DIGITAL PRESERVATION OF UKRAINIAN AUDIOVISUAL HERITAGE DURING WARTIME: CHALLENGES AND INSTITUTIONAL PRACTICES

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Abstract

This article is dedicated to investigating the impact of the war in Ukraine (Russian-Ukrainian War, from 2014, full-scale invasion – 2022) on the preservation of audiovisual heritage and the documentation of wartime events. The study focuses on the role of digital technologies in safeguarding cultural identity, recording historical events, and addressing challenges Ukrainian archives face during the ongoing conflict. It examines the practices of digitization and archiving by state and civic institutions, including the Central State Archive of Film, Photo, and Audio Documents named after Pshenychnyi, the Dovzhenko Centre, and the Center for Urban History in Lviv. The research highlights the implementation of international archiving standards, innovative technologies, and ethical considerations, particularly in documenting war crimes. Results demonstrate how digital archives preserve historical memory, foster humanitarian awareness, and facilitate global cultural exchange. The article concludes with recommendations for enhancing Ukraine's digital preservation framework, emphasizing collaboration with global organizations, adopting advanced technologies, and aligning with international standards to safeguard cultural heritage long-term.

Keywords: *digital preservation, audiovisual heritage, wartime archives, archival standards, historical memory*

CULTURE CROSSROADS

Introduction

The Russia's war in Ukraine since 2014 has led to the widespread destruction of cultural sites, historical landmarks, architectural monuments, and national museum collections. This has placed the nation's cultural heritage – the cornerstone of its identity, historical memory, traditions, and values – under significant threat of irreversible loss. During wartime, the preservation of this heritage has become a crucial instrument for national unity, pride, and resilience, evolving into a cultural mission, as well as a political and social imperative.

Audiovisual heritage plays a unique role in preserving historical narratives, encompassing films, photographs, and sound recordings. Unlike textual records, audiovisual materials provide an immediate and emotionally compelling connection to the past, offering highly authentic evidence of cultural achievements and historical heritage. This form of documentation is particularly essential for capturing the human experience during conflict, documenting not only events but also emotions, expressions, and surrounding circumstances. In Ukraine, where the war has disrupted traditional archival practices, audiovisual documentation has become vital for safeguarding national memory for future generations.

The rapid advancement of digital technologies has made digital archiving and the documentation of wartime realities increasingly precise and accessible, positioning this war as one of the most extensively recorded conflicts in history. The experiences of previous wars and geopolitical conflicts have significantly expanded and intensified, highlighting the necessity of studying the role of digital media in historical and cultural heritage preservation amid the full-scale Russian invasion of Ukraine.

The author analyses the impact of military events on the preservation of Ukraine's cultural heritage, emphasizing digital archiving and contemporary documentation. It aims to identify current trends in digital preservation and audiovisual documentation of war and cultural heritage, serving as a foundation for further research and practical initiatives. Additionally, the author assesses the effectiveness of digital archiving methods used for Ukraine's audiovisual heritage and evaluates the importance of these processes in wartime conditions.

The research methodology employs a comprehensive approach, integrating contextual analysis of materials related to the activities of Ukrainian archival institutions, utilizing academic sources – which remain scarce for various reasons at present – as well as media materials, official websites, and digital platforms. This is supplemented by a comparative analysis of digital preservation approaches adopted by Ukrainian organizations and international institutions. Furthermore, the case study method is applied to model future perspectives based on real-world examples of institutions engaged in digital archiving.

This study contributes to a deeper understanding of how digital technologies can support cultural heritage preservation in crisis situations and underscores the importance of continued investment in archival infrastructure to safeguard Ukraine's historical memory.

Challenges and innovations in wartime digital archiving

On the eve of the full-scale Russian invasion (24 February 2022), Ukrainian state archival institutions – approximately 35 across the country – were in the process of integrating into global digital archiving practices. The State Archival Service of Ukraine (*Державна архівна служба України*) has served as the central coordinating body, overseeing regional archival institutions and state audiovisual archives.

