National Museum of Korea Archives: Restoring Collection Context and Designing a Vertical AI System

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Abstract

The National Museum of Korea Archive aspires to become a specialized repository that provides comprehensive information on Korean and global cultural heritage. By collecting and documenting the diverse activities and history of the museum, it systematizes the contextual restoration of artifacts, facilitating new discoveries and research, while offering reinterpretation. To achieve this, this paper focuses on various operational cases of the museum's early collection archive, examining how the concept of an archive has been applied and expanded in practice. In particular, as the volume of multi-layered information and interpretative possibilities for artifacts grows, this paper suggests that archives should serve as a core foundation to overcome the limitation of 'decontextualization' and enable context-based interpretation and connections by structuring the entire process of artifact collection, preservation, and utilization. Furthermore, this paper proposes the direction and design principles for developing an intelligent archive system by applying domain-specific Vertical AI technology optimized for the unique knowledge environment of a museum.

1. Introduction

The National Museum of Korea is a leading cultural institution that has, over a long period, collected, conserved, exhibited, researched, and educated on artifacts, thereby shaping and disseminating the identity of Korean cultural heritage. The diverse records accumulated through these processes are not merely administrative documents or supplementary materials; rather, they function as an archive that reflect the entire trajectory of incorporating, interpreting, and utilizing artifacts into the museum collection.

Museum collections aren't just isolated physical objects; they possess multi-layered meanings shaped by the currents of their times, societies, institutions, and policies. However, the issue of ‘decontextualization,’ where artifacts are separated from their original contexts during their move into the museum environment, remains a core challenge in museum operations. Consequently, the museum recognizes the necessity of an integrated archive system that comprehensively addresses not only the artifacts themselves but also all related elements. This includes the circumstances of their acquisition, conservation treatment history, exhibition narratives, and the interpretative processes formed through research and education.

Since its establishment in 1945, the National Museum of Korea has accumulated various records related to its collections, such as official documents, photographs, artefact/site drawings, and research reports, alongside its two main founding collections. These archive materials are a core asset that allows for the restoration of the temporal, spatial continuity and institutional context of artifacts, going beyond mere preservation to serve as a foundation for interpretation and research**.**

This paper analyzes the formation of the National Museum of Korea's early collections and the composition and utilization patterns of archival materials, focusing on this archival structure. Furthermore, it examines how these accumulated records have been expanded into academic research and exhibitions, and also proposes the possibility of designing a domain-specific 'Vertical AI' system that reflects the museum's unique information system and knowledge structure.

2. Formation of the National Museum of Korea's Early Collections and Archive

2.1 Overview of Early Key Collections: Duksu Collection and Bongwan Collection

The formation of the National Museum of Korea's archive lies in the process of integrating two major collections from its inception: the 'Duksu Collection' and the 'Bongwan Collection'. This dual-collection structure emerged after independence in 1945, when the artifacts of the Imperial Museum (Yi Royal Family Museum), established by the Korean Empire's imperial household in 1909, and those of the Joseon Government-General Museum, opened in Gyeongbokgung Palace by the Joseon Government-General in 1915, were consolidated into the National Museum. Even after this integration, artifacts from these two sources continued to be managed separately as the 'Duksu Collection' and the 'Bongwan Collection'. 'Duksu' refers to artifacts collected by the imperial household and housed in Deuksugung Palace before the integration, while 'Bongwan' denotes artifacts collected by the Government-General Museum during the Japanese colonial rule.

This distinction was not merely a matter of convenience; it was reflected in the artifact management numbering system and continues to this day. This dual origin of the early museum collections was also mirrored in the archive system, where separate inventories and classifications were maintained based on the source and context of the materials, even after their integration. This can be seen as an application of the principle of provenance in records management, aiming to preserve the origin and history of materials by distinguishing and respecting different fonds formed by separate institutions. This classification functioned as a crucial institutional mechanism and internal code, going beyond simple naming or location

distinctions, to clarify the reasons for an artifact's collection and its historical background, enabling its utilization across all museum activities, including future research, exhibitions, education, and archiving. The formation of this classification system was achieved through the gradual establishment and institutionalization of operational methods, and it itself produced another context and acquired historicity.

