Artificial Intelligence and Knowledge Management Implementation in Electronic Archives Preservation: Literature Review

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Abstract:- Rapid technological developments encourage the birth of archives into new media called electronic archives. The role of artificial intelligence and the implementation of knowledge management in digital archiving is to maintain the integrity of information and avoid various risks in documents. The literature sources used in this review are relevant sources sourced from books, journals and literature obtained from online search facilities . The results of the research show that the role of artificial intelligence (AI) in the preservation of electronic archives aims to assist archivists' work regarding the search for information desired by users through an artificial intelligence analysis. The implementation of a knowledge management system in electronic records preference for records management should be carried out systematically using project plans and methodologies that are appropriate to the situation and outlook to unify the operation of the records management system with business processes and related systems.

Keywords:- Electronic archive preservation, artificial intelligence, knowledge management.

I. INTRODUCTION

The presence of technology that is growing rapidly creates a system with all the given goals and functions, making the system of life easier and more practical. The demands of the times that are increasingly evolving towards a more developed and modern nature make technology a necessity for human survival. Almost all people use the benefits of technology in their daily activities. The method used in this study is a systematic literature review.

Technology is not only used by the general public. Technology also attracts the sympathy of government institutions, private institutions and an agency to take advantage of its sophistication. One of them can be seen from the archives. Archival institutions have a responsibility to maintain, care for, preserve and store archives that have important value in them. Archives in archival institutions are prone to loss and damage caused by disasters, carelessness of officers and being eaten by termites [1]. In maintaining archives, proper management is needed so that in its implementation it is right on target and purpose.

The series of archive life cycles in records management is also known as archive preservation. Archive preservation consists of three parts, namely preventive, curative and reproductive. Archive preservation aims to carry out maintenance and protection as well as prolong life keep physical archives so that information remains intact forever [2]. The role of archival institutions in maintaining the authenticity of documents or records transferred from their original creation environment is to function as memory and evidence for the next generation. The integrated set of archiving theories, methodologies and practices carried out by the Roman tabularium (now called the librarian or archiving officer) had to be designed so that documents could be moved and copied safely from one place to another or from one period to the next [3].

Along with the development of information and communication technology, one of which is scanning technology in computer programming, archiving institutions participate in the use of this technology. Scanning programming on a computer can be used to scan almost any document for distribution and transmission electronically. Electronics in the field of archiving changes the form and format of documents from physical (hardfile) to softfile . The way to treat electronic documents (softfile) will be different from the treatment of physical documents (hardfile) which require quite a lot of physical space. Meanwhile, electronic documents only need to prepare a virtual storage area in cyberspace [4].

The role of librarians is important in archive management and is required to be able to collaborate with media or information technology devices provided by archiving institutions. However, in practice, it is not possible for all librarians or archiving officers to have free access to manage and provide maximum service to users, which is increasing day by day. A competent and qualified librarian is needed in accordance with technological developments. The competence of librarians is needed for adjustment or fulfillment of information from user needs [5].

Discussion of big data in the realm of archiving has given rise to a new term, namely artificial intelligence (AI) or also called artificial intelligence. This means that the filing system is transformed as much as possible using the internet system. Artificial Intelligence is a field of computer science that emphasizes the creation of intelligent machines that work and react like humans as stated by Astrid Savitri in her

book entitled industrial revolution 4.0, which discusses how to turn challenges into opportunities in the era of disruption [6]. If previously archiving used a conventional system where document management mostly used human labor or employees, now archiving must improve following technological developments. By utilizing technology, it is possible to carry out various innovations that can improve the quality of performance and services in document archiving [7]. In this case, knowledge of archiving management is needed so that archiving institution archives can maintain their documents in addition to conventionally also can be done digitally, namely with the preservation of electronic archives.

II. LITERATURE REVIEW

Along with the rapid development of information technology, it also causes changes in archive storage media, namely from conventional storage to storage in digital format. As a result, in the current era, archives are no longer in print or conventional form of paper and the like, but archives are also in the form of digital electronic media or what are called electronic or digital archives, such as in the form of electronic mail (*e-mail*), CD (*compact disc*), and other digital processing results.

The development of information technology-based archive applications has been used and the benefits of this electronic archive in addition to facilitating the retrieval process also provides convenience in the archive distribution process and in this distribution process it does not require archives in physical form. In the development of electronic archives, the retrieval process becomes uncertain in management. The archive retrieval process is a work process that is often carried out and the archive search process certainly cannot be limited to only archives in certain years.

