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# Adoption of software and associated problems: A survey of college librarians

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## ABSTRACT

*This study aims to investigate the current status and challenges for automation of college libraries in Punjab. The objectives of this study were to discover the status of library automation, know the benefits gained and challenges associated with automation. Quantitative research approach and questionnaire was used for the data collection. The target population of the study was consisted of 166 college librarians from Punjab province. This study found that majority of college librarians were using LIMS software (76%) followed by Koha (20%) and SLIMS (4%). The majority of the respondents were using multiple modules including cataloging, administration, circulation, and reports etc. Library automation has enhanced the efficiency of searching and locating materials within the library, improved the accessibility of library resources for users, improved the overall user experience and satisfaction with library services, and has simplified the borrowing and returning process for library materials. This study discovered that that lack of internet, inadequate library budget, lack of IT infrastructure facilities, and lack of up gradation facility were the major problems in library automation in college libraries. Female has experienced higher problems in automation as compared to male. Increase in age, experience, and qualification has decreased the challenges. Higher the designation, the lower is the level of challenges.*

**Keywords:** Library automation; library software; integrated library system; library automation in college, college libraries.

## 1. Introduction

The rapid proliferation of information is expanding on every day, and it is a task for librarians to organize information in a manner in which it can be accessed conveniently and quickly. The primary goal of Library and Information Science (LIS) experts is to assist users by meeting their information needs. Libraries are regarded as one of the most significant and fundamental source for giving accurate information to users in a productive and effective way. Users, like in traditional libraries spend a significant amount of time searching for information and rely heavily on library workers.

In a society based on information, advancements in how information is processed and quick breakthroughs in Information and Communication Technology (ICTs) have emphasized the necessity of library automation software in all types of libraries, particularly academic libraries. To achieve these objectives, libraries use automation software (Jamogha, Owoeye & Godwin, 2022). In today's age of communication technology, software is employed for the day-to-day library operations, saving both visitors and library personnel time (Alikoba, Kiwelu & Lwanga, 2019). According to Asim and Mairaj (2019), an information system is a systematic process for acquiring, classifying, preserving, and retrieving information to fulfill a range of demands. The knowledge revolution has created a demand for development of Information Management System (IMS) to store, organize, and retrieve information for users without squandering their time.

Library automation provides quick functioning of libraries and material accessibility and dissemination. Computers were first used in libraries in the 1960s. Library automation is separated into three stages (Borgman, 1997). In the 1960s, the phrase "Library Automation" first surfaced. It was time to expand higher education in order to boost the collection of the library budget. Library professionals realized that human methods could not readily manage library resources, but automation allows for very quick data processing. Computerized library activities such as acquisition, cataloging, circulation, and serials were among the first. During the 1960s and 1970s, there was a greater focus on optimizing internal operations (Iqbal, Khan & Sheikh, 2023). The Library of Congress developed the Machine-Readable Catalogue (MARC) in 1966. Sharing catalogues was a significant advancement in the advancement of automation in libraries that lowered computational time. In 1967, the Online Computer Library Centre (OCLC) launched the first large shared catalog. "Research Libraries Information Network" and "Western Library Network" were two other catalogues.

In the beginning of the 1980s, libraries were capable to launch and implement their operations utilizing an online method. Libraries may now order suppliers online owing to the Integrated Library System (ILS). The ILS streamlined operations and administration. Libraries all across the globe implemented automation measures for libraries in the 1980s, and this was a growing market for computerized library mechanisms. The library software was created by vendors and distributed to libraries. The online catalog first appeared on local area networks in the beginning of the 1980s, and it became available over the Internet in the latter part of that decade.

At the third stage, the mutual catalog had grown into a union catalog, with OCLC alone having data for hundreds of millions of library objects. The Internet provided everyone with access to resources. The introduction of the Z39.50 standard enabled online data interchange. Cloud computing services provide access to library automation tools.

