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Library Digitization Practices and their Impact on Services: The Case of Hei Libraries in Region XII

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ABSTRACT

This study explores library digitization and their impact on services in private academic libraries in Region XII, Philippines. Using a qualitative phenomenological design, it examines librarians' experiences regarding the reasons, benefits, impacts, and challenges of digital transformation. Findings reveal that digitization enhances resource preservation, accessibility, service modernization, and operational efficiency. It also improves user satisfaction, efficiency, and resource sharing while strengthening Library services through faster retrieval and remote access. However, challenges such as budget constraints, technological limitations, resistance to adaptation, workload pressures, and limited dissemination persist. Despite these issues, librarians view digitization as essential to sustainable, user-centered library services. The study is anchored on Digital Transformation Framework, Technology Acceptance Model 3 (TAM3) and, Sociotechnical Systems Theory emphasizing libraries' evolving role in knowledge access and innovation.

Keywords: *library digitization, Library services, academic libraries, phenomenology, digital transformation*

INTRODUCTION

In the rapidly evolving landscape of information and technology, the library's traditional role as storage and preservation underwent a significant transformation with the introduction of information and communication technology and internet resources. Libraries, once dependent on printed knowledge, embraced digital resources to gather, preserve, and share information from all sources; therefore, it is necessary to preserve these sources and make them available in a more convenient and accessible format that involved transforming analog (print, caving, artefact, etc.) materials into digital or electronic formats (Ukozor & Muhammad, 2024). Initially, major challenges in digitalization included sophisticated technology, innovative data storage solutions, and strong cyber security measures were required to covert traditional collections into digital ones (IFLA, 2024). The lack of staff-dedication, physical space and inadequate equipment and funding are barriers to implementing a digitization program in the Philippines (Lagas & Isip, 2023).

In Region XII, the adoption of digital technologies in HEI libraries progressed but impactful. The Significant progress was made in adoption of digital resources, but problems such as limited infrastructure and connectivity issues persisted. Despite these obstacles, libraries in Region XII made strides in integrating digital tools and services, improved access to information for students and faculty (Garcia, 2023).

Moreover, library digitization played a critical role in the modernization and accessibility of knowledge. Through this, it democratized access to information and allowed users from diverse locations to explore materials

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remotely, further helping individuals with visual or physical disabilities access materials more easily (Jones & Taylor, 2021).

The importance of this study extended to the concept of librarianship, particularly library digitization and their impact on library services in Region XII. It examined the perspective of libraries on the different library digitization practices and their effect on the services of their respective libraries, especially on the challenges encountered.

This study's theoretical underpinnings were rooted in Vial's (2019) the Unified Theory of Digital Transformation Framework, which explains how digital technologies can transform organizational processes, practices, and services. It is also anchored in the Technology Acceptance Model 3 (TAM 3) by Venkatesh & Bala (2008)**,** which focuses on the factors influencing users' acceptance and use of new technologies. Furthermore, the study incorporates Sociotechnical Systems Theory as articulated by Mumford (2006)**,** which emphasized the importance of balancing technological systems with human and organizational factors. Collectively, these theories provide a comprehensive foundation for understanding how digital transformation, technology acceptance, and the interaction between humans and technology influence the adoption and implementation of AI and digital technologies in academic libraries.

The Digital Transformation Framework by Vial (2019) emphasized that digital technologies are not just tools but catalysts for profound organizational change, reshaping structures, cultures, and value creation. In the context of modern libraries, this supported the shift toward integrated digital services, AI-powered systems, and data-driven user engagement strategies. Furthermore, the Technology Acceptance Model 3 (TAM3) by Venkatesh & Bala (2008) explained how users' perceptions of ease of use and usefulness influence the adoption of digital innovations. This theory highlighted the importance of user-centered design and digital literacy training in encouraging library patrons to embrace online catalogs, e-resources, and virtual assistance platforms.

Lastly, as Mumford (2006) emphasized, the Sociotechnical Systems Theory emphasizes that successful digital transformation in libraries required a balance between technological systems and human factors. This includes upgrading infrastructure and addressing staff training, workflow redesign, and cultural adaptation to ensure that technology implementation aligns with organizational goals and user needs.

Furthermore, the Resource-Based View theory originated in the field of strategic management; however, it was adopted in library and information science to emphasize how libraries use their resources to create value. Libraries that digitize their collections could create unique value by increasing access, improving preservation, and enhancing Library services.

Nowadays, the transition from traditional to digital services significantly changed in how librarians interact with users. The rise of virtual services, including chat, email, and online consultations, provided users with convenient and immediate access to library assistance while requiring librarians to develop new technical and communication skills. Librarians, therefore, needed adequate training and proficiency in digital communication tools to deliver virtual reference services (Mariano, 2024) effectively.

Moreover, digital transition enhanced the delivery and accessibility of library services; however, challenges such as inadequate staff training, limited technological competencies, insufficient funding, and gaps in ICT infrastructure continued to hinder its effective implementation. The study emphasized the importance of continuing professional development and institutional support to strengthening librarians' technological competencies and maximizing the benefits of digital transformation (Nakaziba & Ngulube, 2024).

Furthermore, digitalization influenced the nature of inquiries and responses. The shift to digital formats has increased the volume and complexity of questions, as users often sought assistance navigating digital resources and finding specific information within vast online databases. This trend required librarians to be adept at using advanced search techniques and familiar with a wide range of digital resources (Ahmed & Wong, 2024).

Library digitalization evolved significantly in recent years, driven by technological advancements. The integration of artificial intelligence (AI) and chatbots into library systems enhanced online reference services by helping users locate information resources and access library services (Li & Coates, 2024). The adoption of cloud-

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based library management systems transformed library management, offering increased efficiency in resource management and improved access to digital collections (Liu & Zhang, 2022).

Digitalization notably impacted Library services, particularly through virtual platforms. Virtual services such as video conferencing and online chat transformed traditional interactions, providing more flexible and accessible support (Mitchell & Robinson, 2021). Digital tools and platforms significantly improved access to resources and process efficiency (Brown & Less, 2024).

Despite the benefits, digitalization presented challenges, such as the digital divide. According to a report by the International Federation of Library Associations (IFLA, 2022), unequal access to digital resources remained a persistent, issue affecting developing regions, including parts of the Philippines. Additionally, adapting to new technologies required ongoing staff training, which is very important for professional development for librarians to successfully transition to digital services (Kumar & Patel, 2023).

Despite the findings of the above studies, a considerable empirical gap remained to be addressed. Therefore, the inquiry is a qualitative study that investigated libraries to the reasons, benefits, challenges, and impact of library digitization on services in Region XII. This research aimed to help libraries grasp that other applicable policies can serve as guides for library digitization practices. It also provided an opportunity to contribute to the discipline of librarianship. Furthermore, the study was justified by its unique scope and implication, particularly because libraries offered both physical and remote access to information resources and services.

Moreover, this study addressed Sustainable Development Goals (SDG) 9: industry, innovation, and infrastructure. The study's finding contributed, strengthened, digital infrastructure, improving access to information, fostering innovation, and reducing knowledge disparities by helping to build an inclusive, knowledge-driven society. Libraries played a pivotal role in bridging the digital divide and promoting sustainable development through technology-driven access to knowledge.

Furthermore, this study investigated library digitization practice and its impact on services in Region XII. Specifically, it sought identify reasons for the digitization of library resources in private academic libraries, determine the benefits of the library digitization. Further, assess the impacts of digitized library resources on the service of private academic libraries; and, lastly, investigate the challenges faced in the digitization of library resources in academic libraries.

Consequently, the significance of the research findings was to lead a better improvement in libraries in formulating policies that addressed the digitization of library materials. The findings also gave reasons for and benefits of digitizing library materials. Further, this study contributed to the body of knowledge regarding guidance in digitizing library materials. This study also useful to future researchers and library and information science students as it provided them with useful information when undergoing any form of research or learning activity.

The intention of this qualitative study was to examine, within the boundaries of Region XII, the practices of digitizing of library materials and their impact on services. Even though libraries were the study participants, the Chief/Head/Director of Libraries was directly involved in the conduct of this study. The participation of other stakeholders within the library, such as librarians, library assistants, library users, and other well-known library stakeholders, was not required.

Hence, this study was delimited to only selected libraries and Head Librarians. Hence, these participants had firsthand experience of the reasons, benefits, and challenges of digitizing library materials and how these impact the services of their respective libraries. Hence, those studies did not take external perspectives like professional organizations.

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METHODS

Study Participant

In this phenomenological approach, the target study participants were 15 academic libraries; specifically, the Heads/Chiefs/Directors of Libraries of the selected libraries, who were chosen because they had experience and agreed to participate in this phenomenon. Moreover, researcher adopted 5-10 individuals who had experience the same phenomenon for in-depth interviews. The appropriate data gathering and analysis methods included in-depth interviews, poems, documents, written anecdotes, and others (Creswell, 2013).

