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PRESERVATION OF VISUAL CULTURAL HERITAGE THROUGH THE MANAGEMENT OF DIGITAL ILLUSTRATIONS OF THE NUSANTARA MANUSCRIPT OF THE NATIONAL LIBRARY OF THE REPUBLIC OF INDONESIA

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Abstract
The digitization of Indonesian manuscripts is not only related to the preservation of texts, but also includes visual information such as illustrations and illuminations. Previous studies have focused more on the technical aspects of digitization, while the representation of illustrations in metadata is still rarely studied. In fact, without a clear representation, illustrations are difficult to trace and utilize as cultural information. This study aims to examine the management of illustrations of Indonesian manuscripts in digital form and analyze their representation in metadata on the Khastara portal at the National Library of the Republic of Indonesia. The method used is a qualitative case study approach through non-participatory observation techniques, interviews, and literature review with five informants. Data analysis refers to the Digital Cultural Heritage Standards framework: From Silo to Semantic Web, which includes elements of METS, Semantic Web, and Enricher. The research findings show that digitization is carried out systematically and is able to record illustrations well visually. However, in metadata, illustrations are still presented as part of the general description of the manuscript and have not been positioned as independently accessible information. This condition indicates that the function of metadata is still limited to collection description and does not fully support the traceability of visual information. This research confirms that metadata development needs to be directed at the ability to represent illustrations as structured visual information. This is crucial so that digital repositories function not only as storage but also as a means of broader access and utilization of cultural heritage.
Keywords: digitalization, illustration, metadata, Indonesian manuscripts, cultural heritage.

INTRODUCTION

The manuscripts of Nusantara are one of the important manifestations of intellectual and cultural developments of the people of Indonesia in the past. These manuscripts not only embody centuries of literary tradition, but they also carry knowledge, cultural values and complex visual expressions via text, illustration, and illumination. As stated in the National Master Plan for Mainstreaming Nusantara Manuscripts 2025-2034, the amount of manuscripts

that have been identified amounted to 143,259 copies both domestically and internationally, providing a wide network of scientific and cultural relations within the archipelago in the past and present. But, because of the age and fragility of manuscripts, traditional writing materials, and the impact of the tropical climate, physical preservation is becoming less effective.

Technological innovations have also been a major factor in the digital revolution, and they are viewed as an instrument to safeguard this cultural heritage. The National Library of Indonesia in collaboration with the Khastara (Khazanah Pustaka Nusantara) has been working on the creation of the Digital repository to provide open access to Nusantara manuscripts. Manuscript digitization is an important effort to preserve the intellectual wealth of the country from the risk of destruction in the physical medium, but also has technical issues, including less human resources and digital infrastructure (Prastiani & Subekti, 2019). In the variety of digital collections that are available, Nusantara manuscript has special features because it has the visual aspects such as illustrations and illuminations which have aesthetic, symbolic and spiritual value.

Illustrations and illuminations are graphic features that serve different and complementary functions and meanings in the manuscript's 'body'. Illustrations are used to explain and enhance the text's story; illumination is used as decoration, indicating significant and sacred passages in the manuscript. They are not merely decorative but are also symbols of cultural identity, values and worldviews and knowledge of previous societies. The preservation of Nusantara manuscripts should not be limited to the preservation of content or text only, but should also take care of the preservation of other elements in the context of the cultural meaning and knowledge of the manuscript (Izzuddin & Holil, 2023).

The management of illustrations in digital Nusantara manuscripts is still facing several problems in spite of the digitisation program being still ongoing. Illustrations are indeed shown on Khastara and are part of the digital manuscript, but nowhere in the metadata are these illustrations specifically represented. Visual information is still presented generally, so illustrations do not have a specific marker as a stand-alone information element. This condition impacts the retrieval system and utilization of digital collections. Illustrations do not have access points in metadata, so they cannot be searched directly through the system. In terms of accessibility, users need to open the entire document to find illustrations. In terms of utilization, illustrations have not been optimally used as a source of information in visual culture studies. This indicates that the management of illustrations in digital systems does not fully support the function of preserving visual information. Hendrawan et al. (2024) emphasized that metadata created with the same standards and adapted between systems helps cultural heritage collections be more easily accessed and distributed across various platforms. In line with this, Pandanwangi et al. (2023) showed that the illumination of 18th-19th century Javanese manuscripts not only has aesthetic value but also holds philosophical meaning that reflects the cultural identity and traditions of the writers of their communities.

