

Artificial Intelligence Self-Efficacy: A Study of Academic Librarians

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Abstract

Artificial Intelligence (AI) is considered as one of the important change agents in academic libraries owing to their role in managing information, offering digital services, and boosting engagement of users. In this study, the objective is to examine the level of AI self-efficacy amongst academic librarians and influence of AI self-efficacy on AI adoption, professional competency, and digital transformation in academic libraries. The quantitative cross-sectional research approach has been used in which a questionnaire-based method has been followed for the purpose of data collection among 250 academic librarians from public and private universities. The statistical tests, including descriptive statistics, Pearson correlation, and multiple regressions, were performed on the data. The findings have shown that the total score of AI self-efficacy is 4.08/5.00 and the total score of AI adoption is 3.97/5.00. The correlation test has shown a strong positive relationship between AI self-efficacy and AI adoption ($r=0.746$, $p<0.001$), professional competency ($r=0.711$), service innovation ($r=0.695$), and digital transformation ($r=0.758$). The findings from regression analysis revealed that the self-efficacy of AI had considerable influence on digital transformation where the value of R^2 was estimated at 0.521, which implies that 52.1% of the changes in the use of AI can be accounted for by AI self-efficacy. Out of all the perceived benefits of the use of AI, the rapid access to the required information was reported by 85.6% of the respondents, whereas improvements in users' services were reported by 80.4%. However, not having enough AI training (68.0%), no technological knowledge (64.8%), and insufficient financing (61.6%) emerged as the primary barriers to implementation.

Keywords: Artificial Intelligence; Self-Efficacy; Academic Librarians; Digital Libraries; AI Adoption; Information Services; Digital Transformation; Library Technology.

1. Introduction

Through the application of AI technology, contemporary information systems have been changed significantly due to the modification of processes used in libraries for collecting, organizing, searching for, and disseminating information (Mah & Groß, 2024). Academic libraries are widely applying AI-based systems like intelligent search engines, automatic cataloging, recommendation systems, virtual reference assistance, software for plagiarism detection, and predictive analysis software in order to improve their service delivery and increase effectiveness of operations. As the process of digital

transformation is taking place in higher education institutions, the role of academic librarians requires gaining competencies to apply AI technologies in teaching, learning, and research. Thus, AI self-efficacy becomes an essential factor affecting the adoption of artificial intelligence technologies by librarians (Mah & Groß, 2024).

AI self-efficacy refers to a personal confidence in understanding, learning, and using AI technologies for performing tasks associated with professional work (Andersdotter, 2023). According to Social Cognitive Theory, people with high self-efficacy are characterized by such qualities as motivation, adaptability, persistence, and receptiveness to technological changes in new technological environment. In the case of academic libraries, librarians with high levels of AI self-efficacy tend to adopt intelligent information systems, participate in professional development regarding AI technologies, and provide innovative digital services to patrons of libraries (Neog & Ghatowar, 2024).

The recent advances in such domains as generative AI, machine learning, and knowledge management systems have made it necessary for academic librarians to perform new roles beyond the scope of information management. Academic librarians should now provide patron assistance with respect to AI-enabled literature searching, research data management, information literacy, academic integrity, and responsible application of AI technologies. All this necessitates continuous learning and the development of advanced digital competencies. Therefore, it becomes important to conduct an assessment of librarians' confidence in utilizing AI technologies in order to evaluate the degree of readiness for digital transformation at an institution (Wang & Chuang, 2024).

Although there have been growing academic interests in the adoption of AI technologies by higher education institutions, there is little research conducted in terms of AI self-efficacy of academic librarians, particularly those working in developing countries where there are severe technological, digital and institutional imbalances. Understanding the key determinants of AI self-efficacy would be helpful for the universities to design professional development programs as well as to foster technology adoption and digital library services (Fitriana, 2025).