According to Anatolii Khromov, who has led the service since 2019, one of the key challenges at the time was the imperfection of archival legislation. Due to legal constraints, Ukrainian archives predominantly received official government records, which are now perceived as *irrelevant* in reflecting broader historical and societal realities [Ukraïner 2024]. The lack of diverse archival materials makes it difficult to reconstruct an accurate picture of life in Ukraine in past decades. To address this, one of Khromov's first initiatives was the establishment of a collection documenting the COVID-19 pandemic, marking a shift toward a more inclusive approach to archival preservation.

Prior to the war, the absence of standardized methodologies, coupled with insufficient state funding, a lack of financial and technical resources, as well as gaps in legislative regulation, posed significant barriers to systematic digital archiving [Didukh, Zaletok 2019]. Unlike Poland and Lithuania, Ukraine lacked a regulatory framework for the creation of digital archival collections. The registration and cataloguing of digital archives remained largely at the discretion of individual institutions, resulting in inconsistent approaches across the sector. Although initial steps had been taken toward standardizing digital archives and digitization processes, challenges related to long-term storage and preservation of digital copies persisted. The Ukrainian Research Institute of Archival Affairs and Records Management developed methodological recommendations for the creation, preservation, cataloguing, and access to digital archival collections [Didukh, Zaletok 2019]. However, several challenges persisted, particularly regarding the inconsistent use of digital formats, including TIFF, JPG/JPEG, PDF, and DJVU. There was also an absence of unified technical parameters, cataloguing standards, and storage methods. Many archival institutions continued to store documents on obsolete external media, such as optical discs, with only sporadic efforts to combine optical storage with external hard drives, or to transition entirely to server-based and network storage solutions.

At the time, only one-quarter of institutions implemented regular backup procedures, and only one-third followed the practice of creating multiple copies of digital archives across different storage media. This lack of standardized preservation strategies posed a significant risk of losing substantial portions of Ukraine's digital archival heritage. The absence of adequate material, technical, and human resources, coupled with a lack of clear regulatory frameworks for the creation and management of digital archives, further exacerbated these vulnerabilities [Korzhyk 2022].

Thus, even before the full-scale invasion, Ukraine's archival infrastructure faced serious limitations, leaving a substantial portion of its documentary heritage at risk of deterioration or permanent loss. This period of institutional development was abruptly disrupted by the full-scale invasion, further complicating the already fragile landscape of Ukrainian digital archiving.

Since the onset of Russia's full-scale invasion of Ukraine, various institutions and individuals have actively engaged in archiving documentary evidence of wartime events, creating chronicles and video diaries as forms of resistance and humanitarian support. Nearly all state archival institutions, under the directive of the central archival service, began compiling collections of documents, photographs, and video materials related to the war. The Central State Audiovisual and Electronic Archive named after H. Pshenychnyi (*Tsentralnyi derzhavnyi kinofotofonoarkhiv Ukrainy im. H. S. Pshenychnoho*, or TsDKFFA) now receives submissions from citizens for state preservation, ensuring that copyright and related rights are formalized before materials are archived [Ukraïner 2024]. This approach allows for adherence to ethical standards regarding the distribution of private information, particularly concerning individuals affected by Russian aggression.

These large-scale digital documentation efforts have significantly increased the workload and responsibilities of archival institutions. In addition to pre-existing challenges, such as fragmented digitization practices and inconsistent methodologies, new threats have emerged, particularly the risk of document loss due to destruction and physical damage. A particularly critical issue is the assessment of the informational value of materials submitted to archives, as institutions must distinguish between historically significant records and general documentation.

Another pressing priority for Ukrainian archives is the retrieval of collections looted by Russian forces since 2014 from occupied territories. According to Anatolii Khromov, Ukraine has lost the collections of four major state archives – the Crimean, Sevastopol, Donetsk, and Luhansk archives – amounting to 8% of Ukraine's National Archival Fund [Ukraïner 2024]. In contrast, since the full-scale Russian invasion in 2022, archival losses have been limited to 0.3%. To mitigate further damage, Ukrainian institutions have implemented various preventive measures, including

the evacuation and relocation of collections, as well as the acceleration of digital archiving efforts to ensure long-term preservation.

Despite numerous challenges and emerging risks, Ukrainian archives have continued to implement new technologies and international archival standards, largely facilitated by the support of global organizations. The digitization processes initiated before the Russian invasion, as well as the principles of open-access archives and enhanced communication through online platforms and social media, have significantly expanded during wartime [Korzhyk 2022]. The extensive network of Ukrainian state archives has accumulated substantial experience in creating and distributing electronic archival resources.