Library automation, which involves the implementation of a library management system and associated technologies, offers numerous benefits to libraries. Automation streamlines library operations, reducing manual tasks and improving overall efficiency. Functions such as cataloging, circulation, acquisitions, and reporting can be automated, saving time and effort for library staff. This allows librarians to focus on more value-added tasks, such as user support and collection development. Library automation provides users with seamless access to library resources (Choi, 2021). Online catalogs and databases enable patrons to search and locate materials from any location, increasing convenience and accessibility. Electronic resource management allows for remote access to digital resources, expanding the reach of the library beyond physical boundaries (Asim & Mairaj, 2019).
Automation systems ensure consistent and standardized cataloging practices, reducing errors and enhancing data quality. Catalog records can be easily created, updated, and shared, promoting efficient resource discovery and retrieval. Automation simplifies circulation workflows, enabling efficient checkouts, returns, renewals, and holds. Self-checkout stations empower users to perform transactions independently, reducing queues and wait times. Automation systems also enforce loan policies and track borrowing history, aiding in the efficient management of library materials (Nashipudi, 2022). Automation systems provide tools for effective management of library collections. Acquisition module streamlines the procurement process, from purchase requests to invoicing and budget tracking. Serial management module assists in the tracking and control of subscriptions and issues. Automation helps optimize resource allocation, reduce duplication, and ensure the availability of up-to-date materials (Khan & Alshara, 2020).

Library automation systems offer user-friendly interfaces, allowing patrons to search, request, and interact with library resources easily. Online access to library catalogs, digital collections, and personalized user accounts enhances the user experience, enabling self-service functionalities and 24/7 access to library materials. Automation systems provide powerful reporting and analytics capabilities, offering insights into library usage, circulation patterns, and resource utilization (Khan & Ayesha, 2022). These insights help libraries make informed decisions regarding collection development, resource allocation, and service improvements. Automation systems facilitate interlibrary cooperation and resource sharing. Interlibrary loan modules enable libraries to lend and borrow materials from other institutions, expanding access to a wider range of resources for patrons. Automation systems provide security measures to protect library resources and patron data. Features such as authentication, access controls, and backup systems ensure data integrity and prevent unauthorized access. Digital preservation tools help safeguard electronic resources for long-term accessibility (Ramzan, Asif & Ahmad, 2021).

IT has created different kinds of software to automate several library applications in one system to carry out diverse library activities. The most important part of a computerized system is software; a computer without software is like to a library without books or librarians (Mahmood, 1999). Dad and Khan (2012) classified library automation software into three types: vendor-based, in-house created, and turnkey. Vendor-based software, also known as commercial off-the-shelf software, refers to software solutions developed and provided by third-party vendors or software companies. These vendors create and distribute software products that can be purchased or licensed by organizations to meet their specific needs. In addition to commercially available library automation software, some libraries choose to develop their own software solutions in-house. These custom-built software applications are designed to meet the unique needs and requirements of a particular library. Turnkey software refers to pre-built software solutions that are ready to use "out of the box" with minimal configuration or

customization. It is designed to be easily implemented and deployed by organizations without the need for extensive development or programming. Open source software refers to software whose source code is freely available, allowing users to view, modify, and distribute it according to the terms of an open source license. Open source software is developed collaboratively by a community of developers who contribute their expertise and improvements to the codebase (Khan, Zahid & Rafiq, 2016). Integrated Library Software (ILS), also known as Library Management System (LMS) or Library Automation System (LAS), is a comprehensive software solution designed to automate and streamline library operations. An ILS typically includes a suite of modules that facilitate various library functions, such as cataloging, circulation, acquisitions, serials management, and more (Asim & Mairaj, 2019).

The college libraries in Pakistan are facing significant challenges in respect of library automation systems. The traditional manual processes used in these libraries result in inefficiencies, limited access to information, and reduced effectiveness in meeting the evolving needs of students and faculty. Therefore, there is a pressing need to address the issues such as outdated library management practices, limited access to information, insufficient circulation processes, inadequate resource management, inaccurate cataloging, and insufficient data analytics and reporting. Addressing these challenges and implementing library automation systems in college libraries across Pakistan is crucial for enhancing information access, improving operational efficiency, and providing better services to students and faculty. By adopting modern library automation technologies, colleges can streamline processes, improve resource management, and meet the evolving demands of a digital age. Recently hundreds of young librarians have been hired by Higher Education Department Government of the Punjab. This study explores the status of library automation and challenges faced by college librarians during the adoption or implementation of software to automate library operations. This study will be fruitful for the librarians of other colleges who are interested to implement library automation system in their libraries.