1.1 Research Gap

Although previous studies have examined artificial intelligence adoption, AI literacy, and technology acceptance in higher education, limited empirical research has specifically investigated AI self-efficacy among academic librarians in Pakistan. Existing studies primarily focus on faculty members, students, or organizational technology adoption while overlooking librarians' confidence in using AI for library services. Furthermore, little evidence exists regarding the relationship between AI self-efficacy, professional competence, service innovation, and digital transformation in academic libraries. This study addresses these gaps by providing empirical evidence from Pakistani universities.

1.2 Problem Statement

Artificial intelligence is increasingly transforming academic libraries by improving information retrieval, digital reference services, and knowledge management. Despite these advancements, many academic librarians lack sufficient confidence and

competence to effectively adopt AI technologies in their professional activities. Limited AI training, inadequate institutional support, and insufficient technological readiness hinder successful AI implementation in many universities. Moreover, empirical evidence regarding AI self-efficacy among academic librarians in Pakistan remains scarce. Consequently, there is a need to investigate how AI self-efficacy influences AI adoption, professional competence, service innovation, and digital transformation within academic libraries.

1.3 Research Objectives

1. To assess the level of Artificial Intelligence self-efficacy among academic librarians.
2. To examine the relationship between AI self-efficacy and the adoption of AI technologies in academic libraries.
3. To evaluate the influence of AI self-efficacy on librarians' professional competence and service innovation.

1.4 Research Questions

The study seeks to answer the following research questions:

1. What is the level of Artificial Intelligence self-efficacy among academic librarians?
2. Is there a significant relationship between AI self-efficacy and the adoption of AI technologies in academic libraries?
3. How does AI self-efficacy influence librarians' professional competence and service innovation?

1.5 Significance of the Study

Through this study, we hope to advance the existing research on AI adoption in academic libraries through the analysis of the self-efficacy of academic librarians with respect to AI tools. The results obtained will be useful in helping university authorities understand how to invest in and enhance digital library services through institutional support in terms of building up AI infrastructure. It will help library management develop professional development programs for librarians to build their confidence and skills in using AI in information organization, references services, research support, and knowledge management (Rodríguez-Ruiz et al., 2025).

For academic librarians, the results will be helpful in understanding what influences their self-efficacy with AI technologies and motivate their continuing professional development in new technologies (Yakubu et al., 2023). For higher education policy makers, the study will contribute evidence for creating AI competency frameworks, digital literacy initiatives, and technology adoption policies for the modern academic libraries. This study will also contribute to the academic literature by advancing the existing research on the self-efficacy of AI within the discipline of library and information sciences, thus paving the way for future research in artificial intelligence, digital transformation, technology acceptance, and innovation in academic libraries (Özbay, 2026).

2. Literature Review

Mah and Groß (2024) have analyzed the AI integration among higher education faculty through the investigation of AI usage, self-efficacy, professional development, and

technology acceptance. Thus, the research findings have shown that people having greater self-efficacy with regard to AI were much more ready to implement AI-based technologies in their academic and professional work. In addition, the researchers have found several types of user profiles based on AI proficiency; thus, being confident about one's AI knowledge positively affected technology implementation, innovation and learning processes. The authors stated that the implementation of structured professional development could be used to increase AI self-efficacy and digital transformation readiness at the institutional level. This way, AI self-efficacy can contribute to librarians' readiness to implement intelligent library services in their practice.

Hu et al. (2024) have studied the impact of AI learning companions on the improvement of information literacy and self-regulation in academic libraries. The findings have shown that AI-supported learning could help significantly in improving the students' skills of information retrieving, their ability to learn independently and digital literacy skills. Thus, the findings have shown that academic libraries become an environment where AI-based technologies can provide an educational benefit. At this point, librarians should have necessary skills and AI knowledge for supporting the users' needs.

Bellibaş et al. (2026) assessed the correlation between AI literacy, leadership self-efficacy, and technology acceptance based on Technology Acceptance Model. It was found out that AI literacy has a positive effect on self-efficacy; in turn, increased self-efficacy leads to improved perceived usefulness and ease of use and behavioral intention toward the use of AI technologies. The research highlights the importance of having confidence in AI technologies for technology success. The findings are helpful to academic libraries in terms of successful implementation of intelligent information systems and digital services through AI literacy of librarians.