In 1948, during the Buddha statue reorganization work carried out at the National Museum, similar types of artifacts were grouped and catalogued sequentially in ledgers, a method that later became a standardized guideline for storage (National Museum of Korea, 1948). Furthermore, by concurrently using artifact cards and ledgers, a dual information system was formed that recorded material classification, acquisition information, movement status, and photographs (National Museum of Korea, 2006).

Currently, the National Museum of Korea's collection numbering system consists of code names like 'Duksu' and 'Bongwan' along with serial numbers, depending on the artifact's acquisition circumstances and period. This code-based classification system was established in 1996, when the National Museum of Korea standardized its object numbering scheme, and has since served as a management framework that enables quick identification of each artifact’s provenance and acquisition history (National Museum of Korea, 2006).

Consequently, the National Museum of Korea's archive was formed from the outset by a combination of two different collections, and accordingly, the materials were also classified, stored and managed according to these two lineages. For example, the National Museum of Korea currently holds collection lists, photo albums of collection, and guide pamphlets related to the Duksu Collection, while separately, there are artifact lists, archaeological research journals, and administrative documents related to the Bongwan Collection. This dual collection structure was not merely reflected in artifact numbers but also influenced the organization and description of archive materials. At the time of integration, the National Museum managed records from different sources within a single system, preserving historical context by organizing records related to the Bongwan Collection and the Duksu Collection by classification group. In this context, the dual structure of the two early collections shaped the basic design of the National Museum of Korea's archive, and it continues to function as an important axis for data classification during subsequent digitization and integration processes.

2.2 Characteristics and Differentiation of Early Collection Archives

The National Museum of Korea's two early collections, under different backgrounds, each brought their unique record-keeping systems and expanded into an archive structure. These differences stem from the distinct nature of the museums that were the original sources of these two collections. Therefore, this section will examine the content and formal differences in the archive materials accompanying these two collections. Below is a table summarizing the representative archive materials corresponding to the early collections.

Category	Acquisition Circumstances	Representative Archive Materials
Duksu Collection	Collected by the imperial household in the 20th Century	Photo albums of collection, collection lists, museum guide pamphlets, etc.
Bongwan Collection	Collected through excavation and surveys during the Japanese colonial rule	Exhibition pictorial records (Catalog), historic spot investigation records, excavation research, official documents, gelatin dry plates(1), artifact/site drawings, maps, etc.

Table 1. Representative Archive Materials for the Early Collections.

The Duksu Collection consists of artifacts initially gathered by the Imperial Museum, Yi Royal Family Museum. The primary focus of this collection was the rapid acquisition of high-quality artworks and historically significant artifacts for display purposes (Jun, 2023). The museum operated as a collection museum centered on artworks and historical artifacts, systematically cataloging collected artworks and publishing specialized catalogs by field. For instance, the Collection Photo Albums of the Yi Royal Family Museum were first published in 1912 in three volumes, divided by field such as painting, ceramics, and Buddha statues, and then republished three more times. These albums served both as catalogs and pictorial records of the imperial collection (Figure 1) (National Museum of Korea, 2009).

Figure 1. Various types of collection photo albums published by the Yi Royal Family Museum.

They were organized primarily around art pieces, such as paintings, Buddha statues, and crafts, using traditional Chinese character-style names. The 1929 photo album is a prime example, serving as a type of collection catalog with photographs and explanations of Buddha statues (Figure 2). These records remain as a form of early archive, containing formalized information alongside the artifacts. They not only document preservation status but also function as indirect interpretive resources from which one can infer basic information for exhibition narrative construction, the cultural perception of the collecting entity, and the operational structure of the museum space. Most of these are arranged by artifact unit and exhibit a structure where visual materials and text are placed in parallel, indicating a purpose-driven archive system linked with curation and exhibition systems.

(1) Gelatin dry plates are what film is today, made by coating a light-sensitizing emulsion onto a glass sheet, primarily used for photography in the early 20th century.

Figure 2. Collection Photo Album of the Yi Royal Family Museum (1929).

