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Digital Transformation in the Management of the National Archives of the Republic of Indonesia: A Qualitative Analysis of Challenges and Opportunities in Improving the Efficiency and Effectiveness of Archive Management

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Abstract
This study examines the digital transformation of national archives management in Indonesia, using qualitative analysis to identify challenges and opportunities for improving efficiency and effectiveness. The research reveals that high costs of digital technology implementation and limited human resources are major obstacles. However, digital transformation offers significant potential to enhance archival management efficiency through technologies like big data and artificial intelligence. The government has established policies to create a more orderly and usage-oriented archival management system. Digitalization enables electronic government administration, resulting in a more accessible, efficient, and integrated system. The transformation process involves converting files into textual documents and then into digital formats to streamline archival systems. While acknowledging potential negative impacts such as high costs and human resource limitations, the study concludes that successful digital transformation in archiving can significantly benefit Indonesia's governance. Effective digital archive management plays a crucial role in achieving better bureaucratic reform and enhancing public service delivery.

1. INTRODUCTION

Digital transformation is frequently a central theme in various studies within the industrial and public service sectors, with the hope that it will have a significant and positive impact on the performance of organizations and institutions focused on public services (Fauzi & Irvansyah 2022a). This is due to the rapid evolution of digital technology today, which has intertwined with almost all aspects of human life. Digitalization has spread across various fields of modern human life, including data archiving processes (Aminudin, 2023). This has led to: (1) transformation in work methods, (2) evolution in interaction methods, (3) shifts in views on efficiency, (4) innovation in the creation, management, and utilization of information/archives, and (5) new challenges for archivists in managing records (Muhidin, Winata, and Santoso 2016).

According to Law No. 7 of 1971 on the Basic Provisions of Archiving, Article 1 states that archives are: a. Documents created and received by state institutions and government agencies in any form, individually or collectively, in the execution of governmental activities; b. Documents created and received by private entities and/or individuals in any form, individually or collectively, in the conduct of national life. This definition is expanded in Law No. 43 of 2009 on Archiving and reinforced by the National Archives Regulation No. 9 of 2018 on Guidelines for the Maintenance of Dynamic Archives, which states: "An archive is a record of activities or events in various forms and media in accordance with the development of information and communication technology, created and received by state institutions, regional governments, educational institutions, companies, political organizations, community organizations, and individuals in the conduct of social, national, and state life." Digital archives themselves refer to information or archival data stored and transmitted in discrete formats or as binary code. This information can be accessed, created, or deleted through computers capable of reading or managing binary data, enabling archives to be used or utilized effectively (Andayani, 2017).

Archives play a vital role in the operations of organizations, especially those with various assets within them (Barthos, 2007). Archive management systems within institutions or organizations have become crucial elements to support the smooth running of institutional activities (National Archives Head Regulation No. 3 of 2007). Therefore, archives are considered valuable assets that must be securely maintained as they contain important company documents. With the continuous advancement of technology, many institutions have started managing archives in digital form as an alternative.

In recent years, the government has introduced the Integrated Dynamic Archive Information System (Srikandi) application to establish an efficient and accurate national archive management system. The launch of the Srikandi application was accompanied by government policies to implement digital archive transformation in every institution across Indonesia and achieve national archive integration. Thus, digital transformation in the national archive management of the Republic of Indonesia has become part of efforts to enhance efficiency and accuracy in archive management and realize more effective and efficient national archive integration (Vial, 2019). This is related to Law No. 43 of 2009 on Archiving and Law No. 11 of 2008 concerning Electronic Information and Transactions. Electronic archive management offers advantages such as extensive storage capacity due to the transition to digital media, and the ease of accessing archives online, allowing them to be accessed anytime and by anyone. Through electronic archive management and technology-based storage systems, administrative processes become more efficient, supporting future needs (Aprilia et al., 2020).

Digitalization has altered perspectives on efficiency, with organizations and institutions now focusing more on utilizing technology to improve their operational efficiency. Innovation in the creation, management, and utilization of information/archives is another positive impact of digitalization (Ashari & Sallu, 2023). In the effort to improve efficiency and accuracy in archive management, digital transformation also helps reduce paper usage and other costs. Digital archives allow for easier access and retrieval of documents, enabling employees to quickly and easily find the archives they need. Additionally, digital document management applications come equipped with advanced security features (Darwis et al., 2022).

