

Article

Digital Cultural Heritage in Southeast Asia: Knowledge Structures and Resources in GLAM Institutions

Kanyarat Kwiecien , Wirapong Chansanam  and Kulthida Tuamsuk * 

Department of Information Science, Faculty of Humanities and Social Sciences,
Khon Kaen University, Khon Kaen 40002, Thailand; kandad@kku.ac.th (K.K.); wirach@kku.ac.th (W.C.)

* Correspondence: kultua@kku.ac.th

Abstract

This study explores the digital organization of cultural heritage knowledge across national GLAM institutions (galleries, libraries, archives, and museums) in the ten ASEAN countries. By employing a qualitative content analysis approach, this research study investigates the types, structures, and dissemination patterns of information resources available on 40 institutional websites. The findings reveal the diversity and richness of Southeast Asian cultural heritage, including national and local wisdom, history, significant figures, and material culture, collected and curated by these institutions. This study identifies key knowledge domains, content overlaps across GLAM sectors, and limitations in metadata and interoperability. Comparative analysis with international cultural knowledge infrastructures, such as the United Nations Educational Scientific and Cultural Organization (UNESCO)'s framework, Europeana, and the World Digital Library, highlights both shared values and regional distinctions. While GLAMs in the ASEAN have made significant strides in digital preservation and access, the lack of standardized metadata and cross-institutional integration impedes broader discoverability and reuse. This study contributes to the discourse on heritage informatics by providing an empirical foundation for enhancing digital cultural heritage systems in developing regions. The implications point toward the need for interoperable metadata standards, regional collaboration, and capacity building to support sustainable digital heritage ecosystems. This research study offers practical insights for policymakers, digital curators, and information professionals seeking to improve cultural knowledge infrastructures in Southeast Asia and similar contexts.

Keywords: GLAM institutions; cultural heritage informatics; knowledge organization; ASEAN; metadata standards; digital cultural collections; interoperability; world digital library; Europeana; heritage knowledge systems



Academic Editor: Antony Bryant

Received: 5 August 2025

Revised: 4 September 2025

Accepted: 10 September 2025

Published: 15 September 2025

Citation: Kwiecien, K.; Chansanam, W.; Tuamsuk, K. Digital Cultural Heritage in Southeast Asia: Knowledge Structures and Resources in GLAM Institutions. *Informatics* **2025**, *12*, 96. <https://doi.org/10.3390/informatics12030096>

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Cultural heritage refers to the legacy passed down by ancestors across generations, representing ways of life that have been developed by communities. This includes traditions, practices, places, objects, artistic expressions, and shared values, all of which are transmitted from one generation to the next. Cultural heritage serves as a bridge that links the past to the present and carries forward into the future. It holds value not only for individuals but also for society [1]. However, the widespread destruction of cultural heritage around the world has prompted UNESCO to recognize the detrimental consequences of such loss. As a result, numerous international treaties have been established to safeguard cultural assets [2]. These include the 1954 and 1999 Hague Conventions for the Protection

of Cultural Property in the Event of Armed Conflict and the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage [3]. In 2015, additional efforts were made to protect and promote museums and collections. A framework was established through the UNESCO Recommendation concerning the Protection and Promotion of Museums and Collections, their Diversity and their Role in Society, which emphasizes that museums should function as spaces for cultural transmission, intercultural dialogue, learning, debate, and training—contributing to a peaceful and inclusive society [4]. Furthermore, the 2030 Agenda for Sustainable Development recognizes intangible cultural heritage as a key mechanism for promoting cultural diversity and achieving sustainable development across economic, social, and environmental dimensions [5]. This action plan for people, the planet, and prosperity embraces a broadened role of culture in development, highlighting the importance of creativity, local cultural products, community innovation, local materials, and cultural diversity—all of which underscore the enduring significance of cultural heritage [6,7].

The Association of Southeast Asian Nations (ASEAN) is a regional organization established to promote cooperation in economic, social, and cultural sectors among its member states [8]. The region in which the ASEAN is situated is rich in invaluable intangible cultural heritage and is known for its vast cultural and religious diversity. It is also a unique cultural landscape shaped by the interweaving of Western and Eastern influences during the colonial era. The region contains both tangible and intangible cultural assets, resulting in numerous heritage sites that have been inscribed on the UNESCO World Heritage List. Examples include Angkor Wat in Cambodia, the Ombilin Coal Mining Heritage of Sawahlunto in Indonesia, and Melaka and George Town, Historic Cities of the Straits of Malacca in Malaysia. In terms of intangible cultural heritage, the *kebaya* was inscribed in 2024 as a shared intangible cultural heritage of humanity by five ASEAN countries: Brunei, Indonesia, Malaysia, Singapore, and Thailand [9]. The region also holds documentary heritage that reflects its historical significance on the global stage, such as the archival collection titled “The Birth of the Association of Southeast Asian Nations (ASEAN)” (1967–1976), which was jointly registered as documentary heritage by Thailand, Indonesia, Malaysia, and Singapore [10]. In addition to these UNESCO-recognized heritage sites, the ASEAN still possesses numerous other valuable cultural heritages that have not yet been officially registered as World Heritage but remain under the protection and stewardship of its member countries.

Despite these achievements, the preservation and utilization of cultural heritage within the ASEAN remain fragmented. National-level institutions such as galleries, libraries, archives, and museums (GLAMs) are central to preserving and providing access to cultural knowledge. However, preliminary investigations reveal that these institutions frequently operate in silos, leading to duplicated efforts and inconsistencies in metadata standards. Differences in language, resource availability, and institutional policies further complicate cross-border collaboration. Consequently, cultural data that could be shared and interconnected often remains underutilized. To address this, there is a pressing need for a regionally integrated digital platform underpinned by international standards, enabling effective knowledge preservation and shared access to the ASEAN’s rich cultural heritage [11].

A review of previous research highlights several collaborative efforts between GLAM institutions and academic institutions in developing digital information resources. For instance, a study by [12] describes partnerships between GLAM units at Simon Fraser University and the University of Victoria, including digital exhibitions on seahorses at the Redpath Museum, a digital collection of Renaissance books, and a Victorian-era digital exhibit. These exhibitions represent joint efforts between librarians and university faculty

to promote digital teaching methods within higher education. This aligns with the study by [13], which explored collaboration between the University of Iowa Library and the Stanley Museum of Art. The focus was primarily on art exhibitions, and the findings highlighted how both institutions leveraged their respective strengths to support research, teaching, and public service. Furthermore, [14] examined the cooperation among GLAM institutions during the COVID-19 pandemic to facilitate collaborative research, education, and shared understanding. These collaborations received support from various organizations, such as the Andrew W. Mellon Foundation, which backed libraries and museums in universities to promote international resource sharing. Additionally, the OpenGLAM community emphasized open access and copyright awareness, fostering ongoing dialogue among experts to inform decision making during the pandemic, with the goal of optimizing the effectiveness of public services.

The development of a digital platform that aligns with the operational needs of GLAM institutions requires a comprehensive understanding of the information currently stored and provided by GLAM institutions across ASEAN member countries. This is especially critical in the era of digital technology innovations such as 3D scanning, virtual reality (VR), augmented reality (AR), and artificial intelligence (AI), which are reshaping the landscape of cultural preservation [15]. These advancements directly impact GLAM institutions by offering opportunities for enhanced collaboration, enabling institutions to interconnect and share regional cultural knowledge. This can foster mutual understanding, promote cultural diversity, and contribute to the development of international standards for cultural preservation. It emphasizes the interconnectedness of global heritage and enhances equitable access to knowledge for individuals and communities, aligning with the goals of sustainable development [16,17].

Based on these considerations, the researchers recognize the urgent need to investigate current practices, challenges, and opportunities for fostering collaboration among GLAM institutions in Southeast Asia in the realm of cultural information. Southeast Asia, as a region rich in cultural diversity shaped by both Eastern and Western influences, provides a unique context for such a study. However, the development of a platform to support collaborative services and knowledge sharing among GLAM institutions requires a deep understanding of the characteristics of the information resources they hold, including both the physical attributes of the materials and the associated knowledge structures. Therefore, this study seeks to explore how GLAM institutions across Southeast Asia collect, organize, and disseminate cultural heritage knowledge through their digital platforms. This research study aims to (1) identify the thematic scope and knowledge domains preserved and shared by GLAM institutions and (2) examine the typologies and formats of cultural heritage resources in both physical and digital forms. This analysis will inform the design of a digital platform that supports collaborative cultural knowledge preservation and access across the region. By addressing existing gaps in interoperability and metadata standardization, this study aims to contribute to the broader goal of cultural sustainability. Ultimately, the findings will benefit GLAM institutions by enhancing their capacity for knowledge sharing, strengthening regional cultural identity, and advancing the development of inclusive digital infrastructure aligned with the goals of sustainable development.

