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ROLE OF DIGITAL TECHNOLOGY IN MODERNIZATION OF CULTURAL MUSEUM

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ABSTRACT

Modern museums have evolved into dynamic centers for education and entertainment, meeting diverse societal needs. They curate and display historical, scientific, and artistic artifacts, offering visitors valuable insights into the evolution of humanity. Increasingly, museums are integrating advanced technologies, such as augmented reality, virtual reality and interactive digital displays, to create immersive and engaging experiences. These innovations enhance accessibility, foster global outreach, and serve to diverse audiences, ranging from academics to tourists. Additionally, tools like self-guided audio tours, multilingual content, and hybrid virtual programming highlight how museums are adopting inclusive and sustainable practices. In India, the museum movement commenced with the Asiatic Society of Bengal in 1784, gradually evolving into a diverse array of institutions that honor the nation's rich cultural heritage. On a global scale, technological innovations have transformed museum experiences, ensuring the preservation and sharing of cultural heritage while meeting the expectations of a technology-oriented society.

Introduction

The term "Museum" is derived from the Ancient Greek word "Mouseion," which refers to a temple dedicated to the Muses, the divine figures associated with the arts in Greek mythology. Although the notion of a museum has transformed over the years, its fundamental purpose continues to be the preservation and sharing of knowledge. The Oxford dictionary characterizes a museum as "a building in which objects of historical, scientific, artistic, or cultural interest are stored and exhibited," while the International Council of Museums (ICOM) define that "A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates, and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study, and enjoyment." Museums safeguard the cultural heritage of humanity, ensuring its preservation for future generations while educating society about the remarkable histories of ancient civilizations. In addition to their preservation efforts, museums display the rich and illustrious histories of nations, highlighting cultural legacies, technological advancements, and the progressive journey of humankind. They act as centers for entertainment, enjoyment, and education, all within a single venue.

The purpose of museums transcends the simple preservation and display of rare artifacts and antiquities. They act as platforms for the dissemination of knowledge, enhancing understanding, and fostering curiosity (Nasrin, 2024). As noted by Chandrasekaran (2017),

collections of artifacts into vibrant educational institutions. They not only serve the academic community but also satisfy the intellectual interests of the general public and enthusiasts alike. A museum serves as a guardian of its collections, ensuring that exhibits of artistic, historical, or scientific importance are accessible to the public through both temporary and permanent displays (Pushakar, 2013). Ames (1986) notes that museums provide individuals with the opportunity to juxtapose their perceptions of reality against historically recognized narratives, thereby presenting an objective perspective of reality encapsulated within their exhibits. Museums are distinctly equipped to facilitate the visualization of humanity's evolutionary journey. The organized presentation of artifacts and scientific knowledge within their confines grants visitors a thorough understanding of our shared history. By curating art and artifacts, museums play a significant role in fostering the revival of culture from an intellectual standpoint.

As Roy (2006) points out, museums must embody three fundamental characteristics. First, they should exhibit antiquities in a flexible manner, utilizing visual aids such as charts. Second, the antiquities must be oriented towards value, promoting knowledge transfer through their displays. Finally, a museum must possess its own content, providing original and authentic exhibits for public engagement. Ultimately, museums function as essential institutions that connect the past, present, and future, addressing the intellectual, cultural, and educational needs of society.

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Origins of the Indian Museum



The museum movement in India has a rich history that can be traced back to various institutions aimed at educating and entertaining the public. Early Indian establishments, including *alekhyagrihs*, *devakulas*, *viswakarmamandiras*, *chitrashalas* and monasteries significantly contributed to the preservation of cultural and artistic traditions (Roy, 2006). The development of modern museums in India commenced with the founding of the Asiatic Society of Bengal in 1784, which established a museum in 1814. This initiative represented the first organized attempt to systematically display antiquities and cultural artifacts. The museum was divided into two primary sections; one is the archaeological and ethnological section and seconds the geological and zoological section. In 1875, the collections were moved to the Indian Museum in Calcutta, thereby affirming its status as the oldest museum in India. Following this, numerous other museums were established throughout the country, including:

1. Government Museum, Madras (1851)
2. Natural History Museum, Trivandrum (1857)
3. Central Museum, Nagpur (1863)
4. Lady Wilson Museum (1928)

In the 19th century, the British administration played a pivotal role in the advancement of museums and similar institutions. They founded the Geological Survey of India and the Botanical Survey of India, in addition to the Archaeological Survey of India and the Asiatic Society. These organizations were dedicated to research, preservation, and the

in India perceived the nation as a rich repository of antiquities, which further stimulated the creation of museums to document and display their findings. The establishment of the Anthropological Survey of India highlighted the effects of modernization and migration on the lifestyles of tribal populations. This initiative prompted efforts to collect, safeguard, and exhibit the heritage of these communities. The Survey initiated programs to create regional anthropological museums in areas predominantly inhabited by tribal groups, with the goal of preserving their art, crafts, and material culture. A prominent instance of this is the museum of tribal art, which was founded by the Government of Madhya Pradesh in 1982 (Das, 1989). Following independence, numerous treasures, artworks, and artifacts that were once located in the palaces of Rajas and Maharajas were transformed into public museums. This period witnessed a significant proliferation of museums throughout India. Additionally, state governments actively engaged in establishing museums within their regions, thereby reflecting the country's rich cultural and historical heritage (Punja, 1990).

