

The Impact of Cloud Technologies on Preserving and Promoting Cultural Identity

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Abstract. This study explores cloud technologies' role in cultural preservation and promotion, analyzing accessibility, collaboration, and cost-effectiveness. The paper identifies challenges, including the digital divide and cyber-security concerns, and emphasizes addressing them to harness cloud technologies' full potential in cultural heritage initiatives.

Keywords: Cloud Technologies, Digitalization, Cultural Heritage, Cultural Identity.

1 Introduction

Cloud technologies have revolutionized various sectors, including communication, information sharing, and resource management. However, the impact of these technologies on cultural preservation and promotion is still under-explored. This paper aims to investigate the role of cloud technologies in preserving and promoting cultural identity, addressing the opportunities and challenges they pose. The study's objectives include exploring the ways cloud technologies enhance accessibility, collaboration, and cost-effectiveness in cultural heritage initiatives and identifying potential drawbacks such as the digital divide and cyber-security concerns. The analysis is based on a review of recent literature, case studies, and expert opinions. The paper concludes that cloud technologies can significantly contribute to cultural preservation and promotion, but potential challenges should be addressed to fully harness their potential.

2 Cloud Technology Possibilities for Preservation of Cultural Heritage and Ancestral Memory

Cloud technologies have the potential to revolutionize the way we preserve cultural heritage and promote cultural identity. From digital storage to virtual reality experiences, the use of cloud-based systems offers new and innovative ways to protect and share important cultural artifacts and objects. Here, we will look at the different ways in which cloud technologies can be used for the preservation of cultural heritage and

the promotion of cultural identity, as well as some of the challenges that need to be overcome in order to fully realize the potential of this technology.

One of the most promising applications of cloud technologies in cultural heritage is digital preservation. With the rapid development of digital technology, more and more cultural artifacts are being digitized, including photographs, manuscripts, and even 3D scans of sculptures and architecture. However, the sheer volume of digital data, as well as the associated logistics and costs, can make it very difficult to properly preserve and access these artifacts.

Cloud-based systems can help by providing scalable and cost-effective storage solutions for digital artifacts. Instead of having to maintain and upgrade physical storage systems, heritage institutions can store their digital collections in the cloud, where they can be easily accessed and shared with researchers and the public. In addition, cloud-based systems can automatically back up the various digital collections, providing an additional layer of protection against data loss and preservation of cultural identity and ancestral memory.

Another area where cloud technologies can play a crucial role is in the creation of virtual reality experiences that allow people to explore and interact with cultural heritage sites that may be difficult or impossible to access in person for various reasons. For example, many of the masterpieces of modern art such as Leonardo da Vinci's Mona Lisa, apart from being enclosed in glass to protect against vandalism, are constantly surrounded by tourists and the idea of direct contact with high art is irrelevant to say the least. Often, cultural heritage sites have to be kept at a certain temperature, humidity, etc., unsuitable for visitors, these sites undergo periodic restorations, etc., which would again melt the enthusiasm of even the most ardent cultural tourists. On the other hand, a virtual tour of an ancient Egyptian tomb or a 3D reconstruction of a medieval castle can give people a fairly accurate idea of what it would be like to actually be there, even if the site is in a remote area or has been destroyed, and eventually the price and effort for the inquisitive ones are many times smaller and at the same time they can "touch" many more landmarks.

Similar virtual reality experiences can be created using 3D modeling and simulation techniques that can be powered by cloud-based resources. These resources can provide the computing power and storage needed to generate realistic 3D models of cultural heritage sites and to simulate different lighting or weather conditions that would actually be present at the site. In addition, cloud-based systems can be used to create interactive experiences that allow people to explore and learn more about a relevant cultural landmark in an engaging and interactive way.

Cloud technologies can also be used to improve the interpretation of cultural heritage sites. Using natural language processing and machine learning, cloud-based systems can help generate interactive and engaging explanations of the history and significance of a particular site or artifact. This can help make cultural heritage more accessible and attractive to a wider audience.

For example, cloud-based chatbots can be used to answer questions about a cultural heritage site or artifact, providing visitors with much more information and context than they would receive if they simply visited the site. In addition, cloud-based systems can be used to generate multimedia content, such as videos and podcasts, which can provide

visitors with a more immersive and engaging experience and exposure to the cultural identity of nations and peoples.

Although there are many potential benefits of using cloud-based technologies for cultural heritage conservation, there are also challenges that need to be overcome to fully realize the potential of these technologies. One of the main challenges is implementation costs. Developing and deploying cloud-based systems can be quite an expensive affair, and this can be a barrier for many of the smaller heritage institutions, which typically do not have sufficient funding to invest in such cutting-edge technologies. In addition, there may be a lack of expertise in cloud technologies among heritage professionals in smaller museums, which may make it difficult to effectively implement and use them.

Another challenge is ensuring the security and privacy of digital collections stored in the cloud. With cloud-based systems, there is always the risk of data breaches or unauthorized access to sensitive information (NIST Cloud Computing, 2013). This is particularly important when it comes to preserving cultural heritage, especially if it is done at national or European level, as the loss or damage of digital collections can have significant consequences. It is therefore important to ensure that cloud-based systems are properly secured and that access to digital collections is restricted to authorized individuals.

In recent years, cloud technologies have transformed various sectors, including healthcare, education, and business, by providing on-demand access to resources and services (Mell & Grance, 2011). In the field of cultural preservation and promotion, cloud technologies offer promising opportunities for enhancing the accessibility, collaboration, and cost-effectiveness of cultural heritage initiatives (Borowiecki & Navarrete, 2017).