2. Related Literature

2.1. GLAM Introduction

GLAM is an acronym for gallery, library, archive, and museum. These are information institutions responsible for the preservation and provision of cultural knowledge and information. The collaboration among these institutions has been highlighted by Marcum, who noted that the evolution of the digital environment has fostered cooperation among

various agencies in the preservation of cultural knowledge [18]. Initially, GLAM institutions were not categorized as separate entities, but due to differing practices and operational approaches, they eventually came to be recognized as four distinct types of institutions, each with their own unique characteristics and roles:

- **Gallery.** Galleries focus primarily on exhibiting paintings and works of art. Their main purpose is to support artists by displaying their work and organizing related exhibitions that invite public engagement. Through these exhibitions, audiences can appreciate the beauty of cultural heritage expressed through art [19,20].
- **Library.** Traditionally, libraries focused on storing printed materials, inscriptions, manuscripts, and documented records. Over time, they expanded their collections to include other forms of information resources such as audio recordings, artifacts, and electronic resources like e-books and databases. Functionally, libraries aim to promote knowledge, education, and even leisure through access to diverse information resources.
- **Archive.** Archives primarily store unpublished materials or documentary records, which may include texts, images, or handwritten items resulting from organizational or personal activities such as commerce, administration, and law. Unlike libraries, archives are less oriented toward learning or research services and instead emphasize the preservation of records. Their core function lies in the content of the records themselves [21], with a secondary role as a source of primary data for research [22].
- **Museum.** Museums serve as learning institutions similar to libraries, but they focus on collecting and providing access to cultural products and historical artifacts, such as clothing, musical instruments, jewelry, sculptures, natural phenomena, or significant historical events. According to the International Council of Museums (ICOM), a museum is defined as ‘a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing’ [23]. Overall, museums emphasize three key aspects of the objects in their collections: significance, materiality, and form [24]. As such, museums play a central role in promoting learning about various dimensions of cultural heritage, using exhibitions and storytelling as means of communication with the public.

Table 1 presents the key aspects of GLAMs, including their primary collection, material types, functions, access approach, and roles in cultural heritage.

In addition, GLAM institutions face numerous challenges, including the global economic crisis and the COVID-19 pandemic. The need to keep pace with digital trends to make collections more accessible to the public has impacted their operations and budgets. These pressures have compelled GLAM institutions to adopt proactive approaches by implementing innovative strategies, seeking collaboration with other institutions, leveraging partnerships, and developing sustainable service models [25]. Consequently, GLAM collaboration refers to the integration of libraries, archives, and museums into unified institutions that combine their respective materials. These efforts aim to establish common standards and best practices by blending traditional theories and operational methods from each institution. For example, the study by [26] emphasizes that GLAM cooperation must increase focus on community engagement, social inclusion, and public participation.

A concrete initiative is the BYZART project (Byzantine Art and Archaeology on Europeana), which enriched the Europeana platform by adding new cultural and artistic objects related to Byzantine history and culture. These objects were digitized and linked

to illustrate relationships among cultural artifacts [27]. This aligns with the perspectives of [28], who noted that rapid digital development enhances opportunities for collaboration and enables the validation of historical information through broader social engagement.

Table 1. Comparison of the key aspects of GLAMs.

Aspect	Galleries (G)	Libraries (L)	Archives (A)	Museums (M)
Primary collection	Visual art: paintings, drawings, sculpture, photography, and digital art	Printed and digital texts: books, journals, manuscripts, gray literature, and e-resources	Unpublished records: official documents, letters, manuscripts, personal papers, and organizational records	Tangible cultural artifacts: ethnographic items, historical objects, scientific specimens, and artworks
Material types	Artworks (2D and 3D) and digital exhibitions	Textual media, multimedia, digital archives, and reference works	Unique original documents, handwritten manuscripts, official records, photographs, and maps	Objects of historical, cultural, scientific, and artistic significance
Functions	Curate and display visual expression; inspire creativity and cultural appreciation	Provide access to information for learning, education, recreation, and research	Preserve authentic evidence of societal memory and historical development	Collect, conserve, interpret, and exhibit material culture to support learning, identity, and tourism
Access approach	Exhibition-based (temporary/permanent), increasingly digital	Open access, digital lending, physical reading rooms, and educational programming	Restricted/public access based on archival policy; sometimes digitized collections	Public exhibitions, educational tours, outreach programs, virtual exhibitions
Role in cultural heritage	Promote aesthetic and cultural narratives through visual means	Sustain knowledge transmission and democratic access to learning resources	Serve as official memory repositories for nations and institutions	Showcase human experience, foster identity, and support historical and cultural understanding

2.2. GLAM Collection Management

In the digital era, the organization and management of collections in GLAM institutions have undergone significant transformation. Traditionally distinct in their practices, these institutions are increasingly converging in how they structure, describe, and make collections accessible. A central trend is the movement toward integrated collection systems that unify metadata across domains to support interdisciplinary research and broaden user access [29]. The rise of Linked Open Data (LOD), standards such as CIDOC CRM in museums, Dublin Core in libraries, and ISAD (G) in archives enable interoperability and the semantic linking of resources across platforms [30]. Digitization and digital curation have become core strategies in managing both tangible and intangible cultural heritage. GLAM institutions are prioritizing digital surrogates to enhance preservation, improve access, and support remote engagement. However, this shift demands robust metadata practices, long-term digital preservation infrastructure, and alignment with FAIR (Findable, Accessible, Interoperable, and Reusable) data principles [31]. Challenges persist, particularly around metadata harmonization, funding sustainability, and balancing institutional autonomy with collaborative infrastructures [32].

Another key shift is the move toward user-centered collection design. Instead of solely focusing on institutional logic (e.g., provenance or format), collection interfaces are increasingly structured around user needs, cultural narratives, and community engagement. This approach promotes inclusive access and supports knowledge co-creation with stakeholders such as indigenous communities, citizen scholars, and educators [33]. Participatory metadata and community-driven classification schemes are gaining traction as tools for

decolonizing collections and acknowledging multiple epistemologies [34]. Looking ahead, sustainable collection management in GLAMs will rely on collaborative digital infrastructures, adaptive metadata models, and inclusive curatorial practices. Cross-institutional frameworks like Europeana, the World Digital Library (WDL), and national digital libraries offer blueprints for federated access to diverse cultural resources. For GLAM professionals, ongoing skill development in digital humanities, data curation, and knowledge organization will be essential to sustaining the cultural mission of these institutions in an increasingly networked world.

In the ASEAN region, GLAM institutions are increasingly engaging in digital transformation initiatives to enhance access to collections and support the long-term preservation of cultural heritage. Countries such as Singapore, Thailand, and Malaysia have developed national strategies to digitize heritage collections, adopt standardized metadata schemas (e.g., Dublin Core and MODS), and establish integrated platforms that bridge libraries, archives, and museums [35]. A prominent example is the ASEAN Cultural Heritage Digital Archive (ACHDA), which provides digitized access to intangible and tangible heritage materials from multiple member states, promoting intercultural understanding and regional identity [36]. However, progress is uneven. Some countries face constraints related to technical infrastructure, funding, and institutional capacity, which affects metadata quality, interoperability, and the sustainability of digital repositories [37,38]. As a response, regional collaboration through capacity building programs, shared digital standards, and open-access policies is seen as vital to fostering inclusive and resilient collection management systems throughout the ASEAN [39].

2.3. Global GLAM Collections

2.3.1. Europeana

Europeana is a leading digital platform for cultural heritage in Europe, aggregating and providing access to over 50 million digitized items from museums, libraries, archives, and galleries across the continent. It serves as a central hub for discovering a wide range of cultural assets, including artworks, manuscripts, books, photographs, audio recordings, films, and historical artifacts. Through collaboration with more than 3000 cultural institutions, Europeana supports the preservation and dissemination of both tangible and intangible heritage, ensuring that diverse cultural narratives are accessible to global audiences. The platform not only provides digital access but also contextualizes items through thematic exhibitions, educational resources, and curated collections, fostering greater public engagement with heritage materials. From a technical perspective, Europeana adopts the Europeana Data Model (EDM), which standardizes metadata across institutions and enables semantic interoperability between diverse collections. Its commitment to open access and linked open data principles enables researchers, educators, and developers to reuse cultural content for educational, scholarly, and creative purposes. Europeana's thematic initiatives—such as Europeana 1914–1918, Europeana Sounds, and Europeana Fashion—highlight its role in organizing collections around historically and socially significant domains. As a resource, Europeana not only exemplifies digital innovation in the heritage sector but also promotes cross-cultural dialogue, digital literacy, and the democratization of cultural knowledge across Europe and beyond [40–42].

