

Transforming Research Archives into Collective Memory: A Practice-Based Reflection on a National Virtual Exhibition through Indonesia's Archival Network

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Abstract

Digital archives are increasingly understood not merely as passive repositories of scientific documentation, but as active spaces for public engagement and collective meaning-making. This paper presents a practice-based reflection on the transformation of research archives into collective memory through a national virtual exhibition within Indonesia's archival network. The study employs a practice-based reflective method, drawing on the author's dual role as an archivist and researcher to analyse documented curatorial processes, archival workflows, and exhibition development practices. Drawing on the case of the LAPAN-Tubsat virtual exhibition—Indonesia's first micro-satellite curated by the National Research and Innovation Agency (BRIN) and disseminated through the National Archival Information Network (JIKN)—the study examines how archival curation, digital storytelling, and participatory communication converge in practice. The findings indicate that the integration of structured metadata, interoperable archival systems, and narrative-driven design enhances public accessibility and user engagement, while also presenting challenges in maintaining contextual integrity across institutional platforms. The reflection highlights the role of metadata integrity, interoperability, and interpretive design in maintaining archival authenticity while strengthening meaningful public access. Through interdisciplinary collaboration and iterative curatorial processes, the study demonstrates how scientific records can be reimagined as communicative heritage that connects research evidence with national memory. The paper offers insights into professional transformation, ethical access, and digital governance, and proposes a transferable practice model for research archives within the Global South.

Keywords: *archives; digital curation; collective memory; science communication; virtual exhibition.*

INTRODUCTION

In recent years, archives have been increasingly reconceptualised from passive repositories of records into active spaces for mediating social memory and public engagement. This shift reflects a broader transformation in archival theory, in which archives are understood not only as sources of evidence but also as sites of meaning-making, identity formation, and collective memory (Cook, 2013; Edwards, 2023). Within this paradigm, archival institutions are no longer viewed as neutral custodians of information; instead, they actively shape how societies remember scientific, cultural, and institutional achievements.

Digital technologies have further accelerated this transformation. Digital archives now operate as key interfaces for knowledge transmission, expanding access to research outputs and cultural heritage while enabling new forms of participation and interpretation (Sabharwal, 2021; Saaze & Rasterhoff, 2020). This convergence between archival science, digital curation, and public communication signals an epistemic shift in which archives function at the intersection of preservation, interpretation, and engagement, repositioning them as communicative infrastructures linking researchers, policy-makers, and the public (Bhattacharyya, 2025).

Within this context, virtual exhibitions have emerged as a strategic medium for activating archival records as public-facing narratives. Rather than presenting records as isolated data objects, virtual exhibitions contextualise archival materials through storytelling, visualisation, and interpretive design, enabling more accessible and meaningful engagement (Smith & Wallace, 2022; Marty & Jones, 2020; Nogueira & Almeida, 2022). This approach aligns with participatory and performative archival models, where meaning is co-produced through interaction between archival content and audiences (Theimer, 2018; Godoy, 2021), positioning archives as living interfaces that evolve through use and interpretation (Hudoshnyk & Krupskyi, 2025).

The role of archives in science communication is particularly significant. Scientific research generates extensive documentary traces—reports, datasets, images, and technical documentation—that often remain inaccessible to non-specialist audiences. When curated and contextualised, these records can bridge expert knowledge and public understanding, fostering scientific literacy and trust (Marty & Jones, 2020; Miller, 2020; Franco & Flego, 2025). Digital archival platforms thus enable research archives to function as communicative resources that translate scientific evidence into shared cultural narratives (Reinsone et al., 2025).

In Indonesia, these developments are closely linked to national digital governance initiatives. The implementation of the Sistem Pemerintahan Berbasis Elektronik (SPBE) under Presidential Regulation No. 95/2018 emphasises interoperability, transparency, and public access to government information. Within the archival domain, the integration of the Sistem Informasi Kearsipan Nasional (SIKN) and the Jaringan Informasi Kearsipan Nasional (JIKN), coordinated by the National Archives of the Republic of Indonesia (ANRI), provides a nationwide infrastructure for digital preservation and access (ANRI, 2022; Faedah & Ulum, 2025). This framework positions archives as integral components of Indonesia's e-government ecosystem.

The establishment of the National Research and Innovation Agency (BRIN) in 2021 further consolidated this landscape by unifying research institutions and their documentary outputs within a single governance structure. While digital platforms enable broader access to research archives, they also require careful curation to safeguard provenance, contextual integrity, and public trust (Duranti & Thibodeau, 2018; Jeurgens, 2025).

