



Evaluating the Readiness of Pakistani Academic Libraries for the Adoption of Artificial Intelligence and Emerging Technologies

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ARTICLE INFO

Article History:

Received: September 04, 2025
Revised: September 29, 2025
Accepted: October 16, 2025
Available Online: October 30, 2025

Keywords:

Artificial intelligence; academic libraries; technology readiness; staff competency; organizational readiness; digital transformation; Pakistan

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ABSTRACT

Purpose: In this research, the authors endeavor to assess the preparedness of Pakistani academic libraries to embrace artificial intelligence (AI) and new technologies. With AI transforming information provision across the world, technological, organizational, financial, and human-resource preparedness is critical to libraries that intend to remain relevant in terms of service delivery and operational efficiency.

Design/Methodology/Approach: The survey design used was a quantitative and cross-sectional survey that was used to collect information on 230 library professionals in both public and private academic institutions in Pakistan. The information about the demographic characteristics and five central dimensions of readiness, including technological infrastructure, staff competency, organizational readiness, financial capacity, and perceived benefits and challenges, was gathered with the help of a structured questionnaire. A descriptive statistics were applied to data, which entailed frequencies and percentages, to determine trends, gaps, and strong points.

Findings: The results show the medium level of technological preparedness, good hardware, network stability, and the internet connection, yet scarce access to AI tools, cloud services, and frequent system updates. The competency of staff is revealed as one of the primary limitations because most professionals are not trained in AI, they do not know how to program and troubleshoot AI even being highly motivated to do it. The lack of operational structures is demonstrated by organizational readiness through supportive leadership and strategic intent, yet lack of the following structures, such as specific roles of AI or committees. The least prepared area is financial preparedness as majority of the libraries are operating with tight budgets and are not able to invest heavily in long term technology. In spite of them, respondents remain very optimistic about the future of AI to enhance service quality, efficiency, personalization, and research support.

Originality/Value: This paper provides one of the most detailed evaluations of AI preparedness among Pakistani scholarly libraries, which combines the technological, human, organizational, and financial approaches. It also offers evidence-based lessons that will be able to inform institutional planning, policy formulation, and capacity-building initiatives with an aim to promote sustainable AI integration.

Introduction

The active development of the digital technologies has changed virtually all spheres of knowledge creation, sharing, and retention, and academic libraries cannot be an exception. As the institutions of higher learning experience a digital revolution, the library has gone beyond its usual functions to become a dynamic technology-oriented space that is used to facilitate teaching, research, and community interactions (Ali et al., 2024). Artificial intelligence (AI) and new technologies have become the potent facilitators of this dynamic environment, providing unique opportunities to optimize the work of the libraries, increase user services, and improve institutional competitiveness (Ullah et al., 2023). Intelligent cataloging systems, automated metadata extractors, personal recommendation services, chatbots, predictive analytics, and other AI-based tools can help deal with the long-standing issues of resources management, workload stifling in personnel, and service efficiency (Khan et al., 2025). This has made the need to evaluate the AI adoption preparedness in academic libraries a critical issue and is especially true in developing nations where there is a wide range of institutional capacities and technological assets (Lakho et al., 2025).

Pakistan Academic libraries in Pakistan are run in varied administrative patterns, funding patterns and technological capabilities. Some institutions have already gone to the next stage of digitization and system advancement, but others still have serious limitations, including limited funds, the lack of technology facilities, the lack of training opportunities, and diverse degrees of organizational support (Hussain and Khan, 2025). All these inequalities make a major difference between the capacity of libraries to adopt AI and other technologies. The implementation of AI is not just an issue of new tools, but it comprises the comprehensive insight of technological preparedness, employee ability, the organizational intercultural setting, financial abilities, and the sense of advantage and difficulties (Naureen et al., 2025). The lack of proper preparations in these aspects can make the implementation of AI in institutions ineffective, a situation that can result in the squandering of investments or failure by institutions to align themselves with their strategic objectives (Ali et al., 2025).

The increasing relevance of AI in international educational settings has placed the question of the readiness of Pakistani academic libraries to the transition as a crucial issue to address. Libraries become the main focus as most universities in the area attempt to change their ranking, increase the number of research products, and enhance their services (Bibi, 2025). Knowledge of the present state of technological infrastructure, the level of competency in the staff of the library, and access to financial and administrative resources can be useful in determining gaps that can stall the efforts (Khan et al., 2025). Also, by examining the perceptions concerning the advantages and issues of AI, the institutions can predict the potential barriers and implement the correct intervention (Shahab and Jan, 2025).

The current investigation satisfies this requirement by undertaking a thorough evaluation of academic library readiness in adopting AI through a dataset of 230 responses of library professionals who have a divergent institutional background. The results show that technological, organizational, and human-resource preparedness differ in terms of levels. As an example, most libraries indicate a moderate technological preparedness, but they lack cloud services, infrastructure modernization, and accessibility of AI tools. One more important issue is staff competency which is expressed by many who stated that there is not much training in their profession and that they lacked enough knowledge in programming or technical aspects. There is also an organizational aspect, including leadership support, strategic planning and interdepartmental collaboration, to which the capacity to achieve AI-driven innovation is also varied. One of the most significant obstacles is usually financial preparedness where numerous

libraries recognize that there is insufficient funding on AI solutions, digital infrastructures or staff training initiatives (Islam et al., 2025).

Regardless of these obstacles, the paper demonstrates a significant level of interest and hopefulness about the possible advantages of AI. Numerous participants think that AI implementation can enhance the quality of the provided services, improve the efficiency of the operations, increase the engagement of the users, and facilitate the personalized learning experience (Asim et al., 2023). Meanwhile, the fears regarding the staff resistance, the absence of expertise, and the privacy or security threats point to the necessity of specific interventions (Baber et al., 2024). The results highlight the necessity to make academic libraries ready to overcome the challenges of AI-based changes and make sure all institutional solutions match the changes in technology (Naureen et al., 2025).