Based on institutional sources and the Europeana catalog, collections can be grouped into the following categories: (1) Tangible Heritage: Artworks and Visual Materials: paintings, drawings, maps, graphic design, and fashion collections; Artifacts and Museum Objects: cultural artifacts, 3D digitized architectural heritage, and archaeological collections; Textual Heritage: Books, Manuscripts, and Newspapers: digitized historical publications, medieval and Renaissance manuscripts (Europeana Regia), archives from libraries, and

newspapers projects; Audiovisual Materials: Sound Recordings: music, spoken word, oral history, and natural sound collections (Europeana Sounds); and Films and Videos: silent films, newsreels, and documentary media. (2) Intangible Heritage Representations: Practices, traditions, and oral expressions (e.g., Europeana stories on intangible cultural heritage) such as local customs or crafts. (3) Thematic and Specialized Collections: Europeana 1914–1918: extensive wartime personal artifacts, letters, diaries, images, video, maps, and ephemera related to WWI [40–42].

2.3.2. World Digital Library

The World Digital Library (WDL) is a global initiative launched by the U.S. Library of Congress in collaboration with UNESCO and international partner institutions. Its primary objective is to make significant cultural heritage materials from around the world freely accessible on a single platform, promoting international understanding and intercultural dialogue. The WDL curates a wide range of digitized primary sources—including manuscripts, rare books, maps, photographs, prints, recordings, films, and other cultural documents—that span across centuries and civilizations. With contributions from over 150 institutions in more than 60 countries, the WDL presents its collections with multilingual metadata and contextual narratives, enriching their value for educators, researchers, and the general public alike [43].

As a digital cultural heritage repository, the WDL emphasizes diversity, inclusion, and global representation. It provides a unique opportunity to explore the intellectual and artistic achievements of various world cultures, with items dating from the 8th millennium BCE to the 21st century. Through the WDL, users can access foundational documents such as historical treaties, religious texts, scientific manuscripts, and visual records that reflect the collective memory and identity of humanity. The platform not only preserves cultural materials for future generations but also democratizes access to knowledge, contributing to efforts in education, cultural diplomacy, and the digital humanities [44–46].

Since its launch in 2009, the WDL has accumulated over 19,000 unique items contributed by more than 150 institutions across nearly 60 countries. These digital items include a broad range of heritage materials: (1) Textual Collections: Rare and historical texts such as manuscripts, books, newspapers, journals, and printed documents; (2) Cartographic and Graphic Media: Historical maps and architectural drawings, as well as prints and photographs; and (3) Audiovisual Heritage: Sound recordings (including oral histories and music) and historical films. Each item is accompanied by narrative descriptions that provide historical and cultural context, often available in multiple languages (such as Arabic, Chinese, English, French, Russian, and Spanish), enhancing accessibility and educational use [43–45].

A comparative analysis of the cultural heritage collections in Europeana and the World Digital Library (WDL), based on the UNESCO cultural heritage framework, is performed. UNESCO classifies cultural heritage into tangible (movable and immovable) and intangible. Both platforms serve as global resources for preserving and providing access to diverse cultural materials, with unique strengths in terms of scope, curation, and metadata integration (Table 2).

Beyond technical infrastructures, scholars have highlighted that cultural heritage is also frequently contested, shaped by competing claims of ownership, identity, and economic interest. Hauser-Schäublin, for instance, examines Angkor Wat as a world heritage site situated in political and cultural negotiations, illustrating how heritage management extends beyond conservation into questions of legitimacy and power [47]. Such perspectives underscore the importance of situating GLAM initiatives in the ASEAN not only within

digital and organizational contexts but also within broader debates on contested heritage and development.

Table 2. Comparison of cultural heritage collections in Europeana and WDL.

UNESCO Category	Europeana	WDL
Tangible (Movable)	Extensive collections of digitized books, paintings, maps, fashion, objects, and manuscripts from European institutions.	Rare manuscripts, historical books, maps, photographs, and prints from global institutions.
Tangible (Immovable)	Limited—represented through photographs, architectural drawings, or 3D scans.	Represented in visual materials and maps; no immersive spatial representation.
Intangible	Represented through stories, oral histories, recordings, crafts, and folklore.	Represented via oral traditions, music, storytelling, and cultural rituals.
Thematic Curation	Thematic projects: Europeana 1914–1918, Fashion, Sounds, Judaica, etc.	Thematic curation with global scope: sacred texts, world history, and ancient civilizations.
Metadata Standard	Uses Europeana Data Model (EDM) supporting linked open data.	Based on Library of Congress standards with narrative-rich metadata.
Tangible (Movable)	Extensive collections of digitized books, paintings, maps, fashion, objects, and manuscripts from European institutions.	Rare manuscripts, historical books, maps, photographs, and prints from global institutions.

2.4. Knowledge Organization in GLAM Institutions

Knowledge organization (KO) refers to the systematic classification, description, and indexing of information resources typically conducted within institutions such as libraries, archives, museums, and databases. According to [34], KO can be defined in two interrelated ways. Broadly, it encompasses the organization of various types of knowledge prevalent in society—such as academic, institutional, or indigenous knowledge—which involves concepts, criteria, meaning, indexing, and semantic relationships. Narrowly, it pertains to organizing documents or resources within a specific institution. A key characteristic of KO is its focus on clustering similar content while maintaining proximity between related materials, thereby enhancing accessibility and coherence. This organization may be performed manually by information professionals, such as librarians or subject specialists, or facilitated by digital technologies and algorithmic systems.

KO plays a crucial role in the GLAM context, where diverse types of cultural heritage materials, ranging from ancient manuscripts to digital media, require structured representation for public access and scholarly use. Zeng and Qin emphasize that KO supports the classification and discoverability of knowledge through metadata, controlled vocabularies, and interoperable frameworks [46]. The application of KO in GLAMs facilitates semantic interoperability, reduces duplication of content, and enhances the retrievability of heterogeneous cultural assets [48]. Several studies illustrate the importance of KO practices in GLAM institutions. Silva and Terra investigated how user-generated tags are compared with indexing terms assigned by professionals in digital environments [49]. Their findings revealed convergence between user and expert vocabulary, as well as users’ awareness of the subjectivity inherent in term selection and the need for validation. Similarly, Dahlström et al. conducted a project to digitize cultural resources and restructure them across libraries and museums using international metadata standards such as FRBR2 and controlled vocabularies. Their work demonstrated that digital transformation enhances the connectivity and collaborative use of knowledge between institutions, reinforcing GLAM’s role as national memory organizations. They further argued for establishing semantic relationships among documents to support identity representation and heritage access in the digital era [50].

Furthermore, KO theory acknowledges the need for culturally sensitive classification schemes, especially when dealing with intangible or indigenous knowledge. Scholars such as Smiraglia and Tennis advocate for incorporating epistemic diversity in organizing

knowledge to ensure inclusivity and respect for cultural variation [51,52]. This aligns with the goals of many Southeast Asian GLAM institutions, which seek to reflect the richness of regional heritage while preserving local knowledge systems. In the context of this study, KO provides a valuable analytical framework for understanding how GLAM institutions in Southeast Asia structure, classify, and disseminate cultural knowledge through their digital platforms. It also informs the assessment of metadata usage, knowledge structuring, and the potential for integrated regional collaboration. By drawing on KO principles, this research study contributes to identifying institutional disparities and proposing shared strategies for enhancing knowledge integration, access, and sustainability in the digital preservation of cultural heritage.

Taken together, the existing literature underscores the significance of GLAM institutions as custodians of tangible and intangible cultural heritage and highlights the growing relevance of digital transformation in heritage curation and access. However, studies remain limited in offering comprehensive cross-sectoral and cross-national perspectives, particularly within the ASEAN context where cultural richness and digital readiness vary significantly. Building upon these gaps, the present study adopts a qualitative content analysis approach to investigate the types, themes, and formats of cultural heritage information disseminated by national-level GLAM institutions in Southeast Asia. By analyzing 40 institutional websites across the 10 ASEAN countries, this study aims to map the landscape of knowledge representation, explore typologies of heritage resources, and identify patterns of content overlap and divergence. This approach enables a grounded understanding of current practices while informing strategies for integrated cultural knowledge management and regional digital heritage interoperability.