Contemporary archival scholarship underscores that archives actively construct collective memory rather than merely preserve facts (Gilliland & McKemmish, 2016; Waetjen, 2023). In the digital era, this constructivist perspective intersects with participatory archiving, where users contribute to interpretation and meaning-making (Theimer, 2018; Acker & Flamm, 2021). Digital curation is therefore critical, requiring metadata integrity, interoperability, ethical stewardship, and interpretive design (Sabharwal, 2021; Levchuk, 2021), alongside international principles that balance openness and responsibility (ICA, 2016; UNESCO, 2015). In this context, archives may also function as *communicative heritage*, understood as archival materials that are actively interpreted and contextualised to enable public understanding and meaning-making.

Existing studies have extensively examined digital archives, participatory archiving, and virtual exhibitions as mechanisms for public engagement and cultural memory formation. Research by Theimer (2018) and Acker & Flamm (2021), for instance, highlights the role of participatory practices in shaping collective memory, while studies by Marty and Jones (2020) and Smith and Wallace (2022) emphasise the importance of digital curation and interpretive design in enhancing accessibility and engagement. Other works have explored virtual exhibitions as narrative environments that connect archival records with broader audiences (Nogueira & Almeida, 2022; Godoy, 2021). However, these studies largely focus on conceptual frameworks or case studies situated in Western or global contexts, with limited attention to how research archives are operationalised within national archival infrastructures in the Global South. In particular, there remains a lack of practice-based analyses that examine how research archives are transformed into collective memory through integrated national systems such as Indonesia's SIKN–JIKN framework, where archival governance, digital infrastructure, and public communication intersect.

Despite growing literature on digital heritage and participatory archives, practice-based reflections examining how research archives are transformed into collective memory through national archival infrastructures remain limited, particularly in Global South contexts (Godoy, 2021; Jeurgens, 2025). Addressing this gap, this paper presents a practice-based reflection on the transformation of research archives into collective memory through a national virtual exhibition within Indonesia's archival network. Using the LAPAN-Tubsat exhibition—Indonesia's first micro-satellite—curated by BRIN and disseminated through JIKN, the study explores how archival curation, digital storytelling, and participatory communication converge in practice, contributing reflective insights into the role of national archival infrastructures as communicative spaces connecting scientific records with public memory.

RESEARCH METHODS

This study adopts a practice-based reflective approach to examine how research archives are transformed into collective memory through a national virtual exhibition. Rather than employing an experimental or quantitative design, the study is grounded in reflective professional practice, in which archival activities themselves constitute the primary source of inquiry. This approach aligns with participatory action research principles that emphasise iterative cycles of planning, acting, observing, and reflecting within institutional contexts (Kemmis & McTaggart, 2005; Worthen & Weatherall, 2024).

The reflection is situated within the professional practice of archivists at the National Research and Innovation Agency (BRIN), conducted in collaboration with the National Archives of the Republic of Indonesia (ANRI). The LAPAN-Tubsat virtual exhibition hosted on the National Archival Information Network (JIKN) serves as the focal practice context for

examining archival decision-making, curatorial strategies, and communicative outcomes. In this context, BRIN functions as the custodian of research archives originating from former research institutions such as the National Institute of Aeronautics and Space (LAPAN), while ANRI manages JIKN as a national platform for archival access and dissemination. The case is treated as an illustrative instance that enables in-depth reflection on processes and lessons learned rather than as a representative sample (Kadastik & Pedersen, 2023).

The selection of the LAPAN-Tubsat exhibition was based on a thematic identification and appraisal process conducted by the archival unit. Several potential archival themes were initially identified, including records related to Baruna Jaya research vessels, drone technology, botanical research (Kebun Raya), and nuclear reactor development. From these candidates, the LAPAN-Tubsat archives were selected due to their national significance, the relative completeness and organisation of the records, the availability of structured archival inventories, and the existence of digital surrogates that enabled their presentation in a virtual exhibition format through JIKN.