One of the implementations of digital archiving is the role of *artificial intelligence* (AI). AI is a general term that refers to technologies capable of making machines "intelligent." Organizations invest in AI research and applications to automate, enhance, or replicate human intelligence – human analysis and decision making – and the internal audit profession must be prepared to fully participate in organizational initiatives to implement AI. There are many other terms related to AI, such as, deep learning, machine learning, image recognition, natural language processing, cognitive computing, intelligence amplification, cognitive enhancement, increased machine intelligence, and increased intelligence [8]. The sustainability of AI also depends on archive management in managing its documents in the digital world. special knowledge is required in its implementation.

Knowledge management is a process to assist organizations in identifying, selecting, organizing, distributing, and transferring important information and expertise to a person as part of the organizational memory. Archives management is basically being able to create a systematic arrangement of archives, guarantees for safe and well-maintained archive storage to saving archives as evidence and sources of information. Archives have various

forms, the most common is archives in textual form, besides that archives can be in special forms. In managing special archives such as images, photos, and sound recordings, of course, there are problems of their own, starting from how to find the required archives, retrieval systems to archive management so that they can be used by the organization, its creators and by their successors [9].

III. METHOD

The method used is a systematic literature review. This study uses a systematic compilation technique that aims to understand and facilitate the reader regarding the materials and literature used. The systematic literature review is based on the *Systematic Literature Review* (SLR) guidelines for *software development* [10].

The stages of the simplified systematic literature review method consist of three stages which include planning, implementation, and report generation [11]. The first stage is planning, namely looking at the protocol whose structure is based on a particular research context, defining the review protocol and developing research questions. Then proceed to the second stage, namely searching and extracting data to categorize data items as a result. The last stage is reporting which contains the conclusions of the research results and the proposed discussion.

- The initial stage of the LRS method is the planning stage, which is in the form of preparing questions for research based on the PICOC (*Population, Intervention, Comparison, Outcomes and Context* [12]. The basis of the research was then developed by several researchers [11,13,14,15].

No	Criteria	Scope
1	Population	Electronic Archive Preservation
2	Intervention	Limitations on research on the role of *artificial intelligence* and implementation of *knowledge management* in electronic archive preservation
3	Comparison	*artificial intelligence and knowledge management* implementation in electronic archive preservation
4	Results	What is the role of *artificial intelligence* and the implementation of *knowledge management* in electronic archive preservation
5	Context	Overview of all research on *artificial intelligence and knowledge management* implementation in electronic archive preservation Electronic Archives Preservation

Table 1: Formulation of Questions with PICOC

Based on the criteria and coverage in table 1, there are two research questions (PP) that were prepared, namely: PP1: What is the role of *artificial intelligence* in the preservation of electronic archives. PP2: What is the role of

knowledge management implementation in electronic archive preservation.

A. Search strategy

The search strategy is carried out in the second stage, namely the implementation stage. The search strategy was carried out to include the formulation of search terms, search for data sources from online and *offline databases* . The literature sources used in this review are relevant sources sourced from books, journals and literature obtained from online search facilities such as *Schoolar, Scopus* , and *Science direct.* The third stage is making a report which will be described in the results and conclusions.

IV. RESULTS AND DISCUSSION

A. Artificial Intelligence

The implication of the development of information technology for archivists is the triggering of electronic archiving, access to information via the internet which can be obtained easily and quickly. In order to meet the information needs of various users, librarians need to think of a renewable innovation. With the competence possessed by archivists in their fields, it is impossible to work together. There needs to be innovation in the field of information and communication by utilizing technology such as artificial intelligence.

Artificial intelligence is a part of computer science that makes machines (computers) able to do work as and as well as humans do. An *intelligent system is a system built using artificial intelligence* techniques . One of the things studied in artificial intelligence is the theory of expert systems [8].

The use and utilization of *artificial intelligence* is not to replace the role of archivists as a whole. Although in practice information technology dominates the work in archiving. The use of *artificial intelligence* aims to help archivists in carrying out their duties, sometimes archivists face quite a lot of work at one time. That way, the presence *of artificial intelligence* as a solution for archivists to serve users optimally without leaving his job as information manager.

