historical heritage, but also presenting it to the general public through modern methods.

Among the museums of Uzbekistan, one of the institutions of special scientific and historical importance is the State Museum of the History of Uzbekistan. This museum was founded in 1876 under the Governor-General of Turkestan under the name "People's Museum of Turkestan" and is one of the oldest museums in Central Asia. The museum's collection currently contains more than 250,000 archaeological finds, numismatic samples, ethnographic items, manuscripts, historical documents and works of art. These exhibits comprehensively illustrate the history of the territory of Uzbekistan from primitive times to the period of independence. After two years of reconstruction and modernization, the museum reopened in 2026 with a new exposition. The renovated museum has introduced touch-screen information systems, multimedia screens, digital maps, interactive expositions and modern visual technologies. This allows visitors to not only watch historical events, but also to study them interactively.

Today, one of the largest scientific and educational projects in Uzbekistan is the Center for Islamic Civilization in Uzbekistan. This center was established on the basis of the resolution of the President of the Republic of Uzbekistan dated June 23, 2017, and its foundation stone was laid in 2018. The center was commissioned in 2026. Built on the territory of the Hazrati Imam complex, this complex operates as a unique cultural platform that combines a scientific center, museum, library and modern information technologies. The center's exposition covers the stages of historical development from the era of pre-Islamic civilizations to modern Uzbekistan. It displays the scientific heritage of such great scholars as Imam Bukhari, Imam Moturidi, Imam Termidhi, Abu Rayhan Beruni, Muhammad al-Khwarizmi, Ahmad al-Farghani, Abu Ali ibn Sino, Mirzo Ulugbek through modern multimedia tools, holographic technologies, 3D models and interactive displays. The "Time Wall", "Time Capsule", digital expositions and the Quran Hall in the center are of particular importance as a practical expression of the principles of digitization and virtualization in today's museology.

³ https://t.me/Erus_uz



As a result of the rapid development of information and communication technologies, a new direction in the field of museology has emerged - virtual museums. A virtual museum is an electronic platform that presents historical, cultural and scientific heritage to the general public via the Internet using digital technologies. Australian scientist Sarah Kenderdine emphasizes that the use of 3D visualization, virtual reality (VR) and augmented reality (AR) technologies in modern museums helps visitors to understand historical events more deeply. In her opinion, digital exhibitions transform the viewer from a passive observer into an active participant (Kenderdine, 2021). In such museums, exhibits are displayed using high-resolution digital images, 3D models, panoramic views, virtual tours (Virtual Tour), augmented reality (Augmented Reality – AR) and virtual reality (Virtual Reality – VR) technologies. Therefore, virtual museums are recognized as one of the most important innovative directions in museology of the 21st century. British museologist Ross Parry argues that digitization is not a simple technological upgrade of the museum, but a new stage that fundamentally changes its activities. According to the scientist, with the help of digital technologies, museums are creating new forms of storing exhibits, conducting scientific research and communicating with visitors. Therefore, virtual museums have become an important direction of museology in the 21st century (Parry, 2007).

Result

Today, many major museums around the world have created virtual platforms by digitizing their activities. One of the most famous of them is the Louvre Museum (France), through its official website, users have the opportunity to virtually view collections of ancient Egyptian, Greek, Roman and Renaissance art. The British Museum (Great Britain), in collaboration with the Google Arts & Culture platform, presents millions of exhibits in high-quality digital format. The Vatican Museums, the Smithsonian Institution (USA), the Metropolitan Museum of Art (USA), the State Hermitage Museum (Russia) and the Rijksmuseum (Netherlands) are also major cultural centers that have successfully implemented virtual museum technologies. In particular, the Google Arts & Culture project, launched by Google in 2011, united thousands of museums and galleries in more than 80 countries of the world into a single digital platform, marking a new stage in the development of virtual museums.

The main goal of virtualizing museums is to preserve historical and cultural heritage, reliably transfer it to future generations, and make it accessible and accessible to people anywhere in the world. Virtual museums reduce the risk of damage to original exhibits due to natural disasters, fire, war, or the effects of time. At the same time, people with disabilities, residents of remote areas, students, and researchers will have the opportunity to get acquainted with historical exhibits online without having to visit museums. In addition, 3D modeling technologies allow for a comprehensive study of exhibits, scientific research, and effective use in the educational process. Virtual museums also serve as an important tool in the development of international tourism, as many tourists first view the museum virtually and then decide to visit it in person.