In contrast, the Bongwan Collection comprises artifacts primarily collected by the museum that spearheaded cultural property collection and archaeological research during the Japanese colonial period, differing from the Duksu Collection in terms of content and format of records. Most of these were compiled comprehensively, including archaeological excavation finds and artifacts collected from various regions, and were organized according to their classification system, such as archaeology, art, and folklore. Therefore, the Bongwan Collection includes a wide range of items from prehistoric artifacts to Buddhist art and folk artifacts, and each artifact typically has a supplementary note detailing the circumstances of its survey or collection at the time. Although the Government-General Museum also left photo albums that served as artifact catalogs (e.g., *Illustrated Catalog of the Joseon Government-General* (1915-1943), Figure 3), what is more prominent are the photographic records of research sites and collected items (e.g., *Pictorial Records of Joseon Historic Sites* (1915-1935), Figure 4). Primarily, photo albums documenting the results of historic spot investigation were produced, and images of archaeological sites and excavated artifacts from each site are organized from their perspective. A significant difference is that while the Duksu Collection photo albums are artifact-centric, the Bongwan Collection ones are research-activity-centric. In addition, representative archive materials related to the Bongwan Collection include various forms of archive data such as official documents, research journals, gelatin dry plates, drawings, and maps. These are structured around contextual information that goes beyond individual artifact data, focusing on excavation environments, physical relationships between artifacts, and the research entities and administrative procedures of the time.

Figure 3. Illustrated Catalog of the Joseon Government-General Exhibition (1918-1943).

Figure 4. Pictorial Records of Joseon Historic Sites (1915-1935).

In summary, the two collections exhibit different patterns in their record systems. The Duksu Collection, as an imperial museum, focuses on records (collection lists, photo albums, etc.) emphasizing artistic value and tradition. In contrast, the Bongwan Collection, as a colonial institution museum, has more remaining records (historic spot investigation records, excavation journals, official documents, gelatin dry plates, etc.) emphasizing research and administration. This differentiation reflects the fundamental differences in character of the two collections from their inception, and at the same time, each set of records complementarily forms the complete picture of modern Korean museum history. After independence in 1945, under the National Museum of Korea system, these records were managed integrally while still being described by their inherent structure and context in their respective lineages, forming a system that allows for the identification of the artifacts' sources and backgrounds. This can be seen as a dynamic and cumulative result where the contextual and information-structural values of the National Museum of Korea's archive interact.

3. Case Study of the National Museum of Korea Archive

The formation and collection structure of the early archive discussed in the previous chapter demonstrated that the archive functions as an interpretable knowledge structure where artifacts and records are integrated, going beyond simple artifact management. The tangible achievement of the National Museum of Korea's archive lies in the fact that various records related to artifacts function as usable information resources, not merely for simple preservation. In particular, the records accumulated alongside the Bongwan Collection serve as materials that enable multi-layered interpretation beyond single artifact information, clearly demonstrating the structural nature of the museum archive. This chapter explores how archival materials—particularly official documents and gelatin dry plates—have contributed to the museum’s research and curatorial practices (National Museum of Korea, 2012).

3.1 Utilization Structure by Archive Type: Official Documents and Gelatin Dry Plates

3.1.1 Official Documents (Restoring Artifact Context through Textual Records): Official documents are records produced by the Joseon Government-General Museum from its opening in 1915 until 1945, documenting administrative matters such as the process, purpose, and results of historic spot investigation and travel reports. These materials amount to a vast quantity of approximately 210,000 pages, and after liberation in 1945, they were transferred to the National Museum of Korea and are stored, managed, and utilized as archive materials.

The most significant characteristic of official documents is that they contain information about people, organizations, and activities related to the museum, records of artifacts, excavation

processes of historical sites, cultural property repair processes, and preservation status, allowing insight into the actual situation of the time.

For example, documents related to 'discovery' can clarify the context of artifact excavation by recording the discovery site, condition, and administrative processing of artifacts. Documents related to 'purchase' can identify the source of the collection and contemporary collection motives by specifying the previous owner and circumstances of purchase. Documents related to 'display' can restore the social context of artifacts by showing how they were utilized as exhibition mediums. Documents related to ‘historic spot investigation’ contain information on the archaeological discovery environment and research process of artifacts, providing essential information for a comprehensive understanding of current artifacts (Figure 5).