One notable initiative is the *Archive of Ukrainian Silent Cinema* project, launched by the Head of the State Archival Service of Ukraine, Anatolii Khromov, in September 2021. By the start of the invasion, this unique online resource for documentary cinema contained 189 digitized film records [History.rayon.in.ua 2023]. Through joint efforts with international partners, Ukrainian archival institutions are ensuring long-term preservation and accessibility of audiovisual heritage. Institutions such as the Central State Audiovisual and Electronic Archive named after H. Pshenychnyi have adopted frameworks like OAIS (Open Archival Information System) and ISO 15489 to structure and manage archival data. Additionally, new online platforms for accessing digitized materials are being developed, aligning with global trends observed in initiatives such as Europeana.

Both Ukrainian and international archives share the goal of preserving national and global cultural memory, with collaboration playing a key role in advancing digital preservation efforts. The Baltic Forum on Archival Innovation and Restoration underscores the importance of international cooperation in developing effective archiving strategies [Emelyanova 2018]. The integration of digital tools that comply with international standards is crucial for safeguarding Ukraine's cultural heritage in post-conflict conditions [Moskvyak 2023].

A significant milestone in this cross-border collaboration has been the publication of the *Practical Guide for Emergency Digitization of Paper Archives* by the International Council on Archives (ICA), with financial support from the International Alliance for the Protection of Heritage in Conflict Areas (ALIPH). This manual, developed by Ukrainian archival experts, including specialists from the Central State Audiovisual and Electronic Archive, has been made publicly available [International Council on Archives 2023]. It serves as a valuable resource for small regional archives, particularly those located in frontline areas, providing clear instructions on rapid response strategies for emergency situations.

The relentless efforts of Ukrainian archival specialists in digital preservation under constant Russian shelling have resulted in unparalleled expertise, drawing

significant attention and interest from international colleagues. In November 2024, an Estonian delegation, led by Minister of Justice and Digital Affairs of the Republic of Estonia, Liisa-Ly Pakosta, visited the State Archival Service of Ukraine to gain insight into the country's digitization strategies and archival preservation efforts [Ukrainian Archives Initiative 2024].

Ukrainian archives continue to operate under extreme wartime conditions, facing the risk of physical destruction of both materials and infrastructure. Many archival institutions have been forced to evacuate their collections, while limited funding hinders the implementation of advanced technologies and large-scale digitization projects. Despite these challenges, Ukrainian archives actively document wartime events in real time, leveraging social media, war crimes databases, and video and photographic records of destruction.

During the Estonian delegation's visit, officials were informed that Ukraine has emerged as a global leader in digitization efforts. In 2023 alone, Ukrainian archives produced over 21 million digital copies of documents [Ukrainian Archives Initiative 2024]. According to Anatolii Khromov, approximately 50 operators currently work in Ukraine's state archival institutions, each producing around 2000 copies per day.

In other words, the crisis of war and destruction has triggered an opposing force – an accelerating trend in Ukraine's digital archiving efforts. The new challenges and demands posed by wartime conditions are being met with rapid responses and proactive initiatives, solidifying Ukraine's role as a key player in global archival digitization.

International archival institutions primarily focus on preserving historical materials and cultural heritage, engaging less in the documentation of ongoing events. In contrast, Ukrainian archives actively document contemporary history, while maintaining their traditional role in heritage preservation. Although Ukrainian archives collaborate with international counterparts, adopting scanning and restoration technologies, they face unique challenges due to limited access to advanced tools such as artificial intelligence (AI) for automated classification and restoration.

Global archives, including digital repository Europeana, extensively utilize AI to automate and accelerate restoration and archiving processes, offering a valuable model for Ukraine. While Ukrainian institutions are gradually integrating into the international archival community – evidenced by the Dovzhenko Centre's (*Національний центр Олександра Довженка*; *Довженко-Центр*) membership in FIAF – the implementation of cutting-edge technologies and standards remains in its early stages [FIAF, n.d.].

Beyond the broader crisis and the struggle for survival during wartime, Ukrainian archives face additional ethical challenges in preserving and disseminating sensitive

materials, particularly those related to war crimes or personal privacy concerns. Despite these obstacles, they fulfil a dual role, serving both as custodians of traditional heritage and documentarians of contemporary history.