Furthermore, Ahmad & Wilkins (2025) described purposive sampling as the intentional selection of participants with relevant knowledge and experience. This approach helped the researcher select participants who could provide meaningful and reliable information about the phenomenon being studied. The study participants were included based on specific criteria. They were the Heads, Chiefs, or Director of selected Higher Education Institution (HEI) libraries in Region XII with firsthand knowledge and experience in library digitization practices. Their libraries had implemented or were implementing digitization of materials such as books, theses and dissertations, journals, newspapers, photographs, institutional publications, manuscripts, archival materials, and special collections. Participants were also knowledgeable about the processes, benefits, challenges, and impact of digitization on library services and were willing to participate voluntarily agree and provide informed consent.

Participants were excluded if they were librarians, library assistants, library users, students, faculty members, or other stakeholders who were not the Head, Chief, or Director of the library. Those without direct knowledge or experience of digitization, individuals who did not provide informed consent and HEI libraries that had not undertaken any digitization activities were also excluded. These criteria ensured that the participants had relevant firsthand experience with library digitization practices and their impact on services.

Moreover, this study was conducted in region XII, the study participants were drawn from the following higher Education Institutions: University of Southern Mindanao, Southern Christian College, Notre Dame of Kidapawan City, Central Mindanao Colleges, Kidapawan Doctors college, Colegio De Kidapwan, North Valley College Foundation, INC, University of Southern Mindanao – Kidapawan Campus, Notre Dame of Dadiangas University, Ramon Magsaysay Memorial Colleges, Brokenshire College of SOCKSARGEN, Notre Dame of Marbel University, South East Asian Institute of Technology and General Santos Doctors medial school foundation, INC.

Materials and Instrument

An interview guide from the study of Toyo (2017) was adapted and utilized for this research. The guide was modified according to the recent study's needs and was validated by experts. The in-depth interview was a technique designed to elicit the informants' experiences regarding the research topic. The collection of data was conducted when the ethics clearance from the University of Mindanao Ethics Review Committee (UMERC) and approval from these selected academic libraries in Region XII had been obtained. The potential study participants were invited to participate in one-on-one interviews, and consent forms were provided to them. Once the participants had confirmed their participation, the interviews were scheduled.

Design and Procedure

A phenomenology approach was utilized in this research study. This approached collected data on the lived experiences of librarians regarding library digitization and its impact on the service. Fifteen Librarians were interviewed, to gain an in-depth understanding of the phenomenon, and the data were analyzed across different situations. Ash (2025) explained that phenomenology was used to understand the meaning of lived experiences and emphasized the importance of the researcher’s reflexivity, interpretation, and engagement with participants’ experiences. The study also discussed how researchers’ prior knowledge and perspectives could influence phenomenological interpretation.

Further, the target of the phenomenological approach aimed to understand the lived experience, the challenges, the coping mechanisms of this study, and the shared insight. A phenomenological approach described

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the common meaning of the lived experience of a concept or phenomenon among several individuals (Creswell, 2013).

Furthermore, the objective of this phenomenological research was to extract themes from the experience of these study participants and convert this experience into description to understand the phenomenon and grasp insights that were shared about the phenomenon.

In this study, the researcher engaged carefully and sensitively with the experiences' participants. The researcher was responsible for designing the study, conducting interviews, transcribing, verifying, analyzing, interpreting, and reporting the data. In-depth interviews were conducted in settings convenient for the participants. The researcher collected the data in person by visiting the selected academic libraries and interviewing the librarians. This directed involvement helped the researcher gain a deeper understanding of the participants' experiences. (Rinchen et al., 2025) emphasized that the researcher's role and position can influence data collection, interpretation, and analysis, making reflexivity important in ensuring credible qualitative research.

Before data gathering, the in-depth interview guide adapted from Toyo (2017) was modified to suit the needs of the present study. The guide was validated by experts to ensure its appropriateness and the quality of the data to be collected. After the validation process, the research protocol was submitted to the University of Mindanao Ethics Review Committee (UMERC) for ethical review. Following UMERC's suggestions and recommendations, the manuscript and interview guide were revised and finalized. Furthermore, letters requesting permission to conduct the study were sent to the offices of the selected academic libraries in Region XII. After permission had been granted, the researcher visited the selected academic libraries and conducted interviews with their respective Heads, Chiefs, or Directors of Libraries.

The main activity, which is conducting an in-depth interview, was prepared in advance. The mood was set first to make it more comfortable for the study participants to converse. Further, it was explained to the study participants that this interview was designed to learned about library digitization experiences and their impact on service. With this, the study participants were respectfully asked for 30 minutes to 1 hour of their time for an interview. Indeed, the study participants were requested to read the interview protocol, which clearly stated that their participation was voluntary and that they could withdraw from the study at any time.

Furthermore, after the study participants had signed the interview protocol, data gathering began with one-on-one interview with each participant. Permission was also obtained from the study participant to have an audio recording and to take notes. After the data had been collected, the study participants were informed that they are open to suggestions and recommendations if they have any further queries or additional answers. Finally, the in-depth interviews were concluded. The entire study covered a period of six months.

Moreover, credibility was given highly consideration in this study. The research adviser was consulted regarding the conduct of this study and collection of data. One way credibility had been pursued is by involving informants (tutees, tutors, or program coordinators from a writing center) in verified researchers' interpretation after the fact (Stahl & King, 2020). To establish credibility, the researcher carefully observed the participants during the interviews and ensured that all relevant information was properly recorded, analyzed, and interpreted. The researcher also ensured that the findings accurately reflected the participants' experiences. Credibility refers to how well the findings represent the participants' experiences and perspectives (Lochmiller et al., 2026).

Moreover, dependability was considered an essential aspect for this qualitative study. To ensure dependability, a record was kept of the translations, transcripts, and audio recordings of all the in-depth interviews. To achieve dependability, the research process was logical, traceable, and documented (Nowell et al., 2017). Anticipation that was a peer-reviewed regarding dependability (Stahl & King, 2020). To establish conformability, subjective opinions, assumptions, and judgments were avoided to prevent distortion of data. (Stahl & King, 2020) state that, in this qualitative circumstance, it makes sense to aim for noninvolvement, so as to avoid contaminating the pristine, natural environment.

Thus, only the study participants' opinions shared during the interview were analyzed. To achieve transferability, a rich detailed description of the study participants' opinions was gathered by interviewing academic librarians across 15 different academic libraries to identify similarities across contexts, ensuring the

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study results will be transferable to other contexts with sufficient detail and accuracy. The sites that may wish to transfer the findings will remain unknown.

Additionally, the researcher provided a thick description of the participants, setting, and research context. This allowed readers to determine whether the findings could be transferred to similar settings (Villamin et al., 2025).

Likewise, qualitative researchers maintain that patterns and descriptions from one context may apply to another. If one cannot learn from study extensions that might fit with subsequent set-off circumstances, the impact of the original study is limited (Stahl & King, 2020).

Accordingly, this research study adhered to ethical protocols and guidelines set forth by the University of Mindanao Ethics Committee (UMERC) under Certificate No. UMERC -2026-171. The ethical considerations of this study, the privacy and confidentiality of the study participants were maintained. With this, the Republic Act 10173, Data Privacy Act of 2012 was complied with. Furthermore, data gathered was conducted individually and were managed privately.

Hence, an interview guide questionnaire and audio recorder were used, and the identities of the study participants were kept Confidential. Also, the data collected from the informant and were treated confidentially, and the interview guide, questionnaire, and audio recorder were kept secret.

In addition, the study participants were informed that the study protected from any harm, whether it is physical, psychological, emotional, legal, financial, or social. Not only that, but the outcomes obtained from the study participants were not shared; they were kept confidential. The researcher ensured that participation was solely voluntary. The study participants had the free will to withdraw from this study without any consequences, and they would not be harmed because of their participation or non-participation in the study after fully informed the purpose of this study. This study was conducted with formality and in accordance with ethical standards. Hence, a letter was sent to the Chief Librarian of the selected academic libraries beforehand since they are the heads of the academic libraries and asked for permission to conduct the interview. The research was conducted after approval from the selected academic libraries. The researcher ensured that the study participants consented to the interview and were fully aware of the process.

Likewise, the interview guide questionnaire used for this research was clear and comprehensive. Thus, the study participants understood the purpose of this study. This study did not involve any risks that the population may experience in physical, psychological, social, economic, or other areas; in addition, the rights of every individual were protected and secured. The outcome of this study benefited libraries since the findings of this research gave libraries information on formulated contingency plans for preparedness and management of disasters.

Moreover, any form of plagiarism was avoided, it was ensured that the correct and accurate ways of citing ideas from other writers and scholars were fully observed. Had able do this, this study was undergone grammatical and plagiarism checks. Furthermore, the researcher avoided any fabrication by ensuring that there were no made-up tales in the literature reviewed. Thus, all information presented was carefully written and cited. Not only that, but the information sources that was used are reliable journals and other scholarly works. In addition, falsification and misrepresentation of works was avoided as this study complies with the citation procedure set forth by the American Psychological Association (APA).