Cloud technologies provide a platform for easily accessing, storing, and sharing digital cultural content across the globe (Pierotti, 2016). This increased accessibility allows for the preservation and dissemination of cultural heritage materials, facilitating a wider audience's engagement with the content (Cameron & Kenderdine, 2010). In addition, cloud-based platforms offer scalability and flexibility, allowing institutions to accommodate growing collections and expanding user bases (Madhi (Kacollja), Shqau, & Lekaj, 2014).

Cloud technologies facilitate collaboration and networking among cultural heritage institutions, researchers, and communities (Borowiecki & Navarrete, 2017). Through cloud-based platforms, stakeholders can share resources, knowledge, and expertise, fostering interdisciplinary and cross-cultural collaborations (Dallas, 2016). Moreover, cloud technologies enable crowdsourcing and participatory initiatives, empowering local communities to contribute to the preservation and promotion of their cultural heritage (Oomen & Aroyo, 2011).

Adopting cloud technologies can reduce the costs associated with maintaining physical infrastructure, software, and hardware for cultural heritage institutions (Sultan, 2010). In addition, cloud-based solutions offer a pay-as-you-go pricing model, enabling institutions to optimize their expenses based on their needs and available resources (Borowiecki & Navarrete, 2017).

Despite the benefits of cloud technologies, a digital divide persists, limiting access to digital cultural resources for individuals and communities with limited internet connectivity or digital literacy (Warschauer, 2004). This disparity may exacerbate existing inequalities and hinder the preservation and promotion of cultural heritage among marginalized groups (Graham & Zook, 2013).

Cloud technologies raise concerns regarding the security and privacy of sensitive cultural heritage data (Helmbrecht, 2010). Ensuring the protection of digital cultural resources from unauthorized access, data breaches, and cyber-attacks is crucial for preserving the integrity and trustworthiness of these resources (Borowiecki & Navarrete, 2017).

3 European Cloud for Cooperation in the Field of Cultural Heritage

Given all these issues and challenges, in 2022 the European Commission launched a dialogue with Member States on the joint creation of a cultural heritage cooperation cloud to support the protection of cultural heritage through digital infrastructure. The idea of the European cloud is to promote cooperation between the cultural, creative and technical sectors. The cloud will enable the use of cutting-edge technologies for digitizing artefacts, researching works of art and documenting data, all of which will enable significant advances and add a new digital dimension to the preservation and promotion of cultural heritage. The aim is to facilitate access to modern technology and remove barriers for smaller and remote institutions.

In her speech, the Bulgarian European Commissioner Maria Gabriel stated: “So far, only 30% to 50% of the cultural collections in Europe have been digitized. Europe's rich cultural heritage will enter a new digital dimension with the European Collaborative Cloud for Cultural Heritage. This European effort will facilitate cooperation between researchers, curators and museum professionals in order to safeguard our cultural heritage, enable easy access to cultural content and allow future generations to enjoy it for years to come. It will also offer new opportunities to smaller museums and cultural institutions to advance digitization and work together on joint projects in secure and highly professional working space.” She highlights three essential elements distinguishing a unique digital infrastructure. First, this digital infrastructure will provide innovative solutions for the digitization and preservation of artefacts, museum archives and works of art. Secondly, the cloud will provide free access to large volumes of data and a secure digital space for collaboration. Thirdly, the digital infrastructure will ensure the protection of intellectual property rights through high-tech encryption and signature equipment (European Commission, Directorate-General for Research and Innovation, Brunet, P., De Luca, L., Hyvönen, E., et al., 2022).

4 Conclusions

Cloud technologies offer significant opportunities for preserving and promoting cultural identity by increasing accessibility, fostering collaboration, and reducing costs. However, potential drawbacks, such as the digital divide and cyber-security concerns, must be addressed to fully harness their potential. Future research should explore the development of inclusive strategies and policies to ensure equal access to digital cultural resources and the implementation of robust security measures to protect sensitive data. By addressing these challenges, cloud technologies can play a pivotal role in the preservation and promotion of global cultural heritage, fostering a deeper understanding and appreciation of diverse cultural identities.

In conclusion, cloud technologies have the potential to revolutionize the way we preserve cultural heritage. From digital storage to virtual reality experiences, cloud-based systems offer new and innovative ways to protect and share important cultural artifacts and objects. However, there are also challenges that must be overcome to fully realize the potential of this technology. To this end, it is crucial that cultural heritage institutions collaborate with experts in the field of cloud technologies and invest in the development and implementation of cloud-based systems. In addition, security and privacy measures must be put in place to protect digital collections stored in the cloud.

With the right investment and collaboration, cloud technologies can help ensure that cultural heritage, national identity and ancestral memory are preserved for future generations, and that people around the world can empathize with creators' understanding of art and culture, regardless of distance and time. As technology continues to evolve, it is critical that cultural heritage institutions explore and adopt new technologies such as cloud computing to ensure that our cultural heritage is adequately preserved and shared.

The implementation of cloud technologies for the preservation of cultural heritage and the promotion of cultural memory is an extremely promising approach, which is practically irreplaceable, given the fact that every cultural object has a certain lifespan and without its digitalization, sooner or later it is doomed to oblivion. The European Commission is aware of these trends and has outlined a clear strategy with the idea of a European Cloud for cooperation in the field of cultural heritage. It will be an opportunity for cost-effective and scalable storage of digital artefacts and enhancing the interpretation of cultural heritage sites, but will also come with its own set of challenges related to multiple national legislations, cultural specificities and local cultural ecosystems. However, with the right investment and cooperation at national and European level, these challenges can undoubtedly be overcome and Europe's cultural heritage can be adequately promoted, preserved and shared with the world.

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