



Vol. 1, No. 1, 2026, pp. 12-20

Journal of Administration, Languages and Vocational Technology Innovation

<https://ojs.universityedu.org/index.php/jalvti/about>

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## Purpose, challenges and solution of artifact preservation by archivist in Awka museum, Anambra State

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### Abstract

*The study surveyed the use of advanced technology in artifact preservation by archivist in Awka Museum, Anambra State. three research questions guided the research. Descriptive survey research design was used for the study. The population of the study was made up of 8 archivists in Awka Museum, Anambra State. Census sampling was used. The instruments for data collection were the checklist and questionnaire. Data was analyzed using mean scores. The findings of the study revealed that the purpose of use of advanced technology for artifact preservation by archivist in Awka museum are digital documentation of artifacts, improving security and theft prevention, ensuring long-term preservation, and supporting provenance verification, among others. Poor electricity supply, expensive technology updates, and sourcing region-specific technologies were the significant hindrance to the effective use of advanced technology in artifact preservation. Integrated digital system management, cost reduction of technology updates, and sourcing of region-specific technologies were the workable solutions to the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum. The study recommended the establishment of strategic partnerships with technology providers to secure funding and donations aimed specifically at procuring advanced preservation technologies such as blockchain systems, and IoT sensor networks.*

**Keywords:** Purpose, challenges, solution, artifact preservation, archivist, museum

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### Introduction

Artifacts that represent Museums and archival institutions are central to the preservation of cultural heritage and historical identity in very society in Nigeria, museum such as Awka



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museum play a vital role in safeguarding artifacts that represent the traditions, beliefs, and history of the people. These artifacts serve as primary source of information for education, research and cultural continuity. Museum ensure that cultural materials are preserved and transmitted across generations, thereby preventing cultural loss and extinction. According to Okeke and Eze (2023), museums in Nigeria function as cultural memory institutions that sustain indigenous knowledge systems. Similarly, Adawale (2024) emphasizes that museums contribute significantly to national identity and heritage preservation. Traditional, artifacts preservation relied on manual and conventional methods such as proper storage, clearing and physical conservation techniques. While these methods have contributed significantly to preservation efforts, they are often limited in addressing modern challenges such as environmental degradation, frequent handling and disaster risks.

Uche and Nwosu (2024) note that preservative conservation methods such as cleaning and proper storage are effective but insufficient in managing long term deterioration. In addition, Balogun (2023) argues that traditional preservation techniques cannot adequately protect artifacts from environmental hazards such as humidity, pests and temperature fluctuations. The emergence of advanced technology has revolutionized artifact preservation in museums and archival institutions. Technologies such as digitization, artificial intelligence (AI), Virtual Reality (VR), 3D modeling and Internet of Thing (IOT) systems have enhanced the way artifacts are documented, preservation and accessed. According to Ogundale, Aina and Sams (2023), digital technologies improve documentation accuracy and accessibility of museum's collections. Likewise, Mogajane (2022) highlights that digital tools enhance the curation and preservation of indigenous artifacts. The integration of virtual exhibitions and digital museums allows users to interact with artifacts remotely, thereby reducing physical handling and enhancing preservation (Zhang et al., 2025). The purpose of adopting advanced technology in artifact preservation is multifaceted. First, it ensures the longevity of fragile artifacts by minimizing physical handling through digital access. Second, it enhances documentation and cataloging processes, enabling efficient retrieval and management of information. Third, it promotes global accessibility by allowing users to access cultural materials remotely through digital platforms. Obander, Emmanuel and Tsenongu (2024) assert that digital preservation techniques such as data migration and digital archiving system are essential for long term sustainability of cultural heritage.