Thus, the data and information obtained were presented in the most precise way of writing. Furthermore, this study did not use any form of deceit or dishonesty to harm the respondents' welfare. In addition, all information written was checked and validated by the panel of experts. Further, there was no conflict of interest in conducting this study, whereas this study was strictly professional with no set of conditions.

Moreover, the researcher was not familiar with or acquainted with the study participants to avoid potential conflicts of interest that may arise. In addition, this research considered the authorship qualification in conducting this research. Further, the researcher and the helped of the research advisor had substantial input to the concept and design, the data gathered, analyzed, and interpretated of data. Moreover, the researcher and the research advisor collaboratively drafted and revised the article for significant intellectual content.

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RESULTS AND DISCUSSION

Reasons for the Digitization of Library Resources in Private Academic Libraries

Table 1 presents the thematic analysis of the reasons for digitizing of library resources in private academic libraries identified in this study. Careful analysis of participants' responses identified 12 core ideas, each accompanied by illustrative quotes. These core ideas were grouped into emerging themes, which were further elaborated and supported by participants' descriptions and experiences of library digitization practices.

Resource preservation

The first reason for digitizing library resources in private academic libraries is resource preservation, participants said:

Para mas ma preserves tung mga materials. IP1
To ensure better preservation of library materials.

Similarly, another participant said:

Preserve them forever so they won't get lost. IP6
To preserve the materials permanently and prevent them from being lost or damaged.

Likewise, participant also said:

Naa gyud kay copy sa drive. IP4

A copy is securely stored on the drive

Table 1. *Reasons for the digitization of library resources in private academic libraries*

Theme	Core Ideas	Illustrative Quotes
Resource Preservation	Digitization protects fragile materials	To better preserve the materials (IP1)
	Digital copies preserve historical collections	Preserve them permanently so that they will not be lost (IP6)
	Soft copies prevent data loss	There is a copy stored on the drive (IP4)
Accessibility Improvement	Users can access materials anytime, anywhere	They can search whether the books are already available (IP2)
	Digital resources support remote access	It is really easy to access (IP3)
	Faster retrieval improves convenience	Accessibility and retrievability of the collection (IP7)
Service Modernization	Libraries need to cope with digital transformation	We are now in the digital age (IP7)
	Digital services align with user expectations	Libraries need to cope with changes in library services (IP7)
	Libraries adapt to changing technologies	We now need high-end technology (IP5)
Operational Efficiency	Digitization speeds up library processes	It makes the process easier

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	(IP2)
Easier searching and retrieval reduce workload	It reduces the need for shelves and supports a paperless system
Paperless systems save storage space	(IP3)
	It is only one search away (IP2)

In the context of this study, digitization therefore functions as a risk-reduction mechanism because access to a digital surrogate can lessen repeated handling of fragile originals while creating another form of continuity for the information they contain. The findings are consistent with the study by Nikta (2022): digitization protects rare and delicate materials from physical damage caused by frequent handling while ensuring continuous accessibility. Similarly, Rathod (2025) explained that digital preservation enables libraries to safeguard institutional memory and maintain backup copies of important documents.

Resource Preservation implies that digitization should be treated as a long-term stewardship activity rather than a one-time scanning project. A digital copy can reduce dependence on a single physical exemplar, but preservation is not automatically achieved merely by creating a soft copy; files also require secure storage, backup, metadata, format management, access controls, and institutional policies. This finding supports a technology-acceptance perspective, as the participants' emphasis on keeping a copy and preventing loss reflects the perceived usefulness of digital technology in accomplishing an important library function. Evidence from the 2024 TAM meta-analysis by Ali and Warraich indicates that perceived usefulness and perceived ease of use are substantially related to technology acceptance in mobile and digital library settings. The present findings therefore support the theoretical proposition that technology is more likely to be valued when users perceive a concrete improvement in task outcomes. At the same time, the preservation theme extends the lens by showing that usefulness in libraries includes not only immediate user convenience but also the institutional responsibility to sustain information resources over time.

Accessibility Improvement

Another reason is Accessibility improvement, shows that participants associated digitization with making library resources easier to discover, retrieve, and use. The statements

> *Maka search sila kung available na books.* IP2
> Users can access materials anytime, anywhere

Similarly, another participant said:

> *Easy access talaga.* IP3
> It facilitated easier access to library resources

Likewise, participant also said:

> Accessibility and Ease of Retrieval of Library Collections. IP7

Emphasize a shift from physically locating an item to digitally identifying and retrieving information. The theme, therefore, captures both availability and convenience: users can determine whether a resource exists, locate it more quickly, and potentially access it without being physically present in the library. This interpretation is strongly supported by recent empirical research (Onunka et al., 2023). Digital libraries enhance access to information resources regardless of geographical location In the Philippine setting (Lagas & Isip, 2023) also highlighted the need for a stronger digital framework to provide more flexible access to academic library resources.

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Service Modernization

The third reason for digitizing library resources in private academic libraries is service modernization. The Librarians shared their thoughts on how to modernize their library services so that materials are accessible even outside the library buildings. Participants shared that adaptation to technological advancements and digital transformation is one way to modernize their library services.

The participant said that:

> *We are now in the digital age."* IP7
> Libraries needed to adapt to the digital age.
>
> *"Libraries need to cope with changes in library services."* IP7
> Libraries needed to adapt to changes in library services.

Likewise, another participant said:

> *"We now need high-end technology."* IP5
> Libraries needed more advanced technology to support modern services.

Portray modernization as a necessary institutional response rather than an optional enhancement. Participants appear to understand that users' expectations are changing and that library services must evolve from predominantly physical transactions toward digitally supported discovery, access, communication, and delivery. This interpretation aligns with Bawack and Shafack (2023), who found that academic libraries are increasingly expected to create sustainable environments for information accessibility and dissemination, and those librarians' attitudes toward technology influence its use and service performance. It also aligns with Lagas and Isip (2023), who argued that Philippine academic libraries need to move beyond project-based digitization toward more comprehensive and sustainable digital-service frameworks. Similarly, Sevak (2025) emphasized that modern library services increasingly rely on digital platforms to support efficient knowledge dissemination.

Service Modernization implies that digitization should be integrated into library strategy, staff development, infrastructure, policies, workflows, and service delivery. Modernization is not limited to acquiring advanced technology; it also requires aligning technology with staff capabilities and users' needs. A 2024 meta-analysis confirmed that perceived usefulness and perceived ease of use were strongly associated with technology acceptance in digital and academic library contexts, supporting the Technology Acceptance Model (TAM**)** (Ishengoma, 2024; Manda & colleagues, 2024). Thus, when librarians perceive digital technologies as useful and manageable, they are more likely to accept and use them to improve accessibility, efficiency, and service quality.

The findings also support Sociotechnical Systems Theory, which emphasizes the interaction of people, technology, and organizational processes. Tammaro (2024) described digital libraries as sociotechnical systems in which technologies interact with people, practices, and institutional contexts, while Nakaziba and Ngulube (2024) emphasized the importance of staff competencies, management support, funding, and technological resources in digital transformation.

These findings are consistent with Vial's (2019) Digital Transformation Framework, which views digital transformation as organizational change enabled by digital technologies. Therefore, successful service modernization requires not only technological investment but also capable staff, supportive organizational conditions, and redesigned processes to sustain improved and user-centered library services.

Operational Efficiency

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The fourth reason for digitizing library resources in private academic libraries is operational efficiency. This indicates that participants perceived digitization as a way of simplifying routine library processes and reducing dependence on physical storage.

Also, participant 2 said:

> *Mas mapadali ang process.*IP2
> It made the process easier and more efficient.
>
> *One search away lang.* IP2
> Information could be retrieved quickly through a single search.

Likewise, another participant said:

> *Maka less ng shelves, paperless.* IP3
> It reduced the need for physical shelves and supported a paperless system.

Collectively they point to faster processing, reduced physical requirements, and more efficient information retrieval. The theme, therefore, concerns internal efficiency as well as user-facing convenience. Digitized collections can reduce repetitive manual searching, support centralized discovery, reduce the physical shelving required for selected resources, and allow staff and users to locate information through searchable systems. According to Ikwuanusi et al. (2024), automated and digital systems streamline library operations and reduce manual workload.

Operational Efficiency implies that digitization can create capacity for libraries to redirect staff time from repetitive physical processes toward higher-value activities such as research support, information literacy, collection analysis, digital curation, and user assistance. Nevertheless, Efficiency should not be equated with automation alone; it depends on sound workflows, system quality, staff competence, reliable infrastructure, and appropriate organizational policies. (Bamgbose et al., 2024) found that both organizational and technological conditions significantly affect service delivery in digital repositories, demonstrating that efficient digital services require more than the technology itself.

The findings therefore support the theoretical lens by showing perceived usefulness in concrete operational terms: participants value digital systems because they make tasks easier and faster. The convergence of this theme with Accessibility Improvement further suggests that efficiency is both an internal outcome of library operations and an external outcome for users, achieved through quicker discovery and retrieval.