3. Method

3.1. Study Approach

This study employed a qualitative research approach, utilizing content analysis of primary and credible sources, with expert validation to ensure data reliability. The primary sources consisted of key GLAM institutions at the national level across the 10 ASEAN countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. These institutions play official roles in the preservation, conservation, and dissemination of cultural heritage as national knowledge resources, including national galleries, libraries, archives, museums, and other significant collections. A total of 40 institutional websites were surveyed (Table 3). In addition to these, supplementary sources, such as Wikipedia, institutional publications, and documents from international organizations (e.g., UNESCO, ASEAN, and CONSAL), were also analyzed, including reports, white papers, and other relevant materials.

Table 3. List of GLAM institutions for this study (Note: All websites accessed between 1–31 March 2025).

GLAM Institution	Website
Brunei	
1. The Gallery—BKISHHB	https://www.bkishhb-en.gov.bn/Explore/Gallery.aspx
2. National Library	http://www.dbplibrary.gov.bn/
3. National Archives	https://history.state.gov/countries/archives/brunei
4. National Museum	http://www.museums.gov.bn/Theme/Home.aspx

Table 3. Cont.

GLAM Institution		Website
Cambodia		
5.	National Library	https://nlc.gov.kh/
6.	National Archives	https://nac.gov.kh
7.	National Museum	https://www.cambodiamuseum.info
Indonesia		
8.	Perpustakaan Nasional Republik Indonesia	https://www.perpusnas.go.id/
9.	Arsip Nasional Republik Indonesia	https://www.anri.go.id/
10.	Museum Nasional Indonesia	https://www.museumnasional.or.id/
Laos		
11.	National Library	http://www.nationallibraryoflaos.org
12.	National Museum of Luang Prabang	https://www.luangprabang-laos.com/National-Museum
Malaysia		
13.	National Galleries	https://www.artgallery.gov.my/en/homepage/
14.	Wei-Ling Gallery	https://weiling-gallery.com/gallery/
15.	National Library	https://www.pnm.gov.my/index.php/pages/view/1344
16.	National Archives	https://www.arkib.gov.my/en/
17.	National Museum	https://www.muziumnegara.gov.my/en
Myanmar		
18.	National Library	http://www.nlm.gov.mm
19.	National Archives	https://www.nam.gov.mm/
20.	National Museum of Yangon	https://culture360.asef.org/resources/national-museum-yangon/
Philippines		
21.	NCCA Gallery	https://ncca.gov.ph/about-ncca-3/ncca-gallery/
22.	National Library	https://web.nlp.gov.ph
23.	National Archives	https://nationalarchives.gov.ph
24.	National Museum of Yangon	https://www.nationalmuseum.gov.ph

Table 3. *Cont.*

GLAM Institution		Website
Singapore		
25.	National Galleries	https://www.nationalgallery.sg/sg/en.html
26.	Gajah Gallery	https://gajahgallery.com/gallery/
27.	National Library	https://www.nlb.gov.sg/main/discover-and-learn/discover-our-collections
28.	National Archives	https://www.nas.gov.sg/archivesonline/
29.	National Museum	https://www.nhb.gov.sg/nationalmuseum/
Thailand		
30.	The National Gallery of Thailand	https://www.museumthailand.com/en/museum/The-National-Gallery-Hor-Silp-Chao-Fa
31.	Bangkok City Gallery	https://bangkokcitycity.com/
32.	SAC Gallery	https://sac.gallery/
33.	National Library	https://www.nlt.go.th/
34.	National Archives	https://www.nat.go.th
35.	National Museum	https://www.finearts.go.th/thailandmuseum
Vietnam		
36.	National Gallery	https://vnfam.vn/vi/
37.	Art Vietnam Gallery	https://www.artvietnamgallery.com/
38.	National Library	https://nlv.gov.vn/
39.	National Archives	https://luutru.gov.vn
40.	Vietnam National Museum of Fine Arts	https://vnfam.vn/vi/

3.2. Data Collection and Analysis

The data collection for this study was conducted through a systematic content analysis of the official websites of selected GLAM institutions in ASEAN countries during the period of March 1–31, 2025. The websites were examined to extract and record information resources that are publicly available and relevant to cultural heritage. This includes digital collections, exhibitions, events, news articles, educational content, and institutional projects that contribute to the preservation and dissemination of cultural knowledge.

A structured data recording form was developed to guide the collection process. The form comprised two primary sections: (1) the cultural heritage knowledge content identified within the digital collections, and (2) the types and formats of cultural information

resources collected and made accessible by the institutions. The categorization of cultural heritage knowledge followed the conceptual framework outlined by UNESCO's classifications of tangible and intangible cultural heritage. In addition, thematic frameworks and metadata classifications from Europeana and the World Digital Library (WDL) were employed to enrich the analysis and support cross-regional comparability, particularly in terms of knowledge domains and digital resource types.

3.3. Data Validation

To ensure the credibility and trustworthiness of the data, a validation process was conducted with five experts comprising GLAM professionals and digital humanities scholars from Thailand, Myanmar, Indonesia, Vietnam, and Laos. These experts reviewed and evaluated the cultural knowledge categories, and the typologies of information resources recorded in the study. Their feedback was used to refine the knowledge structure and verify the relevance and accuracy of the data. The collected data were analyzed using qualitative content analysis methods. Descriptive analysis was employed to identify recurring themes and patterns, and the results were presented in narrative and tabular formats to illustrate the distribution of knowledge domains, resource types, and country-specific practices within the ASEAN context.

4. Findings

The content analysis of the websites of GLAM institutions in ten Southeast Asian countries comprised a total of 40 sources, and supplementary sources were analyzed and presented in three dimensions: (1) the content related to cultural heritage in GLAM collections, (2) the knowledge structure of the cultural content in GLAM collections, and (3) the types of cultural heritage information resources made accessible by GLAMs. The findings are as follows.

4.1. Cultural Knowledge Content in GLAM Collections

The cultural heritage content found in the collections of key GLAMs in ASEAN countries can be categorized into three major groups: national and local wisdom, history of Southeast Asian countries, and prominent figures in national and Southeast Asian contexts.

Group 1: National and local wisdom. The cultural knowledge found in GLAM collections includes both tangible and intangible heritage, varying by the objectives of each institution. The detailed categories are as follows: (1) *Language and literature*—This includes knowledge related to ancient languages, such as Tai Noi and Old Khmer, as well as both classical and contemporary literature. Examples include revered literary works such as Inao, Lilit Phra Lo, and Phra Aphai Mani, along with modern award-winning works, especially those honored with the S.E.A. Write Award (Southeast Asian Writers Award). Additionally, collections include folklore and ethnological stories, reflecting the beauty of language and conveying the social beliefs and lifestyles of the times. (2) *Music*—The knowledge related to Southeast Asian music found in GLAM resources encompasses lyrics, musical scores, and background narratives of various compositions. Materials include handwritten manuscripts, melodies, and explanations of songs, as well as information about traditional instruments, such as Ranad (xylophone), Pi (woodwind instrument), or Indonesia's alusu, illustrating the region's musical evolution. (3) *Arts*—The artistic knowledge presented through GLAMs reflects the region's cultural, ethnic, linguistic, and religious diversity. Artworks include paintings using natural dyes and lines, and dance performances from both royal courts (e.g., Thai Khon, Cambodian Apsara, and Indonesia's Wayang Kulit) and local folk traditions of indigenous groups. (4) *Traditional medicine*—This category includes knowledge on treatment methods using ancient prescriptions, local herbs, traditional massage, and acupuncture. Resources

are preserved in forms such as palm leaf manuscripts, stone inscriptions, and photographs of heritage sites. (5) *Traditional costumes*—This includes historical and contemporary attire, production processes, and fabric patterns unique to different regions and ethnic groups in Southeast Asia. For instance, the Tai Song Dam community is known for their use of dark-colored clothing. GLAM institutions also preserve ancient fabrics showcasing weaving techniques, tailoring processes, and design aesthetics. (6) *Culture, traditions, and lifestyles*—This area encompasses cultural customs, traditional practices, and beliefs related to different stages of life—from birth to death. It reflects the ethnic diversity and cultural richness across Southeast Asia (Table 4).

