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Uniting The Past and Future: Technology-Based Strategies to Nurture Cultural Identity

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Abstract

The development of digital technology has brought significant changes in the way people understand, access, and maintain culture. The use of Artificial Intelligence (AI), Augmented Reality (AR), and Virtual Reality (VR) has enabled cultural documentation in a more dynamic and interactive form while presenting challenges in maintaining cultural authenticity that is threatened by global cultural homogenization. This research explores how technology-based strategies can be integrated with cultural preservation without reducing the essence of traditional values. Using qualitative methods and digital ethnography, this research explores the interaction between cultural communities, technology developers, and government agencies. The results show that while technology is improving cultural accessibility, there is still a deep need for approaches that preserve the physical and emotional experience of understanding culture. This research offers insights into policymaking and technological development that not only documents culture, but also maintains its integrity and social function in society.

Keywords: Digital technology, Cultural preservation, Virtual reality, Augmented reality, Cultural authenticity.

1. Introduction

Culture is a reflection of the values, traditions, and identity of a society that is inherited from generation to generation. Along with the development of the times, culture is not only a heritage that must be preserved but also adapted to remain relevant to the evolving social dynamics. Globalization and the advancement of digital technology have changed the way people understand, access, and maintain their culture. On the one hand, technology presents an opportunity to preserve and disseminate cultural heritage more inclusively and interactively. On the other hand, there is a challenge in maintaining cultural authenticity so that it is not distorted by global cultural homogenization (Sangeethaa et al., 2024).

In the last decade, digital technology has played a significant role in cultural modernization. The use of Artificial Intelligence (AI), Augmented Reality (AR), Virtual Reality (VR), and blockchain has enabled cultural documentation in a more dynamic and interactive form. For example, the Google Arts & Culture project enables global access to collections of art, artefacts, and cultural heritage from different parts of the world in high-quality digital formats (Sudhir Bale et al., 2023). In Japan, VR technology has been utilized to reconstruct historic cities that have been lost, allowing people to "visit" the past in a virtual world (Okura et al., 2015). Another example is the use of blockchain to protect cultural intellectual property rights, such as those implemented by indigenous communities in Latin America, who use this technology to ensure the authenticity of their traditional arts and crafts (Mehta & Kukreja, 2024; Sørensen & Lansing, 2023; Tan, 2022).

However, the adoption of technology in cultural preservation also raises debate. One of the main concerns is that digital interactions may not be able to fully replace physical experience in understanding culture. In an interview with a curator of digital museums in Indonesia, he stated that although digitalization allows for wider access to culture, there is a risk that culture will only be seen as an object of visual consumption without deep meaning (Priyadharma, 2024; Saputra et al., 2023). This is in line with the view of Giddens (1991) in his theory of modernization, which states that technology changes patterns of social interaction and offers new opportunities for cultural identity, but also risks reducing traditional values if not integrated with a careful approach (Palacios Ramírez et al., 2020).

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In addition, technology has become an important tool for marginalized communities to maintain their cultural existence. For example, the Māori community in New Zealand uses AR apps to teach their language and traditions to younger generations (Boboc et al., 2022; Du & Sanmugam, 2024). Social media has also opened up space for people to share and revive their cultural heritage. In Indonesia, the cultural digitalization movement is increasingly prevalent with the emergence of educational content that discusses the philosophy of traditional fabrics, performing arts, and oral history in a format that is more accessible to the younger generation ("Development of Social Media-Based Cultural Community Applications: A Design Science Approach," 2023; Jones et al., 2023; Rachman, 2024).

Although there are many opportunities offered by technology, there is a need for a strategic approach so that modernization does not lead to the loss of authentic cultural values. A digital anthropologist in an interview confirmed that technology can accelerate cultural assimilation on a global scale. As cultures become more accessible and reproduced in digital formats, there is a risk that the core values of those cultures will be displaced by more dominant global cultural trends (Salehan et al., 2018). This phenomenon is in line with the findings of Castells (2010) which highlights how digitalization can accelerate cultural homogenization, causing local cultures to lose their uniqueness (Güner, 2024).

As digital technology develops, academia and cultural practitioners continue to explore how these innovations can be effective tools in preserving and preserving cultural heritage. Digitalization has allowed cultures to be archived in a variety of formats, but it is still not fully understood how technology can maintain the emotional, spiritual, and social engagement experiences that are an integral part of a culture (Kaur & Rai, 2024; Santosa et al., 2021).