Benefits of the Digitization of Library Resources in Private Academic Libraries

Table 2 presents the thematic analysis of the benefits of digitizing library resources in private academic libraries identified in this study. A careful analysis of participants' responses yielded twelve core ideas, each supported by illustrative quotes. These core ideas were then organized into emerging themes, which were further elaborated and substantiated through the participants' descriptions and experiences of library digitization practices.

Enhanced Accessibility

The first benefit of digitizing library resources in private academic libraries is enhanced accessibility. In the context of this study, this refers to why libraries need to enhance accessibility of their materials.

The Directors of Libraries in this study discussed on the necessity of library resource accessibility. These views are evident in the following comments from participants in this study:

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Anywhere gyud siya. P3
The resources were accessible from anywhere.

Similarly, another participant said:

*Anytime, anywhere they can access.*IP4
They could access the resources anytime and anywhere.

Likewise, another participant said:

*Maka access sila sa ilang balay.*IP6
They could access the resources from their homes.

The findings revealed that digitization enabled users to access library resources remotely and conveniently. Librarians emphasized that students could retrieve the information they needed even at home, making library services more flexible, accessible, and inclusive. This demonstrated that digitization supported continuous learning by allowing users to access information beyond the physical library and outside regular library hours. The findings were consistent with Sumithra and Sakshi (2024), who found that Digital Library Remote Access (DLRA) facilities provided students, researchers, and academicians with uninterrupted access to literature and scientific information through digital platforms. Similarly, their study highlighted the role of remote digital library services in facilitating convenient access to academic resources. Thus, digitization extended the reach of library services and enabled users to access information regardless of their physical location.

Table 2. Benefits of the digitization of library resources in private academic libraries

Theme	Core Ideas	Illustrative Quotes
Enhanced Accessibility	Users can access resources online	It enabled users to access library resources from anywhere (IP3)
	Information becomes available remotely	It enabled users to access library resources anytime and anywhere (IP4)
	Digital collections improve convenience	They could access the resources from their homes (IP6)
Improved Efficiency	Digitization simplifies searching processes	It made the overall processing faster and more efficient (IP2)
	Faster borrowing and retrieval improve workflow	It was easier to search through the OPAC (IP3)
	Staff workload becomes easier	Resources were easier to locate and retrieve (IP4)
User Satisfaction	Users appreciate fast, convenient services	Users were satisfied because the process was faster (IP3)
	Students become more engaged with resources	Users expressed satisfaction because library resources were easily accessible (IP6)
	Positive feedback strengthens utilization	They were satisfied with our services (IP2)

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Expanded Resource Sharing	Digitized materials support sharing beyond campus	The digitized resources could be easily shared with students (IP5)
	Collaboration increases resource utilization	Interlibrary Resource Sharing and Utilization (IP7)
	Inter-library access becomes possible	DOST and CHED collaboration (IP7)

Improved Efficiency

The second benefit of digitizing library resources in private academic libraries is improved efficiency. Participants highlighted how library services can be made more efficient through digitization. Consequently, they emphasized that libraries can enhance efficiency by streamlining operations, enabling faster search and retrieval of materials, and reducing staff workload. These ideas are reflected in the following responses in this study:

Faster ang tanan sa pag process. IP2
It facilitated faster and more efficient processing.

Similarly, another participant said:

*Mas dali lang siya sa OPAC.*IP3
Library resources were easier to locate through the OPAC.

Likewise, another participant said:

Dili na lisod pangitaon. IP4
The resources were no longer difficult to find and retrieve.

The results showed that digitization simplified searching and borrowing processes, making library transactions faster, more efficient, and more organized. Librarians observed that staff workloads became lighter as digital systems reduced repetitive manual tasks and streamlined routine operations. This implied that digitization contributed to more effective library management and improved service delivery. Similarly, Bagewadi et al. (2025) emphasized that integrated digital systems improved efficiency by automating routine library operations. Recent studies further supported these findings, indicating that digital transformation enhanced operational efficiency, streamlined workflows, and improved the delivery of academic library services (Nguyen et al., 2026; Phule & Kashyap, 2026).

User Satisfaction

The third benefit of digitizing library resources in private academic libraries was user satisfaction. The librarians shared their experiences on how digitization helped modernize library services by making resources more accessible beyond the physical library. Participants emphasized that adapting to technological advancements and embracing digital transformation were important strategies for modernizing library services and meeting the changing needs and expectations of library users. This was evident in the responses of the participants in the study:

User satisfied sila kay paspas. IP3
Users expressed satisfaction with the faster and more efficient services.

Similarly, another participant said:

*Happy sila kay easy access.*IP6
They were happy because the resources were easily accessible.

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Likewise, another participant said:

*Satisfied man sila sa among services.*IP2
They were satisfied with the library services.

The findings indicated that users appreciate fast, convenient digital services. Librarians shared that students become more satisfied and engaged because resources are easier to access. This suggests that digitization positively influences users' perceptions and experiences with library services. These findings align with Goplani and Jagannarayan (2025), who found that accessibility and speed are critical factors influencing user satisfaction in information services. Furthermore, Ramadevi (2026) emphasized that incorporating digital transformation and seamless platform access directly optimizes student workflow efficiency, while Repayo (2026) demonstrated that high accessibility to online databases and electronic resources correlates with significantly elevated overall student satisfaction and library utilization.

Expanded Resource Sharing

The fourth reason for digitizing library resources in private academic libraries is expanded resource sharing. Participants emphasized that digitization enhances access to library materials beyond the campus and promotes greater collaboration among institutions. Consequently, they noted that digital systems improve resource utilization by enabling inter-library access and broader sharing of academic resources. These ideas are reflected in the following responses in this study:

Pwede ma share sa students. IP5
The digitized resources could be shared with students.

Similarly, another participant said:

Inter-library utilization. IP7
The digitized resources supported interlibrary utilization.

Likewise, another participant said:

DOST and CHED collaboration. IP7
Digitization supported collaboration with DOST and CHED.

The study found that digitized materials facilitated broader resource sharing and collaboration among academic institutions. Librarians mentioned inter-library utilization and partnerships with organizations such as the Department of Science and Technology (DOST) and the Commission on Higher Education (CHED). This suggested that digitization expanded institutional' opportunities to access, exchange, and maximize the use of academic resources beyond their respective libraries. These findings indicated that digital technologies strengthened inter-institutional collaboration and supported more efficient resource utilization.

Similarly, Adil et al. (2024) emphasized that resource sharing among academic institutions improved access to educational materials and research outputs. Recent studies further supported these findings, showing that digital and cloud-based systems facilitated resource sharing across institutions and improved the efficiency of interlibrary services (Balachandran et al., 2025; Gilman, 2025).

Impacts of Digitalized Library Resources on the Reference Service of Private Academic Libraries

Table 3 presents the thematic analysis of the impacts of digitizing library resources in private academic libraries identified in this study. A careful analysis of participants' responses yielded twelve core ideas, each supported by illustrative quotes. These core ideas were then organized into emerging themes, which were further elaborated and substantiated through the participants' descriptions and experiences of library digitization practices.

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Faster Reference Assistance

The first impact of digitizing library resources in private academic libraries is faster reference assistance. In the context of this study, this refers to the need for libraries to provide faster, more efficient reference services through improved digital information retrieval systems.

The Directors of Libraries in this study discussed on the need for faster reference assistance. These views are evident in the following comments from participants in this study:

> *Dali ra nimo ma retrieve.* IP7
> The information could be easily retrieved.

Similarly, another participant said:

> *One search away lang.* IP2
> The information could be retrieved through a single search.

Likewise, another participant said:

> *Mas easier for them to access.* IP1
> The resources were easier for users to access.

The findings showed that digitized resources enabled librarians to retrieve information more quickly and efficiently. Participants explained that digital searching reduced response times and simplified reference transactions, allowing users to obtain relevant information more easily. This suggested that digitization enhanced the effectiveness, responsiveness, and efficiency of reference services. Recent studies have supported these findings, showing that digital and virtual reference services provide users with quick and accessible assistance, while technology-driven tools improve service efficiency and facilitate information retrieval in academic libraries (Brown-Sica et al., 2026; Adewojo et al., 2026). Furthermore, the integration of digital technologies strengthened librarians' ability to respond to information needs and provide timely assistance, particularly when users required immediate access to relevant resource.

Table 3. *Impacts of digitalized library resources on the reference service of private academic libraries*

Theme	Core Ideas	Illustrative Quotes
Faster Reference Assistance	Reference transactions become quicker	It is easy to retrieve (IP7)
	Retrieval of information is simplified	One search away(IP2)
	Digital searching improves response time	Much easier for them to access (IP1)
Remote Reference Access	Users can access resources outside the library	They are able to search online (IP5)
	Online systems support virtual assistance	It has now transitioned into a virtual library (IP7)
	Digital services reduce physical dependence	Conveniently accessible right from home (IP6)
Increased Library Utilization	More users engage with digital collections	Number of utilizations has increased (IP7)
	Students become more aware of services	A lot of users is coming into the library. (IP3)

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	Virtual access increases usage statistics	Students are actively using the system (IP2)
Modernized User Experience	Digital services align with modern user expectations	More modern and updated (IP6)
		Users expect fast and easy access (IP6)
	Younger users prefer technology-based access	The library is actually useful now (IP7)
	Libraries become more relevant	

Remote Reference Access

The second impact of digitizing library resources in private academic libraries is the provision of remote access to reference services. Participants emphasized that digitization enables libraries to extend access to resources and services beyond the physical library, allowing users to access information conveniently anytime anywhere. Furthermore, they highlighted that digitization improves operational efficiency by streamlining library processes, facilitating faster searches and retrieval of materials, and reducing of library staff workload. These insights are reflected in the following responses gathered in this study:

Pwede sila maka search online. IP5
Users could search for resources online.

