



CHALLENGES AND OPPORTUNITIES IN LIBRARY DIGITAL TRANSFORMATION: A SYSTEMATIC REVIEW

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ABSTRACT

This research uses the Literature Review approach, aiming to analyze the challenges and opportunities in the digital transformation of libraries in order to provide strategic recommendations that support education and literacy in the digital era, as well as build human resources that are responsive to the times. Based on the findings, this study recommends improving infrastructure, enhancing staff digital competencies through continuous training, and developing user-centered digital services to strengthen the library's role in supporting education and literacy in the digital era.

INTRODUCTION

The rapid development of communication and information technology has accelerated the growth rate of digital technology, which affects almost all aspects of life, including the library world. Digital technology can change various elements of life, such as attitudes, behaviors, structures, orders, practices, values, and beliefs (Yoo & Yi, 2022). Digital transformation that occurs in various sectors, including libraries, has a significant impact on information management and access to knowledge. In Indonesia, digital transformation in libraries opens up great opportunities to improve services, facilitate access to information, and expand the scope of utilization of library resources. However, behind these opportunities, there are various challenges that must be faced, such as infrastructure renewal, digital skills development for librarians, and gaps in access to technology in some areas.

Digital transformation in the 5.0 era creates great challenges and opportunities for libraries in supporting education and access to knowledge. As seen, the development

of Society 5.0, which replaces the Industrial Revolution 4.0 has a significant impact on a country. Therefore, the Indonesian government began developing digital and information technology to take advantage of existing opportunities and conditions (Aminah & Saksono, 2021). As an information management institution, libraries have an important role in collecting, processing, and disseminating information effectively (Liodi & Marlina, 2021). However, with an increasingly digital and dynamic society, libraries must now meet the evolving needs of their users. Libraries need to adapt to technological advances through efficient management strategies so that they can provide quality services in the midst of these rapid changes (Mulyadi et al., 2019).

Library transformation, especially in higher education, is increasingly driven by technological advances that enable wider digital access. Key priorities include digitizing collections, developing digital repositories, and applying artificial intelligence and machine learning to improve the efficiency of users in finding information (Zhang et al., 2022). This change focuses not only on technology, but also on strengthening the role of librarians. Today's librarians are expected to have skills in information and communication technology and be able to act as adaptive information specialists, including in the management of social media for promotional purposes (Babieva et al., 2023). Therefore, continuous training in digital technology and information management is crucial to adapt skills to the needs of the times.

Looking at the opportunities that exist in the development of digital transformation, Indonesia has great potential, as stated in the RPJMN (Rencana Pembangunan Jangka Menengah Nasional) 2020-2024, which estimates that the contribution of the digital economy will increase from 3.17% in 2020 to 4.66% in 2024. The information and telecommunications sector, which also plays an important role in digital transformation, is expected to experience significant growth, reaching 7.54%-8.78% by 2024. The Indonesian government has allocated a considerable amount of funds, 13.4 trillion, to accelerate the digitization program, which includes vital sectors such as libraries. This digitization program provides a great opportunity to improve library services by utilizing digital technology, such as integrated library information systems, digital collections, and online services to expand access to information to the public.

The challenges faced by Indonesia in the digital transformation process are also not small. Based on the Network Readiness Index (2020), which states that Indonesia still does not have the readiness to innovate to face the digital revolution. One proof is Indonesia's ranking, which is still ranked 73 out of 139 countries. In addition, the World Digital Competitiveness Ranking (2020) data shows that Indonesia is still lagging behind ASEAN countries in terms of digital transformation. In the context of library digital transformation, these challenges are reflected in the lack of equitable digital infrastructure, limited human resources skilled in technology, as well as limited access in remote areas. While there is a great opportunity to improve library services through digitization, the success of this transformation depends largely on Indonesia's ability to address such issues, such as ensuring equitable internet access, training librarians in the use of digital technology, and updating library management systems to be more modern and efficient.

A major challenge in the digital transformation of libraries is limited resources, such as budget, facilities, and technology-savvy librarians (Nurhidayat et al., 2024). These limitations affect the library's ability to develop digital collections, update equipment, and provide training for staff. Without adequate support, it is difficult for libraries to meet the needs of digitization and deliver services that meet the expectations of modern users. According to Law No. 43 of 2007 on libraries, it is important for libraries to improve information literacy through the use of technology, to ensure accessibility and efficiency in information services (Oktavia, 2019).

While these challenges are significant, digital transformation also opens up opportunities for libraries to expand their reach and improve service quality. Digital transformation in libraries offers a number of advantages over conventional methods. One of the advantages is the availability of up-to-date information, as well as the ease and speed of accessing it. Collaboration with publishers and other institutions can enrich digital collections, while technology training for librarians allows libraries to become more modern information centers (Ruhukail & Koerniawati, 2021). In addition, libraries need to adapt to the needs of the digital native generation, who are accustomed to digital access. By presenting interactive and innovative content, libraries can remain attractive to the younger generation. Therefore, this research, using the Literature Review approach, aims to analyze the challenges and opportunities in the digital transformation

of libraries in order to provide strategic recommendations that support education and literacy in the digital era, while building human resources that are responsive to the times.