To examine this issue, this study utilizes the Digital Cultural Heritage Standards: From Silo to Semantic Web theory proposed by O'Neill & Stapleton (2022), which encompasses three main elements. The first element, mets (metadata encoding and transmission standard), is used to integrate the visual data of physical manuscripts with their digital representations; the second element, semantic web, is utilized to assess the searchability of illustrations on the Khastara portal; and the third element, enricher (enhanced metadata for cultural heritage), emphasizes the role of various parties as key actors in the process of enriching cultural

information. This model and the practice of digital manuscript management can be seen not only as a technical process, but as an interpretive process with a cultural component.

Research on the digitisation of manuscripts has been carried out in various contexts. The overall study on digitization of Indonesian manuscripts research conducted by Wirajaya (2017) is focused on the preservation and protection of intellectual treasures of the Nation. The study emphasizes on policy aspects, enhancing the cooperation between institutions, and formulating a national digitization roadmap between the National Library of Indonesia and Manassa. However, Hendrawati (2018) focused on technical aspects of manuscript digitization, starting from pre-digitization to media transfer and finishing at the post-digitization stage, and paid attention to the preservation of the manuscript's content and to some technical problems such as limited resources and physical condition of the manuscript itself. In addition, Aouinti et al. (2022) have explored the application of a Convolutional Neural Network (CNN) model and International Image Interoperability Framework (IIIF) standard to the automated identification of illustrations in digital European manuscripts. This research focused on technological innovation in visual element detection and not on collection management aspects.

This research is an important aspect which sets it apart from previous research. It is directed on the management of digital Nusantara manuscripts illustration in the National Library of Indonesia. This research not only brings up the digitization process but also analyses their representation in the metadata of Khastara portal. This aspect has not been so fully discussed in the past and there are no illustrations in the metadata system clearly labeled. As a result, illustrations are not included in the system, and are not easily traceable and used as cultural information. The need for this research is the significance of managing illustrations in metadata that has an influence on the retrieval, accessibility and utilization of digital cultural heritages. If not managed properly, illustrations are prone to become unidentified in the system, and hence not to be used to their full information value.

This study aims to describe the management of digital illustrations of Indonesian manuscripts at the National Library of Indonesia and to analyze the extent to which metadata on the Khastara portal represents these visual elements. Furthermore, this study aims to identify various obstacles in the process of managing digital illustrations of Indonesian manuscripts and outline solutions implemented as part of efforts to preserve visual cultural heritage in the era of digital transformation.

This research is expected to enrich digital preservation studies, particularly in the management of illustrations as part of the metadata of Indonesian manuscripts. Furthermore, this research can be used as a consideration in developing metadata management to better support the optimal use of visual information.

RESEARCH METHOD

This research uses a qualitative method with a case study approach to examine the management of illustrations and illuminations of Indonesian manuscripts in the context of digitization. The case study approach was chosen because it allows researchers to understand and describe a phenomenon in depth within a real-life context, especially when the research focuses on a specific system or location (Creswell, 2018). The research was conducted at the National Library of Indonesia, specifically at the Center for Preservation and Media Transfer of Library Materials, as the unit responsible for the digitization and management of Indonesian manuscripts. The method of selecting informants was purposive sampling, the informants were

selected deliberately based on the criteria that fit the research objectives (Fiantika et al., 2022). The informant selection criteria for this study was based on their involvement in the process of manuscript digitization, metadata management and work experience in relevant areas. The criteria and roles of informants are presented in the following table.