Robotic systems may sound familiar in today's information technology, but the use of artificial intelligence as a guide in archiving is an interesting and unique innovation to implement. AI (*artificial intelligence*) archivist is a digital library concept that provides information using a system that is directly integrated with the information in the archive. The AI archivist becomes a guide and translator of the wishes of library users through a large monitor screen with several features that are adapted to specialist subjects in the classification of library material information.

The application of AI in a work occurred in China at a news agency called Xinhua which introduced a news anchor made of artificial intelligence technology. The languages used by AI news anchors are English and Chinese by bringing news like humans in general. The technology used in the AI news anchor is a combination of graphics and audio from the original news anchor through artificial intelligence.

Although AI news anchors display real or realistic voices and facial expressions, in the released videos the lip movements are not in sync with the artificial voice [16].

From the concept that has been described about *artificial intelligence* (AI) it can be an illustration and concept of electronic archive preservation in the present and future. This AI electronic archive preservation has sophistication in managing and managing archiving documents in the field of *online* -based information and communication technology. The role of *artificial intelligence* (AI) in the preservation of electronic records is not intended to replace the duties and responsibilities of archivists but to assist archivists in finding information desired by users through artificial intelligence analysis. The innovations and concepts that will be applied by *artificial intelligence* (AI) are made by archivists who are experts in their fields, so that archivists remain and are used for the success of the *artificial intelligence* (AI) concept in the preservation of the electronic archive.

B. Knowledge Management

In developing countries, knowledge management is a concept that is becoming known, where organizations realize that managing knowledge is as important as managing other assets belonging to the organization. Knowledge is an important element in the continuity of an organization.

Knowledge according to the Regulation of the Minister of State for Empowerment of State Apparatus and Bureaucratic Reform Number 14 of 2011 concerning Guidelines for the Implementation of Knowledge Management Programs (*Knowledge Management*), that knowledge is an understanding of something based on the interpretation of a particular problem context. Knowledge can be seen in documents, processes, activities, rules, and organizational norms that can contain information or commonly known as *explicit* . Or knowledge can also only be attached to a person or commonly known as implicit.

In the Regulation of the State Minister for Empowerment of State Apparatus and Bureaucratic Reform Number 14 of 2011 concerning Guidelines for the Implementation of Knowledge Management Programs. Knowledge management is a structured and systematic effort to develop and use the knowledge possessed to assist the decision-making process for improving organizational performance. Activities in knowledge management include the acquisition, storage, processing and retrieval, use and dissemination, as well as evaluation and refinement of knowledge as an organizational intellectual asset.

In the archiving system *knowledge management* is needed to prevent the risks that will occur. In many cases, electronic records can be updated, deleted, modified or manipulated without human intervention. In this process, important characteristics of an archive (content, structure, and context) can be changed or lost. The more relied on electronic systems by organizations in carrying out their business, the greater the need for these organizations for good records management processes and standards in order

to ensure the authenticity, reliability, and accessibility of information.

A design methodology and implementation is needed in order to run an archive management program that can continuously meet the needs of an organization well. In essence, the methodology for designing and implementing an electronic records management system is no different from the methodology for designing and implementing a non-electronic (paper-based) archive management system.

Eight stages as a method in the design and implementation of an archive management system [17]. The eight stages are designed as non-linear, meaning tasks or activities but as tasks that can be carried out in different stages, or gradually, according to organizational needs, organizational and environmental changes. archive management.

- Stage A Conduct initial investigation. Gather information from documentary sources and identify important factors, as well as important weaknesses related to records management.
- Stage B Analyze business activities. Identify and document each function, activity and transaction and create a hierarchical order of records management.
- Stage C Identify requirements for archives. Identify requirements as evidence and information gleaned from an analysis of the regulatory environment then determine how each of these requirements can be met through the records management process, and articulate and document requirements for records.
- Stage D Assess the existing system. Analyze existing records management systems and other information systems to measure their performance against requirements for records.
- Stage E Identify strategies to meet archive requirements. These strategies must be chosen on the basis of the level of risk in the event of a failure to meet a requirement in both business functions that will be supported by the records management system.
- Stage F Designing an archive management system. Design of a records management system that incorporates the strategies, processes and practices described in the Standard.
- Stage G Implement an archive management system. The implementation of a records management system should be carried out systematically using the project plan and methodologies that are appropriate to the situation and outlook to unify the operation of the records management system with the business processes and related systems.
- Stage H Conduct a post-implementation review. Reviewing and evaluating system performance, initiating and monitoring corrective actions as well as establishing a continuous monitoring system and regular evaluation.