No doubt, library automation has numerous benefits but there are number of challenges to implement or use of library automation software. Pakistani librarians face several challenges when it comes to library automation. These challenges can hinder the successful implementation and utilization of library automation systems. Many libraries in Pakistan operate under limited financial resources, making it challenging to invest in modern library automation systems. The cost of acquiring software, hardware, and necessary infrastructure can be prohibitive, preventing libraries from implementing comprehensive automation solutions. Pakistani librarians often lack the necessary technical expertise to handle library automation systems. Limited exposure to modern technologies and insufficient training opportunities hinder their ability to effectively manage and maintain automation software. This can lead to challenges in system configuration, troubleshooting, and integration with other library systems.

### 1.2 Research question

The main aim of this study is to investigate the status of library automation in colleges located in Punjab province. Reviewing of literature shows that no study was published on library automation in college libraries of Punjab province. Therefore, this study was carried out to explore the status of library automation in the college libraries of Punjab province. The following objectives are framed for this study:

1. What types of software are being used in college libraries of Punjab, Pakistan?
2. What are benefits of library automation?
3. What types of challenges or problems have been faced by college librarians in the adoption and use of library automation?

4. Is there any effect of demographic factors on challenges in library automation?

## 2. Literature review

### *2.1 Adoption of software*

Literature revealed that different software local vs international, open source vs proprietary are being used for automation of library resources. Koha is a free and open-source ILS or library automation software. Developed initially in New Zealand in the late 1990s, Koha has gained popularity worldwide as a powerful and customizable solution for managing libraries of all sizes. The key features and characteristics of Koha are integrated functionality, web-based interface, cataloging and metadata management, circulation and patron management, online public access catalog, reporting and analytics, and customization and extensions (Asim & Mairaj, 2019; Kampa, 2018). Library Information Management System (LIMS) is a type of library software designed to streamline and automate library operations and services. This software was developed in Pakistan. LIMS typically includes a range of modules and functionalities to support cataloging, circulation, acquisitions, serials management, and other library management tasks (Siddique et al, 2023).

Jabeen et al., (2018) conducted a study to examine library professionals' perspectives on the deployment of open-source technology in libraries in Beijing, China. They collected data using a hybrid strategy. A questionnaire and an interview framework were used to collect data. According to the study's findings, the majority of Chinese libraries use international commercially available software, while some use locally made software.

Oladokun (2018) examined on the sustainability of library automation in Nigerian libraries. A descriptive survey methodology was used and 35 libraries were carefully chosen. A questionnaire was utilized to collect data, which was then analyzed using basic percentages and frequency calculations. It was discovered that koha has started to gain traction in Nigeria because of its dependability and community participation. It also indicated the absence of institutional backing, insufficient knowledge, and unfavorable librarian attitudes were some of the hurdles to the adoption and use of Koha in Nigeria.

Ponelis and Adoma (2018) investigated the distribution of OSS to Ugandan academic libraries. The questionnaire was used to collect data. They observed that Uganda's academic libraries have adopted OSS owing to its low cost, ability to meet their library demands and adaptability. They revealed that the majority of the libraries used the Koha ILS. They observed that when contrasted with public university libraries, most private sector libraries have implemented OSS. They identified organizational policies, a lack of human resources, budgetary concerns, and technological resources as impediments to OSS implementation.