In general, this research will add more insights to the overall awareness of the Pakistani academic libraries as they stand to embrace AI and other new technologies. With this analytical approach of analyzing the current capacities, challenges, and perceived benefits, the research offers practical information to the policy makers, administrators, and librarians interested in updating the academic information environment. The results of the study point to the fact that the achievement of AI implementation should not be limited to the availability of the technology; it must be accompanied by strategic planning, commitment of the organization, the development of human capital, and the long-term investment in the digital infrastructure. With Pakistan becoming increasingly technologically integrated, libraries will continue to be a determining factor in the development of academic ecosystems.

Literature Review

Technological Transformation in Academic Libraries

Rapid technological development has contributed to the transformation of academic libraries, which, until recently, were a classic repositories of printed resources, to a hybrid or completely digital form (Nazeer and Gil, 2023). The libraries are becoming more dependent on automation, online cataloging, digital repositories and remoteness aids to support the requirements of the contemporary learners. Accessibility and scalability have been enhanced by the emergence of cloud computing, integrated library systems, and digital preservation technologies (Aslam et al., 2025). As AI is becoming a reality, libraries are also upgrading to include the use of improved tools that can do intelligent work, including automated indexing, semantic search, plagiarism detection, and real-time information retrieval. Such tools do not only increase user experience but also optimize the operations at a backend level allowing libraries to handle vast amounts of information more effectively (Baber et al., 2024). Technological preparedness is thus a necessity to the institutions which intend to implement AI since old-fashioned infrastructure may discourage innovation and reduce the performance of newly developed technologies.

AI Applications in Library Services

It is likely that AI will become more and more relevant to the work of a library, especially in those fields where automation, personalization, and prediction are essential. The chatbots based on AI can be used to provide user support by answering the most frequently asked questions immediately, which will help lessen the employee load and increase the responsiveness of services (Xu et al., 2025). Machine learning software is able to process user behavior and provide personalized suggestions on books, articles, and digital materials. Smart cataloging systems can help librarians to save significant time by creating metadata, categorizing materials, and

uncovering duplicates and enhance accuracy (Azam and Ahmad, 2024). Moreover, AI can improve digital preservation through detecting damaged files, predicting degradation, and making digital assets accessible in the long run. With the further development of these applications, the necessity to develop the capacity of libraries, update systems, and improve the knowledge base of the staff grows more urgent (Hossain et al., 2025).

Staff Competency and Skill Requirements

Knowledge, skills, and attitudes of library personnel are critical in the successful implementation of AI in libraries. The contemporary librarian needs to have both technical and analytical skills which entail the understanding of the AI tools, data interpretation, working with digital platforms, and assisting the user in using the emerging technologies (Ali et al., 2021). Nevertheless, AI-related training is not widely exposed to many library professionals, particularly in the developing regions. Poor preparedness is caused by factors like absence of the continuous professional development programs, poor technical background, and poor institutional support (Hossain et al., 2025). Organizational culture also affects staff competencies; an environment that fosters experimentation, collaboration and sharing of knowledge has a greater readiness level. Even the most technologically sophisticated investments may be used insufficiently without a properly trained staff (Khan et al., 2025).

Organizational Readiness and Leadership Support

Organizational readiness is crucial in defining whether the change introduced by AI will be successful (Ullah et al., 2023). The commitment of leadership is mandatory because administrative entities are required to allocate resources, achieve strategic priorities, and formulate policies that promote innovation. Companies integrating AI projects into their long-term strategic initiatives have higher chances of succeeding in the adoption of new technologies (Rafi et al., 2021). The existence of clear organizational structures and defined roles and various committees that are dedicated to coordination within the various departments. Moreover, it is possible with the help of a positive culture where technological experimentation is welcomed, and change resistance is minimized, which aids the implementation of AI (Bibi, 2025). On the contrary, institutional rigidity, bureaucratic obstacles and absence of coordination may be in the way of adoption.

Financial Capacity and Resource Allocation

Any technology adoption process is supported by financial readiness. The changes to implement AI systems, upgrade infrastructures, subscribe to software providers, and provide staff training are costly (Warraich et al., 2022). Most academic libraries, especially in the developing environment, have limited budgets which restrict their possibilities to purchase advanced technologies (Iqbal et al., 2023). The resources will have to be strategically allocated to balance between the operational requirements and the goals of innovation. Financial limitations can be addressed by negotiating partnerships with technological manufacturers, grant funds, and cooperation with academic units (Hussain and Khan, 2025). Libraries that do not have a sustainable funding might find it difficult to implement or sustain AI-based solutions.

Perceived Benefits and Challenges of AI Adoption

AI can provide significant value in enhancing the quality of services, the efficiency of operations, and satisfaction of users in libraries. AI reduces the amount of time spent by staff on routine and directing it towards more difficult and creative tasks (Sumra et al., 2021). To increase user interaction, the search engine can be enhanced with personal suggestions, predictive analytics, and improved search features, whereas the chatbots can address the questions immediately (Warraich

and Rorissa, 2020). Irrespective of all these benefits, libraries are also challenged in the implementation of AI. Another big issue is that it needs expertise with the advanced systems to implement and maintain them. Potential challenges include staff resistance, the fear of being replaced by machines, and confusion regarding the roles in the future (Asim et al., 2023). The issue of data privacy and security is another challenge to adoption in the context in which institutional protection is low (Ali et al., 2021). Realizing these advantages and difficulties can assist institutions to be prepared to the transition.

Problem Statement

In Pakistan, academic libraries are progressively being called upon to keep pace with the technological changes around the world and contribute to the digitalization agenda of higher educational institutions. Nevertheless, it is still unclear how they will embrace artificial intelligence and new technologies because of the differences in technological infrastructure, staff competencies, insufficient funding, poor organizational plans, and inconsistent administrative support. Although AI can be used to drastically improve service provision, efficiency, and the interaction with users, it is possible that not all libraries are ready to deploy these technologies. Necessity of thorough evaluation of technological, organizational, financial, and human-resource preparedness makes knowledge gap critical, and institutions cannot properly plan their strategy to adopt AI. Libraries may also lose sight of the current potential and issues without knowing the current capacities and challenges, and become even more lagging in the global digital innovation. Thus, a systematic study is necessary to identify the existing preparedness rates of academic libraries in Pakistan and find out the obstacles that can be used to hinder the successful implementation of AI.