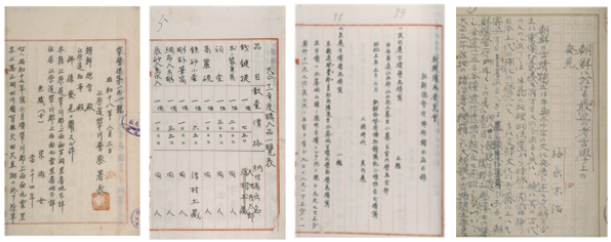

Figure 5. (From left) Official documents related to artifact discovery, purchase, exhibition, and historic spot investigation: utilized for artifact context restoration.

These documents are organically linked, sometimes forming a narrative that follows the entire life cycle of a museum collection. Although official documents reflect the perspectives and purposes of their time and require critical review, objective factual information (date, personal names, places, quantities, etc.) functions as archive material, serving as reliable primary sources for current researchers and empirical evidence for restoring the original source and context of artifacts.

3.1.2 Gelatin Dry Plates (Cross-Verification through Visual Records): Gelatin dry plate photographs capture historical sites, artifacts, people, and folklore from the Japanese colonial period, with currently approximately 38,000 plates held by the National Museum of Korea. These photographs serve as important visual materials for understanding the situation of historic spot investigation or artifacts at a time when images were scarce. Gelatin dry plate photographs, primarily produced in conjunction with historical site research official documents, convey more contextual information than the physical artifacts themselves. For instance, the excavation site, artifact arrangement, excavation points, and relationships between structures within the site are preserved in photographs, allowing for the visual reconstruction of an artifact's spatial location and temporal flow.

In other words, gelatin dry plates function not merely as visual aids but as a core archive capable of identifying and cross-verifying information omissions or distortions that may occur during the research and recording process. For example, when controversies arose regarding the interpretation of the 5th-century *Goguryeo Tomb Stele of King Gwanggaeto* or issues were raised about the repair and dismantling of *Seokguram Grotto*, these visual materials allowed for the visual confirmation of physical traces that documented records could not provide, enabling judgment on the authenticity of records and the situation at the time (Figures 6, 7). This functions as a medium for cross-verification between records, preventing the interpretation of an archaeological fact from relying on a single source and enabling more precise historical criticism, thus being evaluated as an important archive resource. Ultimately, visual records like gelatin dry plates function as meta-records that provide evidence of past research and recording activities and contribute to making the interpretive framework of subsequent research more objective.

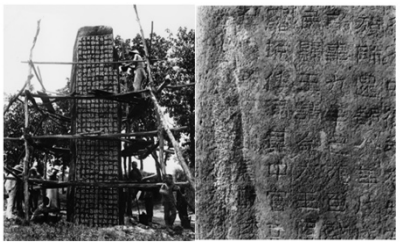

Figure 6. Rubbing of the Tomb Stele of King Gwanggaeto (Left: photographed in 1918, Right: photographed in 1911).

Figure 7. Gelatin dry plates of Seokguram Grotto (Left: 1922, Right: 1920).

Recently, comparative analysis between artifact images on gelatin dry plates and actual artifacts has been actively conducted, functioning as a basis for long-term observation and restoration research that can track damage to Buddha statues and their arrangement methods (Heo, 2025). Even if a physical artifact does not remain but an image record exists, re-examination and new analysis of that artifact are possible. If both an image and a physical artifact exist, the hierarchy and interconnectedness of the archive can be more dynamically structured through cross-referencing between materials.

Official documents and gelatin dry plates are not maintained in isolation but are integrated into the archival structure through cross-referencing centered on artifact information. For instance, the official documentation of a specific artifact may be linked to gelatin dry plate photographs taken during excavation, which in turn connect to the artifact’s exhibition history, conservation records, and other metadata within the museum’s collection management system. This structure functions as a key mechanism for designing the relationships between scattered artifacts and records and integrating them into the museum's knowledge system.