Furthermore, Abioye and Zaid (2022) emphasize that collaboration between libraries, archives and museums enhanced the effectiveness of technological preservation strategies, despite these advantages, the implementation of advanced technology in artifact preservation is not without challenges. One major challenge is the complexity of integrating digital systems with traditional museum practices. Eke and Chukwuma (2023) observe that many Nigerian museum face difficulties in managing hybrid collections due to lack of integration systems. Additionally, rapid technological advancement leads to obsolescence, requiring continuous updates and financial investment (Harvey 2023). Another significant challenge is inadequate funding, particularly developing countries like Nigeria. The acquisition, installation and maintenance of advanced technological tools required substantial financial investment, which many museums cannot afford. Olatunji (2024) notes that poor funding remains a major barrier to technological adoption in Nigeria museums. Furthermore, there is a shortage of skilled personnel capable of operation modern preservation technologies, which limits their effective utilization.

According to Nwankwo (2023), lack of technical expertise among museum staff hinders digital transformation efforts. Infrastructure related challenges such as unstable electricity supply, poor internet connectivity and lack of climate-controlled storage facilities further hinders the successful implementation of advanced technology. Afolabi and Yusuf (2023) emphasize that unreliable infrastructure negatively affects digital preservation initiatives in

developing countries. Environmental factors such as high humidity and temperature fluctuation also contributed to artifact deterioration. In addition, security concerns such as theft, vandalism and illegal trafficking of artifacts highlights the need for advanced technological solutions. Okorro (2022) notes that the use of surveillance systems and digital tracking can significantly enhance artifact security in museums. Moreover, the digital transformation of museum required institutional change, policy development and continuous training of personnel.

Similarly, Lee (2023) argue that successful digital preservation depends on both technological infrastructure and organizational readiness. Given these challenges, there is a growing need to explore effective strategies for improving the use of advanced technology in artifact preservation. Solution such as increased government funding, staff training, international collaboration and investment on infrastructure are essential for enhancing preservation practices. UNESCO (2023) recommends capacity building and global partnerships as key strategies for improving digital preservation in developing countries. The integration of advanced technology into museum operations will not only improve artifact preservation but also promotes cultural awareness, tourism and research development. Therefore, this study seeks to examine the purpose of the use of advanced technology for artifact preservation by archivists in Awka museum, identify the purpose, the challenges associated with its use and practical solutions to enhance its effectiveness.

### **Statement of Problem**

The preservation of artifacts in Nigerian museum, including Awka museum is increasingly threatened by inadequate application of advanced technology. Although modern preservation technologies have proven effective in enhancing the longevity, accessibility and management of cultural heritage materials, their utilization in many Nigerian museums remains limited. One of the major problems is the lack of adequate funding, which restricts the acquisition and maintenance of modern preservation equipment. As a result, many artifacts rely on outdated and inefficient methods that cannot adequately protect artifacts from deterioration. Another significant issue is the shortages of skilled personnel capable of operating advanced technological tools, and environmental factors. Despite the recognized importance of advanced technology in artifact preservation, there is limited empirical research focusing specially on its application in Awka museum. This gap necessitates a comprehensive study to examine the purpose, challenges and possible solutions associated with the use of advanced technology in artifact preservation by archivists in Awka museum.

### **Research Questions**

The following research question would be used to guide the study.

1. What are the purpose of use of advanced technology for artifact preservation by archivist in Awka museum?
2. What are the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum?
3. What are the solutions to the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum?

### **Method**

A descriptive survey research design was used for the study. A descriptive research design is a design that describes variables and population and collects data from the sample which facilitates generalization of the data (Nworgu, 2015). The reason for choosing the descriptive survey research design was because it enables the collection and analysis of data from archivists regarding the use of advanced technology in artifact preservation by archivist in Awka Museum, Anambra State. The area of study is Awka Museum, located in Awka, the capital city of Anambra State, Nigeria, is a cultural institution dedicated to preserving and

showcasing the rich heritage of the Awka community and the broader Anambra region. Established by the Awka Museum Foundation in December 2019, the museum serves as a repository of artifacts that reflect the historical, artistic, and social evolution of the area, including both traditional and contemporary works. It is situated in Umudioka Village, Awka South Local Government Area, and is committed to education and cultural preservation through exhibitions, guided tours, and cultural events that engage visitors and locals alike.