The methodological process followed an iterative curatorial workflow encompassing record selection and appraisal, metadata description, digital transformation, narrative construction, and public dissemination via JIKN. Archival materials related to the LAPAN-Tubsat mission—including technical reports, photographs, audiovisual documentation, and institutional records—were drawn from BRIN's archival holdings. Metadata description and interoperability were guided by the national SIKN–JIKN framework (ANRI, 2022), with emphasis on provenance, authenticity, and contextual integrity in line with principles of trustworthy digital records (Duranti & Thibodeau, 2018). Validation mechanisms ensured consistency between BRIN's internal archival system (SINAR BRIN) and the national infrastructure.

Interpretive design constituted an integral element of the curatorial process. Drawing on digital curation principles (Sabharwal, 2021; Paschetto & Abdu, 2024), archival records were contextualised within thematic narratives to enhance interpretability for non-specialist audiences while preserving their evidential value as communicative artefacts of scientific meaning and national memory (Lester, 2023).

The primary materials analysed comprise digital archival records curated for the LAPAN-Tubsat exhibition, including metadata, visual artefacts, and narrative texts published through JIKN. Supplementary reflective data were derived from internal curatorial documentation, coordination meeting notes, and iterative revisions during exhibition development. These materials function as reflective evidence of archival practice, enabling analysis of professional judgement, collaboration, and interpretive choices (Gilliland, 2019; Chiquet & Felsing, 2023). In addition, supporting data from the JIKN exhibition management dashboard—such as the number of views, exhibition duration, and publication status—were utilised to provide indicative insights into user engagement and accessibility.

The reflective analysis was structured around three evaluation criteria: accessibility, authenticity, and engagement. Accessibility refers to the ease of locating and retrieving content through JIKN's search and navigation features; authenticity concerns the maintenance of provenance links between digital surrogates and original records; and engagement considers patterns of user interaction and qualitative feedback associated with the exhibition (Davidson & Reid, 2020).

Ethical considerations were embedded throughout the curatorial process. The exhibition complied with BRIN's archival access policies and ANRI's public information guidelines, ensuring that sensitive or restricted materials were excluded from public dissemination. This approach aligns with international principles on access and documentary heritage preservation (ICA, 2016; UNESCO, 2015), balancing openness with institutional responsibility and reinforcing the social accountability of archives (Buchanan & Luke, 2023).

RESULT AND ANALYSIS

From Research Records to a National Virtual Exhibition

The curatorial practice resulted in the development of a national virtual exhibition entitled "Satelit Mikro LAPAN-Tubsat dalam Sorotan Lensa", published through the National Archival Information Network (JIKN). The exhibition presents archival documentation of LAPAN-Tubsat, Indonesia's first micro-satellite launched in 2007, curated from the research archives of the National Research and Innovation Agency (BRIN) and disseminated through the national archival infrastructure coordinated by the National Archives of the Republic of Indonesia (ANRI).

Rather than functioning as a repository of isolated records, the exhibition was designed as a structured digital narrative. Archival materials were organised into three thematic clusters—Technological Achievement, International Collaboration, and Societal Impact—enabling users to engage with scientific documentation as a coherent story of national innovation. This curatorial structure reflects a shift from record-centred access toward interpretive, narrative-driven engagement, reinforcing the view that archives actively participate in shaping collective memory and social meaning (Cook, 2013; Bushey, 2023).

Recent scholarship highlights digital exhibitions as participatory storytelling environments, where meaning is co-constructed through interaction, reflection, and empathy. Participatory archives and online exhibitions—such as those developed by MONOVA—demonstrate how curatorial storytelling can foster connectivity and collective resilience, particularly in moments of crisis (Bushey, 2023). Similarly, digital storytelling frameworks in community heritage initiatives emphasise the role of narrative structuring, metadata design, and

audience collaboration in enhancing public engagement with archival records (Davidson & Reid, 2020).

From a curatorial perspective, this approach aligns with the post-digital turn in archival exhibition, which reconceptualises archives as “laboratories of stories”—dynamic spaces where curators, technologists, and users collaboratively shape interpretive experiences (Lacedelli & Fazzi, 2023). Viewed through this lens, the LAPAN-Tubsat exhibition illustrates how participatory design and interpretive storytelling can be embedded within a national archival system, transforming static documentation into interactive public history.

Comparable initiatives in global contexts further demonstrate the cultural and educational value of digital archival curation. The Godrej Archives’ “Back to the Future” virtual tour in Mumbai employed immersive technologies to communicate corporate heritage and societal narratives (Jadhav & Nayak, 2023), while Ukraine’s Central State Scientific and Technical Archives utilised 3D tours to enhance accessibility and inclusion in national memory practices (Balyshev et al., 2023). These initiatives resonate with Indonesia’s efforts to position digital archival exhibitions as vehicles of participatory knowledge and collective remembrance.