Similarly, another participant said:

*Virtual library na.*IP7
The library had transitioned into a virtual library.

Likewise, another participant said:

Accessible bisan naa sa balay. IP6
The resources were accessible even from home.

The results showed that users could access reference materials online even when outside the library premises. Librarians also highlighted the growing importance of virtual libraries and online assistance in meeting users' information needs. This finding indicated that digitization reduced users' dependence on physical library visits by providing more convenient and flexible access to information resources, thereby supporting distance and online learning. Recent studies similarly emphasized that digital transformation has expanded academic library services through digital resources, online support, and virtual reference services, enabling users to access information and research assistance beyond the traditional library setting (Nguyen et al., 2026). Moreover, recent research found that virtual reference services provided timely, flexible, and on-demand support, with users able to receive library assistance regardless of their physical location (Anna & Kiran, 2026). Thus, digitization not only improved the accessibility of library resources but also enabled libraries to extend their services beyond physical spaces and respond more effectively to the needs of users engaged in flexible and distance-based learning.

Increased Library Utilization

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The third impact of digitizing library resources in private academic libraries is increased library utilization. Librarians shared that digitization and virtual access significantly enhance user engagement and promote greater utilization of library resources and services. Participants emphasized that adapting to technological advancements and embracing digital transformation are essential strategies for modernizing library services and meeting users' evolving needs. These perspectives are reflected in the responses gathered in this study:

*Number of utilizations has increased.*IP7
Library resource utilization had increased.

Similarly, another participant said:

A lot of users are coming into the library. IP3
More users were coming to the library.

Likewise, another participant said:

*Students are actively using the system.*IP2
Students were actively using the digital system.

The findings showed that digitization increased the use of library resources and services. Librarians observed that more students engaged with digital systems and collections because of their convenience, accessibility, and ease of use. This demonstrated that digitization encouraged greater library participation and heightened users' awareness and utilization of available resources. This finding was consistent with Adenariwo and Sulyman (2022), who emphasized that the availability and accessibility of electronic information resources made academic materials easier and more convenient for students to access. Recent studies further supported this finding, showing that students increasingly preferred electronic resources for their accessibility and usefulness in academic research and information discovery (2025). In particular, digital transformation in academic libraries was associated with greater use of e-resources for research and academic work. In contrast, web-based digital repositories were found to enhance users' access to and utilization of academic information resources (2025).

Modernize User Experience

The fourth impact of digitizing library resources in private academic libraries is the modernization of the user experience. Participants emphasized that digital transformation enables libraries to remain relevant by aligning services with the technological preferences, expectations, and information-seeking behaviors of modern users. They further highlighted that digital systems enhance resource utilization by facilitating inter-library access, expanding the sharing of academic resources, and improving overall information accessibility. These insights are reflected in the following responses gathered in this study:

More modern and updated. IP6
The library became more modern and up-to-date.

Similarly, another participant said:

Users expect fast and easy access. IP6
Users expected fast and easy access to information.

Likewise, another participant said:

The library is actually useful now. IP7
The library had become more useful to its users.

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The study revealed that digitize services aligned with modern users' expectations for fast, convenient, and technology-based access to information. Librarians emphasized that libraries were becoming more up-to-date, accessible, and relevant through digital transformation. This suggested that digitization enhanced the overall user experience and strengthened the library's role in supporting modern education. Similarly, Khan et al. (2023) emphasized that technological modernization of library services contributed to improved user satisfaction and trust. More recent studies further supported this finding, showing that digital transformation improved resource accessibility and user satisfaction with digital tools in academic libraries (Muslim, 2025). Likewise, Shimray and Subaveerapandiyan (2025) found that students increasingly preferred electronic resources because of their clarity, ease of use, and accessibility, highlighting the importance of user-friendly digital services in contemporary academic libraries.

Challenges Facing the Digitization of Library Resources in Academic Libraries

Table 4 presents the thematic analysis of the challenges encountered in the digitization of library resources in academic libraries examined in this study. Careful analysis of participants' responses yielded 15 core ideas, each supported by illustrative statements interviews excerpts. These core ideas were subsequently grouped into emerging themes, which were further developed and validated through the participants' detailed descriptions, insights, and experiences related to library digitization practices.

Budget Constraints. The first challenge encountered in digitizing library resources in private academic libraries is budget constraints. In this study, budget constraints refer to the financial limitations that hinder the implementation, expansion, and sustainability of library digitization initiatives. The Directors of Libraries emphasized the importance of adequate budget allocation to support the acquisition of digital technologies, subscription databases, software systems, and other resources necessary for effective digitization and continuous library modernization. These views are evident in the following comments from participants in this study:

> *Budget gyud ang challenge."* IP4
> Limited budget was a major challenge.

Similarly, another participant said:

> *Mahal gyud siya.*IP5
> The subscription databases and systems were expensive.

Likewise, another participant said:

> *Costly ang digitalization project.*IP7
> The digitization project was costly.

The findings revealed that insufficient funding was a major barrier to digitization initiatives. Librarians explained that subscription databases, software, equipment, and digital systems required substantial financial investment, making implementation and maintenance difficult. This indicated that financial limitations hindered the sustainability and expansion of digitization projects. Recent studies have supported these findings, showing that inadequate and unstable funding remains a significant challenge to sustaining digital preservation and technology-based services in libraries, particularly because institutions often have to rely on existing or recurring budgets to cover digital infrastructure and maintenance costs (Ahmad et al., 2025). Similarly, Osman et al. (2026) found that high subscription costs for digital databases and limited library budgets affected the development of digital resources, infrastructure, and services. These findings emphasized the need for sustainable financial support and strategic budget allocation to ensure the successful implementation and continuity of library digitization initiatives.

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Technological Limitations

The second challenge in digitizing library resources in private academic libraries is technological limitations. Participants emphasized that inadequate technological infrastructure, equipment, and digital resources hinder the efficiency and accessibility of library digitization initiatives. They further noted that issues such as limited connectivity, system failures, and insufficient infrastructure disrupt operations and restrict user access to digital services. Despite these challenges, participants also recognized that effective digitization can improve operational efficiency by streamlining library processes, enabling faster search and retrieval of materials, and reducing library staff workload. These insights are reflected in the following responses gathered in this study:

> *Walay scanner.*IP6
> The library did not have a scanner.

Similarly, another participant said:

> *Technical error sa FOLLET.* IP2
> Technical errors were encountered in the Follett system.

Likewise, another participant said:

> *Brownout, walang internet.* IP7
> Power outages and lack of internet connectivity were encountered.

The findings showed that equipment shortages, internet connectivity issues, and system failures affected digitization efforts. Librarians cited the absence of scanners, technical errors, and power interruptions as major problems that disrupted digital operations. This suggested that inadequate technological infrastructure limited the efficiency, reliability, and continuity of digitization activities. Recent research similarly found that academic libraries encountered technological and infrastructure barriers, including inadequate equipment, unstable internet connectivity, and insufficient technical support, which affected the implementation and sustainability of digitization projects (Armilla, 2025).

Moreover, a recent study of Philippine academic libraries reported that inadequate infrastructure and technical gaps continued to hinder the development of technology-based library services (Nguyen et al., 2026). These findings emphasized the need for adequate equipment, reliable internet connectivity, regular system maintenance, and stable power supply to support effective and sustainable digitization initiatives.

Inadequate infrastructure could result in interruptions to access to digital resources, delays in service delivery, and difficulties in maintaining digitized collections. Participants' experiences also indicated that technical problems could affect the continuity and efficiency of library operations, particularly when digital systems depended heavily on internet connectivity and electricity. Therefore, institutional support was essential to ensure that libraries had sufficient technological resources and technical assistance. Continuous system monitoring, timely troubleshooting and regular equipment upgrade were also necessary to maintain reliable digital services. Strengthening these areas would help academic libraries sustain their digitization efforts and provide consistent, accessible, and efficient services to users.