The reason for the choice of this Awka Museum is because it highlights Awka's historical significance as a center of arts, notably its renowned blacksmiths and ancient craftsmanship, forming a bridge between Nigeria's past and present cultural narratives. The museum is recognized for its diverse collection of cultural artifacts and is a hub for preservation activities within the state. Lastly, no study of this nature has been done in Awka Museum, located in Anambra State, Nigeria. Hence, the choice of the area. The population of this study comprised 8 staff which includes 3 external staff (archivist), 1 foundation curators, 1 external executive member and art historian/curator (Awka Museum Records, 2024/2025). The entire population of this study was adopted because the population was sizeable and manageable. A structured questionnaire titled "Use of Advanced Technology in Artifact Preservation by Archivist in Awka Museum Questionnaire" (UATAPAAMQ) was used to collect data for the study. The questionnaire was divided into 3 parts, which comprised of 3 clusters that represents the 3 research questions.

Research question 1-3 was structured on a 4-point rating scale of SA – Strongly Agreed; A – Agreed; D -Disagreed; SD – Strongly Disagreed. Each of the cluster 1-3 have 8 items each making a total of 50 items in the instrument Copies of the questionnaire was administered by the researcher with the help of 2 research assistants to the staff of the study area. The instruments were issued to the respondents using the physical method where the staff found and met as at the time of the distribution were used. The distribution and collection of the instrument took two (2) days. After the distribution of the instrument to the 8 staff of Awka Museum, all of them were return. Data collected was analyzed using descriptive statistics particularly the mean scores and standard deviation. However, a criterion means (a mid-point mean score) of 2.50 was used. The average of the individual score for response on a 4-point Liker type scale (SA=4, A=3, D=2, and SD=1)

$$\frac{4 + 3 + 2 + 1}{4} = 2.50$$

**Decision Rule:** Any mean score and percentage range from 2.50 / 50 % and above was accepted as agreed while any below 2.50 / 50 % was regarded as negative and rejected.

## Results

### Research Question 1: What are the purpose of use of advanced technology for artifact preservation by archivist in Awka museum?

Table 1 shows that the archivists at Awka Museum strongly agree that important purposes of makerspace use include digital documentation of artifacts, improving security and theft prevention, ensuring long-term preservation, and supporting provenance verification, with mean scores ranging from 3.12 to 3.26. Similarly, purposes related to environmental preservation, non-invasive analysis, restoration, and accessibility received agreement with mean scores around 2.69 to 2.86. These reflect a recognition of makerspaces as crucial tools for enhancing artifact management and protection. Overall, the grand mean of 2.96 indicates that the purpose of use of advanced technology for artifact preservation by archivist in Awka museum are digital documentation of artifacts, improving security and theft prevention, ensuring long-term preservation, and supporting provenance verification, among others.

Table 1: Mean responses on the purpose of use of advanced technology for artifact preservation by archivist in Awka museum

S/N	Purpose Statement	Mean	Decision
1	To maintain optimal environmental conditions preventing decay or damage.	2.86	Agree
2	To digitally document artifacts for detailed records and future reference.	3.26	Strongly Agree
3	To enhance security and theft prevention through real-time tracking.	3.12	Strongly Agree
4	To enable non-invasive analysis minimizing physical handling of artifacts.	2.69	Agree
5	To facilitate restoration by providing precise color and structural data.	2.69	Agree
6	To increase accessibility to artifact information for researchers and public.	2.69	Agree
7	To ensure long-term preservation beyond the physical lifespan of artifacts.	3.12	Strongly Agree
8	To support provenance verification and safeguarding of cultural heritage.	3.12	Strongly Agree
	<b>Grand Mean</b>	<b>2.96</b>	<b>Agree</b>