Drawing on Lester’s (2023) concept of “Exhibiting the Archive”, which foregrounds the sensory and experiential dimensions of archival engagement, the LAPAN-Tubsat exhibition demonstrates how thematic storytelling and digital interactivity invite reflection and empathy rather than merely presenting information. In this way, the exhibition exemplifies how national archives can function as communicative infrastructures that connect scientific heritage with collective identity formation.

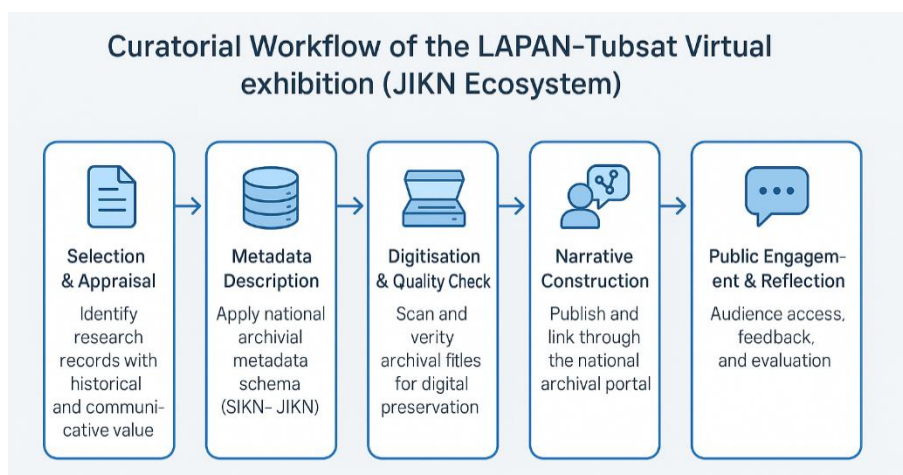


Figure 1. Curatorial workflow of the LAPAN-Tubsat virtual exhibition within the JIKN ecosystem.

As illustrated in Figure 1, the curatorial workflow consists of a sequence of interconnected stages that translate research records into a public-facing digital exhibition. The process begins with thematic identification and archival appraisal, in which relevant records are selected based on their evidential value and completeness. This is followed by the preparation of

archival inventories and metadata description to ensure structured documentation and contextual integrity. The selected records are then digitised and transformed into digital surrogates, enabling their integration into the JIKN platform.

Subsequently, the curatorial process shifts toward interpretive design, where archival materials are organised into thematic narratives and visual structures to enhance accessibility for non-specialist audiences. The final stage involves publication and dissemination through JIKN, where the exhibition becomes accessible to the public and generates user interaction. This workflow demonstrates that the transformation from archival records to collective memory is not a linear technical process, but a multi-stage curatorial practice that integrates archival principles, digital infrastructure, and communicative design.

Archival Materials, Visualisation, and Meaning-Making

The exhibition integrated a diverse range of archival materials, including technical reports, engineering documentation, institutional correspondence, photographs, and audiovisual records related to the LAPAN-Tubsat mission. These materials were digitised and curated as interconnected digital artefacts, allowing heterogeneous formats to be accessed within a single interpretive environment.

Visual records played a central role in mediating scientific knowledge. Archival photographs documenting the satellite's assembly process at the National Institute of Aeronautics and Space (LAPAN) in 2006 were positioned as key exhibits, enabling users to visualise the human, organisational, and technical dimensions of the research process. In this context, photographic archives function as narrative anchors that translate complex scientific work into relatable visual stories.

Images of core technological components—such as the satellite's onboard camera module designed for Earth-observation imaging—were curated to foreground the materiality of scientific research. When embedded within archival narratives, these technical artefacts help bridge the gap between expert knowledge and public understanding, supporting studies that emphasise the role of digital heritage visualisation in translating scientific data into accessible cultural narratives (Marty & Jones, 2020; Smith & Wallace, 2022; Tang & Liu, 2024).

As shown in Figure 2, the visualisation of the satellite assembly process contributes not only as documentary evidence but also as an interpretive mechanism that shapes how scientific work is understood by broader audiences. The image foregrounds the human dimension of technological production, revealing the presence of engineers, laboratory settings, and collaborative practices that are often absent in textual or technical descriptions. This visual context allows users to perceive the satellite not merely as a finished technological object, but as the result of coordinated institutional and human effort.