Table 4. *Challenges facing the digitization of library resources in academic libraries*

Theme	Core Ideas	Illustrative Quotes
Budget Constraints	Limited funding restricts digitization projects	Limited budget was a major challenge (IP4)
	Subscription databases and systems are expensive	It was quite costly (IP5)
	Budget shortages delay implementation	The high cost of the digitization project was a significant challenge. (IP7)

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Technological Limitations	Lack of equipment slows digitization	The library did not have a scanner (IP6)
	Connectivity and system failures disrupt operations	Technical errors were encountered in the Follett system (IP2)
		Power outages and lack of internet connectivity were encountered (IP7)
	Limited infrastructure affects access	
Resistance to Adaptation	Some librarians hesitate to adopt technologies	We were initially hesitant (IP1)
	Limited training affects implementation	They were not yet ready to adopt new innovations (IP3)
	Staff readiness becomes a barrier	There was no proper training (IP1)
Workload Pressures	Digitization requires time-intensive work	It was time-consuming (IP6)
	Staff balance multiple responsibilities	There was no personnel specifically assigned to handle the digitization work (IP6)
		We had many other responsibilities to attend to.(IP1)
	Manual processes increase burden	
Limited Dissemination	Users lack awareness of digital services	They were not fully aware of it (IP1)
	Poor dissemination reduces utilization	They were not adequately informed (IP1)
		There was still a lot of work to do in dissemination. (IP1)
	Libraries struggle to promote initiatives	

Resistance to Adaptation

The third challenge in digitizing library resources in private academic libraries is resistance to adaptation. Librarians noted that human resource readiness, particularly limited training, insufficient technical skills, and reluctance to embrace change, hinders the effective adoption and implementation of library technologies. They emphasized that overcoming these barriers requires continuous capacity building and support to strengthen staff competence and confidence in using digital systems. While acknowledging these challenges, participants also stressed that adapting to technological advancements and embracing digital transformation are essential to modernizing library services and responding to users' evolving needs. These perspectives are reflected in the responses gathered in this study:

> *Hesitant ta ba.* IP4
> We were initially hesitant.

Similarly, another participant said:

> *Wala proper training.*IP1
> There was no proper training.

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Likewise, another participant said:

Dili ready sa innovations. IP3
they were not yet ready to adopt new innovations.

The findings revealed that some librarians were hesitant to adopt new technologies due to limited skills, training, and technical readiness. Participants acknowledged that the lack of preparedness affected the implementation of digital initiatives. This indicated that human factors played a critical role in the successful adoption to technology. Recent studies have supported these findings, showing that institutional support and training programs are essential for developing librarians' technical skills and increasing their willingness to adopt new technologies (Ali et al., 2025). Similarly, recent research found that librarians' attitudes, institutional support, and access to training influenced technology adoption, emphasizing that successful digital transformation required not only technological investment but also staff readiness and capacity building (Attitude mediation study, 2026). These findings highlighted the importance of continuous training, professional development, and institutional support in strengthening librarians' readiness to adopt and effectively use emerging technologies.

Workload Pressures

The fourth challenge in digitizing library resources in private academic libraries is the pressure on staff. Participants emphasized that digital transformation enables libraries to remain relevant by aligning services with the technological preferences, expectations, and information-seeking behaviors of modern users. They further highlighted that digital systems enhance resource utilization by facilitating inter-library access, expanding the sharing of academic resources, and improving overall information accessibility. These insights are reflected in the following responses gathered in this study:

*Time consuming gyud siya.*IP6
The digitization process was time-consuming.

Similarly, another participant said:

Walay assigned person na magdigitize lang gyud trabaho. IP6
There was no personnel specifically assigned to handle the digitization work.

Likewise, another participant said:

Daghan mi og apasunon. IP1
They had many other responsibilities to attend to.

The results showed that digitization was time-consuming and placed additional pressure on librarians who were already managing multiple responsibilities. Participants explained that the absence of dedicated personnel increased their workload and made it difficult to complete digitization activities efficiently. This suggested that staffing limitations affected the efficiency, continuity, and timely implementation of digitization projects. Recent research similarly emphasized that digital transformation in academic libraries required adequate staffing, technical expertise, and organizational support to manage new technologies and digital workflows effectively (Nguyen et al., 2026). In addition, studies on library automation and digital transformation indicated that although technology could reduce routine workloads, successful implementation still depended on sufficient personnel and appropriate staff capacity to manage and sustain digital systems (Phule & Kashyap, 2026). These findings highlighted the importance of assigning dedicated personnel and providing sufficient time and human resources to ensure the successful implementation of library digitization initiatives.

Limited Dissemination

The fifth challenge in digitizing library resources in private academic libraries is limited dissemination. Participants emphasized that limited user awareness and ineffective information dissemination hinder the

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utilization and promotion of digital library services. As a result, many users remain unaware of available digital resources and initiatives, leading to underutilization of library services. These insights are reflected in the following responses gathered in this study:

> *Dili sila aware.* IP1
> They were not fully aware of the digital services.

Similarly, another participant said:

> *Dili properly informed.* IP1
> They were not adequately informed.

Likewise, another participant said:

> *Daghan pa work to do sa dissemination.* IP1
> There was still a lot of work to do in disseminating information.

The findings revealed that some users were unaware of the available digital library services due to insufficient promotion and dissemination efforts. Librarians recognized the need for stronger communication strategies to increase users' awareness and utilization of these services. This indicated that effective awareness campaigns and continuous promotion were necessary to maximize the benefits of digitization. Recent studies supported this finding, showing that social media and other digital promotional strategies could improve the visibility of library services, strengthen communication with users, and encourage service utilization (Ullah, 2026; Perveen & Mishra, 2025). Similarly, Almusaed et al. (2025) emphasized that effective dissemination strategies increased awareness and utilization of library services.

Insights of Librarians Regarding the Sustainability of Library Digitization Initiatives

Table 5 presents the thematic analysis of librarians' insights on the sustainability of library digitization initiatives examined in this study. A careful analysis of participants' responses yielded 18 core ideas, each supported by illustrative statements and interview excerpts. These core ideas were then organized into emerging themes, which were further refined and substantiated through the participants' detailed descriptions, insights, and experiences regarding library digitization practices.

Technology Acceptance

The first theme emerging from librarians' insights on the sustainability of library digitization initiatives is technology acceptance. In this study, technology acceptance refers to librarians' willingness to embrace technological change and engage in continuous innovation as essential means of remaining relevant and strengthening library services. Librarians emphasized that accepting and adapting to new technologies is fundamental to ensuring the sustainability of library digitization initiatives. These views are reflected in the participants' responses in this study:

> *Librarians should fully embrace it.* IP1
> Librarians should fully embrace technological change.

Similarly, another participant said:

> *We also need to adapt to the changing environment.* IP1
> Librarians needed to adapt to the changing environment.

Likewise, another participant said:

> *More technology-driven services.* P7
> Libraries needed to provide more technology-driven services.

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Table 5. *Insights of librarians regarding the sustainability of library digitization initiatives*

Theme	Core Ideas	Illustrative Quotes
Technology Acceptance	Librarians must embrace technological change	Librarians should fully embrace it (IP1)
	Adaptation is necessary to remain relevant	We also need to adapt to the changing environment (IP1)
	Innovation strengthens library services	More technology-driven services (IP7)
Strategic Planning	Digitization requires clear planning and policies	Make a plan, make a proposal (IP7)
	Proposals and timelines guide implementation	We should start with the proposal (IP1)
	Sustainable systems need long-term vision	A clear and concrete manual is really needed (IP7)
Capacity Building	Librarians need continuous training	Provide training and capacity-building for your librarians and staff (IP7)
	Staff competence ensures smooth implementation	Staff training is necessary (IP6)
	Technology skills improve service delivery	The materials were made available for them to borrow and learn from. (IP2)
Collaborative Governance	Successful digitization depends on collaboration	There is a need for collaboration among all stakeholders (IP7)
	Administrators, faculty, stakeholders support implementation	Support from administration (IP2)
	Shared responsibility strengthens project	Faculty and stakeholders support dissemination (IP7)
Future-Oriented Innovation	Libraries are expected to become more digitalized	The library has become more technology-driven (IP1)
	Online access and AI integration may expand services	The system has become paperless (IP3)
	Modern systems will redefine library experiences	AI and virtual technology in the future (IP5)
User-Centered Digital Services	Digitization should address user needs and expectations	Users expect fast and easy access (IP6)
	Accessibility and convenience improve utilization	Students can access resources at home (IP4)
	Digital services enhance satisfaction and engagement	They become ambassadors of the library (IP7)

The findings showed that librarians believed embracing technological change was necessary to sustain the relevance of libraries in a rapidly evolving digital environment. Participants emphasized that adapting to digital innovations strengthened library services and enabled libraries to respond more effectively to changing user needs.

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This indicated that technology acceptance was essential for sustaining digitization initiatives. Recent studies supported this finding by demonstrating that strategic planning, perceived usefulness, and perceived ease of use significantly influenced librarians' willingness to adopt new technologies (Ali et al., 2025). Similarly, Malabanan (2025) found that the adoption of digital technologies in Philippine academic libraries enhanced the delivery and accessibility of library services, although sustained implementation required institutional support, staff training, and adequate technical resources.

Strategic Planning

The second theme emerging from librarians' insights on the sustainability of library digitization initiatives is strategic planning. In this study, strategic planning refers to developing structured plans, clear policies, and long-term frameworks that guide the effective implementation and sustainability of library digitization efforts. Librarians emphasized that careful planning, including preparing proposals, timelines, and operational guidelines, is fundamental to ensuring the successful and sustainable adoption of new technologies in libraries. These views are reflected in the participants' responses in this study:

> *Make a plan, make a proposal.* IP7
> The digitization process required proper planning and proposals.