Table 1. Research Informants

Informant Code	Role	Criteria of Informant
S	Librarian	Involved in processing metadata and describing collections
J	Philologist	Understanding the content, context, and meaning of illustrations
D	Digitization Team Leader	Responsible for planning and implementing digitization
K	Media Transfer Staff	Carrying out the stages of digitization
M	Research and Development Team Leader	Involved in developing digital systems and managing information

Source: National Library of the Republic of Indonesia

The analysis was conducted using the Digital Cultural Heritage Standards: From Silo to Semantic Web framework as an analytical tool to assess digital illustration management practices implemented at the National Library of Indonesia. The mets (metadata encoding and transmission standard) element was used to compare the conformity of illustrations in physical manuscripts with their corresponding digital metadata objects. The semantic web element was used as an analytical framework to assess the extent to which the metadata structure and description on the Khastara portal support the representation and interconnectedness of the manuscripts' visual elements. The analysis focused on the limitations of metadata in linking illustrations as visual information. Meanwhile, the enricher (enhanced metadata for cultural heritage) element was used to examine the roles of various parties involved in the process of enriching visual information as part of digital cultural heritage preservation.

Data collection was conducted through non-participatory observation, in-depth interviews, and literature review. Non-participatory observation and in-depth interviews served as primary data sources in this study, while literature review served as a secondary data source to strengthen and complement field findings (Creswell, 2018). Non-participatory observation was conducted by directly observing the manuscript digitization process, from the preparation stage to the management of digital files. In this process, researchers used observation guidelines that focused on the digitization stage, illustration management, and metadata management. In-depth interviews were conducted using a semi-structured approach using interview guidelines based on the problem formulation and theoretical framework used. Interviews lasted 30-60 minutes for each informant. Interview data was recorded, transcribed, and analyzed according to the research focus. Literature reviews were conducted to examine standards and relevant supporting documents. This data was used to strengthen and compare field findings with theory and previous research. Data were analyzed using the Miles & Huberman (1992) interactive analysis model, which includes data reduction, data presentation, and conclusion drawing. In the data reduction stage, researchers selected data from observations, interviews, and literature studies based on the problem formulation. Next, the data were collected into themes arranged based on the theoretical framework used, namely the METS, Semantic Web, and Enricher elements. This process also served as the data coding stage by grouping information into relevant themes. In the data presentation stage, the results were compiled in the form of an analysis that connected field findings with the theoretical framework.

Next, in the conclusion stage, the researcher interprets the data to analytically answer the research questions. During the analysis process, data obtained from observations, interviews, and literature studies are combined. This ensures that the analysis is not merely descriptive but also yields a deeper understanding.

Data validity is maintained through source triangulation, technical triangulation, and time triangulation (Sa'adah et al., 2022). Source triangulation is conducted by comparing information from parties involved in the digitization and processing of manuscript metadata. Technical triangulation is conducted by comparing the results of non-participatory observation, interviews, and literature studies. Meanwhile, time triangulation is conducted by collecting data at different points in time to ensure consistency of information. Through these procedures, research findings in the context of digitalization have a level and credibility that can be academically justified.

RESULT AND DISCUSSION

This research uses the Digital Cultural Heritage Standards: From Silo to Semantic Web framework by O'Neill & Stapleton (2022), which includes elements of METS to analyze the structure of digital objects and their metadata, Semantic Web to assess the searchability of illustrations on the Khastara portal, and Enricher to examine the role of various parties in empowering visual descriptions as part of digital cultural heritage preservation. Based on this framework, the following are the results and discussion of the management of digital Nusantara manuscript illustrations at the National Library of Indonesia.