Figure 2. Assembly process of the LAPAN-Tubsat micro-satellite at the National Institute of Aeronautics and Space (LAPAN), Indonesia, 2006.

From a qualitative perspective, the photograph functions as a mediating layer between expert knowledge and public interpretation. By making the production process visible, it reduces abstraction and enables users to construct meaning through visual cues such as scale, environment, and interaction between actors and artefacts. This contributes to the transformation of archival records into communicative heritage, where understanding emerges not only from factual information but also from experiential and interpretive engagement. In this sense, visual archives within the exhibition do not simply illustrate content, but actively participate in meaning-making processes that connect scientific practice with collective memory.

These observations demonstrate how visual materials contribute to interpretive engagement, and align with broader discussions in digital heritage scholarship. Recent scholarship shows that digital storytelling and visualisation tools, including 3D models, foster deeper cognitive and emotional engagement in heritage contexts. Projects such as *Surfaced – The Digital Pile Dwellings in Austria* demonstrate how interactive visualisation connects scientific artefacts with collective memory (Leipold & Fonseca, 2025), while the EuroMed 2020 Digital Heritage Conference highlighted visualisation and virtual museum applications as central to contemporary heritage interpretation (EuroMed 2021).

Within Southeast Asia, audiovisual digitisation initiatives further illustrate the dual role of visual archives in preservation and engagement. The National Broadcasting Agency of Malaysia's digital preservation strategies underscore the significance of media archives as cultural and educational resources (Alui & Khan, 2022). Collectively, these perspectives affirm that visual archives, when integrated with digital curation and interpretive design, transform static documentation into multisensory storytelling spaces. In the LAPAN-Tubsat exhibition, the

interplay of textual, photographic, and audiovisual artefacts illustrates how archival visualisation operates both as a communicative strategy and as a mode of meaning-making that situates scientific research within public memory.

Metadata Integrity and Interoperability within the National Archival Network

A key outcome of the project was the successful integration of BRIN's internal archival system (SINAR BRIN) with the National Archival Information Network (JIKN), managed by the National Archives of the Republic of Indonesia (ANRI). All exhibition items were linked to their corresponding archival descriptions, ensuring clear provenance relationships between digital surrogates and their original records.

Metadata elements documenting creation context, custodial history, and record relationships were consistently applied in accordance with the SIKN–JIKN metadata schema. This alignment ensured both structural and semantic interoperability between institutional systems and the national archival infrastructure, demonstrating how metadata integrity underpins trustworthiness and contextual authenticity.

Recent scholarship confirms that metadata interoperability is foundational to trustworthy digital preservation. The integration of descriptive and structural standards—such as Dublin Core, METS, PREMIS, and EAD—is widely recognised as supporting long-term preservation and provenance validation (Formenton & Gracioso, 2022). Interoperability, in this sense, extends beyond technical consistency to sustain semantic linkages that preserve evidential and functional relationships among archival objects (Duranti, 2022; Pacheco Silva, 2023).

Conceptually, the application of FAIR (Findable, Accessible, Interoperable, and Reusable) data principles has further strengthened archival metadata practice. Research highlights that FAIR Digital Objects (FDOs) support structured description, provenance, and authenticity, bridging research data management and archival curation (Islam & Weber, 2022; Soiland-Reyes et al., 2022). Similarly, the FAIR Accessor framework combines archival diplomatics with FAIR technologies to ensure long-term authenticity and intelligibility of digital archival information (Pacheco & Freitas, 2022).

Within the BRIN–JIKN context, interoperability functioned not merely as a technical mechanism but as a trust-building process that preserves archival context across institutional boundaries. This approach reflects Henttonen and Kallberg's (2020) argument that accessibility and authenticity are complementary objectives when supported by metadata frameworks focused on contextual integrity and provenance traceability.

Finally, emerging global initiatives—such as the Global Community Guidelines for FAIR Dataset Quality Information—underscore that metadata quality, completeness, and provenance documentation directly affect the trustworthiness of digital archives (Peng et al., 2022). Alignment with SIKN–JIKN schema standards therefore situates Indonesia's national archival

network within broader international discussions on metadata-driven interoperability and responsible digital stewardship.