3.1.3 Expansion to Digital Archive through Online Disclosure: In the 21st century, the National Museum of Korea fully embarked on projects to digitize, publish, and utilize its archival materials. In particular, the vast official documents and gelatin dry plate materials mentioned earlier are considered prime examples of digital archive construction.

The National Museum of Korea began exploring ways to systematically organize and utilize official documents and gelatin dry plate materials in the 1990s. By cataloging actual official documents and gelatin dry plate photographs and publishing them as data collections, basic information to understand the nature and scale of the materials was provided. Based on this work, the foundation for a digital archive was laid by securing digital data through photography and scanning, and actively accumulating databases.

As a result, since 2013, official documents have been organized into an online system searchable by theme, year, and region, and gelatin dry plates by field, region, and size, transitioning into a public archive system easily accessible to the general public and external researchers (Figure 8).

Figure 8. Official Document and Gelatin Dry Plate Search System.

Moving forward, the National Museum of Korea is also exploring the possibility of extending these documents to precise data for information retrieval through OCR (Optical Character Recognition) and translation/annotation. This demonstrates that the National Museum of Korea’s transition to a digital archive is not merely about digitization, but rather aims to transform its holdings into knowledge resources through datafication. Moreover, in 2019, the museum launched a high-resolution image service (up to 6 megapixels) via the e-Museum platform (*e-Museum* is a collection search website for museums nationwide created by the National Museum of Korea), enhancing both detailed visual analysis and public accessibility to gelatin dry plate photographs.
As such, the National Museum of Korea has systematically digitized its extensive analog archival collections—including official documents and gelatin dry plates—and established databases and online platforms to enable new modes of utilization. This effort marks a pivotal shift in the museum’s information infrastructure, one that more effectively links records with artifacts and artifacts with interpretation. It has laid the groundwork for the archive to evolve into a dynamic platform for knowledge creation and dissemination. If AI-based systems are introduced in the future, such a highly interconnected archive structure could serve as a critical starting point for scalable integration.

3.2 Archive-Based Research Expansion, Sharing, and Utilization

The archive developed by the National Museum of Korea has demonstrated its value in various aspects, including research, exhibitions, and sharing through academic conferences. Especially recently, new achievements have been derived in research dissemination projects, exhibition planning, and re-excavation research by actively linking the existing archival materials.

As examined in the previous section, continuous efforts have been made to systematically organize and utilize official documents and gelatin dry plate materials. Based on this, in the 2010s, the museum pursued a project to systematically organize and publicly disclose materials from the Japanese colonial period in its collection to academia and the general public (see National Museum of Korea, 2012). This project went beyond simple material organization; it was designed to analyze multi-layered record assets such as official documents, gelatin dry plates, research journals, and architectural drawings to derive new academic questions and conduct empirical re-investigations and interpretations based on them.

Furthermore, it did not stop at organizing records of a single institution; centered on the National Museum of Korea, it established a collaborative record maintenance and utilization system involving 13 affiliated national museums nationwide. As a result, a total of 54 volumes, as of 2025, of various thematic research reports titled *Research Reports from the Japanese Colonial Period* have been published, and they function as a digital archive accessible to anyone by being fully disclosed in PDF format on the museum's website.

The reports do not simply organize archaeological information about historical sites; they use primary sources from the Japanese colonial rule (official documents, research journals, gelatin dry plates, drawings, etc.) as original sources and serve as a basis for modern research and reinterpretation. For example, the *Iksan Ssangneung* report organizes research reports, gelatin dry plates, drawings, and material purchase records from the 1910s-1930s, making the context and methods of the research and collection themselves the core of the narrative (National Museum of Korea, 2021). In this way, by reconstructing the records themselves and transforming them into objects of interpretation based on the interoperability and complementarity between different record media, these reports function as 'secondary archives'. They also demonstrate an attempt to transition from 'paper-based, disconnected archives' to 'database-type archives' that are linked and searchable, by including high-resolution gelatin dry plate images, scanned drawings, and translated documents in the reports.