Hazarika and Ravikumar (2019) conducted a research study on implementation and integration of radio-frequency identification system. They defined that the real advantage of Koha and open source OPAC software is open to all type of changes. They compared High Frequency (HF) RFID with Ultra High Frequency (UHF) RFID system. They disclosed that UHF RFID system is providing multi-reading capacity, implementation of quick shelving of books, more efficient implementation for security gates, small size UHF tag, single turned, single layer-loop antenna and lower manufacturing cost compared with HF RFID system in library automation system. They implementation of quick shelving of books, more efficient implementation for security gates, small size UHF tag, single turned, single layer-loop antenna and lower manufacturing cost.

Salma and Devi (2020) did a literature review on Koha ILS adoption. According to the assessment, academics and special libraries in North America and Asia primarily utilize Koha.

Koha is utilized in the southern Indian states of Karnataka, Kerala, and Tamil Nadu. The majority of libraries and library professionals are enthusiastic about adopting Koha. They reported that the majority of libraries and librarians are enthusiastic about adopting Koha. This is because Koha provides various functions such as Web 2.0 features like tagging, feedback, sharing via social media, and RSS feeds. Because of its online design, multilingual compatibility with user-friendliness, and many customization options. This condition necessitates the necessity for library personnel to attend conferences, seminars, and receive technical assistance in order to successfully integrate Koha.

Qasim and Shah (2023) conducted study on the Status and Challenges of Library Automation in the Faisalabad Division University Libraries in Pakistan. To gather information about the whole population, the study employed an approach to quantitative research based on the survey methodology. All university libraries in the Faisalabad Division were polled, and 15 librarians from 10 universities answered. According to the library automation situation, all university libraries were substantially computerized, and KOHA software was utilized for automation. The major reason for using KOHA software was because it was open source anyone can modify to this software. Overall, participants were pleased with the software's functionality.

Koha Integrated Library Program (ILS) has been gaining appeal in Pakistani libraries in the past few years due to the needed characteristics and free availability (Asim & Mairaj, 2019).

Khan and Ayesha (2021) conducted research on the key characteristics of library automation software for automation in university libraries of Pakistan. This investigation is quantitative in character. The targeted demographic of 157 library professionals employed by university libraries was chosen via purposeful sampling. An online questionnaire was used for gathering data. They discovered that open-source, free is frequently utilized in university libraries to handle library reading contents. They reported that the majority of the university libraries employed by Koha software in Pakistan. The primary aspects of library automation software are software dependability and security, an intuitive user interface, advanced searching capabilities, library standards, online upgrades, development of corporate technical assistance, and shared databases.

Iqbal, Khan, and Sheikh (2023) did research at Sialkot on the use of software for academic library automation. To meet the study's aims, a quantitative research technique was applied. A survey was performed to gather data from librarians who worked in Sialkot's university libraries. A structured questionnaire was used to acquire data from 46 library workers. The findings revealed that the financial expenses of execution, upkeep, and software with support in multiple languages were the main motivations for the use of software for automation purposes. They claimed that adherence to the internet, university/institution refusal to cooperate in automated library services, unavailability of education amenities, inadequate library spending limits, and an absence of financial/economic assets were the main concerns while utilizing library automation software.

**2.2 Benefits and challenges of automation**

Library automation refers to the use of technology and software systems to streamline and enhance the operations and services of a library. It involves the computerization and digitization of various library processes, including cataloging, circulation, acquisitions, and more (Asim & Mairaj, 2017). The main goal of library automation is to improve the efficiency, accessibility, and management of library resources and services. Library automation typically involves the implementation of a library management system, also known as an ILS or library automation system. This system serves as the central hub for managing and organizing the library's collections, user information, and administrative tasks (Salma & Devi, 2019).

Library automation systems provide tools and modules for cataloging and classifying library materials. This includes creating bibliographic records, assigning subject headings, and

organizing items according to a standardized classification system such as Dewey Decimal Classification or Library of Congress Classification. Automation systems facilitate the circulation of library materials by automating processes such as checkouts, returns, and renewals (Naveed, Siddique & Adil, 2021). They maintain patron records, handle loan transactions, and enforce library policies such as due dates and fines. These systems also enable users to search and reserve items, manage their accounts, and receive notifications. An Online Public Access Catalog (OPAC) is an online database or interface that allows library users to search for and access library resources. Library automation systems provide a user-friendly OPAC interface, enabling patrons to search the library's collection, view item availability, place holds, and access digital resources. OPACs can also include features like book covers, summaries, and user reviews (Marasinghe, 2022).