The purpose of this stage is to systematically identify and define a suitable strategy to implement the plans in the previous stage. The plan provides an overview of how the various components of the system (processes, procedures, people and technology) should fit together.

C. Electronic Archive Preservation

The era of technology takes a role in everyday human life, especially the need for information. The development of information media is also the impact of technological developments. Almost all current information needs can be accessed through technology. Not only information sourced from books or printed references, but the passage of time has changed the human view that now information can be poured in other forms or formats, namely digital or electronic.

It is also the same fate with the archive. Information in archives must always be kept intact, not only physical archives must also be considered, considering and considering the role and function of archives which are so important for the state as well as for the implementation of a government institution, private sector, organization or individual. Physical preservation activities and archive information can be carried out by carrying out a series of archive preservation activities.

Preservation is an action that includes aspects of efforts to preserve library and archive materials which include policies on financial processing, labor methods, and storage techniques. Preservation is carried out on original library materials or archives that become collections as well as ancient manuscripts or manuscripts and historical heritage books of high value from previous generations [18].

Preservation can also be understood as an activity that ensures that the information contained in the archive can still be used as needed [19]. Meanwhile, digital archive preservation is a series of actions or activities to maintain digital collections in media that can be used and utilized for a long time.

Preservation is an effort used to maintain by storing or transferring conventional archival materials into digital form so that the available collections can be used later if needed without any damage. Several observations reveal that digital archive collections are very vulnerable to damage. This is because technology is constantly changing, including hardware and software used.

Conventional archive preservation is very different from the preservation carried out with electronic or digital archives. Conventional archive preservation can be done on the information contained by giving care to the physical paper and its place. Unlike the case with digital archives, where the information contained in digital archives is not integrated with the place that is the physical object, but is integrated, in line with the software *system* and *hardware* .

An important reason for the preservation of electronic archives. for several reasons, that there are three factors that encourage the preservation of electronic archive [20], including:

- Hard information lasts long. Information in digital form is difficult to last long in the long term. This problem can be caused by outdated software and hardware, natural damage to hardware and can also be caused by viruses or hacker attacks.

- Archives may be lost without warning or even permanently.
- Issues relating to the authenticity of the manuscript and copyright. Digital materials are generally easier to misuse, alter the content of data and other actions concerning copyright and the validity of materials from digital archives.

The lifespan of a digital object can be said to be short because problems sometimes cannot be detected quickly, so the preservation of digital or electronic records must be carried out with appropriate and consistent maintenance steps for active management and preservation. There are consequences that must be faced when archive management is not carried out properly. A lot of information, data, images, manuscripts and other types of digital archive material that can be damaged or permanently lost due to mechanical damage, or other things that are the driving factors why digital archives need to be preserved regularly as already mentioned in the paragraph above.

The existence of problems that might occur provides several strategies that need to be carried out in digital archive preservation activities [21], namely as follows:
- Medium Preservation, preservation of storage media can be done by *backing up* or making *copies* into similar media.
- Technology Preservation is carried out by migrating every change in format, so that digital collections will continue to be accessible.
- Intellectual Preservation, is carried out to prevent information from being changed due to the hands of irresponsible parties.

V. CONCLUSION

Electronic archive preservation is an effort used to maintain by storing or transferring conventional archival materials into electronic form so that the available collections can be used later if needed without any damage. In this case, archivists utilize *artificial intelligence* (AI) technology in the preservation of electronic archives.

Artificial intelligence in the filing system is a digital archiving concept that provides information using a system that is directly integrated with the information in the archive. The role of *artificial intelligence* (AI) in the preservation of electronic records is not intended to replace the duties and responsibilities of archivists but to assist archivists in finding information desired by users through artificial intelligence analysis. The innovations and concepts that will be applied by *artificial intelligence* (AI) are made by archivists who are experts in their fields, so that archivists remain and are used for the success of the *artificial intelligence* (AI) concept in the preservation of the electronic archive.

The implementation of a *knowledge management system* in electronic records preference for records management should be carried out systematically using project plans and methodologies that are appropriate to the situation and outlook to unify the operation of the records management system with business processes and related systems. So that the preservation of digital or electronic archives must be carried out with appropriate and consistent maintenance steps for active management and preservation.

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