In summary, the research project goes beyond mere publication, carrying the significance of critical reinterpretation of past records and ensuring the continuity of modern research. This is an important case in that it reveals the limitations of colonial research and fills those gaps, thereby making our understanding of Korean cultural heritage more complete. The surveys are not limited to Korea; by analyzing records of historical sites in North Korea that are difficult to physically investigate (e.g., *Nangnang* or Goguryeo historical sites) and artifacts from Central Asia collected during past overseas expeditions (e.g., Turfan excavated items), the blind spots in research on inaccessible historical sites or overseas cases are supplemented through archive analysis. This can be said to be an example of the National Museum of Korea's archive acting as an alternative

platform for historical reconstruction beyond physical limitations.

The National Museum of Korea's archive has been developed in a direction that establishes a structural system for external sharing and dissemination. Along with the publication of research reports and related exhibitions, the scope of the project has expanded to include academic conferences, indicating that research results based on archive materials are not confined within the museum but function as a public archive shared with both the general public and academic experts.

This structure suggests that the museum's archive can function as a platform for knowledge production, verification, and sharing, going beyond a simple internal data system. For instance, when survey records, drawings, and visual images like gelatin dry plates from the time of excavation are presented together with an artifact in an exhibition, visitors can integrally understand not only the artifact itself but also the entire process of its creation, discovery, and preservation. Simultaneously, academic conferences and publishing activities provide a venue for relevant researchers to propose possibilities for expanding interpretation based on archive materials and to share new research questions.

4. Design Direction for an Intelligent Archive based on Vertical AI

Archive-Based Research Expansion, Sharing, and Utilization The National Museum of Korea's archive has been accumulated in a structure that allows for context-based interpretation by linking artifacts and records. This structure goes beyond simple data storage and is designed to reflect the knowledge system and operational context of the specialized domain of a museum archive. This chapter examines the applicability and conceptual design direction of a domain-specific Artificial Intelligence ‘Vertical AI’ system based on this museum-type archive structure.

Vertical AI is a domain-specific artificial intelligence system that understands and operates based on the unique context, procedures, and data structures of a particular industry or field. Unlike general-purpose AI, it allows for structural learning based on the unique knowledge system accumulated by each institution and can reflect complex inter-data relationships and interpretive structures. Museum archives typically have an unstructured, context-based data structure. For example, a single artifact is linked to gelatin dry plate images, excavation records, exhibition history, educational materials, and research papers, and the temporal, spatial, and institutional contextual information among these is not captured by a single metadata structure alone. Therefore, Vertical AI should be designed from the following perspectives.

4.1 Metadata Standardization and Domain-Centric Information Structure Learning

The workflow of a museum is divided into several functional units—such as research, conservation, exhibition, and education—each generating distinct types of information. Accordingly, vertical AI must be capable of learning not only the fixed attribute data centered on individual artifacts, but also the interactional structure among function-specific record groups. To enable this, it is essential to refine and integrate the metadata used across these record groups in accordance with cultural heritage information standards. Furthermore, it requires the construction of a knowledge graph–based semantic network linked to cultural heritage ontologies such as CIDOC CRM and Getty AAT. Such a graph structure provides a foundation for dynamically analyzing how diverse records—such as gelatin dry plate images, excavation documents, exhibition histories, and educational materials—are interrelated for a given artifact like the Iksan Ssangneung tombs. This structure functions with greater precision when supported by standardized metadata, ensuring consistent interpretation and reproducibility.

4.2 Contextual Search and Narrative-Based Recommendation System

Traditional museum search systems are predominantly keyword-based and centered on individual artifacts. However, users often seek to explore the contextual narratives surrounding artifacts rather than isolated items. Accordingly, Vertical AI should support relationship-based exploration and enable the following functions.

4.2.1 Contextualization: Present contextual information—such as excavation records, exhibition plans, and photographic materials—alongside individual artifact search results.

4.2.2 Thematic Exploration: Offer thematic exploration features that recommend artifacts and records along temporal and spatial trajectories.

4.2.3 Semantic Recommendation: Implement semantic recommendation algorithms based on similar acquisition routes, shared donors, or related exhibition themes.