Library automation serves several crucial purposes and fulfills the needs of libraries and their patrons. Library automation streamlines the process of cataloging and organizing library resources, making it easier for users to find the information they need. Automated systems enable quick searching, sorting, and retrieval of materials, reducing the time and effort required to locate specific items (Das & Chatterjee, 2015). Automation allows libraries to provide online access to their catalogs and digital resources, enabling users to search and access materials remotely. This expands the reach of the library beyond its physical location and enhances accessibility for users who may not be able to visit in person. Automation enables libraries to offer a range of user services that enhance the overall library experience. Features like self-checkout, online renewals, and personalized recommendations improve convenience and efficiency for library patrons. Automated systems also facilitate interlibrary loan services, allowing users to request materials from other libraries more easily (Ponelis & Adoma, 2018).

Library automation systems help librarians manage their collections more effectively. Automated cataloging and circulation functions streamline the acquisition, processing, and circulation of materials, reducing manual labor and minimizing errors (Nunekpeku, 2020). It also enables better inventory control, ensuring accurate and up-to-date information about the availability and location of items. Automation systems capture and store data about library collections, usage, and user behavior. This data can be used for various purposes, such as generating reports, analyzing trends, and making informed decisions about collection development and resource allocation. It helps librarians understand the needs and preferences of their users and tailor their services accordingly (Nayana, 2019).

Library automation facilitates digital preservation efforts by providing tools and systems to manage and preserve digital collections. It enables the creation of digital repositories, digitization projects, and long-term access to electronic resources. Automation systems also assist in managing conservation activities for physical materials, tracking their condition, and scheduling necessary preservation measures (Khan & Ayesha, 2021).

Automated library systems support collaboration and resource sharing among libraries. Interlibrary loan networks, shared cataloging databases, and consortiums can be established, allowing libraries to pool their resources, share knowledge, and provide access to a wider range of materials for their users. While the initial implementation of library automation systems requires investment, it can result in long-term cost savings. Automation reduces manual labor, increases efficiency, and optimizes resource utilization. It eliminates the need for physical card catalogs, minimizes paper-based processes, and streamlines workflows, ultimately saving time and resources for libraries (Choi, 2023).

## 3. Research Methodology

The research design is an important aspect of the research. It is the advanced preparation of data collecting and analysis procedures to achieve the aim of the study. Kothari (2004) described research design as "research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure."

Johnson and Onwuegbuzie (2004) stated that "research approach always follows the research questions which offer the best and suitable solution of the research problem". In social science, there are four types of research methodologies on the basis of data: (a) "quantitative" and (b) "qualitative", (c) Mixed Methods"., (d) "Multimethod (Ullah & Ameen, 2022; Ullah & Ameen 2023)". A quantitative research design is defined by Creswell (2017) as "an inquiry into a social or human problem, based on testing a theory composed of variables, measured with numbers, and analyzed with statistical procedures, in order to determine whether the predictive generalizations of the theory hold true". Muijs (2010) explained quantitative research as "collecting and numbering data from the large population and analyzing it by using statistical methods". This study used quantitative research approach to achieve its objectives.

One of the fundamental parts of the research procedure is the choice of the best approach for achieving the study objectives. The survey research approach was defined by Dad and Khan (2012) as "a survey can be anything from a short paper and pencil feedback form to an intensive one-on-one in-depth interview". In the social sciences, survey research is a particularly important research method. Powell (2004) said that the survey approach is the greatest and most appropriate method for the profession of librarianship. The current study collected data from the population at large through survey research using a questionnaire accessible via the internet.

A population is characterized as a homogeneous group of people being examined. Powell (2004), a well-known scholar, defined the word population as "any set of individuals or items that owns at least one mutual characteristic". The current study's target demographic is college librarians in the Punjab province. A sample is a subset of a population that is being studied in a research project. Goode and Hatt (1952) pointed out that "sample is the representative of whole population of the study". Purposive sampling technique is used for the selection of college librarians. College librarians were purposefully selected who are using library automation services in their libraries.