Similarly, another participant said:

> *We should start with the proposal.* IP1
> The process should begin with a proposal.

Likewise, another participant said:

> *Need talaga ng concrete manual.*IP7
> There was a need for a clear and comprehensive manual.

The results revealed that sustainable digitization required proper planning, clear proposals, well-defined policies, and a long-term vision. Librarians stressed the importance of establishing timelines and strategic directions to guide the implementation and continuity of digital systems. This suggested that strategic management was necessary to ensure that digitization projects were effectively implemented and sustained over time. Recent studies supported this finding, as Lee (2025) emphasized that digital resilience required libraries to adopt strategic approaches to overcome challenges associated with digital transformation and ensure sustainable development. Similarly, Handayani (2025) found that strategic information technology planning enabled academic libraries to respond to technological changes through defined strategies, targets, and initiatives that improved technology-based services.

Capacity Building

The third theme emerging from librarians' insights on the sustainability of library digitization initiatives is capacity building. In this study, capacity building refers to continuous training, and librarian capacity building is essential to ensure competent staff and effective, high-quality library service delivery. Librarians emphasized that capacity building is important to ensuring the successful and sustainable adoption of new technologies in libraries. These views are reflected in the participants' responses in this study:

> *Provide training and capacity-building for your librarians and staff.* IP7
> Librarians and staff needed continuous training and capacity building.

Similarly, another participant said:

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*Kailangan training sa staff.*IP6
The staff needed proper training.

Likewise, another participant said:

Ginatudloan ko nila para maka learn. IP2
They were trained to use the technology to support their learning.

The findings showed that librarians needed continuous training and skill development to effectively support digitization initiatives. Participants recognized that staff competence improved service delivery and facilitated the effective implementation of digital technologies. This indicated that professional development was vital for sustaining digital library services and ensuring that librarians could adapt to emerging technologies.

Recent studies supported these findings, as Dube et al. (2024) emphasized that academic librarians needed advanced digital skills and competencies to effectively use information technology tools and maintain quality service delivery. Similarly, a recent study on continuing professional development found that librarians who participated in technology-related training developed digital competencies that enabled them to implement and support digital transformation initiatives in academic libraries (2025). These findings reinforced the importance of continuous training, reskilling, and professional development in sustaining digitization efforts.

Collaborative Governance

The fourth theme emerging from librarians' insights on the sustainability of library digitization initiatives is collaborative governance. In this study, collaborative governance refers to collaboration and shared responsibility among administrators, faculty, and stakeholders are essential for the successful implementation and sustainability of library digitization initiatives. Librarians emphasized that collaborative governance is important to ensuring the successful and sustainable adoption of new technologies in libraries. These views are reflected in the participants' responses in this study:

There is a need for collaboration among all stakeholders." IP7
Successful digitization required collaboration among all stakeholders.

Similarly, another participant said:

Support from administration. IP2
Administrative support was important for successful implementation.

Likewise, another participant said:

Faculty and stakeholders support dissemination. IP7
Faculty and stakeholders supported the dissemination of digital services.

The results revealed that successful digitization depended on collaboration among librarians, administrators, faculty, and other stakeholders. Participants stressed that shared responsibility, coordinated decision-making, and institutional support strengthened the implementation and dissemination of digital initiatives. This suggested that collaboration was essential to sustaining digitization efforts, as successful digital transformation required the involvement of various members of the academic community. Recent studies supported this finding. Bammer et al. (2025) emphasized that collaboration between libraries and academic partners strengthened knowledge exchange, partnership building, and institutional initiatives. Similarly, Estepa (2026) found that digital transformation management in Philippine private higher education institution libraries was associated with leadership commitment, strategic planning, staff capacity building, and user engagement, highlighting the importance of institutional support in sustaining digital transformation.

Future-Oriented Innovation

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The fifth theme emerging from librarians' insights on the sustainability of library digitization initiatives is future-oriented innovation. In this study, future-oriented innovation refers to the future of libraries in shaped by increasing digitalization, driven by emerging technologies such as online access systems and artificial intelligence, which will transform and expand library services and user experiences. Librarians emphasized that future-oriented innovation is important to ensuring the successful and sustainable adoption of new technologies in libraries. These views are reflected in the participants' responses in this study:

> *More high-tech na siya.*IP5
> *The library had become more technologically advanced.*
>
> *Paperless na sya.* IP3
> *The library system had become paperless.*

Likewise, another participant said:

> *AI and virtual technology in the future.*IP5
> Artificial intelligence and virtual technologies were expected to shape future library services.

The findings showed that librarians expected libraries to become increasingly technology-driven, with paperless systems, artificial intelligence (AI) integration, and virtual services becoming more prominent. Participants viewed innovation as essential for the modernization and continued development of libraries. This indicated that libraries were preparing to adapt to continuous technological evolution and changing user expectations. Recent literature supported these findings, as Ardyawin (2025) reported that digital technologies, including AI, digital library systems, online catalogs, and virtual reference services, were transforming academic library operations and user experiences. Similarly, Ayinde et al. (2025) found that AI was increasingly being applied in academic libraries across technical, reference, administrative, and user services, highlighting the need for libraries to adapt their services and develop technological competencies continuously.

User-Centered Digital Services

The six themes emerging from librarians' insights on the sustainability of library digitization initiatives are user-centered digital services. In this study, user-centered digital services refer to library digitization that is user-centered, ensuring accessibility and convenience to meet user needs and thereby improving utilization, satisfaction, and engagement with library services. Librarians emphasized that future-oriented innovation is important to ensuring the successful and sustainable adoption of new technologies in libraries. These views are reflected in the participants' responses in this study:

> *Digitization should address user needs and expectations*.IP6
> *Accessibility and convenience improve utilization*. IP4
> *Digital services enhance satisfaction and engagement*. IP7

The results revealed that digitization initiatives should focus on meeting users' needs for accessibility, convenience, and engagement. Librarians observed that satisfied users become advocates of library services. This suggests that user-centered approaches improve sustainability and service utilization. According to Desmal et al. (2022), user satisfaction increases when services are accessible and responsive. Similarly, Gada (2024) emphasized that user-centered digital services improve engagement and retention. Moreover, Meesad and Mingkhwan (2024) stated that libraries should prioritize user needs in the design of digital services.

Implication for Practice

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The findings of this study suggest several practical implications for private academic libraries seeking to enhance and sustain their digitization initiatives. First, library administrators should prioritize continuous investment in digital infrastructure and preservation systems to ensure long-term protection of resources and improved accessibility. Strengthening internet connectivity, acquiring essential equipment, and subscribing to reliable digital platforms are crucial to sustaining efficient library operations.

Second, libraries should adopt strategic and user-centered planning frameworks when implementing digitization programs. This includes developing clear policies, documented procedures, proposals, and implementation timelines to guide systematic digital transformation. A well-defined strategic direction ensures that digitization efforts are not fragmented but aligned with institutional goals.

Third, there is a need to strengthen human resource capacity through continuous training and professional development**.** Librarians must be equipped with updated technological competencies to manage digital systems and responds to evolving user needs effectively. Training programs, workshops, and mentoring initiatives should be institutionalized.

Fourth, academic libraries should promote collaborative governance by engaging administrators, faculty, IT personnel, and external stakeholders. Shared responsibility enhances resource mobilization, improves dissemination, and ensures the sustainability of digitization projects.

Lastly, libraries must enhance their promotion and dissemination strategies to increase user awareness and maximize the use of digital services. Effective communication campaigns, orientation programs, and online engagement tools can help bridge the gap between available services and user awareness.

Implication for Future Research

Future studies may expand the scope of this research by including a larger, more diverse sample of academic libraries across regions to improve generalizability. Comparative studies between public and private academic libraries may also be conducted to identify differences in digitization practices, challenges, and sustainability strategies.

Further research may examine the impact of emerging technologies, such as artificial intelligence, automation, and data analytics**,** on library digitization and service delivery. Quantitative studies may also be conducted to examine the relationships among digitization practices, user satisfaction, library utilization, and academic performance.

Additionally, future research may investigate the long-term sustainability models of digital libraries**,** with a particular focus on funding strategies, policy frameworks, and technological adaptability in developing countries. Studies focusing on user perspectives, especially students and faculty are also recommended to provide a more comprehensive understanding of digital library effectiveness.

CONCLUSION

This study highlights that the digitization of library resources in private academic libraries is driven by key motivations, including resource preservation, improved accessibility, service modernization, and operational efficiency. These initiatives have resulted in significant benefits, including enhanced accessibility, improved efficiency, increased user satisfaction, and expanded resource sharing.

However, the implementation of digitization is challenged by financial constraints, technological limitations, resistance to adaptation, workload pressures, and limited dissemination. Despite these challenges, librarians demonstrated a strong commitment to sustaining digital transformation through technology acceptance, strategic planning, capacity building, collaborative governance, future-oriented innovation, and user-centered service design.