The study by Khan (2024) assessed the influence of artificial intelligence, self-efficacy, and user engagement in relation to religious tourism. The findings indicate that AI self-efficacy contributes to confidence, satisfaction, engagement, and acceptance of AI-enabled services. Users who have higher confidence in AI technology tend to be more engaged and perceive services of higher quality. Although the research was conducted outside the library environment, it also emphasizes the significance of AI self-efficacy in promoting technology acceptance.

In their pilot study on awareness about AI, Harisanty et al. (2024) explored the awareness of artificial intelligence among library leadership, practitioners, and scholars. The results revealed growing awareness of AI applications within the library services such as cataloging, information searching, digital repository, and reference service. Nonetheless, the study revealed the existence of considerable knowledge deficits, poor experience, and inadequate training in using AI among the majority of library professionals. It is important to emphasize that developing librarians' AI competence through continuous education is very important to boost their confidence and implement AI successfully in academic libraries.

Falebita and Kok (2025) constructed a structural equation model to explore the relationship between technological readiness, self-efficacy in using AI, attitude and

usage of AI tools. The results of this study revealed the positive impact of technological readiness on self-efficacy in the use of AI, as well as significant role of self-efficacy in forming a positive attitude towards adopting the technology and its effective use. The conclusion of the study reveals that the development of technological competence and confidence is very important for sustainable AI adoption in educational organizations. In her recent study, Andersdotter (2023) examined the skills and knowledge acquisition of AI through collaborative learning circles in the profession of library and information services. Therefore, the study indicated that training programs are essential to increase self-efficacy and prepare librarians for digital libraries in the future.

Oran (2023) conducted a review on the empirical evidence concerning the effect of artificial intelligence in education and self-efficacy beliefs. Consistently, the study found that AI literacy, technological competency, and professional development had a positive impact on self-efficacy and resulted in more technology adoption, better performance in instruction, and innovations. Thus, the researcher concluded that self-efficacy is a mediating variable between AI knowledge and technology integration. This review suggests that improvement of AI self-efficacy among academic librarians can help improve the digital service delivery of higher education institutions.

3. Research Methodology

In this study, a quantitative research design was used to examine the Artificial Intelligence (AI) self-efficacy of academic librarians and their effect on the adoption of AI technology, professional competence, innovation in service delivery, and digital transformation within academic libraries (Hajizadeh et al., 2025). The study was based on the positivist research philosophy since it involved the use of statistical measures to determine the relationship among the predefined variables. Deductive research design was used in the study because the hypotheses tested in this study were derived from the Social Cognitive Theory and the Technology Acceptance Model (Hussein Ramadan Atta et al., 2025).

The study population consisted of academic librarians in both public and private universities. From the population of 25 universities, 250 respondents were selected using stratified random sampling (Hajizadeh et al., 2026). The target population consisted of academic librarians working in public and private Higher Education Commission (HEC) recognized universities located in Punjab, Sindh, Khyber Pakhtunkhwa, and Islamabad Capital Territory, Pakistan. A stratified random sampling technique was employed. The questionnaire was adapted from previous validated studies on AI self-efficacy and technology acceptance, particularly Mah and Groß (2024), Harisanty et al. (2024), and Falebita and Kok (2025). Minor modifications were made to suit the context of academic libraries in Pakistan. Universities were first divided into public and private strata. Academic librarians were then randomly selected from each stratum to ensure proportional representation. These librarians are directly involved in information management, digital library services, research support, and technology-based library operations. The primary data for the study was collected using a structured questionnaire comprising five sections. Frequency counts, percentages, mean and standard deviations were used to provide a description of the variables under investigation. Pearson correlation analysis and multiple regression analysis were used

to investigate the relationship between the variables and the effect of AI self-efficacy on AI adoption, professional competence, innovation in services and digital transformation readiness respectively (Rasheed & Ahmed, 2024).