Technology Trends Revolutionizing Cultural museum

1. Digital Information for Accessibility

Ensuring digital accessibility is a vital component of adhering to the Americans with Disabilities Act (ADA). Museums can utilize technology to enhance both their digital and physical offerings, making them more inclusive for individuals with disabilities. For example, multimedia resources can address diverse

enhancement of art and culture. Western philosophers and researchers who arrived

needs by providing audio assistance for those with visual impairments, as well as



videos, images, and transcripts for individuals with hearing challenges.

2. Multilingual Content Integration

Offering content in various languages is crucial for engaging a wide range of audiences. Digital displays and tour applications in museums can present multilingual information without overwhelming physical exhibits. The use of advanced AI translation tools can streamline the translation process, while the employment of professional editors guarantees the quality and precision of the content.

3. Immersive Augmented Reality Experiences

Augmented Reality (AR) is transforming the museum landscape by facilitating immersive and realistic interactions. A prominent example is the National Museum of Natural History in Paris, which employs AR technology to animate extinct species. Such captivating exhibits are particularly attractive to families and children, positioning AR as an increasingly popular trend in museum innovation.

4. Self-Guided Audio Tours

Institutions like the Walt Disney Family Museum have adopted audio tour applications, enabling visitors to discover narratives at their own pace. These applications are favored for their ability to eliminate the necessity for shared devices, promote hygiene, and accommodate those who prefer solitary exploration. In the years ahead, museums are anticipated to broaden their use of audio tours to convey more significant stories and assess their societal impact.

5. Interactive Digital Displays

interactive content significantly enhancing the visitor experience in museums. These digital displays present a myriad of opportunities, including interactive maps, scenes, and timelines, which convert static exhibits into vibrant and engaging presentations.

6. Cloud-Based Ticketing

Cloud-based ticketing solutions provide contemporary options such as paperless tickets, contactless entry, and scheduled admissions. While many larger museums have already implemented this technology, smaller institutions are progressively adopting it to enhance visitor convenience and optimize operational efficiency.

7. QR Codes for Seamless Engagement

QR codes serve as a flexible and user-friendly resource within museums. Visitors can scan these codes to access menus, applications, newsletters, or donation platforms directly on their devices. This straightforward technology fosters engagement while ensuring a contactless experience.

8. Discoverable Online Collections

The movement towards making private collections accessible online is gaining momentum. Digital collection platforms enable museums to display items through images, videos, and descriptive text. By optimizing these collections for search engines, museums can enhance their visibility, thereby attracting a larger audience and potential patrons.

9. Hybrid Virtual Programming

Although in-person experiences are currently in high demand, virtual

The transition from traditional physical displays to digital formats is increasingly prevalent, with kiosks and

programming remains essential for international visitors, students, and individuals with mobility challenges. Hybrid



models combining in-person and virtual museum tours facilitate broader participation, promoting inclusivity and extending global outreach.

The Role of Technology in Modern cultural museum

Technology has become an integral component of contemporary society, making it difficult to envision daily life without its digital aspects. This widespread impact is particularly evident in museums, where technology has significantly enhanced visitor engagement and redefined the conventional functions of these institutions. Across the globe, museums are adopting cutting-edge technologies such as Augmented Reality and Virtual Reality to deliver immersive and authentic experiences to their audiences. These innovations enable museums to reconstruct historical events, simulate archaeological environments, and facilitate interactive narratives, thereby providing a tangible connection to the subject matter. Prominent examples include the Prado Museum in Madrid, the Science Museum in London, and the Miraikan(National Museum of Emerging Science and Innovation) in Tokyo, where digital tools and interactive exhibits have garnered widespread acclaim from visitors.

The digital revolution has significantly altered the landscape of museums through technological advancements. This shift has favorably influenced their sustainability by drawing in larger audiences and boosting revenue streams (Sethi and Naik, 2021). While the adoption of cutting-edge technology often necessitates considerable financial investment, the

andBorza, 2016). Museums are now embracing innovative technologies that offer visitors distinctive and memorable experiences. These technologies are capable of storing extensive information and presenting it in customizable formats to accommodate a wide range of audiences and their individual preferences. Furthermore, visitors can access museum content remotely, which enhances global accessibility and promotes inclusivity. Consequently, technology ensures that museum resources are available to individuals from the comfort of their homes or any location worldwide (Medic and Pavlovic, 2014).

Nevertheless, it is essential that these technologies are implemented with strategic foresight to ensure alignment with the museum's primary objectives. While engaging audiences, these technologies should not detract from the fundamental mission of preserving and sharing cultural heritage. Rather, they should enhance this mission by facilitating memorable and impactful experiences (Vaz, Fernandes, and Veiga, 2018). On a global scale, there is an increasing awareness and concern regarding the conservation and preservation of cultural heritage. Museums, bolstered by technology, play a crucial role in protecting the tangible remnants of our ancestors for future generations. This collaboration between technological progress and cultural preservation illustrates the dynamic relationship between tradition and modernity (Mahapatra, 2017).

Conclusion

Museums have transcended their traditional roles as mere repositories of

benefits in terms of visitor engagement and satisfaction have been remarkable (Pop

artifacts to become vibrant hubs of education, cultural preservation, and



public engagement. Rooted in history yet dynamically adapting to the demands of modern society, they offer a blend of entertainment, intellectual stimulation, and community service. By integrating advanced technologies such as Augmented Reality, Virtual Reality, and interactive digital displays, museums are redefining the visitor experience, making cultural heritage of communities more accessible, engaging, and inclusive. In India, the evolution of museums, from colonial-era institutions to modern centers of cultural pride, reflects the nation's commitment to preserving its diverse heritage for future generations. Globally, the integration of technology has further enhanced their role in sustaining and disseminating the essence of human history and culture.

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