Research Objectives

1. To examine how well academic libraries are prepared in terms of technological infrastructure to adopt AI.
2. To assess the level of competency and skills of the library staff concerning AI and the new technologies.
3. To analyze the level of organizational preparedness and leadership encouragement of AI integration.
4. To determine the economic and financial potential of academic libraries to deploy the AI technologies.
5. To investigate the perceived advantages and obstacles of the adoption of AI in academic libraries.
6. To recommend ways of improving library preparedness to AI-driven change.

Research Questions

1. How prepared are academic libraries in terms of technological infrastructure to adopt AI?
2. To what degree are library employees skilled in the use of AI tools and other novel technologies?
3. How organizationally-ready are academic libraries in the area of AI integration?
4. What is the financial capacity and financial resources to embrace AI in the libraries?
5. What opportunities and issues do the professionals in the library field relate to the introduction of AI?
6. Which measures can be taken to increase the preparedness of academic libraries to AI?

Methodology

Research Design

The research design adopted in this study was a cross-sectional and quantitative survey design to determine the preparedness of Pakistani academic libraries regarding the use of artificial intelligence and emerging technologies. The design was chosen to represent up-to-date perceptions, infrastructural state, level of skills, organizational support, and financial readiness of various professionals of libraries of a wide range in one point of time. Quantitative approaches were suitable because they produce quantifiable data and establish a relationship, pattern, and trends in a large group of people. The structured survey approach also allowed conducting the system analysis of various dimensions of readiness, such as technological, human, organizational, and financial components.

Population and Sampling

The target population was determined by the library practitioners in academic libraries in Pakistan such as both the government and privately owned institutions. The total sample that was obtained reached 230 respondents including Assistant Librarians, Librarians, Chief Librarians, Library Assistants, and other pertinent titles. The convenience sampling method was non-probability because it is easy to access respondents and the geographical spread of academic libraries. Although such an approach restricts the generalizability, it allows including a wide group of respondents that has down-to-earth experience in library functioning and technological background.

Research Instrument

Information was gathered with the help of a structured questionnaire that consisted of sections that included demographic data and five fundamental dimensions of AI readiness, namely, technological infrastructure, staff competency, organizational readiness, financial readiness, and perceived benefits and challenges. The five-point Likert scale was used to measure all the items in the readiness sections (Strongly Disagree 1; Strongly Agree 5). The questionnaire was developed to determine the state of libraries and the attitude of the professionals to the adoption of AI. The construction of the items relied on thematic areas found in the modern literature on the technology preparedness and integration of AI in libraries.

Data Collection Procedure

The questionnaire was distributed online through the online survey systems to ensure its maximum accessibility and coverage. The purpose of the study was communicated to the respondents and they were assured of its confidentiality and given the instructions on how to complete it. The involvement was voluntary and no personally identifiable information was measured. The process of data collection was left open in given few weeks so as to allow maximum participation within various institutions. Periodic reminders were sent to boost response rates.

Data Analysis

Analysis of data was done using descriptive statistics such as frequencies and percentages to summarize the demographics and answers of the participants regarding readiness indicators. The discussion was aimed at defining trends of each readiness dimension and showing the strengths, weaknesses, and discrepancies between institutions. The interpretations were facilitated using tabulated summaries and graphical visuals. Such inferential statistics as reliability test and

distribution analysis were taken into consideration to test internal consistency and identify the degree of agreement between respondents.

Ethical Considerations

During the research, ethical principles were observed carefully. Participation of the respondents was voluntary and they were made aware of their right to withdraw anytime. All the answers were treated as confidential and intended only to be utilized in the academic research. No personal identifiers were taken, which guaranteed the anonymity and protection of the data of the participants.

Findings

Findings refer to the recorded results or observations obtained as a result of the systematic study of the collected data. They reflect the evidence-driven findings of a research, and they show patterns, associations, or trends that respond to research questions or objectives. The results of a research give the basis of interpretation, discussions and conclusion making.

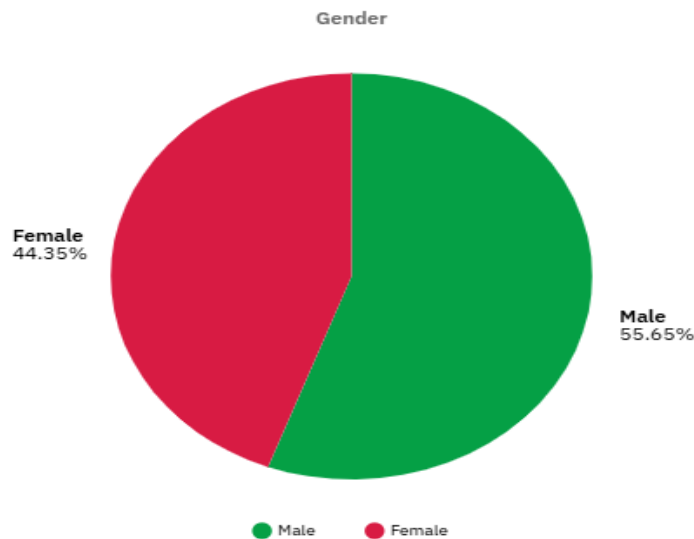


Figure No 1: Gender of the respondents

The given frequency distribution shows the composition of the sample of 230 individuals in the gender. The statistics show that there is a majority of males where 128 people constitute 55.7% of the total. The population of female contingent is 102, which is the remaining 44.3%. This will produce a gender ratio of about 125.5 males to 100 females in this sample indicating a moderate imbalance to the male category. It is complete in distribution and the total frequency and percentage summations will be appropriate in the total population of the sample.