Ethical Considerations

Ethical approval was obtained before data collection. Participation was voluntary, and informed consent was obtained from all respondents. Participants were assured that their identities would remain anonymous and confidential. Data were used solely for academic purposes, and respondents were free to withdraw at any stage without any consequences.

4. Results and Analysis

Table 4.1 Demographic Profile of Respondents (n = 250)

Variable	Category	Frequency	Percentage (%)
Gender	Male	142	56.8
	Female	108	43.2
Age	25–35 Years	78	31.2
	36–45 Years	102	40.8
	Above 45 Years	70	28.0
Institution	Public University	145	58.0
	Private University	105	42.0

This section presents the demographic characteristics of the respondents. Variables including gender, age, educational qualification, institutional affiliation, and professional experience were analyzed to understand the background profile of academic librarians participating in the study. These characteristics provide an overview of the sample and improve the interpretation of subsequent statistical findings

Table 4.2 Artificial Intelligence Self-Efficacy among Academic Librarians

AI Self-Efficacy Indicator	Mean	SD
Ability to use AI tools	4.18	0.58
Confidence in learning new AI applications	4.11	0.63
Solving work problems using AI	4.03	0.67
Understanding AI technologies	3.98	0.65
Overall AI Self-Efficacy	4.08	0.61

The results indicate that academic librarians possess relatively high AI self-efficacy.

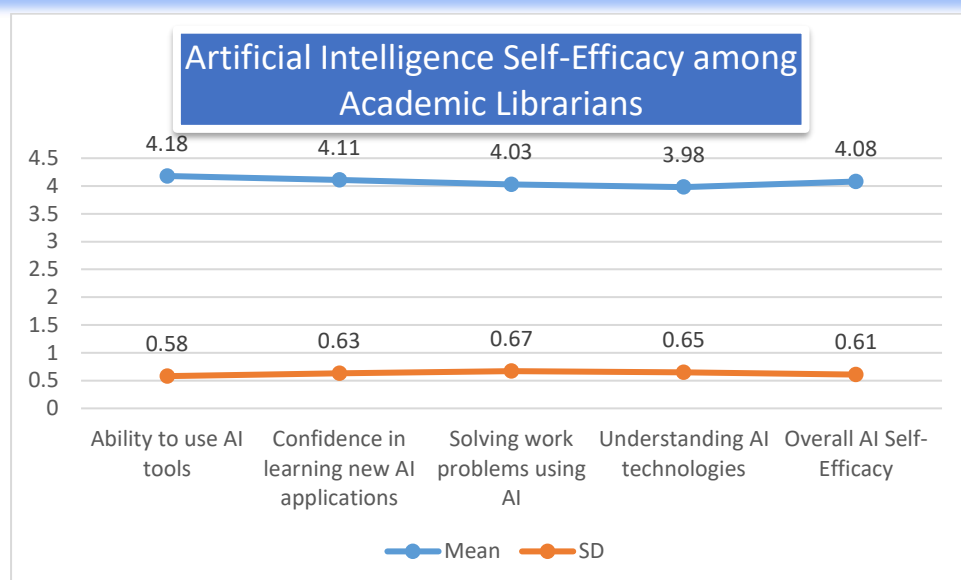


Table 4.3 AI Technology Adoption in Academic Libraries

AI Application	Mean	SD
AI-assisted cataloguing	4.02	0.62
AI-based information retrieval	4.09	0.60
Chatbots for user services	3.86	0.69
AI recommendation systems	3.91	0.66
Overall AI Adoption	3.97	0.64

The results demonstrate that AI-based information retrieval obtained the highest mean score ($M = 4.09$), indicating that librarians widely recognize its effectiveness in improving access to information resources. AI-assisted cataloguing also showed strong adoption ($M = 4.02$), reflecting increasing integration of intelligent systems into routine library operations. Although chatbot services and recommendation systems recorded slightly lower mean values, they still indicate positive acceptance among respondents. Overall, the findings suggest that AI technologies are gradually becoming an integral component of modern academic library services.