Museologist Fiona Cameron describes virtual museums as "a new communication environment for digital cultural heritage." In his opinion, virtual platforms transform museums not only as places for exhibiting exhibits, but also as interactive spaces for developing scientific communication and education (Cameron, 2007).

However, virtual museums also have some disadvantages. First of all, the virtual environment cannot fully convey the aesthetic and emotional impression that results from directly viewing the original exhibit. In addition, the creation of high-quality virtual platforms requires significant financial resources, modern technical equipment and qualified specialists. The possibilities of effective use of virtual museums are limited in regions with low Internet quality. Also, protecting digital data from cybersecurity threats is one of the pressing issues.

Consistent work is being carried out in Uzbekistan to digitize and virtualize museums. In particular, virtual tours, interactive information systems, touch screens and 3D visualization technologies are being introduced in some museums within the State Museum of History of Uzbekistan, the State Museum of the History of the Timurids, the Ichan Kala State Museum-Reserve, the Savitsky State Museum of Karakalpakstan, the State Museum of Art of Uzbekistan, the Center of Islamic Civilization in Uzbekistan, and the Samarkand State Museum-Reserve. In particular, the holographic technologies used in the Center of Islamic Civilization, the "Time Wall", the "Time Capsule" and interactive expositions deserve special attention as a modern example of digitization in the museology of Uzbekistan.

The issue of virtual museums is currently being studied by many scientists internationally. Canadian museologist Ross Parry is one of the leading experts who developed the theory of digital museums, and his works *Recoding the Museum: Digital Heritage and the Technologies of Change* (2007) and *Museums in a Digital Age* (2010) are the main scientific sources of this direction. British scientist Fiona Cameron has studied the socio-cultural significance of digital cultural heritage and virtual museums. Italian scientist Maurizio Forte has also extensively covered the role of virtual archaeology and 3D reconstruction technologies in museum practice. American scientist Sarah Kenderdine is recognized as one of the leading researchers in the application of immersive technologies, virtual reality and interactive exhibitions in museum activities. Italian scientist Maurizio Forte notes that virtual reconstruction allows for the scientific restoration of historical monuments and their presentation to future generations in a form close to their original state. According to the scientist, digital technologies have initiated a new methodological stage in the study of archaeological heritage (Forte, 2010).

According to the new definition adopted by ICOM (International Council of Museums) in 2022, modern museums should operate not only as institutions preserving historical heritage, but also as open and inclusive spaces that promote social development, science, education and cultural exchange. This approach further increases the relevance of the processes of digitization and virtualization of museums.



Conclusion

Thus, the virtualization of museums, in addition to being a modern way to preserve historical and cultural heritage, has become an important factor in the development of science, education, tourism and cultural diplomacy. With the help of modern digital technologies, museums have risen to a new level not only as a place for displaying exhibits, but also as a center for global information exchange, scientific research and cultural dialogue. In my opinion, although the process of digitization of museums in Uzbekistan has been developing rapidly in recent years, the creation of a single national platform of virtual museums, digitization of all museum funds in 3D format, and the introduction of interactive excursions based on artificial intelligence remain urgent tasks. This will serve to widely promote the national cultural heritage internationally and increase the effectiveness of scientific research.

REFERENCES

1. Mirziyoyev Sh.M. Ensuring the rule of law and human interests - the guarantee of the development of the country, the well-being of the people. - Tashkent: Uzbekistan, 2017.
2. Resolution of the President of the Republic of Uzbekistan No. PQ-3080 dated June 23, 2017 "On the establishment of the Center of Islamic Civilization in Uzbekistan".
3. UNESCO. Recommendation concerning the Protection and Promotion of Museums and Collections, their Diversity and their Role in Society. Paris, 2015.
4. UNESCO. Charter on the Preservation of Digital Heritage. Paris, 2003.
5. ICOM. Museum Definition. Prague, 2022.
6. Ross Parry. Recoding the Museum: Digital Heritage and the Technologies of Change. Routledge, London, 2007.
7. Ross Parry (Ed.). Museums in a Digital Age. Routledge, London, 2010.
8. Fiona Cameron, Sarah Kenderdine (Eds.). Theorizing Digital Cultural Heritage. MIT Press, 2007.
9. Maurizio Forte. Cyber-Archaeology. Archaeopress, Oxford, 2010.
10. Ambrose T., Paine C. Museum Basics. 4th Edition. Routledge, London, 2018.
11. Lord B., Lord G.D. The Manual of Museum Management. Rowman & Littlefield, 2009.
12. Macdonald S. A Companion to Museum Studies. Wiley-Blackwell, 2006.