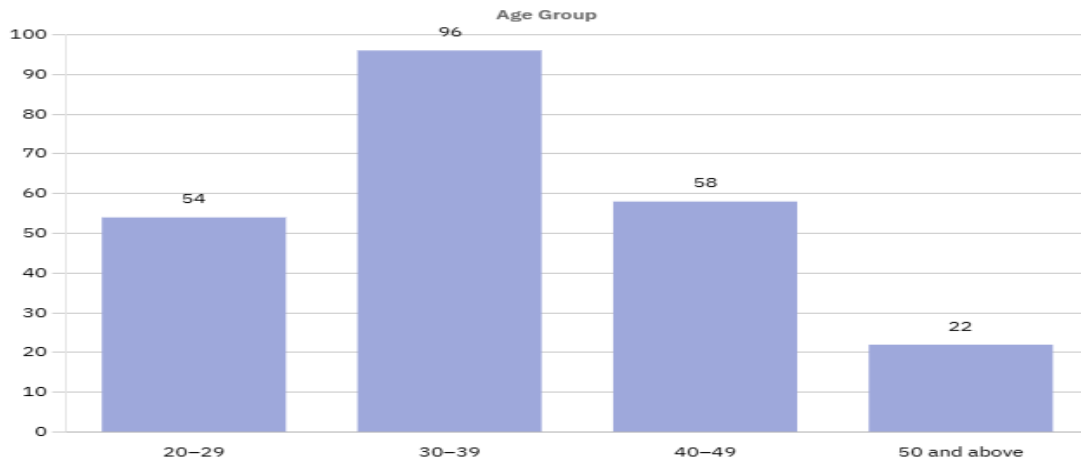


Figure No 2: Age of the respondents

The sampling age distribution (N=230) is skewed positively with the relative majority of participants (41.7%) centering on the 30-39 years age range (n=96). The sample sample is mainly constituted of younger adults of working age since most of the respondents (90.4%) lie within the 20-49 years bracket. To be more precise, the age group of 20-29 years makes 23.5% (n=54) and the 40-49 years old group is 25.2 (n=58) in that order. Age The age group 50 years and over is a clear minority (only 9.6% n=22). This is a structure that shows a sample strongly biased towards the early and mid-career age groups.

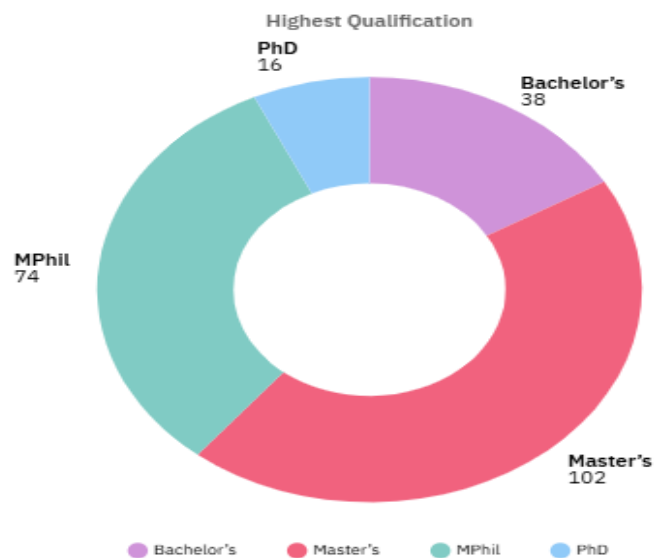


Figure No 3: Highest Qualification of the respondents

The qualification profile of the sample indicates a very educated group with all the 230 sample having a minimum of a Bachelor of degree. Postgraduate qualifications dominate it. The modal category is the Master degree which constitutes 44.3% (n=102) of the respondents. The MPhil holders come right behind them at 32.2% (n=74). These two groups of people make up more than three quarters (76.5%) of the sample. The subgroups with bachelor degree holders (16.5% n=38) and Doctoral (PhD) holders (7.0% n=16) are smaller groups. The data shows a pyramidal form of

data with prevalence negatively associated with the progressive academic level beginning with the Bachelor and ending with PhD.

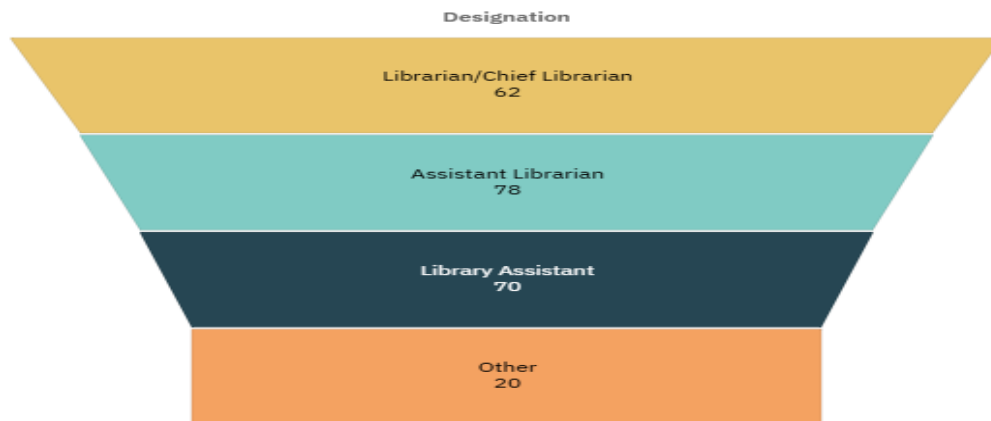


Figure No 4: Designation of the respondents

The term distribution in the sample (N=230) implies a distribution of workforce that is organized in three fundamental professional library functions. The highest single category was Assistant Librarians (33.9% n=78) with the next highest category Librarians/Chief Librarians (27.0% n=62) and the last category was Library Assistants (30.4% n=70). This three-fold division covers 91.3% of the sample which is a complete cross-section of the standard professional hierarchy. The 8.7% (n=20) remaining which is grouped under the Other category must probably be the specialized or administrative jobs that do not fall under these main categories. The statistics indicate a fairly equal distribution of such basic levels of occupation in the library situation.