RESEARCH METHOD

This research uses a qualitative approach method, namely literature review or literature study as a data source, which means comparing and analyzing existing theories and looking for references to support the theoretical basis relevant to the problem being studied. According to Winoto & Sukaesih (2020), literature review is an activity of tracing written sources, such as books, archives, magazines, journals, and other documents related to the topic or problem discussed. Literature review is compiled systematically, explicitly, and reproducibly to identify, evaluate, and synthesize works that have been published by previous researchers or practitioners (Ulhaq & Rahmayanti, 2020).

The main purpose of the literature review is to conduct an in-depth analysis supported by theoretical foundations and concepts, which are sourced from research reports, scientific journals, academic documents, or other relevant works (Satria et al., 2021). The source of the literature search used in this study was traced through Google Scholar. The most widely used keyword is "Challenges and Opportunities in Library Digital Transformation".

Data analysis in this study was carried out through several stages of literature review, such as formulating research questions, conducting a search, identifying keywords, reviewing abstracts and articles, and documenting results as described by Demiris et al. (2019). The data obtained was analyzed using these stages to obtain conclusions that can provide ideas and in-depth descriptions of the topics studied.

RESULT

The results of the research in the form of a literature review obtained as many as 6 of literature, written in detail and can be seen in Table 1.

Table 1. Literature Analysis

Title	Analisis Tantangan dan Peluang yang Dihadapi Perpustakaan di Era Digital
1 Author	Ilhami, M Satrio Rofi Fadil, Rheina Ferina, Syifa Aulia Assabilla
Year of Publication	2024

	Research Purpose	Analyze the challenges and opportunities facing libraries in the digital era, including changes in user behavior, budget constraints, digital literacy, competition with digital platforms, and data security issues.
	Methodology	Qualitative approach with library research design
	Conclusion	The main challenge libraries face is that budget constraints prevent the procurement of technology and training needed to improve services. Opportunities in the digital era can provide wider access to information through digitizing collections and developing technology-based services.
	Title	Analisis Kebutuhan Hard Skill Pustakawan dalam Menunjang Transformasi Digital di Perpustakaan Universitas Gadjah Mada
	Author	Desy Natalia Anggorowati, Shinta Sisca Zuraida, Araf Aliwijaya Pasaribu
	Year of Publication	2024
2	Research Purpose	Describing the hard skill needs of librarians in supporting library transformation
	Methodology	Descriptive qualitative approach
	Conclusion	Ability to manage social media for promotion and interaction with users. Skills in website management and utilization of technology such as big data and AI to support research activities and publications. English language and public speaking skills also for ease of technology utilization and international cooperation.
	Title	<i>Vibes Chill</i> di Perpus : Spotify sebagai <i>Healing</i> Digital untuk gen Z
3	Author	Santi Delliana, Enjela Pratiwi, Fredi Wahyu Wasana, Erlina Kusuma Sari
	Year of Publication	2024
	Research Purpose	Knowing the benefits of songs in playlists for library users' recreational facilities

	Methodology	Qualitative approach
	Conclusion	The utilization of Spotify playlists in libraries can influence users' mood and motivation to learn. Easily accessible and engaging, Spotify can be used as a digital recreation of the library, involving interaction between users and the library
	Title	Rancang Bangun Aplikasi Berbasis Web Perpustakaan Fakultas Dakwah dan Komunikasi UINSU
	Author	Ahmad Boby Amari, Nayla Faiza
	Year of Publication	2025
	Research Purpose	Design and build a web-based library application at the Faculty of Da'wah and Communication, State Islamic University of North Sumatra (UINSU).
4	Methodology	Research and Development (R&D) with Waterfall approach
	Conclusion	This application aims to modernize the existing library system by overcoming various challenges faced by conventional libraries, such as difficulties in book search and loan data management. This application not only improves the accessibility and efficiency of library services, but also becomes a model for other faculties at UINSU in their library service modernization efforts.
	Title	Digital Library's IAIN Curup Sebagai Bentuk Transformasi Layanan di Era Pandemi Covid 19
	Author	Rhoni Rodin, Cut Afrina, Lusi Puspasari
	Year of Publication	2023
5	Research Purpose	Analyzing the utilization of IAIN Curup Digital Library as a form of service transformation in the era of the Covid 19 pandemic, in this case it will be analyzed and evaluated how the utilization and obstacles for users
	Methodology	Descriptive qualitative
	Conclusion	Digital library collections can be stored in a relatively small digital space, allowing multiple users to access the same