Table 4. Knowledge about national and local wisdom found in GLAM collections in Southeast Asia.

No.	Category	Description	Example Countries
1	Language and literature	Includes ancient and modern languages, classical and contemporary literature, folktales, and S.E.A. Write Award works.	Thailand, Cambodia, Laos, and Vietnam
2	Music	Song lyrics, traditional compositions, original manuscripts, and indigenous instruments.	Indonesia, Thailand, and Myanmar
3	Arts	Traditional paintings (natural pigments), court and folk dances, sculpture, and stage art.	Thailand, Cambodia, and Indonesia
4	Traditional medicine	Herbal healing, traditional massage, acupuncture, and ancient medicinal manuscripts.	Thailand, Laos, and Myanmar
5	Traditional costumes	Ethnic and historical clothing, weaving techniques, and local patterns.	Vietnam, Malaysia, Thailand, and Laos
6	Culture, traditions, and lifestyles	Customs, beliefs, everyday life rituals, birth-to-death ceremonies, and ethnographic practices.	Philippines, Indonesia, Cambodia, and Myanmar

Group 2: History of Southeast Asian countries. This includes significant historical events and sites relevant to the ASEAN region. This study found that GLAM institutions in these countries preserve and provide access to historical knowledge across different periods, which can be classified into six subcategories: (1) *General world history*—This refers to historical content related to global developments, such as evidence of early human settlements and ways of life during prehistorical and historical times. (2) *Southeast Asian regional history*—This category provides insights into the origins and development of Southeast Asia as a region, from ancient times to the formation of the ASEAN Community. (3) *National histories*—This includes the historical narratives of individual countries such as Thailand, Laos, Cambodia, and Malaysia, including their interactions with neighboring states from the past to the present. It also encompasses the historical integration and shifts in territorial boundaries prior to modern national delineations. For example, the history of the Philippines includes archival documents that recount periods of colonial rule—first by Spain (1552–1900) and then by the United States (1900–present). These histories reflect the merging of Eastern and Western cultures throughout Southeast Asia. (4) *Colonial histories*—This includes the history of chronicles of colonization by European powers (e.g., Spain, France, Britain, and the Netherlands) over Southeast Asia countries, such as the Philippines, Cambodia, Laos, Vietnam, Indonesia, and Myanmar, and its long-term effects on society, identity, and governance. (5) *Post-colonial histories*—This includes the histories of transition to independence, national reconstruction, Cold War dynamics, democratization, and contemporary state building. (6) *Significant historical events related to Southeast Asia*—This includes major events such as the Greater East Asia War (a critical theater in World War II that spanned across Southeast Asia) and key incidents like the Khmer Rouge genocide trials in Cambodia in 1979 (Table 5).

Table 5. Knowledge about *history of Southeast Asian countries* found in GLAM collections in Southeast Asia.

No.	Category	Description	Example Countries
1	General world history	Human origins, prehistorical settlements, and universal historical developments provide global context to Southeast Asia's local histories.	All ASEAN countries (as comparative context)
2	History of Southeast Asia	Overview of Southeast Asia's collective past—from ancient kingdoms and trade networks to the founding of the ASEAN.	Indonesia, Thailand, Cambodia, and Laos
3	National histories	Focused narratives on each country's formation, development, and socio-political evolution, including historical figures and events.	Thailand, Vietnam, Malaysia, and Philippines
4	Colonial histories	Chronicles of colonization by European powers (e.g., Spain, France, Britain, and the Netherlands) and its long-term effects on society, identity, and governance.	Philippines, Vietnam, Cambodia, Laos, Myanmar, Malaysia, and Indonesia
5	Post-colonial histories	Transition to independence, national reconstruction, Cold War dynamics, democratization, and contemporary state building.	Indonesia, Malaysia, Cambodia, and Philippines
6	Significant historical events	Major moments impacting the region: WWII and the Greater East Asia War, the Khmer Rouge genocide, the Vietnam War, and political revolutions.	Cambodia, Vietnam, Thailand, and Myanmar

Group 3. Prominent figures in national and Southeast Asian contexts. Historically, most countries in Southeast Asia were governed by monarchies. As a result, GLAM institutions in countries such as Thailand, Laos, and Brunei preserve and exhibit royal items such as personal belongings, garments, ornaments, and portraits of kings and queens. For example, displays often include royal thrones, court attire, ceremonial jewelry, and information related to significant royal events—such as coronations and royal funerals—along with interpretive content explaining the cultural and historical significance of these resources. In addition to monarchs, GLAM institutions also collect and provide information about other notable individuals. These include national leaders, renowned scholars, and influential figures across various fields. In countries like Singapore and Indonesia, for instance, personal histories are preserved through oral history recordings. These audio archives serve to safeguard knowledge, memories, and life experiences of prominent individuals for future generations (Table 6).

Table 6. Knowledge about prominent figures found in GLAM collections in Southeast Asia.

No.	Category	Description	Example Countries
1	Monarchs and royalty	Preservation and exhibition of royal items such as personal belongings, garments, ornaments, portraits, and ceremonial objects. Display of royal thrones, court attire, and ceremonial jewelry. Information on significant royal events such as coronations and royal funerals.	Thailand, Laos, and Brunei
2	Interpretive content	Provision of explanatory information and knowledge resources to contextualize the exhibited royal artifacts.	All countries
3	Other prominent figures	National leaders, renowned scholars, and influential figures in various fields.	Singapore and Indonesia
4	Oral histories	Use of audio recordings to preserve personal experiences, memories, and knowledge as part of oral history collections.	Singapore and Indonesia

4.2. Knowledge Structure of the Cultural Content in GLAM Collections

The cultural heritage knowledge identified within the GLAM collections was systematically organized into a hierarchical knowledge structure based on knowledge organization principles. This structure consists of three main classes, which are further divided into 15 sub-classes and 30 sub-divisions. Each level of classification represents distinct thematic areas and domains of cultural heritage as found in the digital collections. Representative

examples of knowledge items under each sub-division are also provided to illustrate the scope and diversity of content curated by GLAM institutions (see Table 7).

Table 7. Classification of knowledge structure found in GLAM collections in SEA.

Class	Sub-Class	Sub-Division	Examples
National and local wisdom	Language and literature	Languages	Tai Noi, Khmer, Pali, Sanskrit, and Tagalog
		Classical literature	Hikayat Panji Semirang and Ramayana
		Award-winning literature	Seekor Anjing Mati di Bala Murghab (Indonesia) and Hua Jai Hong Thi Ha (Thailand)
		Poets	–
	Music	Musical instruments	Alusu, Serunai, Ranad-ek, and Saron
		Manuscripts of lyrics or melodies	Royal Compositions (e.g., King Bhumibol Adulyadej’s music)
		Musicians	King Bhumibol
	Arts	Sculpture	–
		Architecture	Anglican, Canti, and Thành Cổ Loa
		Painting	Hooptam and The Ramakian mural paintings
		Performing arts	Khon (Thailand), Apsara Dance (Cambodia), and Wayang Kulit (Indonesia)
		Traditional medicine	Herbal medicine
	Traditional costumes	Medical recipes	–
		Treatment methods	Acupuncture, Thai massage, postpartum healing (Yu-Fai), etc.
		Types of fabric	Silk, Pattah, Batik, and Sarong
		Fabric patterns	Mudmee (Ikats)
		National/local dress	Tai Song Dam, Baju Kurung, Ao Dai, and Kebaya
		Production	Weaving
		Culture, tradition, and life	Culture
	History	Tradition	Birth, funeral, dress, and food
		Beliefs (spiritual or religious)	Loy Krathong
		Prehistorical and historical eras	Aetas, Karma, Spirits, and Nature Spirits
		General history	–
Prominent figures	Southeast Asian history	Lanna history, Lan Xang history, and ASEAN history	–
		Thai History, Indonesian History, and Singapore history	–
	National/local histories	Spain, France, Britain, and the Netherlands	–
		Transition to independence and national reconstruction	–
	Colonial histories	Greater East Asia War and Killing Fields	–
		Post-colonial histories	–
	Significant historical events	Royalty	King Bhumibol and Norodom Sihanouk
		National leaders	Prime ministers, and presidents
		Revolutionaries and scholars	Lee Kuan Yew, Mahathir Mohamad, and Ramon Magsaysay
	Notable individuals	Revolutions and scholars	Ho Chi Minh