To obtain data from respondents, a questionnaire was created. The questionnaire is divided into six sections. The first part contains demographic data. The second section covered the information of modules are being used in college libraries. The third section covered the benefits of library automation. The fourth sections consisted of problems faced during library automation implementation and using. The fifth section is about expertise of librarians, and sixth section covered the methods to get expertise for library automation. Pilot testing was carried out on 05 research participants. The goal of pilot testing was to get additional clarity and assess respondents' comprehension, and the time it took to complete the questionnaire. Following the pilot research, specific phrases in the questionnaire were rewritten, and new questions were included. The validity of the questionnaire was checked through expert opinions. However, to assess the reliability of the study instrument, the Cronbach alpha reliability test was used. Pallant (1997) stated that "Cronbach values were reliant on the number of items in the instrument". The lower acceptable number for the Cronbach alpha coefficient typically is 0.70, however in certain circumstances it is 0.60 (Hair et al., 2006). The reliability of the questionnaire is showing in below table.

After the final editing, the researchers prepared questionnaire on Google Form. The researcher distributed the link of questionnaire through email, Faceook, and WhatApp. The researcher

briefed the question when respondent asked for more clarity. However, data was collected from 223 college librarians. The researcher assigned a unique number to each questionnaire when the data gathering phase was completed. For analysis, the data was entered into the "Statistical Package for the Social Sciences" (SPSS). The errors made during data entry into SPSS were repaired. Using SPSS software, the data was analyzed using descriptive statistics, "frequency and percentage counts", "mean", and "standard deviation". Inferential statistics was also used. The Independent Sample t-test was used to determine the disparity between opinions. In Chapter 4, the results were laid out in tables and graphs.

## 4. Results

### *4.1 Demographic detail of respondents*

The data was received from 223 college librarians. The majority of the respondents were Librarian 187 (84%). The results showed that 33 (15%) respondents were working as senior librarian while 03 (1%) as deputy chief librarian in college libraries. The majority of the respondents 167 (75%) were from public sector college libraries and 56 (25%) respondents were working in private sector. Amongst 223 respondents, majority of the respondents 132 (59%) were male while 91 (41%) respondents were female. The majority of the respondents 94 (42%) were from the age group of 31-35, followed by 62 (29%) respondents belonging to age group of 26-30 years. The age of 36 (16%) respondents were from the 20 to 25 years. Out of 223, 122 (55%) respondents have MLIS/BS degree in library and information/management sciences and 101(45%) have MPhil and PhD degree. The majority of the respondents 106 (47%) were working from 1-5 years while 76 (30%) respondents were working from 6-10 years.

**Table 1: Demographic information of respondents (N=343)**

| Demographic Information | Frequency | Percent |
|---|---|---|
| **Designation** | | |
| Deputy Chief Librarian | 14 | 06.30 |
| Senior Librarian | 22 | 09.90 |
| Librarian | 187 | 83.90 |
| **Gender** | | |
| Male | 132 | 59.20 |
| Female | 91 | 40.80 |
| **Education** | | |
| MPhil | 101 | 45.30 |
| MLIS/BS | 122 | 54.70 |
| **Age** | | |
| 20-25 years | 31 | 13,90 |
| 26-30 years | 62 | 27.80 |
| 31-35 years | 94 | 42.20 |
| 36-40 years | 14 | 06.30 |
| Above 40 years | 22 | 09.90 |
| **Experience** | | |
| 1-5 | 106 | 47.50 |

| | | |
|---|---|---|
| 6-10 | 67 | 30.00 |
| 11-15 | 28 | 12.80 |
| Above 20 | 22 | 09.90 |
| **Total** | **223** | **100.0** |

### *4.2 Kinds of Software being used*

The findings (table 2) showed that majority of the respondents 169 (76%) were using LIMS software as compared to Koha integrated library software 46 (20%) and SLIMS 08 (04%).