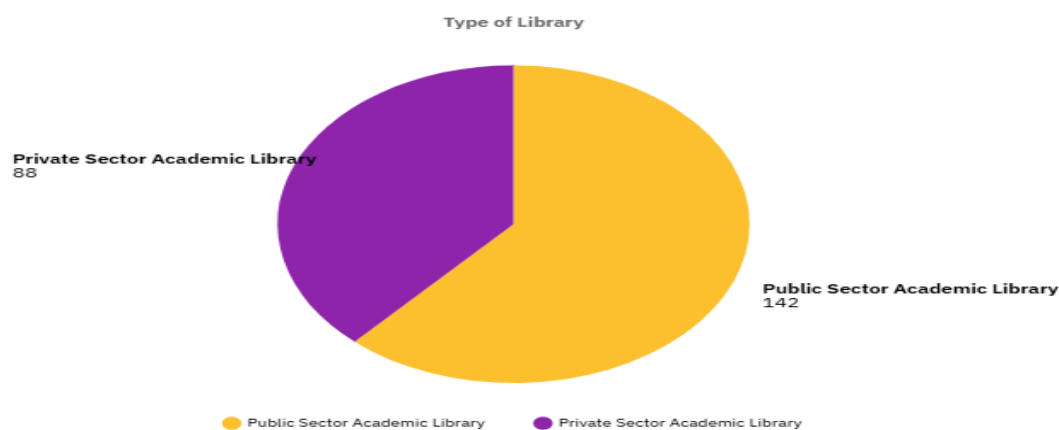


Figure No 5: Type of Library

The type data of libraries have shown that the sample is selected only among academic libraries but is distinguished by a high sectoral imbalance. A majority, 61.7% (n=142) of the institutions are comprised of Public Sector Academic Libraries. Contrarily, the rest 38.3% (n=88) of respondents are found in the Private Sector Academic Libraries. This also leads to a ratio of 1.6:1 in the sample between the number of public and private institutions and thus, they are highly overrepresented in the sample of the study.

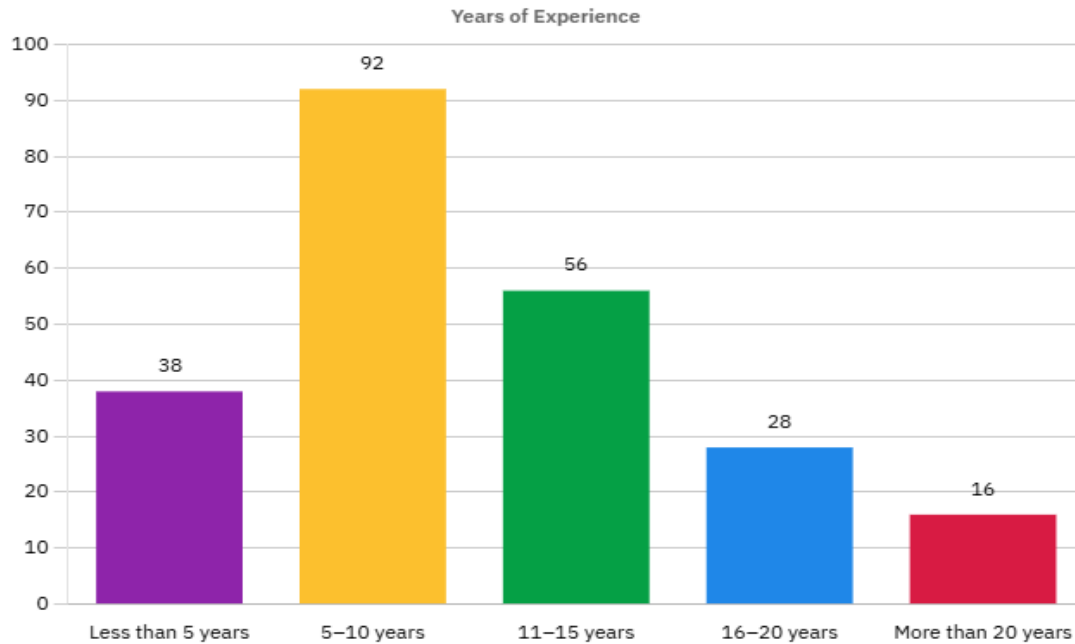


Figure No 6: Years of experience

The professional experience is distributed in a unimodal and skewed right way, which demonstrates that the personnel is concentrated in the early-mid and mid-career periods. The apparent plurality, which reflects 40.0% (n=92) of the respondents, have 5 to 10 years experience, which makes it a modal category. Together, the individuals with 15 years of experience or less make up 80.8% of the cohort. The older professionals are fewer, with only 19.2% reporting 16 or more years of service, and only 7% (n=16) reporting 20 years or more. This profile implies that there is a large population of practitioners who are already established but a relative lack of experienced knowledge.

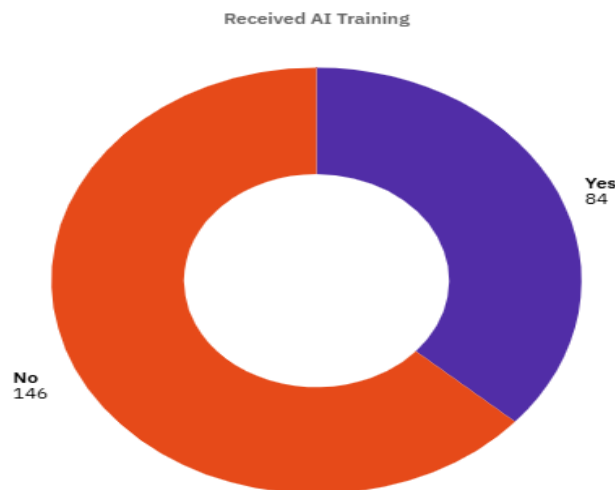


Figure No 7: AI training of the respondents

The statistics on AI training acceptance show that there is a very wide skills gap among this highly educated professional group, and that a clear majority 63.5% of the samples (n=146) have reported

no formal training in artificial intelligence. On the other hand, significant minority of 36.5% (n=84) respond that they have been instructed in the same. This distribution shows an intense dichotomy of preparedness, indicating that, with AI being a well-known field of development in the industry, formal training programs have so far targeted a limited group of the professional population.



Figure No 8: Staff Number

The distribution of number of staff in the sampled academic libraries shows that the number of small and medium sized operational teams is predominant. The modal category is libraries having the staff size of 10-25, which consists of 45.2% (n=104) of the sample. This is then followed by the smallest libraries (less than 10 staff) at 31.3% (n=72). These two groups of institutions comprise more than three-quarters (76.5%) of the total institutions, highlighting the fact that small staffing is a common practice. There is a steep drop in bigger libraries where only 16.5% (n=38) currently accommodates 26-50 staff and only 7.0% (n=16) has over 50 staff, indicating that very large staff requirements are unusual in this academic library environment.