While technologies such as Artificial Intelligence (AI), Augmented Reality (AR), and Virtual Reality (VR) have opened up new opportunities in cultural reconstruction and dissemination, there is no universal standard that ensures that these technologies can authentically represent culture without experiencing excessive simplification (Boboc et al., 2022; Murphy et al., 2024; Zhong et al., 2021). In addition, there is still a research gap in understanding how communities with different levels of technology access can adopt and adapt cultural digitalization strategies according to their social and economic contexts (Bezklubaya, 2023; Reyes-Alardo et al., 2023; Tripathi, 2024; Zheng et al., 2024).

It is also unknown to what extent the boundary between innovation and cultural commodification in the digital age, especially when culture is packaged in a digital format that is widely consumable, risks losing its essence, and is more oriented towards global market trends than its original meaning (Lazzeretti et al., 2022; Poddar, 2024; Towse & Handke, 2013). Therefore, further research is needed to develop a based strategy teknologi yang tidak hanya sekadar mendokumentasikan budaya, tetapi juga mampu mempertahankan nilai, fungsi sosial, dan keterlibatan komunitas dalam proses pewarisannya kepada generasi mendatang (Jiawei & Sangiamvibool, 2025; Yang & Inkuer, 2024).

Technological advances have had a profound impact on the way people access, understand, and pass on their culture, but there is still a balance between the digitization of culture and the preservation of its authentic value. Several studies have focused on how technology can be used to document culture in digital form, but there is still no method capable of effectively incorporating the physical, emotional, and social aspects of cultural heritage into digital ecosystems (Comes et al., 2020; Kukreja et al., 2024). Therefore, this study seeks to answer how technology-based strategies can be designed not only to function as a documentation tool but also as a medium capable of re-presenting immersive and contextual cultural experiences, without losing the essence of their cultural values (Nie et al., 2023; Srdanović et al., 2024).

Currently, there is still a lack of studies that discuss how technology can be applied inclusively in different cultural communities with different levels of digital readiness. Indigenous communities and minority cultures, for example, often face barriers to adopting technology due to limited access, resources, or lack of understanding of the benefits of technology for the preservation of their cultures (Aghdam et al., 2022; Pavez et al., 2023; Rony et al., 2022). Therefore, this study aims to design an adaptive and contextual model of technology application, which not only considers technical aspects but also emphasizes the role of local community participation in the process of technology-based cultural preservation (Han et al., 2016; Nam & Thanh, 2024).

In addition, it is still unknown to what extent the boundaries between cultural digitalization as a form of cultural preservation and commodification in the era of digital globalization (Bezklubaya, 2023). In many cases, digital culture is commercialized and simplified to meet the tastes of the global market, which can lead to distortion of the meaning of culture itself (Kasemsap, 2015; Nakata et al., 2019). Therefore, this study also aims to explore how cultural digitalization strategies can be carried out with the right ethics, so that culture can still develop globally without losing its intrinsic meaning. By understanding this aspect, this research will contribute to designing ethical guidelines for the

use of technology in cultural preservation, so that digitalization is not only a tool for cultural exploitation, but also a means of empowering cultural communities (Innocente et al., 2023; Lukita et al., 2024).

2. Research Method

2.1. Research Design

This research uses a qualitative approach with case studies and digital ethnographic methods, which aims to deeply understand how technology-based strategies can be used in cultural preservation without eliminating their authentic values.

This approach allows for a direct exploration of the experiences and perceptions of cultural communities in using digital technology, as well as identifying challenges and opportunities that arise in the implementation of cultural digitalization. With participatory observation, in-depth interviews, and document analysis, this research highlights the interaction between cultural communities, academics, technology developers, and government agencies in preserving cultural heritage in the digital age.

2.2. Participants and Sampling Techniques

Participants in this study were selected using purposive sampling, where subjects were determined based on their involvement and relevance in technology-based cultural preservation. The selection of participants considers the diversity of perspectives from various actors involved in the cultural digitalization ecosystem.