**Table 2: Use of software (N=223)**

| Software | Total |
|---|---|
| Koha | 46 |
| SLIMS | 08 |
| LIMS | 169 |
| **Total** | **223** |

### *4.3 Software Module Use*

The respondents were asked about the use of different modules in college libraries to perform certain automation activities. The findings (Table 3) showed that majority of the respondents were using module including cataloging (Mean=4.23), administration (Mean=3.81), circulation (Mean=3.80), and reports (Mean=3.56). The lowest mean score was found of Serials (Mean=2.75), which indicates that few college librarians were using serials module.

**Table 3: Use of software module (N=223)**

| Sr. No. | Module | Mean | SD |
|---|---|---|---|
| i) | Cataloging | 4.23 | 1.08 |
| ii) | Circulation | 3.80 | 1.46 |
| iii) | Patron/Library Member | 3.42 | 1.40 |
| iv) | Acquisition | 3.04 | 1.48 |
| v) | Administration | 3.81 | 1.37 |
| vi) | Tools | 3.54 | 1.09 |
| vii) | Reports | 3.56 | 1.17 |
| viii) | Serials | 2.75 | 1.51 |

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### *4.4 Benefits of Library Automation*

The respondents were asked about the benefits of library automation. The respondents believe that major benefits of library automation the efficiency of searching and locating materials and the accessibility of library resources. Library automation has improved the overall user experience and satisfaction with library services and simplified the borrowing and returning process for library materials.

**Table 4: Benefits of library automation (N=232)**

| Sr. No. | Benefits | Mean | SD |
|---|---|---|---|
| i) | Library automation has enhanced the efficiency of searching and locating materials within the library | 4.71 | 0.49 |
| ii) | Library automation has improved the accessibility of library resources for users | 4.57 | 0.45 |
| iii) | Library automation has simplified the borrowing and returning process for library materials. | 4.37 | 0.58 |
| iv) | Library automation has reduced manual paperwork/ administrative tasks for library staff. | 4.37 | **0.71** |
| v) | Library automation has provided remote access to library resources for off-campus users. | 3.99 | 1.18 |
| vi) | Library automation has improved the accuracy and timeliness of library notifications and reminders. | 4.14 | 0.84 |
| vii) | Library automation has facilitated interlibrary loan services, allowing users to access materials from other libraries | 3.80 | 1.22 |
| viii) | Library automation has improved the overall user experience and satisfaction with library services | 4.40 | 0.63 |
| ix) | Library automation has reduced the time spent on administrative tasks, allowing library staff to focus more on user assistance and support. | 4.22 | **0.71** |
| x) | Library automation has supported efficient collection management, including acquisition, cataloging, and weeding. | 4.15 | 0.91 |
| xi) | Library automation has enabled seamless integration with other systems and technologies used in the library. | 4.09 | 1.06 |

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### *4.5 Problems faced during Library Automation*

The respondents were asked about the library automation problems. The findings (Table 5) showed that lack of cooperation by college is the major problem followed by lack of consultancy, and competent library staff. Other major problems include non-availability of training facilities and inadequate library budget.

**Table 5: Problems faced during Library automation (N=223)**

| Sr. No. | Problems | Mean | SD |
|---|---|---|---|
| i) | "Non-cooperation in library automation by college" | 4.00 | 1.02 |
| ii) | "Lack of consultancy and technical service" | 4.07 | 1.15 |
| iii) | "Lack of competent library staff" | 3.49 | 1.11 |
| iv) | "Availability of training facilities" | 3.56 | 1.16 |
| v) | "Inadequate library budget" | 4.30 | 1.04 |
| vi) | "Lack of customization facility" | 4.09 | 1.08 |
| vii) | "Lack of up gradation facility" | 4.17 | 0.98 |
| viii) | "Lack of IT infrastructure facilities (Hardware /Software)" | 4.18 | 1.06 |
| ix) | "Lack of admin right by IT department" | 4.11 | 1.02 |
| x) | "Lack of admin right for software-by-software house / company" | 3.95 | 0.99 |
| xi) | "Lack of library automation policy" | 3.81 | 1.07 |
| xii) | "Staff transfer" | 3.87 | 1.05 |
| xiii) | "No cooperation of super ordinate with subordinates" | 4.05 | 1.04 |
| xiv) | "Lack of fund / economic resources" | 4.21 | 1.00 |
| xv) | "Lack of internet with good speed" | 4.33 | 1.07 |