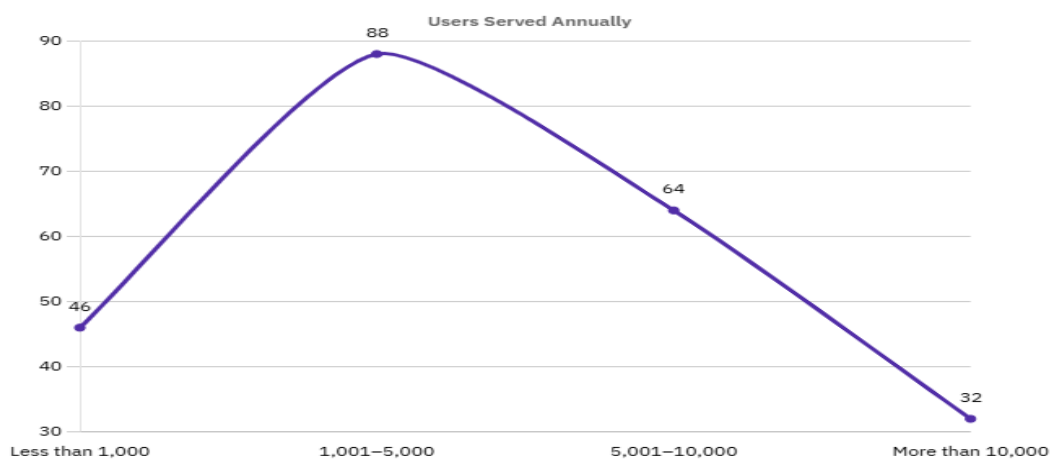


Figure No 9: Visitors per Year

The yearly user distribution of the sampled academic libraries is unimodal and moderately skewed to the right, meaning that the moderate level of user traffic is the most prevalent scale of

operational level of the sampled libraries. The frequency of 1,001-5,000 visitors in a year in the plurality of libraries (38.3%, n=88) is the modal category. These two groups with the second level (5,001-10,000 users, 27.8%, n=64) include two-thirds (66.1%) of all institutions, which is the average volume of service. Libraries with less than 1,000 users per annum make 20.0% (n=46) and 13.9% (n=32) are in the minority respectively. This profile is in accordance with the previous observation of mostly small staff sizes, with an overall indication of a relationship between the institutional size and the volume of user services in this academic library setting.

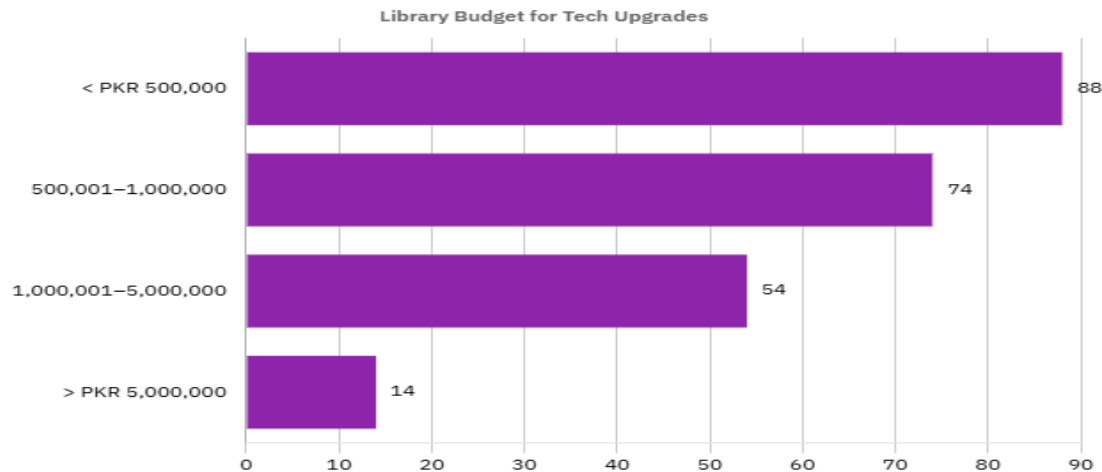


Figure No 10: Library Budget for Tech Upgrades

This is shown in the budget allocation information on technology upgrades that depicts a sharp concentration on the lower end of the financial scale with an upwardly sloping decents as the budget level goes up. With 70.5% of sampled academic libraries saying they have an annual budget of PKR 1,000, 000 or less on technology upgrades, the highest single group (38.3%, n=88) has a budget of PKR 500,000 or less. Mid-range (PKR 1,000,001-5,000,000) are distributed on 23.5% (n=54) of institutions and only a small amount (6.0% n=14) have budgets above PKR 5,000,000. The fact that this type of distribution is highly skewed towards the right implies that much of the investment in technological development is financially constrained in the vast majority of libraries, in this context. This financial portrait creates a necessary explicatory framework of the low attendance of formal AI training previously recorded, with institutional financial constraint being a probable reason behind the identified skills deficit.

Scale:

- 1= Strongly Disagree (SD)
- 2 = Disagree (D)
- 3 = Neutral (N)
- 4 = Agree (A)
- 5 = Strongly Agree (SA)

Table 1: Technological Infrastructure Summary

Item	SD	D	N	A	SA
Modern hardware/software	8	22	56	102	42
Network supports AI	10	26	48	98	48
Sufficient digital resources	12	32	60	86	40
LMS compatibility	6	30	64	94	36
Regular upgrades	14	36	72	78	30
Cloud services available	10	34	68	88	30
Security/privacy system	6	24	58	102	40
Access to AI tools	16	40	72	70	32
Reliable internet	8	28	54	102	38
Infrastructure allows AI	10	30	62	94	34

Table 1 shows that the technological infrastructure of the sampled libraries is rather positive and to some extent disproportional in self-assessment. The most favorable perceptions are about the basic IT factors: a large majority (62.6%) of respondents are in agreement or strongly in agreement with the statement that they have modern hardware/software, a reliable internet (60.9%), and a strong security/privacy system (61.7%). Majority also agrees with network capacity to support AI and compatibility of infrastructure, on the whole, with AI (63.5% and 55.7%, respectively). Nevertheless, there are notable weaknesses in the critical operation and innovation areas. The perceived adequacy of digital resources is least agreeable (54.8% agreement) and regular technology upgrades are least agreeable with only 47.0% agreeing. Most importantly, direct access to AI tools is referred to as the most critical deficit, which is only agreed on by 44.3% of the participants the least of the items to substantiate the previous statement of a lack of practical AI interaction and that there is a concrete resource gap inhibiting the practical use of AI.

