**Impact of ICT on User Services in the University Libraries: Evidence from Islamabad and Rawalpindi**

**Ammar Hassan**

[lisammarhassan@gmail.com](mailto:lisammarhassan@gmail.com)

Document Controller Officer, Finance Department, CCTEB Head Office Islamabad

**Dr. Ata ur Rehman**

[ata.rahman@iiu.edu.pk](mailto:ata.rahman@iiu.edu.pk)

Assistant Professor, Al-Hamd Islamic University, Islamabad

**Syed Arif Ali Shah**

[Arif.lis@suit.edu.pk](mailto:Arif.lis@suit.edu.pk)

Assistant Professor, Sarhad University Peshawar

**Corresponding Author: \* Ammar Hassan** [lisammarhassan@gmail.com](mailto:lisammarhassan@gmail.com)

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**ABSTRACT**

*Integration of Information and Communication Technology (ICT) has transformed nature of library service in higher education in the world. This paper analyses the effects of ICT on the services of users in the libraries of two universities in Islamabad and Rawalpindi. It used a quantitative survey research design and used structured questionnaire to collect data on 100 library professionals. The SPSS was used to analyze responses and descriptive statistics were used. The findings indicate that ICT had also enhanced the library operations particularly in cataloging, circulation, access to electronic resources and user satisfaction. The efficiency of the services that had been improved through the adoption of ICT were justified by the respondents as well as their effectiveness and availability. However, un-funding, ageing infrastructure, shortage of training personnel and intermittency in the upkeep of the system is an impediment to the full utilization of ICT. The study concludes that even with the positive transformations that the ICT has had on user services in university libraries, sustainable development requires strategic investment, staff capacity building, as well as policy level support. These results can be of great use to policy makers, administrators and the library professionals in an attempt to strengthen the digital library infrastructures in Pakistan.*

***Keywords:*** *ICT, User Services, University Libraries, Digital Resources, Islamabad, Rawalpindi*

**INTRODUCTION**

The emergence of the Information and communication technology (ICT) has radically changed the role of university libraries and turned them into flexible digital hubs that no longer focus on the physical book collections. ICT integration is a strategic plan by institutions of higher learning and is seen as a way of expanding accessibility to information so as to improve service provision as well as research output. Online Public Access Catalogues (OPACs), electronic databases, digital repositories and online reference systems are now being actively integrated into the operational infrastructure of contemporary library systems.

In Pakistan, there is an increasing trend of university libraries especially the ones found in Islamabad and Rawalpindi to adopt the use of ICT in order to accommodate the growing informational demands of the students, faculty, and researchers. Even though these technologies are likely to offer more resource accessibility and increased user satisfaction, a number of barriers still exist. Limited financial capabilities, outdated infrastructure, lack of employees training, and personal aversion to using new technologies are some of the major challenges to effective implementation of ICT.

The available literature on adoption of ICT in academic libraries has been mostly focused on the more generalized terms of automation or infrastructure instead of assessing the subsequent influence in the provision of user services. Such a gap is more pronounced in the Pakistani context, where little academic interest in the topic of ICT-enabled service transformation is seen. The subtle knowledge on the way ICT improves user experience and the realization of the issues surrounding its use are key concepts in the development of sustainable practices in the digital library setting.

The current paper aims to measure the impacts of ICT on the services of users in the university libraries of Islamabad and Rawalpindi. It clearly studies the degree to which ICT can be used to improve the efficiency, usefulness, effectiveness of library activity, as well as defining challenges that remain to date.

**Statement of the Problem**

**The fast growth of the Information and Communication Technology (ICT) has radically transformed the functioning of the academic libraries worldwide and allowed them to achieve quicker access to the resources, improved management of the resources and user-oriented services. This however does not apply to the case of Pakistan; in particular in the cities of Islamabad and Rawalpindi, with integration of ICT in university libraries being haphazard due to financial constraints, infrastructural constraints, and management constraints. Though several studies have been done on ICT adoption and automation there is dearth of a research that has specifically focused on the direct influences of ICT on user services such as accessibility, efficiency, effectiveness and user satisfaction. Furthermore, little focus has been given to the competences of the staff in a library and the challenges that will be involved in the implementation of ICT. As such, there is an existing gap in the empirical data on the impact of ICT on the overall service quality of university libraries in such regions. In that regard, the given research attempt attempts to fill this void by assessing the effects of ICT on user services in the library of the Islamabad and Rawalpindi University.**