Digitization of Nusantara Manuscripts in Illustration Management

Digitization of Nusantara manuscripts is a preventative preservation strategy aimed at safeguarding visual cultural heritage. The vulnerability of physical manuscripts due to age, traditional writing media, and environmental influences makes digitization a crucial approach to shift access from physical objects to digital forms without increasing the risk of degradation of the original materials. In cultural heritage preservation studies, digitization is understood as a media transfer process centered on the desire for access to the visual and intellectual information of manuscripts (Mshvidobadze, 2021).

The media transfer activities were carried out in the digitization room located on the 5th and 6th floors of Building E of the National Library of Indonesia, involving a technical team that divided tasks according to their respective competencies. Based on responses from the National Library of Indonesia's media transfer team, the Indonesian manuscripts being digitized originated from the hunting and collecting activities carried out by the deposit center. The collections were made from different parts of the country including Sulawesi, Sunda, Kalimantan, Bali and Java. Manuscripts were acquired from the communities, individuals or institutions that submitted manuscripts for preservation. Thus the manuscripts translated are not simply the collections of the authors, but they embody the cultural diversity of different geographical areas.

Implementation of the manuscript digitization is based on operational guideline established by the National Library of Indonesia (National Library of Indonesia, 2020) which is also known as NSPK for Media Transfer. The NSPK has followed best practices in preparing it, using international best practices including the Federal Agencies Digital Guidelines Initiative (FADGI) and Metamorfoze. The standards include resolution, colour management, image quality

and management of digital objects. The media transfer team also carries out annual evaluations at the end or beginning of the year according to the NSPK guidelines, on which the refinement methods are based, thereby maintaining a steady visual quality and preservation standards. From an operational perspective, the digitization of Indonesian manuscripts in the National Library of the Republic of Indonesia is conducted in two stages: preparation stage and the digitization process.

a) In the preparation stage there is a need to coordinate the target determination process for the year, identify and select the manuscripts for suitability, implement conservation work if required and transfer the manuscripts to the media transfer room.

   The preparation stage is critical because this determines the nature of manuscript handling that will take place before the manuscripts are digitized. Selection at this stage is more concerned with the physical condition in the process of conservation. Specific attention has not yet been given to illustrating, and initial information on illustrations has not yet been recorded in detail. This affects the next step, which is to have illustrations included in the metadata in only general terms. In the framework of the Digital Cultural Heritage Standards: From Silo to Semantic Web, the METS element evaluates the appropriateness of illustrations in physical manuscripts for objects in the digital realm. Practices are appropriate in the preparation stage since manuscripts are chosen and prepared based on the physical condition of the manuscripts, and ensure that they are fully prepared for the media transfer stage. At the same time, the Semantic Web component stresses the necessity to identify and track each of the pieces of information in a specific manner. This is not evident at this stage because identification is still being done based on the manuscript as a whole. There aren't any illustrations yet recorded as information items. So they're missing any foundation for their tracking in the system. The result is consistent with Hendrawati (2018), who showed the importance of avoiding damage prior to the widespread use of cultural objects. A difference, however, is apparent when comparing this approach with that of Aouinti et al. (2022) which sees illustrations as objects that can be identified with technology.

b) Manuscript preparation before the shooting of the photograph, high resolution digital single-lens reflex (DSLR) camera digitization of the image, recto-verso shooting techniques, quality control, conversion of file formats, and digital storage and publication.

   The digitisation process is an important one as it dictates how the manuscript (and its illustrations) will be captured digitally. By using a high resolution camera and quality control process, the emphasis is placed on quality and accuracy of the digital output. This will capture the image of any part of the manuscript, such as illustrations, completely. The METS element is suitable in the context of the Digital Cultural Heritage Standards: From Silo to Semantic Web, as it pertains to the digitisation process, which yields a faithful digital copy of the physical manuscript. The object structure and the quality of the images is good. The digital output is not completely addressed by specific information management in the Semantic Web element, which focuses on information connectivity and retrieval. The illustrations have been recorded, but at this stage are not considered as individual information. This is consistent with the results of Rahmi & Nur (2025) which stated that digitization is not only media transfer but also ensuring the quality of the media and the management of the media for easy access. The findings of this research indicate that the quality of digital output has not been paralleled with increased visualization of information management, in particular the identification of illustrations as searchable, separate parts.