Public Access, Engagement, and Communicative Outcomes

Following publication, the LAPAN-Tubsat Virtual Exhibition became openly accessible through the JIKN portal, supporting multiple modes of user interaction, including keyword search, thematic navigation, and visual browsing. This open-access configuration aligns with national mandates on e-government transparency as well as international frameworks promoting equitable access to documentary heritage (ICA, 2016; UNESCO, 2015).

Usage analytics from JIKN indicated sustained and measurable engagement, with users spending longer durations on visual artefacts and narrative sections than on static metadata pages. This pattern suggests that the combination of archival authenticity and interpretive storytelling encourages exploratory, curiosity-driven, and learning-oriented behaviour, echoing findings from participatory heritage studies that associate open digital platforms with digital literacy and lifelong learning (Brodefrank, 2025).

Qualitative feedback from educational institutions and science communication practitioners further highlighted the exhibition's pedagogical value. Teachers and students reported using the exhibition to contextualise Indonesia's aerospace history and innovation, demonstrating how archives can function as knowledge mediators that connect technical documentation with broader cultural meaning. These observations align with research emphasising participatory co-creation as a central component of digital heritage and humanities initiatives (Ma & Chen, 2025).

Comparable international case studies reinforce this perspective. The Watery Archives project in the United Kingdom showed how participatory workshops and open-access exhibitions fostered critical engagement with environmental histories and collective learning (Worthen & Weatherall, 2024). Similarly, studies by Felsing and Fornaro (2023) indicate that interoperability and community participation enhance the sustainability and reuse of digital image archives through open infrastructures and participatory use.

Within Indonesia, similar dynamics have been observed in studies of digital archival governance. Research conducted in Makassar found that participatory mechanisms, public training, and digital outreach significantly improved trust, accessibility, and transparency in archival services (Baharuddin & Munna, 2025). In this context, JIKN's open-access exhibition environment illustrates that accessibility and engagement are not merely technical features but social processes of communication and inclusion.

Overall, the LAPAN-Tubsat exhibition demonstrates how digital archival practice—grounded in metadata integrity, storytelling, and participatory access—can transform archives

into communicative infrastructures that support collective memory, public learning, and national identity formation (Marty & Jones, 2020; Miller, 2020; Grasso & Porretti, 2025).

Professional Practice, Collaboration, and Institutional Learning

The project generated significant professional and institutional outcomes by establishing a new model of interdisciplinary collaboration among archivists, researchers, data managers, and science communicators within the National Research and Innovation Agency (BRIN) and the National Archives of the Republic of Indonesia (ANRI). This collaborative practice redefined the role of archivists, positioning them not merely as custodians of records but as interpretive agents engaged in narrative construction, contextual analysis, and visual knowledge mediation (Gilliland, 2019).

Through iterative reflection and teamwork, the LAPAN-Tubsat virtual exhibition functioned as a learning laboratory for archival innovation. Participants developed shared vocabularies and curatorial workflows that bridged archival science, science communication, and digital curation. This is evidenced by internal coordination records and iterative revisions of exhibition narratives, which show how terminologies, thematic structures, and metadata descriptions were continuously refined through collaborative discussions among archivists, researchers, and communication specialists. This process reflects what Pierroux and Sauge (2021) describe as a “collaborative research space,” in which exhibitions operate as interdisciplinary interfaces connecting research, design, and public engagement.

The collaborative process also fostered a community of practice within and across institutions. As Field and Lewis (2025) argue, such communities—grounded in mutual learning, reflection, and co-creation—are essential for sustaining interdisciplinary expertise and professional renewal. In the BRIN–ANRI context, this translated into strengthened cross-departmental dialogue and informal mentoring mechanisms, enhancing institutional readiness for future digital curation initiatives.

International experiences further reinforce these dynamics. Landes-Price et al. (2025) demonstrate how socially engaged archival collaborations, such as the Rosine 2.0 project in the United States, integrate interdisciplinary learning with community care and social justice, while Bezdrabko (2021) highlights the role of networked communication and collaborative digital practices in supporting institutional renewal and professional visibility within archival organisations.

Overall, the project contributed not only to the creation of a public-facing virtual exhibition but also to the institutionalisation of reflective and participatory curatorial practices. Internal evaluations within BRIN indicated that the LAPAN-Tubsat experience informed subsequent initiatives in areas such as environmental science, space technology, and biomedical archives, positioning the exhibition as a reference model for integrating archival scholarship,

digital engagement, and institutional learning within Indonesia's evolving national archival ecosystem.