**Research Objectives**

1. To determine the level of computerization/automation of university libraries.
2. To evaluate the usefulness, efficiency, and effectiveness of ICT resources in university libraries.
3. To assess how skillful and knowledgeable the staff are in the use of ICT resources.
4. To identify the challenges associated with the application of ICT in university libraries.

**Research Questions**

1. What is the level of computerization/automation of university libraries?
2. How useful, efficient, and effective are ICT resources in university libraries?
3. How skillful and knowledgeable is the staff in the use of ICT resources?
4. What are the challenges associated with the application of ICT in university libraries?

**LITERATURE REVIEW**

### **Computerization and Automation of University Libraries**

Johnson (2019) argues that the presence of automation in academic libraries of the United States has also changed the traditional library activities significantly. In his research, he notes that the cataloguing, circulation and reference services have gotten more efficient and precise when the manual processes are replaced by automated systems. Users Librarians can also focus on user-based services since automation reduces human error and conserves the time of the staff. These results are important in the current research because they reveal that the computerization is paramount in improving user services and meeting the soaring demands of academic communities.

Mirza and Arif (2016) analyzed the libraries of the Pakistani universities and found that automation was not evenly adopted in all the universities. Libraries with powerful financial aid incorporated automation systems with ease, as compared to the ones with inadequate resources and outdated infrastructures. They found that the disparity of resources creates a considerable difference in the quality of services between the universities which is directly associated with the first goal of the ongoing study as it has shown that local financing and infrastructure determine the effectiveness of the ICT-based automation of user services.

Latif and Mahmood (2023) have conducted a research at libraries in Islamabad and Rawalpindi and documented that more sophisticated systems than Koha and DSpace are being used to handle catalogues and repositories of digital materials. According to their studies, ICT integration enhances better organization of resources and enables better access to users. They, however, also point out that technical support and training continuously are very important in maintaining such improvements. The current study supports that computerization is a requisite of libraries in Pakistan, and more specifically in Rawalpindi and Islamabad to ensure that they are up-to-date with the global standards Ullah et al., (2023).

### **Usefulness, Efficiency, and Effectiveness of ICT Resources**

**Through their research on the Pakistani academic institutions, Ahmad and Fatima (2020) found that the use of information and communication technology ICT-based services significantly improved access to online public access catalogues (OPACs), electronic journals, and electronic databases. They claimed that this type of services allowed users to access information swiftly and efficiently, which consequently made them even more satisfied and fewer dependent on print collections. The findings highlight the critical role played by the ICT resources in enhancing the importance of library services to the diverse requirements of academic users. So, the present paper is supported by the strong evidence that ICT adoption is directly associated with the quality of library services.**

**Rafiq and Ameen (2020) in their research explored about the user perception of information and communications technology (ICT) in university libraries found that technology had contributed to the increase in ease, dependability, as well as speed of accessing library resources. They found that the lack of internet connectivity and also undependable bandwidth to be major limitations to the optimal performance. These findings highlight that despite all its significant positive impacts, infrastructural limitations are a decisive factor to the success of Information and Communication Technology. The results are in line with the modern research agenda that puts special emphasis on efficiency and effectiveness of ICT based supported services.**

**Khan and Bhatti (2018) explored the level of use of electronic resources in the libraries of higher education institutions and proven that ICT-based digital platforms play a significant role in enhancement of research productivity. The authors finds a very strong collaborative and innovative use of online databases and electronic journals. These findings have a specific association to the current study in that they finds that ICT utility is associated with academic performance, thus making it seem that ICT is not simply an instrument of better service delivery but is one of the fundamental components in which overall institutional goals are informed.**