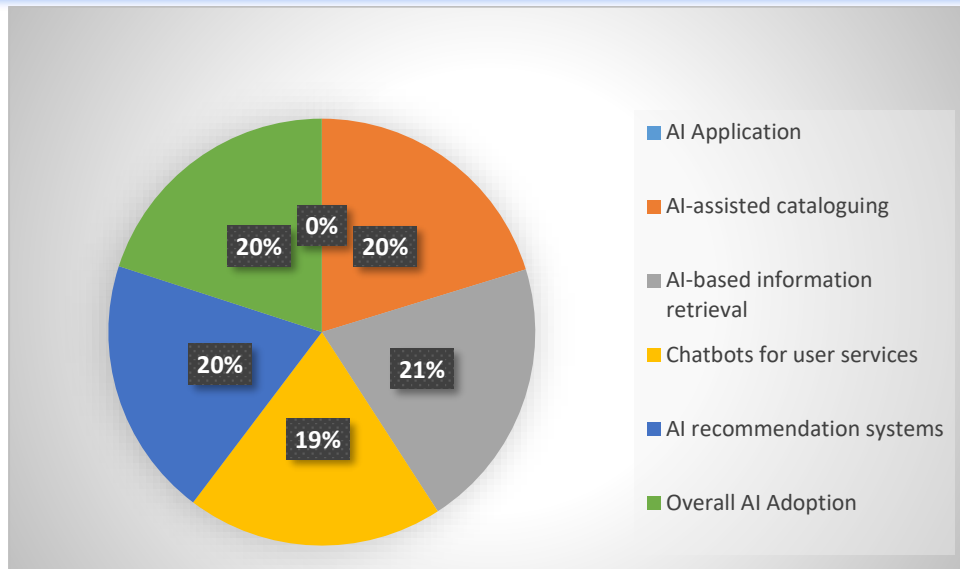


Table 4.4 Correlation between AI Self-Efficacy and Study Variables

Variables	Correlation (r)	Significance
AI Self-Efficacy & AI Adoption	0.746	<0.001
AI Self-Efficacy & Professional Competence	0.711	<0.001
AI Self-Efficacy & Service Innovation	0.695	<0.001
AI Self-Efficacy & Digital Transformation	0.758	<0.001

The correlation analysis demonstrates significant positive relationships between AI self-efficacy and all study variables. Higher confidence in AI use is associated with greater technology adoption and improved library services.