4.3. Types of Information Resources in GLAM Collections

An analysis of the types of cultural information resources curated and disseminated by GLAM institutions in Southeast Asia reveals a wide range of materials that can be categorized into four major groups (see Table 8):

- Printed documents. This category encompasses a diverse array of textual publications, including books, journals, rare books, and historically significant documents originating from Southeast Asian countries, particularly those dating from the 16th to the 19th centuries. Examples include historical exhibition catalogues and both governmental and personal records, such as reports concerning the Straits of Malacca and correspondence between prominent historical figures. These materials serve as foundational records for understanding regional historical narratives.
- Audiovisual materials. Audiovisual resources are extensive and include the following: (1) *Photographs and paintings*: Ranging from monochrome to color, these images document significant events, places, and individuals from various time periods. Notable are the paintings depicting cultural practices and daily life, including works by renowned artists such as Nguyễn Gia Trí, a Vietnamese master of lacquer painting. (2) *Posters and postcards*: These items capture major cultural and traditional events, often presented on old calendars featuring Southeast Asian cultural or geographic imagery. Some collections also contain posters from public campaigns and commercial advertisements, particularly from Singapore. (3) *Vinyl records and audio tapes*: These resources contain recordings of royal speeches, recitations of classical literature and dramatic performances (e.g., Thai traditional verse), folk and classical music, and oral history interviews. The latter preserves personal memories of pivotal national and societal events. (4) *Films, CDs, and DVDs*: These document important national and regional ceremonies, such as the royal cremation of King Bhumibol Adulyadej of Thailand, along with documentaries on regional traditions and cultural expressions. (5) *Maps and blueprints*: These include geographic and administrative maps—such as land surveys and territorial delineations—as well as architectural drawings of significant national sites like parliaments and royal palaces.
- Cultural artifacts. This category comprises tangible objects reflecting the intellectual and artistic heritage of the region: (1) *Manuscripts and ancient documents*: Often written on traditional materials such as palm leaves, khoi bark, mulberry bark, and pineapple fiber, or *parabaik* in Myanmar, these documents cover a range of subjects, including religion, astrology, medicine, governance, law, folklore, and royal chronicles. (2) *Sculptures and artworks*: These include molded or carved religious artifacts, particularly from the Hindu and Buddhist traditions in Java and Sumatra, Indonesia, representing the aesthetic and spiritual knowledge of past civilizations. (3) *Archival documents*: These include both official and personal handwritten records, such as royal decrees, intergovernmental correspondence, and international treaties. They provide crucial evidence of political, social, and diplomatic history. (4) *Antiquities*: These objects embody the cultural legacy of the region, categorized by material: *Stone*, such as inscriptions (e.g., Thai Sila inscriptions and bai sema boundary markers found in Thailand, Laos, and Cambodia) that document religious teachings, folktales, or agrarian knowledge, as well as stone sculptures reflecting historical architectural styles; *Metal*, such as bronze statues and ritual or domestic utensils, which often reflect societal status and religious functions; *Wood*, such as carved wooden panels and inscribed planks illustrating cultural narratives and traditions, including elaborately decorated cabinets used for storing Buddhist scriptures, representing vernacular architecture and artistry; and *Ceramics*, such as pottery and ceramic items like religious figurines, bowls, plates, and jewelry that reveal everyday life and belief systems in historical communities.
- Digital resources. These consist of digitized versions of the aforementioned traditional cultural materials. Through processes such as scanning and high-resolution photography, items are converted into digital images, maps, e-books, and audiovisual files. This transformation enhances accessibility, preservation, and knowledge dissemination,

enabling GLAM institutions to reach broader audiences while safeguarding fragile heritage assets.

Table 8. Types of information resources in GLAM collections in SEA.

Category	Subcategory/Type	Description
Printed Documents	Books, Journals, Rare Books, Government and Personal Documents	Documents from the 16th to 19th centuries, historical exhibition booklets, and personal records related to events.
Audiovisual Materials	Photographs and Paintings	Black-and-white and color photographs of events, people, places; paintings reflecting history and culture.
	Posters and Postcards	Cultural and traditional event posters, old calendars, and campaign advertisements, especially in Singapore.
	Sound Recordings	Vinyl records or tapes of royal speeches, traditional music, and oral history interviews.
	Films, CDs, and DVDs	Documentaries and ceremonial recordings, e.g., Thai royal cremation ceremonies.
	Maps and Plans	Geographical maps, territorial maps, and architectural blueprints of national landmarks.
Cultural Objects	Manuscripts and Ancient Texts	Written on palm leaves, bark, and fibers; containing religious, medical, and literary content.
	Sculptures and Artifacts	Hindu–Buddhist sculptures from Java and Sumatra showcasing historical artistry.
	Archival Documents	Official and personal manuscripts, such as royal letters and historical treaties.
	Antiquities	Inscriptions, metalwork, wood carvings, and ceramics used in cultural contexts.
Digital Resources	Digitized cultural heritage	Digital versions of books, images, audio, video, and objects created through scanning and photography.

5. Discussion

This study explored the scope and characteristics of cultural heritage information disseminated through the websites of GLAM institutions in ten ASEAN countries, focusing on the classification of knowledge and types of information resources. The findings offer insights into the roles and functions of national galleries, libraries, archives, and museums in preserving and providing access to national and local cultural heritage.

In relation to the first research objective, the study found that GLAM institutions across the ASEAN actively disseminate a wide range of cultural knowledge. This includes national and local wisdom, intangible heritage, and historical narratives. The content was classified into categories such as language and literature, music, arts, traditional medicine, traditional attire, customs, beliefs, and important historical events. These findings align with UNESCO's emphasis on safeguarding both tangible and intangible cultural heritage and support the 2030 Agenda for Sustainable Development, which recognizes culture as a vital enabler of sustainable development across social, economic, and environmental dimensions [4].

Furthermore, this study showed that the collections of ASEAN GLAM institutions reflect a shared cultural identity while also highlighting regional diversity. For example, national libraries and archives tend to store textual and documentary heritage, including rare books, manuscripts, and government records. Museums focus on tangible cultural objects such as artifacts, sculptures, and traditional crafts. Galleries primarily exhibit visual and performing arts. This supports the differentiation of roles among GLAM sectors as outlined by [14,53], who emphasize the importance of collaboration among GLAM institutions to avoid duplication and enhance public access to cultural resources. GLAM institutions in the ASEAN are uniquely positioned to contribute to the creative economy. As demonstrated in this study, digital resources such as traditional textiles,

music, folklore, and medicinal practices serve not only as cultural memory but also as sources of creative inspiration. This is in line with UNESCO's 2013 Creative Economy Report, which highlights the importance of local heritage in driving sustainable economic development [54]. Europeana provides a successful model in this regard by integrating diverse cultural collections and supporting reuse of digital heritage in education and creative industries.

When compared to Europeana and the World Digital Library (WDL), ASEAN GLAM institutions share similar goals in promoting equitable access to cultural knowledge and preserving human heritage. Europeana provides access to millions of digitized items from European institutions, organized around themes like art, fashion, music, and World War I [27,42]. The WDL, initiated by the Library of Congress and UNESCO, focuses on high-value historical content from across the world, including manuscripts, maps, rare books, and recordings [43]. ASEAN GLAMs, while smaller in scale, demonstrate comparable diversity in their collections and increasingly adopt digital technologies for preservation and dissemination. In addition, the diversity and richness of Southeast Asian local knowledge align well with global efforts to decolonize and democratize access to cultural knowledge. Institutions such as the World Digital Library and Europeana are addressing cultural imbalances by curating underrepresented voices and histories. This study's findings on the representation of royal history, folklore, and ethnic traditions on ASEAN GLAM platforms suggest a strong potential for similar impact, provided that digital platforms expand their accessibility, multilingual support, and educational frameworks.

This study also highlights the fragmented structure of GLAM operations in the region, where similar resources are stored and presented by different institutions without integrated systems. This duplication results in inefficient use of resources. Aligning with the suggestions by [13,26,53], collaboration among GLAM institutions can serve as a foundational infrastructure for cultural innovation. Europeana's federated model, bringing together museums, archives, and libraries under shared metadata and access systems, offers a framework for ASEAN integration.

While the findings emphasize the diversity and richness of Southeast Asian cultural knowledge, it is important to recognize that heritage is not neutral but often contested. Disputes over meaning, representation, and control—such as those observed in Angkor Wat—highlight that digitization and knowledge organization are deeply embedded in broader political and social processes [47]. Thus, the development of interoperable digital platforms in ASEAN GLAMs must be understood not only as technical progress but also as interventions in how contested heritage is represented, managed, and negotiated in contemporary society.