However, despite the many benefits, the digitalization of archives also presents new challenges for archivists in managing records. It emphasizes that archivists need to adapt to rapid technological changes and ensure that archives remain preserved, secure, and easily accessible in this digital era (Sholahuddin, 2023). Another challenge of digitalizing archives is that trust in records can no longer be based on the same foundation as before. Trust in the digital world is colored by various risks and vulnerabilities that are part of the nature of digital materials, as well as in the management and storage of digital records, documents, and data. In the ICOLAIS webinar (International Conference on Library, Archives, and Information Science) organized by FIB UI in October 2020, it was emphasized that there is no full security guarantee in the digital world against hacker threats, so interdisciplinary cooperation is needed to build trust in National archive management (Safitri, 2020).

Therefore, it can be concluded that digital transformation has both positive and negative impacts on data archiving and archivists. Organizations and institutions that effectively utilize digital technology will gain a competitive advantage, enhance operational performance, and provide better services to stakeholders. On the other hand, they also face new challenges, such as issues of trust and the threat of hacking. Thus, cross-disciplinary collaboration is crucial in building trust in the management of digital archives within the Republic of Indonesia.

Based on the above discussion, the research problem to be addressed in this study is the effectiveness of electronic archive management in Indonesia and the challenges faced in managing the Republic of Indonesia's national archives in a digital format, a topic considered important and relevant for investigation. The objective of this research is to measure the effectiveness of digital archive management in the Republic of Indonesia and identify its challenges. The results of this study are

expected to be beneficial to the scientific community, particularly in the field of archiving. This research will focus on archive management with a specific emphasis on the management of electronic archives in Indonesia, examining a scope limited to archive management with a particular focus on the management of electronic archives within the Indonesian context.

2. METHOD

The research method used is a literature review, which involves examining various literature related to the research topic. Theories and ideas presented in the literature will serve as the foundation for the researcher to describe, analyze, and develop new ideas in addressing issues related to "Digital Transformation in the Management of National Archives of the Republic of Indonesia: A Qualitative Analysis of Challenges and Opportunities in Enhancing Archive Management Efficiency."

The research method outlines the procedures and processes undertaken to achieve objective results. In this article, the research method used is qualitative. According to Creswell as cited in (Hardani et al., 2020), qualitative research is a method for exploring and understanding the meaning that individuals or groups ascribe to social phenomena. Creswell outlines five approaches in qualitative research: narrative studies, phenomenology, grounded theory, ethnography, and case studies. This article employs a case study approach, focusing on a specific issue—namely, the challenges and effectiveness in the management of digital archives in Indonesia. Data is collected through literature reviews or documents, such as international journals.

3. RESULT AND DISCUSSION

Digital Transformation of National Archiving

Digital transformation refers to the shift in methodologies for handling tasks using information technology to enhance efficiency and effectiveness. Various sectors have embraced this transformation, including education through e-learning, business via e-commerce, banking with e-banking, government through e-government, and others. The essence of this transformation lies in improving efficiency and effectiveness in work and document management by utilizing databases. The ultimate goal of this process is to create a paperless work environment where all transactional documents are replaced by a simpler, more flexible, and accessible database (Danuri et al., 2019).

In this context, digital transformation has significantly impacted the field of archiving, affecting both infrastructure and non-infrastructure aspects, such as human resources and policies. This transformation also influences archival management approaches, shifting from traditional to digital methods.

To succeed in this transformation and become proficient in managing electronic/digital archives, more than just technology is required; other factors also play a crucial role. According to research conducted, digital transformation extends beyond technology and is more related to the strategies adopted (Kane et al., 2015).

From the discussion above, it is evident that the digitization of archival documents can provide significant advantages in archiving activities, including the establishment of a more effective administrative system, reduced reliance on physical archival documents, and faster access to information.