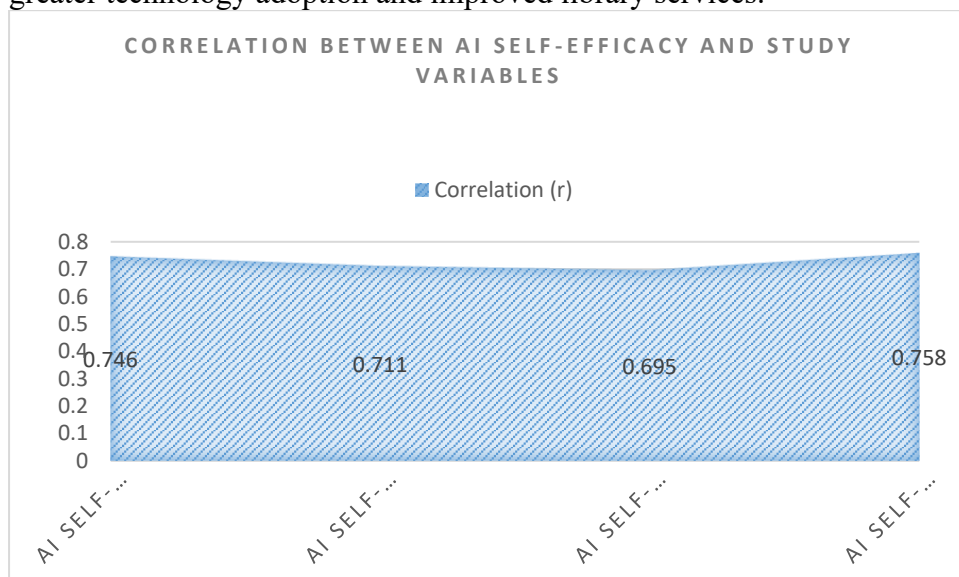


Table 4.5 Regression Analysis

Variable	β	t-value	p-value
AI Self-Efficacy	0.648	15.83	<0.001

R²	0.521	—	—
Adjusted R²	0.517	—	—
F-value	250.61	—	<0.001

Regression results indicate that AI self-efficacy significantly predicts AI adoption and professional performance. Approximately **52.1%** of the variation in library digital transformation is explained by AI self-efficacy.

Table 4.6 Perceived Benefits of Artificial Intelligence

Benefit	Frequency	Percentage (%)
Faster information retrieval	214	85.6
Improved user services	201	80.4
Increased work efficiency	196	78.4
Better decision-making	184	73.6
Reduced routine workload	176	70.4

The majority of librarians perceived AI as beneficial for improving library operations. Faster information retrieval and enhanced user services were identified as the most significant advantages.

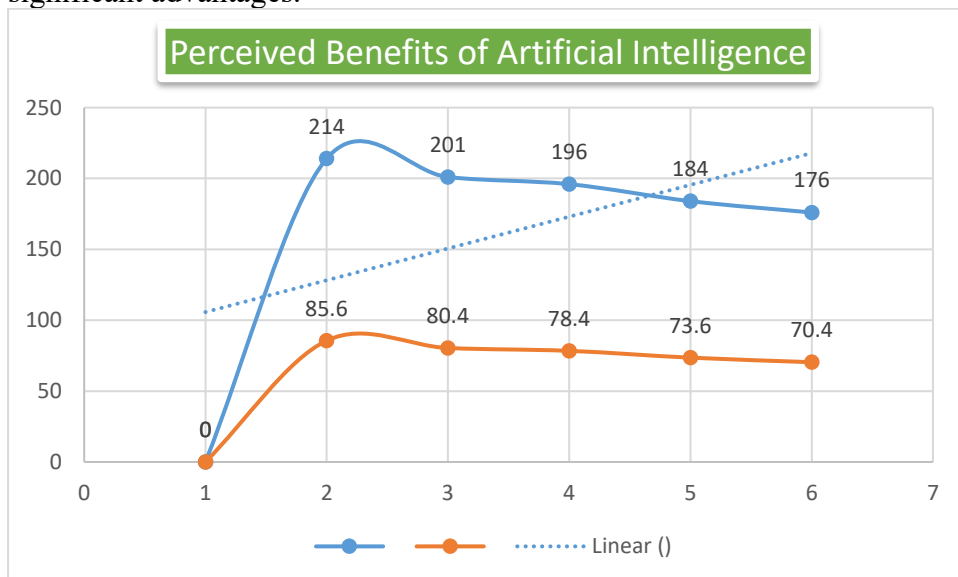
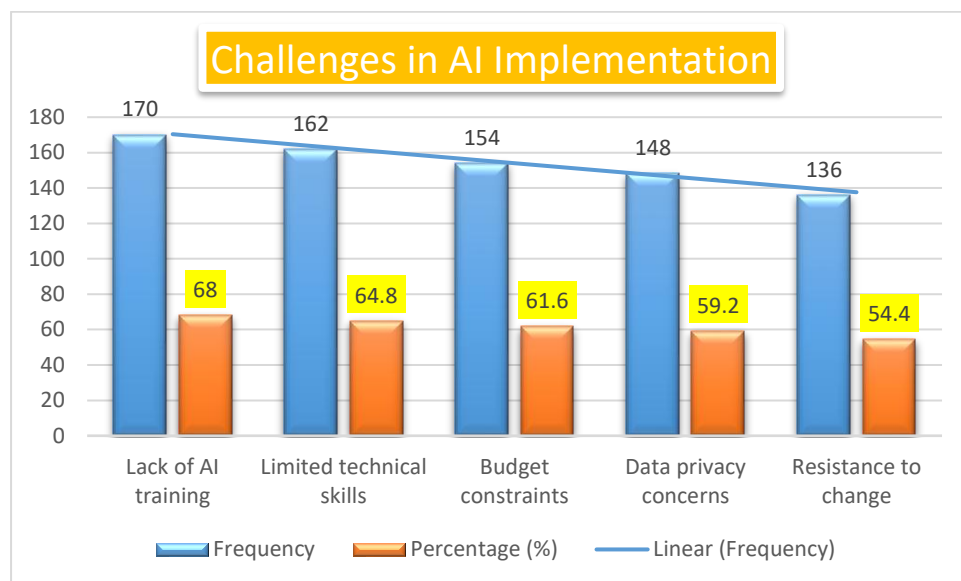