Table 1. Participants and Sampling Techniques

Participant Category	Sum	Selection Criteria
Local Cultural Community	10	Traditional leaders, art actors, and managers of cultural sites who use technology in cultural preservation.
Academics and Cultural Researchers	5	Expert in digital anthropology, cultural history, and digitization of cultural heritage.
Technology Developer	5	Professional in the development of AI, AR, VR, and blockchain for cultural preservation.
Government and Cultural Institutions	3	Representatives from the Ministry of Culture, National Museums, UNESCO, or related institutions.
Digital Museum & Cultural Archives Practitioner	5	Curators of digital museums, managers of cultural archives, and managers of digitalization projects.
Digital Community Leader	5	Moderators/managers of digital platforms who are active in supporting the preservation of online culture.
Total Participants	33	-

With a total of 33 participants, this study seeks to capture the dynamics of technology implementation in cultural preservation from various perspectives. The selection is carried out in stages, taking into account the representation from traditional cultural communities to digital innovation actors.

2.3. Data Collection Techniques

The study collected data through three main techniques to obtain holistic information:

a. Field Observation and Digital Ethnography

1) Observing the practice of cultural digitization in cultural communities, digital museums, and online archives.
2) Analysis of user interaction with cultural preservation technologies (VR, AR, blockchain).
3) Observing the pattern of community adaptation to digital innovation in cultural preservation.

b. In-Depth Interviews

1) Conducted with semi-structured questions to explore the experiences, expectations, and challenges of cultural digitalization.

2) The focus of the interview included the meaning of culture in the digital era, the impact of technology on cultural heritage, and obstacles in the application of technology in cultural communities.

c. Document Analysis

1) Studies on UNESCO reports, scientific journals, government policies, and digital publications on technology-based cultural preservation.
2) Evaluate cultural digitization projects in different countries to compare best practices and challenges faced.

2.4. Data Analysis Techniques

The data were analyzed using a thematic approach (Braun & Clarke, 2006), which involved the following stages:

a. Data Coding

1) Identify the main themes of the interviews and observations based on categories such as the role of society, the challenges of digitalization, opportunities for the use of technology, and the impact of digitalization on cultural meaning.

b. Pattern Identification

1) Analyze patterns of interaction between cultural and technological communities based on participant experiences and data from document analysis.

c. Critical Interpretation

1) Compare the field findings with relevant theories, such as Functional Structural Theory (Parsons, 1951) and Symbolic Interactionism (Blumer, 1969), to understand how technology plays a role in the formation and preservation of cultural identity.

2.5. Validity and Reliability

To ensure the accuracy and credibility of the research results, the following validation steps are carried out:

a. Triangulation Source

Comparison of observations, interviews, and documents to avoid interpretation bias.

b. Member Checking

Reconfirm the results of the interview to the participant to ensure the accuracy of the interpretation.

c. Audit Trail

Thorough documentation of the research process to ensure transparency and traceability of data.

3. Results and Discussions

3.1. Result

The results of this study show that cultural digitization has a significant impact on improving accessibility, community involvement, and challenges in maintaining cultural authenticity. Cultural communities that are active in digitalization show a higher level of involvement in cultural inheritance, especially in online documentation and information dissemination. However, the technology access gap is still an obstacle, especially for people with limited digital infrastructure.

In general, the study identifies three main aspects of cultural digitalization:

a. Accessibility

Digital technology allows people from different backgrounds to get to know cultures without geographical restrictions.

b. Authenticity

Cultural digitization faces challenges in retaining original values when adapted into digital formats.

c. Regulatory Challenges

Government policies and support are needed to ensure that cultural digitalization does not lead to excessive commercialization.

3.2. Thematic Analysis of Interview Results and Observations

From the results of data analysis, this study found four main themes that emerged in cultural digitalization.

a. Digitalization Expands Cultural Access, but Doesn't Always Deepen Understanding

The majority of participants stated that technology allows for wider cultural access, especially through digital media such as virtual museums, online archives, and social media.

1) In the past, culture could only be studied in person, but now it is available in a variety of digital formats.
2) We have archived ancient manuscripts so that they can be accessed by anyone, at any time.

However, some participants highlighted that digital experiences do not always provide a deep understanding of cultural values.

3) Watching a traditional dance performance online cannot replace a hands-on experience where we can feel the energy and philosophy behind the movement.

These findings are in line with previous research showing that although digitalization improves accessibility, direct interaction still plays an important role in cultural inheritance (Sangeethaa et al., 2024).

b. The Technology Access Gap Affects the Success of Cultural Digitalization

The study found that cultural communities that have access to digital technology are more active in documenting and disseminating their culture online compared to communities that are limited in digital infrastructure.

1) People in urban areas have an easier time adopting technologies such as Augmented Reality (AR) and Virtual Reality (VR) in introducing their culture.
2) In contrast, people in rural areas tend to use simple digital methods such as video documentation and social media.