Greater integration with international standards and enhanced collaboration with global organizations would provide Ukrainian archives with the necessary support to overcome these challenges and achieve significant advancements in archival preservation and digitization.

Modern digital technologies in the preservation of audiovisual heritage during wartime

Modern digital technologies play a crucial role in processing and preserving video materials in Ukraine, particularly during wartime, when the digital preservation of cultural heritage and the documentation of ongoing events are of critical importance. Transformative tools are being implemented to safeguard audiovisual materials, helping archives overcome the physical vulnerabilities associated with traditional formats. High-resolution scanning, metadata tagging, and cloud storage enhance accessibility and longevity, while advanced film scanners not only digitize but also improve quality through colour correction and defect removal. AI further optimizes archiving by automating classification, keyword tagging, and restoration, making archives more user-friendly. The development of digital access repositories by Ukrainian archives reflects a growing commitment to modern archival practices [Didukh & Zaletok 2019].

An example of the implementation of cutting-edge digital tools and the creation of digital archives across various cultural and academic institutions is the activity of the Digital Country organization (*Цифрова Країна*), which focuses on preserving and promoting national cultural heritage through digitization and the development of electronic resources [Digital Country, n.d.]. The company employs state-of-the-art technology for digitization and data preservation. It utilizes specialized industrial equipment for document scanning, ensuring high-quality digital copies. Moreover, the organization has developed, certified, and continuously improves the FOLIUM software, designed to facilitate efficient work with digitized data. Key procedures include the use of open file formats (e.g., MXF, AVI, MOV) and codecs (e.g., H.264, ProRes) for long-term accessibility, systematic metadata organization, and the maintenance of three copies of data on local, remote, and cloud platforms. Regular audits and data migration are essential to counter technological obsolescence and ensure the integrity of files over time.

During the ongoing conflict, Ukrainian archives face significant challenges related to limited infrastructure, specialized servers, cybersecurity technologies, and funding. International standards such as OAIS (Open Archival Information System)

and METS (Metadata Encoding and Transmission Standard) provide frameworks for systematic preservation, yet their implementation is hindered by resource constraints and the impact of war. Ethical considerations are particularly relevant, requiring victim anonymization and the secure handling of sensitive materials related to war crimes.

The work of many institutions, such as the Pshenychnyi Archive and the Dovzhenko Centre, has been significantly slowed due to the war. At the same time, grassroots initiatives such as the Center for Urban History of Lviv (*Центр міської історії*) have played a prominent role in preserving audiovisual heritage. However, resource limitations in remote regions exacerbate the risk of data loss due to military actions, underscoring the urgent need for strategic solutions and sustainable policies.

Digitization of audiovisual heritage has become a leading technology in Ukrainian institutions, contributing to the preservation and protection of numerous cultural achievements and values by converting film, photo, and sound documents into digital formats [Menska 2023]. Digitalization efforts remain a cornerstone of Ukrainian institutions' strategies for protecting cultural assets. The transformation of audiovisual materials into digital formats has become a key approach to preserving and sharing national heritage, despite the challenges posed by the ongoing conflict.

Challenges and case studies of Central State Archive of Cinema, Photo, and Audio Documents (Pshenychnyi Archive)

The Pshenychnyi Central State Archive of Cinema, Photo, and Audio Documents plays a crucial role in preserving Ukraine's audiovisual heritage [Yemelyanova 2016]. Established in the 1930s, the archive houses materials dating back to 1896, serving as a repository of the nation's historical memory. In 2023, the archive created a digital user fund comprising 414 film documents, utilizing modern scanners funded by international organizations [Central State Archive of Cinematic, Photographic and Sound Documents of Ukraine, n.d.]. This initiative underscores the potential of digitization to safeguard cultural heritage and highlights the urgent need for expanded digitization programs, as only 10% of Ukraine's archival materials have been digitized.

The archive's efforts extend beyond digitization to include the development of electronic catalogues and accessible digital platforms, ensuring historical materials are preserved and shared with global audiences [Yemelyanova 2016]. Recent initiatives focus on integrating advanced metadata systems, enabling improved searchability and retrieval of content. Modern technologies, including artificial intelligence, optimize film restoration processes, such as removing image defects, restoring color, and

enhancing contrast and detail. These advancements significantly enhance the quality and accessibility of the archive's materials.