Type of Collection	Total of Collection	Total of Copies
Rare Books	2.599	4.451
Voices	100	1.070
Maps	1.874	2.226
Photos, Drawings, and Paintings	11.807	11.712
Magazines and Newspapers	640	309.519
Ancient Manuscripts of the Archipelago	10.859	23.103
Total	**27.879**	**352.081**

The number and classification of collections that can be found on the Khastara portal suggest that Indonesian manuscripts are placed in the midst of a network of digital collections. Manuscripts do not stand alone as separate archives, but rather are integrated within a collection structure that can be recognized, combined, and traced through available systems. Based on the Semantic Web elements within the Digital Cultural Heritage Standards: From Silo to Semantic Web framework, the standards emphasize not only the orderliness of metadata but also the interconnectedness of data, allowing each information element to be recognized as a specific entity and directly traced within the system. In this context, practices on the Khastara portal demonstrate that metadata fulfills the basic functions of digital collection management, such as categorizing and presenting organized information. This indicates that the orderliness and integration aspects of the system are functioning well. However, at the level of information connectivity and traceability, these practices have not fully met Semantic Web standards. Illustrations are still presented in a general manner and have not been positioned as metadata entities with their own access. Illustrations can therefore not be copied directly from the document without opening the entire document. The situation shows that there is still a limited degree of “interconnection” or “interlinguence” of visual information in the system.

The study carried out by Wirajaya (2017) shows that manuscript digitization is not just a transfer between media, but it needs a structured and integrated management system. This is also supported by Koho et al. (2023), who stated that national memory institutions play a crucial role in ensuring that cultural heritage collections are not only digitized but also managed in a structured manner for easy discovery and use by the public. This demonstrates a gap between the function of metadata as a collection management tool and as a means of information connectivity. Metadata is not enough to simply guarantee structural order; it also needs to address the ability to represent visual elements as units of information that can be accessed and independently explored.

One example of an illustration of a Nusantara manuscript from Yogyakarta published in the Perpusnas Press publication entitled "Jongensspelen: Permainan Tradisional Anak-laki" (Traditional Games for Boys).

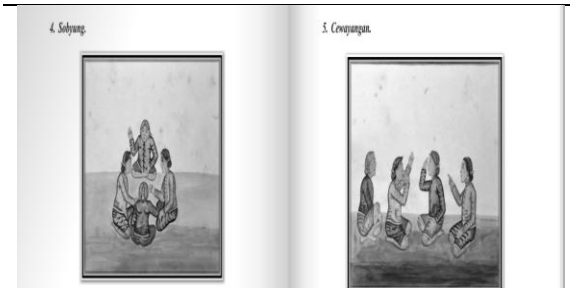
Ilustration	Form of Visualism
 Sumber: https://press.perpusnas.go.id/	1. The Sobyung game, a group of boys sit in a circle on the ground, performing hand movements as a game mechanism. The parallel seating indicates a collective, non-hierarchical game, while hand movements determine the outcome and determine whether a player wins or loses. 2. The Cewayangan game, characterized by dynamic body and hand movements, as well as children holding specific body parts, such as their foreheads or noses, in response to game instructions.

Figure 1. Illustration of Jongenspelen: Traditional Boys' Games

The illustrations in the Jongensspelen manuscript: Traditional Boys' Games depict Sobyung and Cewayangan games played by a group of boys sitting in a circle. The arrangement of the images displayed together, along with the presence of important characters, with hand gestures and gaze directions, indicate the dynamics of the game.