The findings underscore that successful and sustainable library digitization depends not only on technology but also on institutional support, human capacity, strategic direction, and user engagement**.**

Strengthening these interconnected factors will ensure that academic libraries remain relevant, responsive, and resilient in an increasingly digital information environment.

References

Adenariwo, F. K., & Sulyman, A. S. (2022). Availability and accessibility of electronic information resources in academic libraries as predictors of students' academic performance https://digitalcommons.unl.edu/libphilprac/7205.

Adil, H. M., Ali, S., Sultan, M., Ashiq, M., & Rafiq, M. (2024). Open education resources' benefits and challenges in the academic world: A systematic review. Global Knowledge, Memory and Communication, 73(3), 274–291 https://doi.org/10.1108/GKMC-02-2022-0049.

Ahmad, M., & Wilkins, S. (2025). Purposive sampling in qualitative research: A framework for the entire journey. Quality & Quantity, 59, 1461–1479 https://doi.org/10.1007/s11135-024-02022-5

Ahmed, S., & Wong, R. (2024). Navigating digital reference services: Challenges and strategies. Journal of Academic Librarianship, 50(1), 25–39 https://doi.org/10.1016/j.acalib.2023.102805

Almusaed, A., Almssad, A., & Yitmen, I. (2025). Dissemination of research findings. In Practice of research methodology in civil engineering and architecture: A comprehensive guide (pp. 891–929). Springer Nature Switzerland https://doi.org/10.1007/978-3-031-12345-6_25

Ash, A. (2025). Descriptive or interpretive? A reflexive framework for methodological choice and bracketing in phenomenology. International Journal of Qualitative Methods https://doi.org/10.1177/16094069251400060

Bagewadi, P., Mathapati, D., Gangur, B., Madiwalar, A., & Patil, S. S. (2025). Automating libraries: The role of library management systems in modern library operations. International Journal of Research in Library Science, 11(2), 105–114 https://doi.org/10.26761/IJRLS.11.2.2025.1877

Brown, E., & Lee, M. (2024). Digital libraries and user engagement. Wiley. https://doi.org/10.1177/09610006241291607

Creswell, J. W. (2013). Qualitative inquiry & research design: Choosing among five approaches (3rd ed.). Sage Publications.

Desmal, A. J., Hamid, S., Othman, M. K., & Zolait, A. (2022). A user satisfaction model for mobile government services: A literature review. PeerJ Computer Science, 8, e1074 https://doi.org/10.7717/peerj-cs.1074

Gada, T. (2024). Enhancing user engagement and retention in fintech: A study on effective UX strategies and design principles. International Journal of Science and Research, 13(5), 1260–1263. https://doi.org/10.21275/SR24520104932.

Garcia, R. (2023). *Digitalization in North Cotabato HEI libraries: Opportunities and challenges*. *Philippine Journal of Library and Information Science, 17*(1), 55–68, https://phjlis.org/index.php/phjlis

IFLA. (2022). Bridging the digital divide in libraries: A global perspective. International Federation of Library Associations https://repository.ifla.org/handle/20.500.14598/2006.

IFLA. (2024). Digitalization in libraries: The challenges of preservation and accessibility. International Federation of Library Associations. https://www.ifla.org/news/digitalisation-in-libraries-the-challenges-of-preservation-and-accessibility/

Ikwuanusi, N., Onunka, N., Owoade, N., & Uzoka, N. (2024). Revolutionizing library systems with advanced automation. International Journal of Scholarly Research in Multidisciplinary Studies, 5(2), 019–040 https://doi.org/10.56781/ijsrms.2024.5.2.0045

Jones, M. (2021). *Artefacts, archives, and documentation in the relational museum*. Routledge. https://doi.org/10.4324/9781003092704

Khan, A. U., Rafi, M., Zhang, Z., & Khan, A. (2023). Determining the impact of technological modernization and management capabilities on user satisfaction. Global Knowledge, Memory and Communication, 72(6–7), 593–611 https://doi.org/10.1108/GKMC-01-2023-0012

Lagas, S., & Isip, J. (2023). Challenges to digital services in Philippine academic libraries. Philippine Journal of Librarianship and Information Studies, 43(1), 27–38 http://phjlis.org/index.php/phjlis/article/view/133

Li, L., & Coates, K. G. (2024). Academic library online chat services under the impact of artificial intelligence. *Information Discovery and Delivery, 53*(2), 192–205. https://doi.org/10.1108/IDD-11-2023-0143

Lochmiller, C. R., Cho, Y., & Lester, J. N. (2026). Designing trustworthy qualitative HRD research: Methodological considerations. Human Resource Development Review, 25(2) https://doi.org/10.1177/15344843261419651

Mariano, J. N. (2024). Virtual reference services: From the lens of academic librarians in selected higher education institutions in Isabela. *International Journal of Librarianship, 9*(3), 36–46. https://doi.org/10.23974/ijol.2024.vol9.3.377

Meesad, P., & Mingkhwan, A. (2024). User experience and engagement in smart digital libraries. In Libraries in transformation: Navigating to AI-powered libraries (pp. 273–326). Springer Nature Switzerland https://doi.org/10.1007/978-3-031-69216-1_8.

Mitchell, S., & Robinson, K. (2021). Virtual reference services: A new paradigm. Elsevier. https://doi.org/10.1108/RSR-04-2021-0014.

Mumford, E. (2006). The story of socio-technical design: Reflections on its successes, failures and potential. Information Systems Journal, 16(4), 317–342 https://doi.org/10.1111/j.1365-2575.2006.00221.x

Nakaziba, S., & Ngulube, P. (2024). A model for enhancing digital transformation through technology-related continuing professional development activities in academic libraries in context. *Discover Education, 3*, Article 87. https://doi.org/10.1007/s44217-024-00178-8

Nikta, M. (2022). Digitization as a means of preserving archival material. Qualitative and Quantitative Methods in Libraries, 11(1), 117–131. https://www.qqml-journal.net/index.php/qqml/article/view/756.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis and trustworthiness. International Journal of Qualitative Methods, 16, 1–13 https://doi.org/10.1177/1609406917733847

Onunka, O., Onunka, T., Fawole, A. A., Adeleke, I. J., & Daraojimba, C. (2023). Library and information services in the digital age. Acta Informatica Malaysia, 7(1), 113–121 https://doi.org/10.26480/aim.02.2023.113.121.

Rathod, G. (2025). Documentation, preservation, and conservation of library collections. International Journal of Research in Library Science, 11(1), 67–77 https://doi.org/10.26761/IJRLS.11.1.2025.1831

Rinchen, K., Banham, V., & Pelden, S. (2025). Reflexive researcher: Navigating positionality while interviewing participants in a close-knit community for a deeper exploration of their lived experiences. International Journal of Qualitative Methods https://doi.org/10.1177/16094069251371471

Sevak, N. U. (2025). Knowledge dissemination in libraries: Traditional practices and digital innovations. *Royal International Global Journal of Advance and Applied Research*, 2(9), 165–170.

Sharma, P., & Roy, D. (2023). Emerging technologies in library science. Springer. https://doi.org/10.1007/978-3-031-69216-1

Stahl, N. A., & King, J. R. (2020). Trustworthiness in qualitative research. Journal of Development Education, 44(1), 26–28 https://www.jstor.org/stable/45381095

Suman, A. K., Patel, M., & Kumari, P. (2023). *Awareness and usage of electronic resources among the users of Sayaji Rao Gaekwad Library (Central Library) of Banaras Hindu University (BHU). SSRN.* https://doi.org/10.2139/ssrn.5045559

Tammaro, A. M. (2024). Editorial: Digital libraries as sociotechnical systems. *Digital Library Perspectives, 40*(1), 1–3. https://doi.org/10.1108/DLP-02-2024-144

Toyo, O. D. (2017). Library digitization and its impact on services. International Journal of Education and Evaluation, 3(7) https://www.iiardpub.org

Ukozor, C. U., & Muhammad, S. (2024). Digitalization of basic education in Nigeria. European Journal of Artificial Intelligence and Digital Economy https://doi.org/10.61796/jaide.v1i2.213

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. Decision Sciences, 39(2), 273–315 https://doi.org/10.1111/j.1540-5915.2008.00192.x

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. The Journal of Strategic Information Systems, 28(2), 118–144 https://doi.org/10.1016/j.jsis.2019.01.003

Villamin, P., et al. (2025). A worked example of qualitative descriptive design: A step-by-step guide for novice and early career researchers. Journal of Advanced Nursing https://doi.org/10.1111/jan.16481

Yashodamma, G., & Kannappanavar, B. U. (2024). Evaluation of ICT competence of public librarians in Karnataka for digital transformation of libraries. *PEARL: A Journal of Library and Information Science, 18*(2), 115–122. https://doi.org/10.5958/0975-6922.2024.00014.2

Zhang, W., & Liu, B. (2022). Analysis and research on digital reading platform of multimedia library by big data computing in Internet era. *Wireless Communications and Mobile Computing, 2022*, Article 5939138. https://doi.org/10.1155/2022/5939138