As part of the Program for the Digitization of Archival Information Resources for 2022–2025, approved by the State Archival Service of Ukraine, the archive has accelerated its digitization processes by acquiring advanced scanning technologies supported by the International Alliance for the Protection of Heritage in Conflict Areas [Central State Archive of Cinematic, Photographic and Sound Documents of Ukraine, n.d.]. These efforts are complemented by regular collection presentations on the archive's website and social media platforms, which feature thematic exhibitions and film and video documents to engage a wider audience.

Preserving digital moving images requires a systematic approach integrating technological solutions with ethical and organizational measures. The Pshenychnyi Archive's specialists digitize historical film, photo, and audio documents, including materials documenting wars, while ensuring long-term accessibility through electronic cataloguing and implementing global best practices in archival preservation.

Initiatives and approaches of the Oleksandr Dovzhenko National Centre

The Oleksandr Dovzhenko National Centre is vital in preserving and promoting Ukrainian cinema. As the largest film archive in Ukraine, it houses a collection of over 7000 titles of Ukrainian feature, documentary, and animated films, along with thousands of archival documents on the history of Ukrainian cinema [National Oleksandr Dovzhenko Centre, n.d.]. Since its establishment in 1994 during Ukraine's independence, the Centre has aligned its work with European standards, integrating restoration, digitization, and international distribution into its practices as a member of the International Federation of Film Archives [FIAF, n.d.].

The Centre's dual role as a preserver and promoter of cultural heritage makes it a unique institution in Ukraine [Біла, Акварельна 2019]. Its policies and strategies focus on preserving, researching, and promoting national film heritage while creating a cultural space for contemporary society. Unlike traditional archives like the Pshenychnyi Archive, the Dovzhenko Centre emphasizes innovation, aligning its activities with European counterparts. Restoration work is coupled with public engagement through curated projects like the *Silent Nights* festival and the *Ukrainian Re-Vision* DVD collection. These initiatives revive and disseminate Ukrainian film heritage, breathing new life into restored works.

The Centre also serves as a hub for academic and cultural activities, bridging the gap between archival work and public awareness through conferences, workshops, and film screenings. Its international distribution efforts further integrate Ukrainian

cinema into global cultural networks, reflecting its commitment to digital archiving standards and fostering international collaboration [Біла, Акварельна 2019].

Despite financial crises and challenges securing stable income sources, the Dovzhenko Centre has maintained positive economic performance and sustained its role as a cultural and research hub. This resilience underscores the Centre's importance in safeguarding Ukraine's cinematic legacy and ensuring its accessibility to diverse audiences.

The Dovzhenko Centre exemplifies how innovative archival practices can sustain and celebrate a nation's cultural heritage by integrating restoration, digital preservation, and public dissemination.

Examples and case studies of the Center for Urban History in Lviv

The Center for Urban History in Lviv plays a significant role in digital archiving and researching audiovisual materials, focusing on creating digital collections and preserving often-overlooked historical sources. This grassroots initiative provides unique insights into local histories and has become a leader in community-based archiving efforts.

The Center's notable projects include the *Urban Media Archive* and *Lviv Interactive Map*, which utilize digital technologies to visualize historical narratives and provide public access to cultural resources [Center for Urban History of East Central Europe, n.d.]. The *Urban Media Archive* collects, preserves, and promotes materials related to urban history, covering diverse aspects from multiple perspectives. A prominent example is the online encyclopedia *Lviv Interactive (LIA)*, an interactive map presenting the modern city within its historical context.

One innovative project involves digitizing personal collections from residents, capturing everyday life during the war. This approach preserves unique perspectives and fosters community ownership of historical documentation. Through interactive platforms, the Center ensures accessibility for both local and international audiences.

The Center also engages in academic activities, including research projects, conferences, and seminars. Under the global initiative Home Movie Center, it organizes the *International Home Movie Day* in Lviv, further promoting audiovisual heritage.