Situating the Findings within Digital Governance and Global South Contexts

Situated within Indonesia's e-government framework, the findings demonstrate how national archival infrastructures can function as communicative platforms aligned with broader digital governance agendas, including the Sistem Pemerintahan Berbasis Elektronik (SPBE). The integration of research archives into JIKN illustrates how archives operate as nodes within a networked information ecosystem, reinforcing public sector principles of transparency, accountability, and participatory access (ANRI, 2022).

This alignment reflects global trends in open government data and digital public infrastructure, where archives, records management, and information systems are increasingly interconnected to support evidence-based governance and citizen engagement (Asogwa & Ezema, 2022). Within this context, archival institutions function not only as custodians of memory but also as information intermediaries that facilitate the ethical circulation of knowledge between government and society (Maseko, 2023).

From a Global South perspective, this case contributes to discussions on participatory digital heritage by demonstrating how innovation can emerge through institutional collaboration and adaptive use of existing infrastructures, rather than reliance on proprietary or high-cost technologies. Empirical findings from the JIKN exhibition, including user engagement data, documented curatorial workflows, and the integration of BRIN's archival system with national metadata frameworks, indicate that accessibility and participation are achieved through coordinated governance and curatorial practices rather than technological sophistication alone.

Comparable initiatives across Asia and Africa highlight the strategic role of national archival networks in integrating digital access, community memory, and social inclusion (Choi & Park, 2021; Hara & Seale, 2019; Nguyen & Bui, 2023). However, unlike many cases that emphasise community-driven or decentralised approaches, the Indonesian context demonstrates a more integrated model in which a centralised national platform (JIKN) operates in coordination with institutional archives such as BRIN, enabling standardised metadata interoperability and nationwide access. Research in Southeast Asia emphasises that participatory heritage practices depend less on technical sophistication than on institutional flexibility and cross-sectoral partnerships (Nguyen & Bui, 2023). Similarly, studies from African contexts show that digital heritage initiatives are most effective when embedded within community-oriented governance systems that link cultural participation with social accountability (Mutsvairo, 2024). The LAPAN-Tubsat case extends these perspectives by showing how a state-coordinated archival network can simultaneously support interoperability, public engagement, and scientific communication within a unified system.

The LAPAN-Tubsat exhibition illustrates how archival infrastructures in resource-constrained yet strategically coordinated environments can sustain both scientific memory and civic engagement. This is evidenced by the structured curatorial workflow, the use of interoperable metadata systems (SIKN–JIKN), and observable user interaction patterns from the JIKN dashboard, which collectively demonstrate how archival records are transformed into accessible and meaningful public narratives. By leveraging national interoperability frameworks and participatory design principles, Indonesia’s archival system demonstrates that digital transformation in the Global South is not merely a matter of technology adoption, but of embedding communication, collaboration, and collective memory within digital governance architectures.

CONCLUSION

This paper has presented a practice-based reflection on transforming research archives into collective memory through a national virtual exhibition within Indonesia’s archival network. Using the LAPAN-Tubsat exhibition curated by the National Research and Innovation Agency (BRIN) and disseminated through the National Archival Information Network (JIKN), the study demonstrates that scientific research archives can function not only as evidential records but also as communicative heritage, understood here as archival materials that are actively interpreted, contextualised, and presented to enable public understanding and meaning-making when approached through interpretive and participatory curation.

The findings indicate that this transformation relies on the integration of archival integrity, metadata interoperability, and narrative design. By embedding research records within a coherent digital storyline while maintaining provenance and authenticity through national metadata frameworks, the exhibition shows how accessibility and trust can be jointly sustained within a public archival infrastructure. In this context, virtual exhibitions operate as effective interfaces connecting scientific documentation with wider publics.

From a professional perspective, the project highlights the evolving role of archivists as communicators and reflexive practitioners. Engagement in digital curation and interdisciplinary collaboration required archivists to move beyond traditional custodial roles toward active mediation of knowledge, fostering professional learning and institutional capacity building. At the institutional level, the case illustrates how national archival networks can function as strategic components of digital governance, supporting transparency, interoperability, and public engagement. Within a Global South context, the LAPAN-Tubsat exhibition demonstrates that archival innovation can be achieved through adaptive use of existing infrastructures and collaborative practices rather than reliance on advanced technologies.

Overall, this study contributes empirical and reflective insights to discussions on participatory digital heritage by positioning national archival platforms as living interfaces

between science and society, capable of sustaining collective memory and informed public engagement with scientific knowledge.

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