These findings are explained using the Digital Cultural Heritage Standards: From Silo to Semantic Web framework. This relates to the Enricher element, which emphasizes the enrichment of meaning through the interpretation of digital objects. The Jongenspelen illustrations can be read as representations of community social practices, embodying the values of collectivity and interaction patterns in traditional games. In practice, this interpretation has not been provided in the Khastara metadata. The information presented is limited to the illustrations in the manuscript, without visual descriptions or meaningful context. More in-depth explanations are found in philological studies, such as those published by the National Library of Indonesia (Perpusnas Press) that include translations and translations. This indicates that enrichment of meaning is available scientifically, but has not yet been connected to the metadata system.

Compared to the Enricher element standard, this situation indicates that illustration management practices have not yet fully integrated meaning into the digital system. Visuals have been captured in totality, but the interpretive function is still not in the system. This translates into a picture-based approach to understanding illustrations, as opposed to using them as cultural data that can be analyzed. The effort to preserve Indonesian manuscripts through digitization is also underlined with the support of scientific study and collaboration of scholars, as done by Wirajaya (2017). This echoes a study performed by Windhager et al. (2018) that also noted that digital cultural heritage objects become more valuable when presented with an accompanying interpretive context that would help the users understand the social and historical context of the objects. In these terms, Khastara has covered the technical aspect of preservation, and the metadata will take up the role of connecting digital images with cultural meaning, which needs to be developed optimally.

Moreover, illustrations in the manuscript Serat Pawukon Ugi Penanggalan Jawi published on Khastara portal illustrate handling of visual information during the digitization process of Indonesian manuscripts, as follows.

Ilustration	Form of Visualism
 Sumber: https://khastara.perpusnas.go.id/ (Researcher screenshot, 2026)	The figures are shown standing and sitting, with a variety of gestures and clothing, typical of the era. The background details of the buildings and trees are minimal, and the buildings are not depicted with too much detail, minimizing depth of field so that the figures and what is happening in front of them are the main focus.

Figure 2. Pawukon Ugi Penanggalan Jawi Fiber

The Pawukon manuscript originates from Java, specifically Central Java. Philologists at the National Library of Indonesia state that the illustrations in Serat Pawukon Ugi Penanggalan Jawi depict human figures in a wayang style with slender postures and distinctive body positions, accompanied by supporting elements such as buildings and trees. The human figures in the illustrations represent character, the cycle of time, and the relationship between humans and the cosmological order in the Javanese calendar system.

Within the framework of the Digital Cultural Heritage Standards: From Silo to Semantic Web, this condition indicates that the illustrations possess a source of cultural information related to the Enricher element, namely the enrichment of meaning through the interpretation of digital objects. The Pawukon visuals can be understood as representations of traditional knowledge systems that address the relationship between humans, time, and the universe. However, this symbolic meaning has not been accommodated in the Khastara metadata and is generally obtained through philological studies. This indicates that the enrichment of visual information remains outside the main system. The Khastara system does not fully meet the ideal standards of the theory used. Metadata still functions at the level of general recognition, not yet providing visual context or cultural meaning to the illustrations. These limitations make the process of interpreting illustrations dependent on sources outside the system, such as philological studies in Perpusnas Press publications containing transliterations and translations. This means that enrichment of meaning is available academically, but not yet directly linked to the digital system.

Research by Wirajaya (2017) confirms that preserving Indonesian manuscripts through digitization requires scientific support to maintain their intellectual and cultural value. This finding is also supported by Hady et al. (2025), who stated that manuscripts function not only as historical documents but also as systems of knowledge and cultural values that are continuously transformed in people's lives. The situation highlights the need for the incorporation of the results of philological studies and metadata systems, where illustrations are not just pictorial representations, but can be used directly and followed as cultural information.

Illustration Representation through Khastara Metadata

The metadata presented on the Khastara portal is basic information about Indonesian manuscripts such as its title, author, origin, language, subject and physical description. The information is used to identify collections and to get an overview of the characteristics of manuscript collections in the digital environment (Brandt et al., 2024). The illustrations in Khastara do not always contain details (illustration type, page location etc.). This means that illustrations are not presented separately from the system as visual objects that are described.