Table 2: Staff Competency Summary

Item	SD	D	N	A	SA
Staff knowledgeable in AI	14	42	70	78	26
Staff trained on AI	18	48	72	68	24
CPD programs available	16	40	74	74	26
Can analyze data	12	38	78	78	24
Can troubleshoot AI	20	42	82	64	22
Motivation to learn	8	26	64	94	38
Can guide users	10	32	70	86	32
Collaboration among staff	12	34	68	86	30
Programming skills	22	52	80	58	18
Knowledge sharing	8	28	72	92	30

Table 2 shows that there is a severe gap in staff competencies, with powerful foundational and interpersonal skills on the one hand, and a sharp lack of advanced technical and AI-specific skills on the other hand. Although much majority of the respondent agree or strongly agree with the motivation of staff to learn new technologies (57.4%), be able to guide users (51.3%) and work effectively (50.4%), there is a significant weakness in competencies directly pertaining to the field of AI and data science. It is only 45.2% that the staff are knowledgeable in AI, with an even smaller percentage (40.0%) saying that staff have undergone AI training. The largest of the gaps are in programming (33.0% agreement) and being able to troubleshoot AI systems (37.4% agreement). According to this profile, the workforce has a high potential and is ready to work with

soft-skills, as witnessed in the high education levels of the demographic data. This possibility is however limited by the lack of specialized technical upskilling, which is directly aligned with the low levels of formal AI training (36.5%), and the access to AI tools (44.3% agreement in Table 1). Its continuous professional development (CPD) programs are only agreed with by 43.5%, indicating that there is a gap in the system to support mechanisms that are structured to fill this knowledge gap.

Table 3: Organizational Readiness Summary

Item	SD	D	N	A	SA
Management supports AI	6	22	54	108	40
Strategy includes AI	8	30	60	96	36
Policies support innovation	12	36	66	88	28
Culture open to change	10	32	62	92	34
Leadership encouraging	12	34	66	90	28
Clear AI roles	14	36	70	84	26
AI committee/team exists	16	40	68	78	28
Interdepartmental collaboration	10	34	72	90	24
Flexible organizational structure	12	36	66	90	26
Decision-making supports AI	6	30	68	96	30

According to Table 3, the sampled organizations show a high propensity of readiness paradox, in which the high top-down strategic support of AI has not entirely been translated into tangible structural and procedural assistance. Top-level organizational variables demonstrate strong approval: most of the participants answer YES or the variables agree and strongly agree that the management is in favor of AI (64.3%), the organizational strategy is in favor of AI (57.4%), culture of the organization is open to changes (54.8%), and the decision-making process is in favor of AI initiatives (54.8%). This implies an open strategic environment. Nonetheless, the conversion of this support into action structures has some big gaps. Creation of special committees or teams on AI is only agreed upon by 46.1% of the respondents and definitions of specific roles relating to AI are even a bit better at 47.8%. Moreover, some of the enablers in the foundation, such as flexible organizational structure and policies that support innovation, receive an agreement of only 50.4% each among the sample. This lack of connection points to a critical bottleneck where strategic intent has not adequately permeated the operational layer to establish the specified governance, specialized roles and adaptive structures required to effectually implement AI, and thus putting a contextual lens on the infrastructural and competency deficits identified above.

Table 4: Financial Readiness Summary

Item	SD	D	N	A	SA
Sufficient funding	18	40	70	78	24
Can afford AI subscriptions	20	42	72	74	22
Investments in digital infra	14	38	68	84	26
Budget considers long-term AI cost	16	44	64	82	24
Resources efficiently used	8	30	72	94	26
Funding for training	18	42	74	74	22
Investment in research	20	46	68	70	26
Financial sustainability	16	40	80	76	18
Partnerships leveraged	14	38	72	88	18
Resources align with strategy	10	32	70	94	24

Table 4 exposes financial preparedness as the most important constraining variable in AI adoption which is typified by general inadequacy in committed finances and long term investment ability. Although moderate majority of the respondents are convinced that the resources used are efficient (52.2%) and meet organizational strategy (51.3%), all questions related to specific and forward-looking financial commitment are significantly lower. Remarkably, less than fifty percent of the surveyed deem that it has adequate overall funding (44.3%), funding on staff training (41.7%), or investment in research (41.7%). The ability to pay the continuing AI-related expenses is also constrained, as only 41.7% respondents believed the institution can afford AI tools subscriptions and 46.1% believed the budget factored in long-term AI costs. This financial profile offers a conclusive explanatory background to the infrastructural gaps (Table 1) and competency deficiencies (Table 2) that have been established before stating that strategic intent (Table 3) is inherently undermined by a deficiency in sustainable financial provisioning of both underlying technology and the human capital development needs of AI introduction.

Table 5: Benefits & Challenges Summary

Item	SD	D	N	A	SA
AI improves service quality	4	12	42	112	60
Increases efficiency	6	14	46	110	54
Enhances user satisfaction	6	20	48	108	48
Automates tasks	4	14	42	116	54
Lack of expertise challenge	6	18	60	102	44
Security/privacy concerns	10	26	62	94	38
AI supports research	8	18	48	108	48
Staff resistance challenge	12	32	70	86	30
AI supports personalization	4	16	50	112	48
Long-term benefits outweigh cost	6	22	64	98	40

Table 5 highlights a profound paradox within the sampled academic libraries: an overwhelming consensus on the transformative potential of AI coexists with a clear-eyed recognition of the significant barriers to its realization. A strong majority strongly agree or agree that AI would improve service quality (74.8%), increase efficiency (71.3%), automate tasks (73.9%), and enhance user satisfaction (67.8%). This indicates a highly positive and aspirational perception of AI's benefits. Nevertheless, the perceived challenges are also salient and they are a direct indication of the deficits that have been determined in previous analyses. The greatest recognized challenge (63.5% agreement) is the shortage of in-house expertise, which is a direct reflection of the staff competency gaps of Table 2. Security concerns as well as privacy concerns are significant (57.4% agreement) which are associated with infrastructure trust. The staff resistance can be perceived as a minor issue (50.4% agreement), whereas the financial proposal is not that unblemished; only 60.0% respondents are sure that long-term benefits are more significant than costs, which highlights the financial concerns outlined in Table 4. This table summarizes the central story of the information: a tactically inclined, operationally discretionary space in which there is a lot of conviction about the importance of AI, but the avenue to adoption is blocked by resource, competency, and financial constraints.