	collection simultaneously and from anywhere in the world, as long as they are connected to a network, allowing the storage of various types of multimedia materials, including text, images, audio, and video. However, it requires staff with specialized skills, especially in the utilization of information technology to support library operations.
Title	Optimalisasi Layanan Digital Di Perpustakaan Fakultas Tarbiyah: Studi Kasus Universitas Islam Negeri Raden Intan Lampung
Author	Rofif Hilmi Fauzan, Salsabila Sisda Elzahra, Tsamara Alya Ardama, Nabila Fitriani, Ilhami
Year of Publication	2024
Research Purpose	Analyze the condition of digital services in the Faculty of Tarbiyah Library, Raden Intan Lampung State Islamic University, identify existing challenges and opportunities, and provide strategic recommendations for service development.
6 Methodology	Case study with a qualitative approach
Conclusion	The Faculty of Tarbiyah Library does not yet have adequate digital services due to limited infrastructure, human resource competencies, and funding. On the other hand, there are great opportunities for optimization through infrastructure improvement, human resource competency development, and the application of new technologies such as artificial intelligence (AI)-based systems and mobile applications. This requires a holistic strategy that involves revamping technology, improving service quality, and intensive socialization to users.

Source: Data processed by the author (2024)

DISCUSSION

The digital transformation of libraries brings great challenges, including the need for adequate technological infrastructure, budget limitations, increasing the digital

literacy of staff and users, and competition with other digital platforms. Limited human resources competent in information technology often hinder optimal management of digital-based services (Delliana et al., 2024). In addition, there is resistance to change from employees who are accustomed to traditional use. A case study at the Library of the Faculty of Tarbiyah UIN Raden Intan Lampung revealed the limitations of the internet network, hardware, and the availability of digital collections that are not in accordance with user needs (Fauzan et al., 2024). Similarly, the experience from IAIN Curup Digital Library shows that the promotion and socialization of services is still less than optimal, despite the availability of Android-based applications (Rodin et al., 2023).

Overall, from all the notes above, the challenges in library digital transformation do not only cover technical aspects such as infrastructure and technology, but also involve organizational aspects and human resources. Resistance to change, lack of continuous training, and low promotion of digital services are obstacles that also need to be considered in the implementation of transformation. This challenge is even more complex when it occurs in areas that have a digital divide, such as between urban and rural areas, which has an impact on equal access to information (Ilhami et al., 2024).

However, despite these obstacles, the digital age also opens up significant opportunities for libraries to improve accessibility and efficiency of services. Technologies such as Online Public Access Catalogue (OPAC), cloud-based libraries, and mobile applications can overcome the limitations of physical libraries. For example, the implementation of Android-based services can facilitate user access anytime and anywhere. In addition, digital libraries allow storage of collections in electronic format, reducing physical space requirements and maintenance costs (Amari & Faiza, 2025). This supports the library in providing services that are more relevant to the needs of the modern era.

The existence of digital libraries also accelerates the transformation process of academic services. In the era of the COVID-19 pandemic, for example, digital libraries support distance learning by providing access to e-books, electronic journals, and digital repositories (Rodin et al., 2023). Research shows that digital libraries can improve information retrieval efficiency and reach users across geographies. On the other hand, the application of artificial intelligence (AI) to catalogues and search systems can help create a more personalized and relevant user experience. Thus, digital libraries are not

only information providers but also key supporters in education and research activities (Anggorowati et al., 2024).

To optimize this digital transformation, a holistic strategy is needed that includes infrastructure upgrades, digital literacy training for staff, and the development of user-based service features. Measures such as increasing curriculum-relevant digital collections, strengthening online catalogue systems, and intensive socialization to students can support more inclusive digital adaptation. Studies show that the development of library digital services, such as e-resources, online lending features, and AI-based applications, provide tangible benefits to users. Libraries must continue to innovate to remain relevant as knowledge centers in the digital era. With collaboration between library managers, users, and related parties, this digital transformation can be an important momentum to make libraries the driving force of global information literacy.

SUGGESTION

This research provides some suggestions for further development in library digital transformation. Further research can focus on measuring the effectiveness of digital library services, especially in increasing user participation and their satisfaction with the available services. In addition, comparative studies between digital libraries in different educational institutions can be conducted to identify best practices and innovations that can be widely applied. In addition, in-depth studies on the influence of technologies such as artificial intelligence (AI) and machine learning on the personalization of library services are also needed, so that services can be more relevant to user needs.

CONCLUSION

Digital transformation of libraries is an essential strategic step in responding to the needs of the digital age. Despite faces some challenging aspects such as infrastructure limitations, lack of staff digital literacy, and service promotion, the opportunities offered by technologies such as Android-based applications, and AI provide significant solutions for growth. To optimize their benefits, a concerted effort is needed to improve infrastructure, expand digital collections, and engage users through education and socialization. With a focused strategy and continuous innovation, libraries can maintain their relevance and serve as information literacy centers that support learning, research, and community service in the digital era.

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