The National Library of Indonesia uses standard metadata, Resource Description and Access (RDA) for bibliographic description and Machine Readable Cataloging (MARC) as a catalog data encoding format in the management of digital collections. These standards are designed to ensure consistency and order in describing basic manuscript information. In the context of illustration representation, these standards do not specifically accommodate the need to describe illustrations and illuminations as stand-alone units of visual information (Lorenzini et al., 2021). This finding is reinforced by the following interview results with informants in January 2026.

> *"…Khastara's metadata for illustrations still indicates whether or not an illustration is present." (J)*
> *"Librarians have to open each manuscript one by one to view the illustration." (J)*
> *"The system still operates in a general manner, not specifically for illustrations…" (K)*
> *"The reason there's no specific management for manuscript illustrations yet is because illustrations require more in-depth research…" (J)*
> *"…limited human resources, yes, that's true. So it's not just about competence, but more about the time required for research, which would take longer…" (J)*
> *"…the manuscripts themselves aren't like regular books, so the manuscripts are fragile and difficult to read. Repeated reading will certainly shorten the lifespan of the manuscripts themselves." (D)*
> *"So that's why there hasn't been a specific classification for illustrations yet, so the sections are simple…" (J)*

The findings above indicate that metadata management practices at Khastara have fulfilled the basic function of collection description, especially in the context of manuscript identification and classification. However, when linked to the need to represent illustrations as visual information, this practice remains at a general stage and has not yet reached a level of description that allows illustrations to be independently searched.

Within the framework of Digital Cultural Heritage Standards: From Silo to Semantic Web, this condition is directly related to the Semantic Web element, which emphasizes the importance of metadata connectivity so that digital object information can be recognized as a specific entity within the system. In this study, the aspect of information connectivity, particularly in representing visual elements, remains limited in its implementation. Illustrations lack a metadata structure that allows systems to connect and display specific visual information. This demonstrates that while standards such as RDA and MARC have guaranteed consistent bibliographic descriptions, the level of metadata information does not yet support specific illustration searches. This situation indicates that metadata is capable of presenting collections in a structured manner, but has not yet reached the stage of representing illustrations as elements with their own information access. The ideal standard for Semantic Web elements

emphasizes the connectivity of every aspect of information, while in practice, illustrations are still attached to the general description of the manuscript. Consequently, digitized illustrations cannot yet be directly accessed through retrieval systems.

Hendrawati's (2018) research shows that while the manuscript digitization process generally follows technical preservation standards, developing a more specific description system remains a challenge in managing digital collections. Furthermore, Nishanbaev et al.'s (2019) research shows that in digital cultural heritage management, data is often stored in poorly organized and poorly interconnected formats. Therefore, illustration management should not stop at the digitization process; it should also be followed by the development of metadata capable of representing visual information in a more structured manner. This research demonstrates that illustrations need to be placed as an information aspect within metadata, so they can be traced and utilized as part of cultural information within digital systems.

Roles in Managing Digital Illustrations of Indonesian Manuscripts

Managing illustrations of Indonesian manuscripts in a digital environment is a collaborative process involving various parties with complementary roles. At the National Library of Indonesia, this management involves librarians, philologists, and a media translation team in separate but integrated work stages.

Librarians play a role in managing digital ancient manuscript information during the post-media translation stage, particularly in compiling metadata using the Resource Description and Access (RDA) standard and MARC format. This role contributes to the order and consistency of manuscript identity information, including title, author, language, subject, and physical description. However, in the context of illustrations, the resulting descriptions are still limited to general information, such as the presence of illustrations, without encompassing visual descriptions or deeper meanings. This indicates that the metadata function is still oriented towards collection identification, rather than specific visual analysis (Fan et al., 2022).

The media translation team plays a role in the initial stage of digital manuscript management, namely the process of visualizing manuscripts through digitization. This team is responsible for producing complete and accurate digital images. The role of the media translation team is technical and documentary, ensuring that all visual elements of the manuscript are properly recorded as a digital archive. The media translation team does not select meanings or group illustrations, but rather focuses on the visual quality of the digitized results as a basis for further management (Fatmawati, 2022).