Today's specific focus of the Center's digital archiving is documenting the everyday realities of the Russian-Ukrainian war [Center for Urban History of East Central Europe, n.d.]. The *Most Documented War* symposium, organized by the Center, unites various initiatives to collect and archive materials about the conflict, emphasizing its importance for future research and historical preservation.

By integrating digital technologies with community-driven approaches, the Center for Urban History exemplifies how innovative archiving practices can uncover and preserve urban and wartime histories, ensuring they remain accessible and relevant for future generations.

Ethical and technical framework for digital preservation

Preserving digital materials during wartime presents ethical and technical challenges that require careful consideration. Archiving sensitive materials, such as footage of war crimes, necessitates strict adherence to ethical protocols, including anonymizing victims, obtaining consent for the use of personal images, and ensuring the secure storage of sensitive data. Simultaneously, maintaining the integrity of digital files over time is a significant technical challenge. Regular audits, data migration, and adherence to international standards like OAIS and METS are essential for ensuring the longevity and accessibility of archival materials. Integrating AI technologies can streamline processes such as metadata creation and file restoration; however, their effective implementation requires substantial investment and specialized training.

To address these challenges, several key steps are recommended. First, adopting and adapting international standards such as OAIS and METS is essential for ensuring the systematic preservation of digital materials. Of equal importance is the development of national programs to support digitization and equip archives with modern technologies so that digitization initiatives can be expanded to preserve intangible cultural heritage in the aftermath of war [Moskvyak 2023]. Collaboration with global platforms like *Europeana* can further integrate Ukrainian heritage into international cultural networks, amplifying its reach and significance. Additionally, establishing specialized training programs for archivists in digital preservation techniques will ensure that staff have the necessary skills to manage advanced technologies. Public engagement through digital platforms and social media can raise awareness and foster a shared sense of responsibility for preserving cultural heritage. Finally, sustainable archiving policies must be developed, with frameworks for consistent funding and regular updates to technical infrastructure, to guarantee the long-term accessibility and reliability of digital archives.

Conclusion

The digital preservation of audiovisual heritage during wartime is not only a cultural and historical priority but also a matter of national security. The war in Ukraine has posed immense challenges for archival institutions, including the threat of physical destruction, the evacuation of collections, and limited resources for digitization. Despite these difficulties, the process of digital archiving has significantly

intensified due to governmental and civic initiatives, international support, and the application of modern technologies such as AI, cloud storage, and blockchain solutions. By implementing international standards, fostering collaboration, and addressing ethical challenges, it can be ensured that the invaluable collections of Ukrainian archives survive and remain accessible for future generations. These efforts contribute to the preservation of national identity, facilitate global cultural exchange, and deepen the understanding of the impact of war.

Strategic investments in technology, ethical frameworks, and international cooperation are crucial for building a resilient digital preservation system that safeguards Ukraine's cultural heritage and enriches the global historical narrative. The adoption of standards such as OAIS and METS is essential to provide for the long-term accessibility and reliability of archives. Additionally, collaboration with global platforms like Europeana can integrate Ukrainian materials into the international context, expanding their reach and significance.

Of equal importance is the development of a national training program for archival professionals in the field of digital preservation. Equipping archivists and cultural managers with the skills necessary to manage advanced technologies will enhance the efficiency of preservation efforts and ensure the sustainability of archival practices.

Today, the preservation and actualization of audiovisual collections in Ukraine occur within a multidimensional digital space, which includes state institutions responsible for heritage preservation, civic organizations, and individual Ukrainians documenting ongoing events. These collective efforts highlight the need to refine verification methods, organizational strategies for digital archives, and specialized training in audiovisual documentation.

The dissemination of digital documents and documentary films contributes to global awareness of the consequences of war, fostering a shared humanitarian consciousness. Digital archives and social media serve not only as repositories of historical records but also as platforms for media literacy, critical reflection, and international solidarity. These tools are crucial to ensuring that the lessons of today are preserved and shared for the benefit of future generations.

The digital preservation of Ukrainian heritage stands at a pivotal juncture: on the one hand, the war has created unprecedented challenges; on the other, it has driven innovative approaches to archiving. Future research should focus on developing regulatory frameworks, implementing cutting-edge digital solutions, and establishing a resilient infrastructure for archives in the post-war period. Only a comprehensive approach to these challenges will guarantee the long-term preservation of Ukraine's national audiovisual heritage.

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