In conclusion, the findings reinforce the importance of GLAM institutions not only in preserving heritage but also in fostering inclusive access, economic development, and innovation. Through regional collaboration and alignment with international frameworks such as those of UNESCO, Europeana, and the WDL, ASEAN GLAMs can expand their impact and serve as central platforms for safeguarding and revitalizing the region's cultural legacy.

6. Conclusions

This study explored the scope, content, and characteristics of cultural heritage information disseminated through national-level GLAM institutions across ten ASEAN countries. The findings reveal a rich and diverse array of cultural heritage resources, ranging from national and local wisdom, historical narratives, and significant individuals to physical cultural objects and digital collections. These resources reflect the historical trajectories, sociocultural diversity, and indigenous knowledge of Southeast Asia, and they demonstrate

how GLAM institutions serve as essential knowledge infrastructures for preserving and transmitting cultural heritage.

This study confirms that GLAM institutions in the region play overlapping but complementary roles in safeguarding tangible and intangible cultural heritage. However, a lack of standardization, metadata interoperability, and integrated access systems limits the potential for unified cultural preservation and shared knowledge dissemination. Comparisons with global platforms such as UNESCO's Memory of the World, Europeana, and the World Digital Library indicate that ASEAN GLAM institutions are progressing but still face challenges in achieving regional collaboration, cross-border data sharing, and global visibility.

The research highlights the critical importance of strengthening regional cooperation among GLAM institutions in Southeast Asia. Enhancing metadata standards, developing cross-institutional digital repositories, and adopting international frameworks can enable more effective knowledge sharing and preservation. Additionally, the cultural heritage knowledge curated in GLAM institutions holds great potential for use in education, cultural tourism, digital humanities, and creative economy.

Recommendations from this study are as follows: (1) Policy and Strategic Development: Regional bodies such as the ASEAN should support collaborative frameworks for digital heritage integration, including shared metadata standards and sustainable funding models. (2) Capacity Building: Investment in staff training, digital infrastructure, and multilingual access is essential to improving digital curation and public engagement. (3) Interoperability and Innovation: Encourage the use of linked open data and semantic web technologies to connect collections across institutions and borders. (4) Public Engagement: GLAM institutions should develop outreach programs, including digital storytelling and community-based archives, to involve citizens in cultural preservation.

Finally, this study was limited to national-level GLAM institutions and publicly available digital information as of March 2025. Local, private, or community-based heritage repositories were not included. Moreover, while efforts were made to include diverse types of resources, the availability and completeness of online data varied across countries. Further research could incorporate stakeholder interviews, user perspectives, and case studies of integrated GLAM initiatives.

Future work will build upon this initial phase by developing a standardized metadata schema tailored to ASEAN GLAM contexts and testing its interoperability with global platforms such as Europeana and the World Digital Library. A second direction will involve designing and piloting the proposed digital platform with selected GLAM institutions, ensuring usability, scalability, and alignment with UNESCO heritage frameworks. Additionally, further research should examine how contested heritage and cross-cultural interpretations are represented within digital environments, engaging stakeholders from multiple ASEAN member countries. These steps will not only validate the present findings but also contribute to the long-term goal of establishing a sustainable, inclusive, and regionally interconnected digital heritage ecosystem for the ASEAN.

Author Contributions: Conceptualization, K.K., W.C., and K.T.; Methodology, K.K. and K.T.; Validation, K.K.; Formal analysis, K.K. and K.T.; Writing—Original Draft Preparation, K.K. and K.T.; Writing—Review and Editing, K.T.; Project Administration, W.C.; Funding Acquisition, W.C. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Fundamental Fund of Khon Kaen University. The project entitled “Digital Platform for Managing Cultural Information Resources in GLAMs ASEAN (ASEANA)” was additionally funded by the National Science, Research, and Innovation Fund (NSRF), Fiscal Year 2025 (B.E. 2568), under Grant No. 4776146.

Institutional Review Board Statement: This study was approved by the Human Research Ethics Committee of Khon Kaen University according to the “Exemption Determination Regulations No. 6.4: Research that uses identifiable private information for which consent is not required”. Approval ID No. HE673579; date: 26 December 2024.

Informed Consent Statement: According to the ethical guidelines outlined by the National Policy on Behavioral, Social Science, and Humanities Research (Thailand, B.E. 2564), this study did not require informed consent from participants, as it involved minimal risk and did not collect any identifiable personal data.

Data Availability Statement: The original contributions presented in this study are included in the article. Further inquiries can be directed to the corresponding author.

Acknowledgments: The researchers gratefully acknowledge all sources that contributed to this study, including the official websites of GLAM institutions, professionals working within these organizations, and subject-matter experts who provided valuable evaluations and insightful comments on the findings.

Conflicts of Interest: The authors declare no conflicts of interest.

References

- Heritage for Peace. What Is Cultural Heritage. Available online: <https://www.heritageforpeace.org/heritage-for-peace/what-is-cultural-heritage/> (accessed on 28 May 2025).
- Rasmussen, C.H.; Hjørland, B. Libraries, archives, and museums (LAMs): Conceptual issues with focus on their convergence. In *Cultural Heritage and Value Creation*; Golinelli, G., Ed.; Springer: Cham, Switzerland, 2022. [CrossRef]
- UNESCO. World Heritage, 2025. Available online: <https://www.unesco.org/en/world-heritage> (accessed on 24 April 2025).
- UNESCO. Recommendation Concerning the Protection and Promotion of Museums and Collections, Their Diversity and Their Role in Society Adopted by the General Conference at Its 38th Session, 2015. Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000246331> (accessed on 24 April 2025).
- United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2015.
- UCLG. *Culture in the Sustainable Development Goals: A Guide for Local Action*; United Cities and Local Governments: Barcelona, Spain, 2018; Available online: <https://uclg.org/new/culture-in-the-sustainable-development-goals-sdgs-a-guide-for-local-action/> (accessed on 24 April 2025).
- UNESCO. Culture: Urban Future—Global Report on Culture for Sustainable Urban Development, 2016. Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000246291> (accessed on 24 April 2025).
- Department of ASEAN Affairs, Thailand. The Birth of ASEAN, 2025. Available online: <https://asean.mfa.go.th/en/page/62206-the-birth-of-asean?menu=5d68abb115e39c1b9c05d33c> (accessed on 28 May 2025).
- UNESCO. Recognizes ‘Kebaya’ as Intangible Cultural Heritage Shared by Five Countries. Thai PBS, 2024. Available online: <https://www.thaipbs.or.th/news/content/346961> (accessed on 28 May 2025).
- UNESCO. Recognizes Three Thai Heritage Items as Memory of the World in 2025. Thai PBS, 2025. Available online: <https://www.thaipbs.or.th/news/content/351575> (accessed on 28 May 2025).
- Toomchaiyaporn, P.; Sacchanand, C.; Kheokao, J. The administration of national libraries of ASEAN member countries. *TLA Res. J.* **2022**, *15*, 19–36.
- Hilburger, C.; Langille, D.; Nelson, M.; Bordini, A.; Greenhill, J.A.; Dowson, R.; Goddard, L. Collaborating with GLAM institutions. *Digit. Stud./Le Champ Numérique* **2021**, *11*, 53. [CrossRef]
- Constantine, E.; Garrity, J.; Hammes, M.; Lockwood, C.; Teesch, L. *Libraries and Museums: Fostering GLAM Collaboration at the University of Iowa*; Working paper; University of Iowa: Iowa City, IA, USA, 2018. [CrossRef]
- Kennedy, M.L. GLAM collaborations under COVID-19 conditions and beyond. *Investig. Radiol.* **2020**, *300*, 32–38. [CrossRef]
- Candela, G.; Gabriëls, N.; Chambers, S.; Pham, T.-A.; Ames, S.; Fitzgerald, N.; Hofmann, K.; Harbo, V.; Potter, A.; Ferriter, M.; et al. A checklist to publish collections as data in GLAM institutions. *arXiv* **2023**, arXiv:2304.02603. [CrossRef]
- Lian, Y.; Xie, J. The evolution of digital cultural heritage research: Identifying key trends, hotspots, and challenges through bibliometric analysis. *Sustainability* **2023**, *16*, 7125. [CrossRef]
- Luther, W.; Baloian, N.; Biella, D.; Sacher, D. Digital twins and enabling technologies in museums and cultural heritage: An overview. *Sensors* **2023**, *23*, 1583. [CrossRef]
- Marcum, D. Archives, libraries, museums: Coming back together? *Inf. Cult.* **2014**, *49*, 74–89. [PubMed]