4.3 Interface Design for AI as a Curator

Vertical AI should go beyond simple information retrieval to function as an AI curator that selects and assembles meaning-based content according to the user's intent. For instance, when a user seeks to draft an exhibition proposal, the AI can support automated curation by:

4.3.1 Curated Arrangement: Recommending and arranging relevant artifacts, either chronologically or thematically.

4.3.2 Documentation Linkage: Linking associated research records and conservation histories.

4.3.3 Narrative Design: Proposing a narrative structure to shape the exhibition storyline.

Such capabilities enable the implementation of a domain-specific interface that supports the full process of curation planning, contextual linking, and visualization, rather than mere keyword-based search.

4.4 Ethical and Transparent Design Considerations

Archival records are not neutral; they are often products of power-laden interpretations. If AI systems prioritize certain records while omitting invisible or implicit contexts, they risk producing distorted historical narratives. Therefore, ethical design principles must be embedded in the architecture of vertical AI systems, including:

4.4.1 Bias Management: Detection and mitigation of data bias

4.4.2 Source Transparency: Clear indication and visualization of data sources (e.g., official documents, gelatin dry plates, research reports)

4.4.3 Contextual Annotation: Annotation systems for preserving implicit contextual information

Vertical AI should not be regarded merely as a tool for automation. It must function as an intelligent system capable of learning the domain-specific knowledge structures and performing information structuring, exploration, and interpretation based on contextual understanding.

In domains like cultural heritage—particularly museum archives where records are complex and interrelated—it is essential to reflect relationships, temporality, and semantic networks among data.

The design directions proposed in this chapter offer a theoretical foundation for the development of intelligent archival systems and illustrate the practical scalability of vertical AI grounded in the structural characteristics and data ecosystem of the National Museum of Korea's archive.

5. Conclusions

The National Museum of Korea has established itself as a key institution for protecting and researching Korean and world cultural heritage since its liberation, and it has accumulated the practical foundation of a museum archive through overall activities such as artifact acquisition, classification, exhibition, education, and research.

This study has focused particularly on the formation and structural characteristics of the National Museum of Korea’s archive, as well as the potential for designing an intelligent archive system based on these foundations.

First, the museum’s archive was formed through a dual-collection structure centered on its early holdings. Each collection has maintained distinct acquisition backgrounds and record-keeping systems, which continue to influence current principles of archival classification and management. In particular, official documents and gelatin dry plate photographs have functioned as key resources for restoring the provenance and context of artifacts, serving as representative examples that embody the structural features of the archive.

Second, these archival materials demonstrate practical value across various domains, including museum research, exhibition planning, academic publishing, and digital access initiatives. The recent publication of excavation reports, release of high-resolution images, and construction of database-based archival systems are especially noteworthy in how they expand the archive as a public knowledge resource—enhancing both accessibility and interpretive potential.

Third, this study proposed the concept and design framework of Vertical AI, grounded in the domain-specific characteristics and accumulated knowledge ecosystem of the National Museum of Korea. Beyond mere automation or search functionality, such a system can serve as an intelligent platform capable of detecting and interpreting the relational networks between artifacts and associated records. Context-driven exploration structures, curatorial recommendation functions, and principles for ethical and transparent AI design constitute essential technical conditions tailored to museum-based archives.

However, the introduction of AI technologies must not substitute for professional expertise or interpretive authority within museums. Algorithmic systems should serve to complement and extend the museum’s accumulated knowledge structures, while consistently addressing the risks of data bias and automation-related misinterpretation. A technology-centered design must be accompanied by a shared understanding of social responsibility and cultural context—necessitating close collaboration between technology and the humanities.

In conclusion, this study examined the structural and conceptual conditions required to transform museum archives from mere repositories into platforms for the generation of meaning. Through the specific case of the National Museum of Korea, it affirmed the potential of museum archives to operate as dynamic ecosystems—capable of not only accumulating knowledge, but also generating, sharing, and reinterpreting it.

It is hoped that this study will serve as both a theoretical and practical foundation for the structural transformation of museum archives and the development of AI-based archival systems in the future.

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