The main challenges faced by cultural communities in remote areas are limited internet access and lack of technology training. This is in line with a UNESCO report that shows that only 40% of cultural communities in developing countries have access to cultural digitalization programs (Marakovits, 2021).

c. Challenges in Maintaining Authentic Values in Cultural Digitalization

Most academics and cultural managers highlight that cultural digitization is often simplified to make it easier for digital audiences to consume.

1) Digitalization makes culture more accessible, but many elements of philosophy and spirituality are missing in the process.
2) We are trying to digitize traditional rituals, but spiritual elements are difficult to represent in their entirety in a digital format.

In addition, some cultures that have been digitized have experienced uncontrolled commercialization, where cultural elements are used as products without considering the rights and ownership of indigenous peoples. These findings reinforce previous research that highlights the risks of cultural exploitation in the digital era (Bezklubaya, 2023).

d. The Role of Governments and Institutions in Encouraging Ethical Digitalization

The results of the analysis of UNESCO's policy documents and government regulations show that policy support is very important in maintaining the ethics of cultural digitalization.

1) Several countries have developed official digital platforms for cultural archives, which help ensure that cultural heritage is digitized while maintaining aspects of community ethics and ownership (Sangeethaa et al., 2024).
2) However, not all cultural communities have received sufficient support in terms of regulation and infrastructure

A cultural official stated:

"We have formulated policies so that cultural digitization still respects indigenous peoples and is not used commercially without permission."

3.3. Discussion

The results of this study directly fill the gaps that have been identified in previous studies, especially related to how technology-based strategies can be effectively applied for cultural preservation without eliminating their authentic values.

Digital technologies have enabled cultural documentation in a variety of formats, but there is no method capable of effectively incorporating the physical, emotional, and social aspects of cultural heritage into the digital ecosystem (Galani & Kidd, 2019; Ocón, 2021). The results of this study found that although cultural digitization improves accessibility, many participants emphasized that the physical experience of understanding culture remains more profound compared to digital interaction.

Many technology-based strategies have been developed for cultural preservation, but there is no approach yet that ensures that the emotional, spiritual, and social aspects of cultural heritage remain intact when translated into digital formats (Yang & Inkuer, 2024). The findings of the study show that cultural spiritual elements are difficult to represent in their entirety in digital form, so there is a risk of simplifying meaning in the process of digitization.

There is still a lack of in-depth studies on how technology can be applied adaptively in communities with different levels of digital access and readiness (Okonji & Ogwezzy, 2019). The results of this study prove that cultural communities in urban areas are easier to adopt advanced technologies such as AR and VR, while people in remote areas still face infrastructure constraints and access to technology.

It is not known how best to balance the use of technology as a means of preservation without changing the original meaning of the inherited culture. Based on the results of interviews and observations, cultural digitization must be carried out by considering regulations and preservation ethics, so that culture is maintained without losing its authenticity in the midst of global market consumption.

This research seeks to answer how technology-based strategies can be designed and implemented effectively to ensure that culture is not only digitally documented, but also retains relevant meaning for future generations, without being reduced by global modernization (Yang & Inkuer, 2024). The results of this study provide evidence that policy support and community involvement are very important in creating a sustainable and ethical cultural digitalization strategy.

4. Conclusion

This research confirms that cultural digitalization plays an important role in improving the accessibility and involvement of the community towards cultural heritage. However, the results of the study also show that digitalization cannot completely replace direct experience in understanding cultural values, especially in its emotional, spiritual, and social aspects. The main challenges in applying technology for cultural preservation lie in the gap in access to technology, the risk of excessive commercialization, and efforts to maintain cultural authenticity in digital formats.

To ensure that cultural digitization not only functions as a documentation tool, but also as an ethical preservation medium, a strategic approach involving cultural communities, technology developers, and government institutions in the digitization process is needed. Clear policies, technology training for cultural communities, and regulations to avoid cultural exploitation are key factors in creating a sustainable cultural digitalization ecosystem.

In the future, the results of this research provide insights for policymakers, cultural communities, and technology practitioners to develop a more inclusive and adaptive digitalization model. Cultural digitalization should not only be oriented towards increasing access, but must also consider how culture continues to have a deep meaning for future generations. Thus, the integration of technology in cultural preservation must be done wisely in order not only to be a bridge between the past and the future, but also to ensure that cultural identity remains sustainable and develops in the context of the digital world.

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