Table 4.7 Challenges in AI Implementation

Challenge	Frequency	Percentage (%)
Lack of AI training	170	68.0
Limited technical skills	162	64.8
Budget constraints	154	61.6
Data privacy concerns	148	59.2
Resistance to change	136	54.4

The findings indicate that inadequate AI training and limited technical expertise are the major barriers to AI implementation. The analysis reveals that lack of AI training (68.0%) represents the greatest challenge to AI implementation, followed by limited technical expertise (64.8%). Budget constraints and concerns regarding data privacy

also significantly influence AI adoption in academic libraries. Resistance to organizational change remains another important barrier. These findings indicate that successful AI implementation requires not only technological investment but also continuous professional development and institutional support.



5. Discussion

The results revealed that AI self-efficacy plays an important role in the successful adoption of AI technology by academic librarians. Those who were confident in using AI technologies utilized more AI-based solutions for cataloging, searching for information, and conducting digital references. Such results are similar to those obtained by Mah and Groß (2024) and prove that the self-efficacy level of professionals significantly affects their willingness to adopt new AI technologies. The positive relation between AI self-efficacy and digital transformation in academic libraries also coincides with the results presented by Hu et al. (2024) and proving the beneficial effect of AI applications on the process of information literacy and services delivery in academic libraries. Similarly, Harisanty et al. (2024) stressed the importance of awareness and practical skills in preparing librarians to the implementation of AI systems. Challenges related to the lack of proper training, poor technical skills, and financial difficulties proved that the progress in technology is not enough for digital transformation. Such results coincide with the statements made by Andersdotter (2023) on the importance of development of AI competencies in librarians. Additionally, Falebita and Kok (2025) proved the positive influence of technological readiness and self-efficacy on attitudes to AI adoption.

5.1 Practical Implications

The findings provide practical guidance for university administrators, library directors, and policymakers in designing AI competency development programs. Investment in AI infrastructure, continuous professional training, and institutional support can strengthen librarians' confidence in AI technologies and improve digital service

delivery. The study also assists higher education institutions in developing AI implementation strategies that enhance information accessibility, research support, and overall library efficiency

6. Conclusion

From the discussion above, it is evident that artificial intelligence self-efficacy has a key role in fostering the acceptance and utilization of AI technology in academic libraries. Librarians who have high self-efficacy regarding AI exhibit extensive use of intelligent library systems, high-quality service delivery, and professional efficiency (Chen, 2025). Additionally, it is observed that AI self-efficacy positively affects digital innovation in academic libraries. However, despite all these advantages, poor technical training and low AI skills pose significant hindrances in the implementation of AI technology in academic libraries.

7. Recommendations

Academic organizations should develop continuous training sessions for AI for building up technical skills and self-efficacy in librarians. Academic organizations should devote some budget towards the development of AI infrastructure, intelligent library systems, and digital assets. Workshops and professional courses should be provided to increase AI literacy among library professionals (Oluwaseun, 2025). Cooperation among academic organizations, technology firms, and library associations should be encouraged to enhance the process of knowledge sharing and innovation. Policies for the development of ethical use of AI should also be established. Future studies should focus on employing longitudinal and comparative designs in various countries to understand the impact of AI self-efficacy on library efficiency and effectiveness.

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