**Research Question 2: What are the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum?**

Table 2: Mean responses on the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum

S/N	Challenge	Mean	Decision
1	Limited funding to acquire and maintain sophisticated preservation technologies.	3.12	Strongly Agreed
2	Insufficient technical training for archivists on using advanced equipment.	2.76	Strongly Agreed
3	Inadequate infrastructural support, such as stable electricity supply.	3.22	Strongly Agreed
4	Challenges integrating multiple digital systems into a cohesive workflow.	3.05	Strongly Agreed
5	Resistance to technology adoption due to traditional practices and mindsets.	2.41	Disagreed
6	Poor data security and privacy concerns linked to digital artifact records.	2.38	Disagreed
7	High cost of technology updates and software licensing fees.	3.11	Strongly Agreed
8	Difficulty in sourcing region-specific technologies adapted to local conditions.	3.24	Strongly Agreed
	<b>Grand Mean</b>	<b>2.88</b>	<b>Agreed</b>

Table 2 shows that archivists at Awka Museum strongly agree that challenges such as limited funding, inadequate technical training, infrastructural issues like unstable electricity

supply, integration difficulties of digital systems, expensive technology updates, and sourcing region-specific technologies significantly hinder the effective use of advanced preservation technology. These items garner mean scores between 3.00 and 3.24, reflecting strong agreement regarding their impact. Conversely, resistance to technology adoption based on traditional mindsets and concerns about data security and privacy receive disagreement with mean scores around 2.38 to 2.41. Overall, the grand mean of 2.88 signals clear recognition of poor electricity supply, integration difficulties of digital systems, expensive technology updates, and sourcing region-specific technologies as significant hindrance to the effective use of advanced technology in artifact preservation.

### **Research Question 3: What are the solutions to the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum?**

Table 3: Mean responses on the solutions to the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum

<b>S/N</b>	<b>Solution</b>	<b>Mean</b>	<b>Decision</b>
1	Adequate funding to acquire and maintain sophisticated preservation technologies.	3.29	Strongly Agree
2	Providing sufficient technical training for archivists on using advanced equipment.	3.33	Strongly Agree
3	Ensuring adequate infrastructural support, such as stable electricity supply.	2.81	Agree
4	Resolving issues with integrating multiple digital systems into a cohesive workflow.	3.00	Strongly Agree
5	Conduct awareness campaigns to mitigate resistance of technology adoption alongside traditional practices.	3.38	Strongly Agree
6	Ensuring strong data security and privacy concerns linked to digital artifact records.	2.74	Agree
7	Low cost of technology updates and software licensing fees.	3.26	Strongly Agree
8	Providing ease in sourcing region-specific technologies adapted to local conditions.	3.29	Strongly Agree
<b>Grand Mean</b>		<b>3.06</b>	<b>Strongly Agree</b>

Table 3 reveals that archivists at Awka Museum strongly agree that solutions such as adequate funding, sufficient technical training, integrated digital system management, awareness campaigns, cost reduction of technology updates, and sourcing of region-specific technologies are vital to overcoming challenges in advanced technology use. These items have mean scores between 3.00 and 3.38. also, solutions related to infrastructure support and data security are agreed upon with mean scores of 2.74 to 2.81. The grand mean of 3.06 signifies an overall strong endorsement of integrated digital system management, awareness campaigns, cost reduction of technology updates, and sourcing of region-specific technologies as workable solutions to the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum.