19. Thebele, W. Museums and community: Bridging the gap between the museum and its audiences through research & education. *Rev. Muzeelor* **2024**, *1*, 53–64. [CrossRef]
20. Delagrange, J. What is Difference Between an Art Gallery and a Museum: The Key Differences Explained. 2023. Available online: <https://www.contemporaryartissue.com/what-is-the-difference-between-an-art-gallery-and-a-museum/> (accessed on 6 June 2025).
21. Thibodeau, K. A foundation for archival engineering. *Analytics* **2022**, *1*, 144–174. [CrossRef]
22. Hedstrom, M.; King, J.L. *On the LAM: Library, Archive, and Museum Collections in the Creation and Maintenance of Knowledge Communities*; University of Michigan School of Information: Ann Arbor, MI, USA, 2003; Available online: <https://www.researchgate.net/profile/Margaret-Hedstrom/publication/255637749> (accessed on 16 April 2025).
23. International Council of Museums (ICOM). Museum Definition. 2022. Available online: <https://icom.museum/en/resources/standards-guidelines/museum-definition/> (accessed on 4 September 2025).
24. Latham, K.F.; Simmons, J.E. Whither Museum studies? *J. Educ. Libr. Inf. Sci.* **2019**, *60*, 102–117. [CrossRef]
25. Avdikos, V.; Dragouni, M.; Michailidou, M.; Pettas, D. Rethinking GLAMs as commons: A conceptual framework. *Open Res. Eur.* **2024**, *3*, 157. [CrossRef] [PubMed]
26. Mansfield, T.; Winter, C.; Griffith, C.; Dockerty, A.; Brown, T. *Innovation Study: Challenges and Opportunities for Australia's Galleries, Libraries, Archives and Museum*; Australian Center for Broadband Innovation: Sydney, Australia, 2014.
27. Marsili, G.; Orlandi, L.M. Digital humanities and cultural heritage preservation: The case of the BYZART (Byzantine art and archaeology on Europeana) project. *IU Libr. J.* **2020**, *3*, 144–155. [CrossRef]
28. Bowyer, S.; Gupta, S.; Paterson, L.; Acharya, N. State of the (future) field: The history of collecting and its institutions. *History* **2025**, *110*, 298–325. [CrossRef]
29. Logan, M.A.; Liew, C.L. GLAM convergence revisited: An examination of user perception and experience. *J. Libr. Adm.* **2023**, *63*, 1014–1043. [CrossRef]
30. Isaac, A.; Summers, E. (Eds.) SKOS Simple Knowledge Organization System Primer. W3C Working Group Note. 2009. Available online: <https://www.w3.org/TR/2009/NOTE-skos-primer-20090818/> (accessed on 28 May 2025).
31. Wilkinson, M.D.; Dumontier, M.; Aalbersberg, I.J.; Appleton, G.; Axton, M.; Baak, A.; Blomberg, N.; Boiten, J.W.; da Silva Santos, L.B.; Bourne, P.E.; et al. The FAIR guiding principles for scientific data management and stewardship. *Sci. Data* **2016**, *3*, 160018. [CrossRef]
32. Terras, M.; Nyhan, J.; Vanhoutte, E. (Eds.) *Defining Digital Humanities: A Reader*; Routledge: London, UK; New York, NY, USA, 2018.
33. Kim, Y.J.; Toh, S.M.; Baik, S. Culture creation and change: Making sense of the past to inform future research agendas. *J. Manag.* **2022**, *48*, 1503–1547. [CrossRef]
34. Hjørland, B. Knowledge organization (KO). *Knowl. Organ.* **2016**, *43*, 475–484. [CrossRef]
35. ASEAN Secretariat. ASEAN Launches First E-Exhibition on Cultural Heritage Digital Archive Portal. Cultural Information Division, 2021. Available online: <https://asean.org/asean-launches-first-e-exhibition-on-cultural-heritage-digital-archive-portal/> (accessed on 7 April 2025).
36. ASEAN-Japan Centre. ASEAN Cultural Heritage Digital Archive (ACHDA) Phase II Report. 2022. Available online: <https://jaif.asean.org/project-brief/asean-cultural-heritage-digital-archive-achda-phase-2/> (accessed on 7 April 2025).
37. Siliutina, I.; Tytar, O.; Barbash, M.; Petrenko, N.; Yepyk, L. Cultural preservation and digital heritage: Challenges and opportunities. *Amazon. Investig.* **2024**, *13*, 262–273. [CrossRef]
38. Aimar, F.; Jigyasu, R. Cultural landscapes of the Asia-Pacific region: Dilemmas of resilience. In *The Routledge Handbook of Cultural Landscape Heritage in the Asia-Pacific*; Silva, K.D., Taylor, K., Jones, D.S., Eds.; Routledge: London, UK; New York, NY, USA, 2023; pp. 403–419.
39. Wijesundara, C.; Monika, W.; Sugimoto, S. A metadata model to organize cultural heritage resources in heterogeneous information environments. In Proceedings of the 19th International Conference on Asia-Pacific Digital Libraries, ICADL 2017, Lecture Notes in Computer Science, Bangkok, Thailand, 13–15 November 2017; Springer: Berlin/Heidelberg, Germany, 2017; pp. 81–94. [CrossRef]
40. Purday, J. Europeana: Digital access to Europe's cultural heritage. *Alex. J. Natl. Int. Libr. Inf. Issues* **2012**, *23*, 1–13. [CrossRef]
41. Silva, A.L.; Terra, A.L. Cultural heritage on the semantic web: The Europeana data model. *IFLA J.* **2024**, *50*, 93–107. [CrossRef]
42. European Commission. The Europeana Platform. 2024. Available online: <https://digital-strategy.ec.europa.eu/en/policies/europeana> (accessed on 6 June 2025).
43. Library of Congress. World Digital Library Collection. 2025. Available online: <https://www.loc.gov/collections/world-digital-library> (accessed on 17 April 2025).
44. Nasreen, N.; Bashir, B.; Loan, F.A. World Digital Library: An analysis of collection. *Libr. Philos. Pract.* **2019**, 2606. Available online: <https://digitalcommons.unl.edu/libphilprac/2606> (accessed on 11 May 2025).
45. Van Oudenaren, J. The World Digital Library. *Bibl. Forsch. Und Prax.* **2017**, *41*, 242–249. Available online: <https://scispace.com/pdf/the-world-digital-library-2ltiwp7o58.pdf> (accessed on 11 May 2025). [CrossRef]
46. Zeng, M.L.; Qin, J. *Metadata*, 2nd ed.; ALA Neal-Schuman: New York, NY, USA, 2016.

47. Hauser-Schäublin, B. (Ed.) *World Heritage Angkor and Beyond: Circumstances and Implications of UNESCO Listings in Cambodia*; Göttingen University Press: Göttingen, Germany, 2011. [[CrossRef](#)]
48. Hunter, J. The role of information technologies in cultural heritage. In *Encyclopedia of Library and Information Sciences*, 3rd ed.; Bates, M.J., Maack, M.N., Eds.; CRC Press: Boca Raton, FL, USA, 2009; pp. 1330–1341.
49. Silva, P.I.; Terra, A.L. The role of users in the organization of digital information: A Portuguese experience in an academic museum and archive setting. *IFLA J.* **2024**, *50*, 64–74. [[CrossRef](#)]
50. Dahlström, M.; Hansson, J.; Kjellman, U. 'As we may digitize'—Institutions and documents reconfigured. *Liber Q.* **2012**, *21*, 455–474. [[CrossRef](#)]
51. Smiraglia, R.P. *The Elements of Knowledge Organization*; Springer: Cham, Switzerland, 2014.
52. Tennis, J.T. Epistemology, theory, and methodology in knowledge organization: Toward a classification, metatheory, and research framework. *Knowl. Organ.* **2012**, *39*, 261–270. [[CrossRef](#)]
53. Day, A.; Pendharkar, A. Current connections, future collections: Researchers and information professionals working together. *J. Aust. Libr. Inf. Assoc.* **2024**, *73*, 415–423. [[CrossRef](#)]
54. UNESCO. Creative Economy Report, 2013, Special Edition: Widening Local Development Pathways, 2013. Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000224698> (accessed on 24 April 2025).

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.