### *4.6 Impact of demographic factors on challenges in automation*

The findings (Table 5) showed that demographic factors have significant influences on the challenges faced by respondents. Female (Mean=66.34) has faced higher problems in the adoption of software as compared to male (Mean=56.07). The value of Person correlation showed that the relationships of experience, age, designation and education with challenges

**Table 6: Impact of demographic factors on challenges in automation**

| Factors (Codes) | Statistics | Value | Sig. |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Gender** (Male=0, Female=1) | Independent Sample t-test | **-6.060** | **.000** |
| **Experience** (1=1-5, 2=6-10, 3=11-15, 4=16-20, 5= above 20) | Pearson correlation | **-.780**** | **.000** |
| Age (1=20-25, 2=26-30, 3=31-35, 4=36-40, 5=above 40) | Pearson correlation | **-.565**** | **.000** |
| **Designation** (1=Librarian, 2=Senior Librarian, 3=Deputy Chief Librarian, 4=Chief Librarian) | Pearson correlation | **-.532**** | **.000** |
| **Education** (1=MLIS, 2=MPhil, 3=PhD) | Pearson correlation | **-.297**** | **.000** |

## 5. Findings and implications

The results demonstrated that the majority of the college libraries were using LIMS software for the purpose of automation. The findings showed that majority of the respondents were using module including cataloging, administration, circulation, and reports. The findings showed that majority of the respondents were agreed that lack of internet with good speed, inadequate library budget, lack of IT infrastructure facilities, and lack of up gradation facility were the major problems in library automation in college libraries. Library automation significantly improved the efficiency of library operations and enhanced the quality of services provided to users. College libraries in Pakistan often face resource constraints, including limited staff, budgets, and physical space. Female has experienced higher problems as compared to male. Increase in age, experience, and qualification has decreased the problems. Higher the designation, the lower is the level of challenges.

Research on library automation can provide insights into resource optimization strategies and best practices that can be implemented in Pakistani libraries. The digital transformation of libraries is a global trend, and Pakistan is no exception. Studying library automation in Pakistan can provide valuable insights into the adoption and impact of digital technologies in libraries, including the challenges faced and the benefits gained. This research can guide libraries in Pakistan to navigate the digital transformation process effectively and make informed decisions about technology adoption. Library automation in Pakistan can be an important area for academic research, fostering collaboration between researchers, librarians, and policymakers. The current research can contribute to the existing body of knowledge in library and information science, providing empirical evidence and data specific to the Pakistani context. This can support evidence-based decision-making and policy formulation related to library automation and development.

## 6 Conclusions

The core aim of the study was to investigate current status and challenges in the automation of college libraries in Punjab province. The majority of college librarians were using LIMS software for the purpose of automation followed by Koha and SLIMS. The findings showed that majority of the respondents were using module including cataloging, administration, circulation, and reports. College librarians got benefits of library automation including library automation benefits including library automation has enhanced the efficiency of searching and locating materials within the library, library automation has improved the accessibility of library resources for users, library automation has improved the overall user experience and satisfaction with library services, and library automation has simplified the borrowing and returning process for library materials. It was discovered that that lack of internet with good speed, inadequate library budget, lack of IT infrastructure facilities, and lack of up gradation facility were the

major problems in library automation in college libraries. College librarians have the expertise to generate different types of label on software, to use the cataloging module, to install the software, and they can generate administrative accounts for other library staff on software. College librarians gained expertise using various methods including online tutorials or video courses, seeking feedback from users or experts, self-study and practice with library software, and collaborative projects or discussions with colleagues to learn more about library software.

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