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Preservation of Electronic/Digital Archives

Regarding the digitization of archives in Indonesia, there is considerable variation among organizations in implementing electronic records and archives management. Each entity has its own technological systems. When discussing the implementation of the Electronic-Based Government System (SPBE), inconsistent policies among organizations can pose challenges in achieving compatibility when interacting with other agencies.

Various organizations in Indonesia have adopted digital archival management systems. These organizations include government agencies, private entities, banking institutions, and educational institutions. They use various computer-based applications, Android-based mobile applications, and web-based applications connected to the internet for managing archives. These applications are used in various archival processes within these institutions, including managing permanent archives, government documents, document photographs, financial data, vital records, newspapers, and inactive archives (Nyfantoro et al., 2019).

From a legal perspective, electronic archives are also recognized as valid and reliable evidence in law. According to (Rusmiatiningsih, 2017), electronic archives hold an equivalent function to conventional archives as evidence of transactions conducted, thus not diminishing their primary function despite the change in form. Additionally, electronic archives play a crucial role as the main memory, a source of information, and an essential oversight tool. Based on this, electronic archives hold significant primary and secondary value as materials for accountability and legal evidence, including in legal situations (Rusmiatiningsih, 2017)..

Challenges

Data analysis shows that electronic archives offer various conveniences and new opportunities not available with physical archives. For instance, electronic archives are easier to copy or share, reducing duplication. Additionally, electronic archives enable faster and easier transmission and sharing compared to physical archives. Electronic archives also allow institutions to reduce the need for physical storage space and provide more efficient user access. However, managing electronic archives also demands a different level of complexity than managing physical archives.

Institutions transitioning from paper-based to paperless or digital management face various unique challenges. One such challenge is the debate over the legal status of electronic archives, as some institutions have yet to recognize emails as equivalent to physical letters. Furthermore, there are also considerations regarding the importance of physical stamps or signatures as proof of authenticity. Another challenge is that the presence of electronic archives is a consequence of advances in information technology, prompting institutions that previously managed paper documents to make adjustments in both technical and policy aspects (Diah et al., 2023).

The digitization of archives in Indonesia has indeed become a key component in efforts to improve efficiency and accuracy in archival management. However, several obstacles are encountered during this digitization process. The digital divide is one of the main barriers, with Indonesia at high risk of experiencing a 'digital blackout' due to significant disparities. Other obstacles include the adoption of new technologies, which requires changes in thinking and acting toward a more digital work culture. The preservation of archives in digital form also presents its own challenges, ensuring that digital archives remain preserved and easily accessible. In some institutions, the digitization process is still limited to converting physical archives to digital without making them publicly available. Therefore, it is important to adopt technologies that support a digital work culture and conduct qualitative analyses to explore the challenges and opportunities in the digital transformation of national archival management in the Republic of Indonesia.

Other challenges, such as the loss or damage of digital files or information, can also have

significant financial and social impacts. According to research by the Ponemon Institute published in 2018, the global average cost per incident of data theft or credit card information misuse is approximately $141 per lost data, with total losses reaching around $3.6 million for affected organizations. Furthermore, when data center operations are disrupted due to power issues, the estimated financial loss is $7,900 per minute. For small organizations with around 100 lost archival units, losses can range from $18,120 to $35,730. Meanwhile, for major incidents with around 100 million lost archival storage units, losses can reach between $5 million and $15.6 million (High & Whitt, 2017).

To address these challenges and obstacles, integrated and sustained efforts are required. One step that can be taken is to increase the awareness and capability of relevant parties in facing digital transformation. Moreover, the development of better information and communication technology is crucial to improving the efficiency and effectiveness of archival management. In the context of government, this transformation will affect every aspect of bureaucracy. Therefore, integrated and sustained efforts must be made to enhance the government's capability in facing digital transformation. One step that can be taken is to increase the awareness and capability of relevant parties in facing digital transformation. Additionally, the development of better information and communication technology is crucial to improving the efficiency and effectiveness of archival management.

According to "Digital Mindset Readiness in Supporting Digital Transformation" by ANRI, digital transformation requires preparation in terms of leadership and digital culture. They emphasize that digital transformation must be accompanied by a change in mindset and the integration of all service areas to create added value that provides satisfaction to the public.