### **Summary of Major findings**

The following findings can be deduced from the study: The purpose of use of advanced technology for artifact preservation by archivist in Awka museum are digital documentation of

artifacts, improving security and theft prevention, ensuring long-term preservation, and supporting provenance verification, among others. Poor electricity supply, integration difficulties of digital systems, expensive technology updates, and sourcing region-specific technologies were the significant hindrance to the effective use of advanced technology in artifact preservation. Integrated digital system management, awareness campaigns, cost reduction of technology updates, and sourcing of region-specific technologies were the workable solutions to the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum

## **Discussion of Results**

### **Purpose of use of advanced technology for artifact preservation by archivist in museum**

Results from the data analysis shows that the purpose of use of advanced technology for artifact preservation by archivist in Awka museum are digital documentation of artifacts, improving security and theft prevention, ensuring long-term preservation, and supporting provenance verification, among others. Museum archivists value makerspaces primarily for digital documentation, security enhancement, longevity in preservation, and cultural safeguarding. These results agree with findings by Abubakar (2025) who noted strong awareness and use of digital tools for documentation and security alongside recognition of limitations for non-invasive analysis. Also, Aiyebilehin (2018) observed makerspaces' role in heritage safeguarding while identifying challenges in accessibility improvements. Similarly, Okezie (2024) highlighted the need for stronger integration of makerspaces in preservation workflows to optimize restoration and public access. These studies contextualize the current findings within Nigeria's evolving cultural heritage management.

### **Challenges in the use of advanced technology for artifact preservation by archivist in museum**

Findings from the analyzed data shows that clear recognition of poor electricity supply, integration difficulties of digital systems, expensive technology updates, and sourcing region-specific technologies were the significant hindrance to the effective use of advanced technology in artifact preservation. Museum archivists recognize a multitude of infrastructural, financial, and operational challenges impacting advanced technology adoption, attitudinal and security concerns appear less pronounced. These findings are supported by studies conducted by Eze and Ihejirika (2020) who identified funding and infrastructural deficits as major challenges for Nigerian museums, while Nwosu and Chukwuma (2019) Chukwuma highlighted technical training gaps and system integration difficulties limiting digital transformation. Similarly, Olujimi and Adeyemi (2021) also emphasized the importance of sourcing localized technologies tailored to regional conditions, affirming the critical challenges flagged by Museum archivists.

### **Solutions to the challenges in the use of advanced technology for artifact preservation by archivist in museum**

Results from the data analyzed shows that integrated digital system management, awareness campaigns, cost reduction of technology updates, and sourcing of region-specific technologies were the workable solutions to the challenges in the use of advanced technology for artifact preservation by archivist in Awka museum. The data emphasize a broad-based agreement among archivists that funding, training, system integration, awareness building, and local technology adaptation are crucial solutions. While infrastructural and security concerns remain relevant, this balanced view provides a framework for policymakers and practitioners aiming to innovate and improve preservation outcomes using technology effectively. These conclusions align with findings by Eze and Ihejirika (2020) who emphasize sustained funding and staff training. Also, Nwosu and Chukwuma (2019) highlighted the need for workflow

integration and awareness-raising initiatives. Similarly, Olujimi and Adeyemi (2021) stressed the importance of affordable, localized technological solutions and data security enhancements to ensure sustainable technology use.

## **Conclusion**

The study reveals despite these gaps, archivists recognize important purposes of available technologies in enhancing digital documentation, security, long-term preservation, and provenance verification. However, poor electricity supply, challenges integrating diverse digital systems, costly technology updates, and difficulties sourcing region-specific technologies impede effective technology use. Addressing these challenges through integrated digital system management, awareness campaigns, cost reduction strategies, and local technology adaptation provides a viable roadmap for improving preservation practices. Overall, the findings highlight the urgent need for targeted investments, capacity building, and tailored technological solutions to safeguard Awka Museum's cultural heritage for future generations.

## **Recommendations**

The researchers gave the following recommendations

1. Archivists and museum leadership should collaboratively develop clear institutional guidelines that integrate advanced technology use into routine preservation workflows, with emphasis on purposeful and outcomes-driven.
2. Invest in infrastructural improvements including reliable power solutions such as solar backup systems, and deploy integrated digital management platforms to harmonize multiple preservation technologies.
3. Design targeted financial strategies should include negotiating volume licensing and leveraging open-source software to reduce costs for technologies adapted to local environmental conditions.

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