Discussion

The results of the research will offer a detailed insight into the level to which Pakistani academic libraries are currently prepared to embrace artificial intelligence and new technologies. The general picture is that the findings represent a field with high strategic intent and favorable views on AI,

but with limited technical capacity, restricted funding, and skewed organizational frameworks. These trends are much similar to the trends that have been reported in previous literature on the adoption of AI in developing library settings (Ali et al., 2021; Hussain and Khan, 2025).

The outcomes of the technological infrastructure are medium readiness, where respondents declare sufficient hardware, internet stability, and digital security. Nevertheless, there is no easy access to AI tools and frequent technological updates. Such a void supports the fears that Baber et al. (2024) express; she claims that the lack of the latest system updates and the infrequent upgrades creates a barrier to the deployment of intelligent technology within the Pakistani libraries. In the same way, underdeveloped cloud services, poor access to digital resources indicate that libraries do not have the background environment required to achieve sophisticated automation (Aslam et al., 2025).

The level of competency of the staff proves to be one of the most serious impediments, as less than half of the people interviewed said that they possessed adequate AI knowledge, training, and programming expertise. This is in line with the regional research that has shown that there is low levels of AI literacy among information professionals (Hossain et al., 2025). Though the respondents are highly motivated and collaborative in their attitudes, due to lack of structured professional development program, the respondents are not able to convert the interest to technical skills. According to Khan et al. (2025), the effectiveness of AI projects greatly relies on the provision of both theoretical and applied knowledge to the staff.

The paradox of organizational readiness is exceptionally interesting: the leadership seems to be supportive, and the institutional strategies become more and more inclusive of AI, but the structural mechanisms, including AI committees, assigned roles, and flexible organizational frameworks, fail. This reflects the findings by Naureen et al. (2025) who point out that the willingness of the administration does not necessarily relate to the institutional preparedness. Even motivated organizations can have a hard time trying to implement AI without clear governance and role allocation.

The most serious limitation is financial preparedness. Majority of the institutions have a small budget to upgrade technology, employee training, or invest in AI over the long term. Researchers have reported that a lack of funds has been a structural problem in Pakistani academic libraries (Warraich et al., 2022; Iqbal et al., 2023). Impossibility to pay AI subscriptions or sustain long-term operations makes it challenging to sustainably implement it, no matter the perceived advantages.

In spite of such barriers, respondents express high levels of hope towards the prospect of AI to change the library services to make them more efficient, personalized, and research-oriented. These impressions are consistent with the results of Asim et al. (2023), who note that AI transforms the experience of users and the quality of services. Nevertheless, issues connected with privacy, security, and employee opposition indicate the necessity of policy frames and capacity-building strategies.

Altogether, the results show that Pakistani academic libraries are conceptually prepared to be implemented in AI but demand a strong investment in infrastructure, training, and reorganization of the work to provide a significant technological change.

Conclusion and Recommendations

The paper makes the conclusion that Pakistani academic libraries are in a significant milestone in their quest of embracing the advent of artificial intelligence and technologies. The results suggest that the readiness to conceptually embrace AI is high, but actual adoption of AI is still low since

there are several structural, financial, and human-resource barriers. The majority of the libraries have limited technological resources like up-to-date hardware, working networks, and reliable internet access, but do not have direct access to AI, cloud-based services, and regular system upgrades. These are the gaps, which show an underlying weakness that limits the incorporation of more sophisticated and intelligent solutions. It is also crucial that staff competencies are limited because most library workers lacked AI-specific training and exhibit poor programming or troubleshooting knowledge regardless of their high motivation and collaborative intentions. At the organizational level, the research indicates promising scores of organizational support of leadership and strategic intent to adopt AI, whereas such intentions have yet to be converted into the establishment of formal roles, committees, or loose structures to operationalize technological change. Financial preparedness is the most urgent issue, though. There are numerous institutions with small budgets to upgrade technologies, train their staff, and invest in AI over time, which is why it is challenging to maintain or grow AI projects despite the existence of the will and vision. With these obstacles, library professionals are of high opinion with respect to the potential transformation of AI to enhance service delivery, efficiency, customer experience, research assistance, and overall performance productivity. Such a combination of a high interest rate and limited capacity creates the necessity of specific institutional, governmental, and professional interventions.

Considering these results, a number of recommendations are offered to increase the preparedness to integrate AI. First, libraries should focus on the enhancement of their technological base, including the extension of the digital library and the introduction of the cloud-based environment, alongside the systematic renewal of the systems. Investment strategies should be viewed in phases where the institutions can introduce AI tools in stages without straining the current budget limits. Second, professional development must be seen as one of the most significant cores of AI preparedness. Libraries must introduce organized training courses, workshops, and certifications, which raise the staff level of data literacy, machine learning principles, and the management of artificial intelligence. Training can fill skill gaps that are immediate, by collaborating with universities and IT departments and external training bodies. Third, organizations need to be made more adaptive and more innovation oriented. The adoption of AI can be simplified by creating special AI committees, creating a clear set of responsibilities, and introducing AI initiatives into strategic planning to decrease opposition to change. Fourth, the library administrators ought to go out of their way to seek alliances and grants and external collaborations to augment the small budgets and to tap state-of-the-art technology. Lastly, libraries are encouraged to implement an explicit data privacy policy, ethical usage of AI, and change management policy that foster trust and minimize uncertainties among employees and users.

With all these technological, human, organizational, and financial aspects combined, Pakistani academic libraries may be able to leave the conceptual preparedness stage and move to practical, as they will now be seen as innovative and forward-looking institutions of the digital age.

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