Opportunities

Digital transformation in Indonesia's public sector, particularly in national archival management, has shown significant improvements in added value, agility, oversight, accountability, and collaboration. The implementation of e-government services has successfully enhanced public service delivery. For example, the National Archives of the Republic of Indonesia (ANRI) has actively adopted digital technologies such as Artificial Intelligence (AI) to facilitate the identification, determination, and preservation of digital archives, ensuring they are accessible to the public in this era of information openness. The integration of these technologies has become a key driver in archival practices and the Archivist profession, ensuring that national archives can be efficiently managed and preserved for future generations (Adi Qumara Wahyu Sulistya et al., 2019).

Digital transformation has become inevitable for organizations and institutions, including the National Archives of the Republic of Indonesia (ANRI), to enhance the effectiveness of national archival management in Indonesia. According to a study (ANRI, 2019) by ANRI's Center for Archival Systems Research and Development, digital transformation can create a conducive environment for implementing digital archival management. In the study, ANRI, through its Deputy for Information, initiated the Outdoor Archival Laboratory (OLK) as a tool to promote digital archival transformation. This OLK functions through ANRI's research and development, particularly in addressing issues related to electronic/digital archives in the context of Industry 4.0.

Moreover, research by (Fauzi & Irvansyah, 2022) indicates that digital transformation can improve school performance in archival services, create an effective and efficient archival management system, and ensure the security of archives. In a study conducted by (Sari et al., 2023), digital transformation is defined as a process that triggers significant changes in archival systems. They emphasize that digital transformation is not only about how much an organization can benefit from information technology but also about the evolution process that makes information technology a fundamental element in organizations and everyday life.

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Research conducted by (Adi Putranto et al., 017) shows that the shift from paper-based to electronic archival management not only increases efficiency but also accuracy in data storage and retrieval. This transformation allows national archives to be more easily accessed and managed, ensuring that important information can be preserved for longer periods.

Overall, digital transformation is crucial for national archival management in Indonesia. With digital transformation, ANRI can enhance the effectiveness of archival management through the implementation of more effective and efficient digital archival management systems while ensuring the security of archives.

4. CONCLUSION

Digital transformation in the management of national archives in Indonesia has become the government's hope for realizing a more organized and utilization-oriented archival governance system. Archival digitization enables government administrative activities to be conducted electronically by utilizing information and communication technology, creating a more accessible, efficient, and integrated administrative system.

The success of the government in digital transformation in the field of archiving can have a significant impact on the progress of the Indonesian government. Effective archival digitization contributes significantly to achieving better bureaucratic reform, increasing government productivity, and ensuring more responsive and efficient public services. The success of the government in digital transformation in the field of archiving can provide substantial benefits for the progress of the Indonesian government. The implementation of an effective digital archival management system plays a crucial role in supporting better bureaucratic reform. The availability of easily accessible, managed, shared, and utilized archives will enhance government productivity and enable more responsive and effective public services.

The implementation of digital transformation in archival systems at various institutions, such as State Senior High School 1 Takengon, has shown positive outcomes, including improved archival services, more efficient management systems, and enhanced security. However, this transition also faces challenges, such as high costs, limited human resources, and the significant expense of maintaining hardware and software.

One major challenge in digital transformation is the substantial cost required for implementing digital technology in archival systems. For instance, research at State Senior High School 1 Takengon highlights the significant expenses involved in maintaining both hardware and software. Additionally, limited human resources pose another hurdle, as some staff, like the teachers at KB Tunas Mulia, lack sufficient knowledge in managing digital data and correspondence, necessitating training and support to enhance their skills.

In line with the implementation of the Electronic-Based Government System (SPBE) under Presidential Regulation No. 95 of 2018, the government has established policies aimed at creating a more organized and utilization-focused government archival management system. Digitalization of archives enables the electronic administration of government activities using information and communication technology, resulting in a more accessible, efficient, and integrated administrative system.

Overall, digital transformation has become an effective strategy for improving national archival management in Indonesia. It enhances archival management efficiency, facilitates access, improves the quality of archive management, boosts government accountability, and increases government productivity and the responsiveness and effectiveness of public services. Additionally, digital transformation ensures the availability of authentic and intact archives and

preserves historically valuable records.

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