Furthermore, philologists play a crucial role in providing context to the manuscript's content, including the relationship between text and illustrations. In the context of manuscript management, a philologist is a scholar who provides information about the cultural context and symbolic content of the manuscript, text and image. The output of philologists is usually in the form of studies, transliterations, or separate publications in the form of articles or books, which are published by the National Library of Indonesia (Perpusnas Press). Philological sources in various systems are more often used to enrich the deepest understanding of illustrations than visual descriptions directly embedded in the digital portal (Zhang 2022). This is confirmed by the following interview results in January 2026.

> *"...so our job in media translation is to ensure that all pages of the manuscript, including illustrations, are recorded clearly and according to standards." (D)*

"The meaning of illustrations is usually explained in philological studies, not in portal descriptions..." (J)

Based on these findings, it can be seen that illustration management at the National Library of Indonesia has been carried out through a clear and complementary division of roles. Functionally, this practice has met the basic needs of preserving and documenting digital manuscripts, both from a technical and scientific perspective. However, when viewed in the context of representing illustrations as information in digital systems, this practice still shows a separation between functions that is not yet fully integrated.

Within the framework of Digital Cultural Heritage Standards: From Silo to Semantic Web, this condition relates to the Enricher element, which emphasizes the role of various parties in optimizing metadata as part of digital cultural heritage management. Based on the findings of this study, the role of enrichment remains separate from the main digital system. Librarians provide general descriptions through metadata, the media translation team focuses on accurate visual recording, while cultural meaning is more present through separately published philological studies. This situation indicates that existing practices have met the collaborative aspect of manuscript management, but have not yet fully achieved the integration of information enrichment as envisioned in the Enricher element. Illustrations have been documented and interpreted, but they are not yet fully connected within the system. Consequently, users cannot simultaneously access the visual display and its cultural meaning.

Wirajaya's (2017) research confirms that digitization is part of a preservation strategy involving various parties with complementary roles. Collaboration between technical managers and scientific actors is a crucial element in maintaining the sustainability of information and the cultural value of manuscripts. Research conducted by Prasad M S (2021) also confirms that in digital cultural heritage management, the difference between technical explanations and cultural understanding can lead to digital objects being understood only technically without capturing their cultural value. This research shows that the main problem lies not in the division of roles, but in the lack of connection between the work of each role in the digital system. Even though metadata is still used for description, no cultural interpretations have been integrated into it. This condition highlights the need for metadata that captures fundamental facts that is also rich with meaningful context for use of illustrations as more complete visual information.

CONCLUSION

The results of this research indicate that technically the digitisation of Indonesian manuscripts is progressing well at the National library Indonesia, especially in creating complete and manageable digital image. At the information management level, however, illustrations are still included as part of the manuscript and are not considered to be visual information that can be recovered independently in metadata. This situation reveals that there is still no full support for the development of metadata that can represent the meaning of the visual in the process of digitization. Although the illustrations are well documented they are not yet complete to support the searching and use of cultural information in digital systems.

The results of this research indicate that, in digital preservation, success goes beyond the transfer of the media, it is also important that metadata is able to tie the visual forms to the meanings. Hence, it is essential to enhance the metadata in digital repositories to ensure that they serve as information systems in addition to the storage container they are.Thus, it is

important to improve the metadata in digital repositories to make them accessible and usable for wider user groups.

SUGGESTION

In the future, Khastara portal should be enriched with more detailed information about illustrations, including the type of illustration and its place in the manuscript. This will assist users to locate the required visual data without having to open the entire document.

Furthermore, the results of philological studies, such as translation and translation, can begin to be linked to metadata. This way, illustrations appear not only as images but also as easily understood cultural information. Future research can develop a metadata model specifically for illustrations, which can serve as a reference in the management of cultural heritage-based digital collections.

THANK YOU-NOTE

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