**Aslam and Farooq (2021) have highlighted the importance of certain Information and Communication technology services, including online renewal, remote access system, and online query management. They found, libraries that had these functionalities are more likely to be more satisfied with the users as compared to those with low ICT infrastructure. Therefore they make a conclusion that ICT based, user driven services have become a basic need instead of a luxury. This fact directly supports the second objective of the present study that is the assessment of the efficiency and adaptability of ICT resources in enhancing the library services.**

**ICT Skills and Competencies of Library Staff**

**Farooq and Anwar (2020) finds that the presence of staff competencies is a key factor in successful implementation of information and communications technology in libraries. The study showed that although most Pakistani librarians already had basic ICT skills, but they had no formal chances of professional development thus restraining their ability to fully utilize advanced ICT systems. The authors recommended adoption of continuous professional development programs that would help in increasing technical expertise and improving library service delivery. Considering the current study, the results are important as they highlight the inseparable staff competence in enhancing successful implementation of Information and Communication Technology resources in libraries.**

Warraich and Ameen (2017) in their research explored the consumer satisfaction with electronic resources in Pakistani libraries and conclude that the extent of user satisfaction directly proportional to the ICT proficiency of library personnel. The hypothesis of the researchers, librarians who are confident in their use of technology can offer timely services and quality guidance, which improves user experience. These results support to the third objective of the research that evaluation of ICT competencies of personnel is crucial in respect of recognizing the ability of a library to maintain user services in a digital context.

**Challenges in ICT Adoption**

**Shahid and Mushtaq (2022) carried out a study of issues immediate the adoption of information and communication technology (ICT) in Pakistan library of higher education and concluded that lack of infrastructure, insufficient maintenance facilities, and lack of finances are all key hindrances to successful adoption of Information and Communication technology in learning institutions. Though customers express satisfaction in general, these systemic shortcomings undermine the sustainability of the ICT services in the long term.**

**Rasheed and Tariq (2020) examined libraries of universities in Punjab and found that the ICT services were often interrupted by the lack of consistency in the technical support and unreliable internet connectivity. Although these institutions deployed the use of digital portals, insufficient troubleshooting systems led to frustration among the users hence highlighting how technical flaws can undermine the effectiveness of ICT implementations.**

**A review of African scholarly libraries revealed detractors like frequent system malfunctions, staff opposition and inadequate security, by Elisha and Olabisi (2021). Their results suggest that without cultural and organizational preparedness, even advanced ICT systems can be underused, thus emphasizing even more the human and managerial components of ICT issues Baber et al., (2024).**

**As Wema (2018) has argued, libraries located in the developing countries often face challenges with maintaining ICT projects due to financial constraints and lack of support on policy level. He noted that in many cases of short-term, donor-financed ICT projects, long-term planning in conjunction with initial ICT investment is relevant because the projects do not lead to any lasting improvement unless they are part of the larger institutional frameworks.**

**On the whole, these studies prove the multi-dimensionality of the issues of ICT adoption in university libraries, including both technological and financial and managerial and cultural and policy issues. It is hence imperative to address these issues in order to maintain ICT-facilitated user services in academic libraries.**

**Research Gap**

Despite the fact that a number of studies have examined the presence of ICT in university libraries, there are still a number of weaknesses. The majority of the current studies conducted in Pakistan have been on the overall acceptance of ICT tools or the level of library automation (e.g., Mirza and Arif, 2016; Rafiq and Ameen, 2020). Nevertheless, not many studies have particularly focused on the effects of ICT on user services, including accessibility, efficiency and satisfaction in the university libraries. Moreover, although the transformative potential of ICT is evidenced through the works of international studies (e.g., Johnson, 2019; Elisha and Olabisi, 2021), it does not present much context-specific evidence of the city, where the academic libraries have specific infrastructural and managerial challenges. Moreover, the research conducted in the past tended to ignore the skills and competencies of the library staff as one of the factors that would affect the effectiveness of ICT. As such, the research bridges this gap since it specifically concentrates on the role of ICT in influencing user services, staff competencies and the problems in the university libraries in Islamabad and Rawalpindi to give a local understanding with theoretical and practical implications.

**METHODOLOGY**

The research design used in this study was quantitative as it sought to explore the impact of Information and Communication Technology (ICT) on the user services in the university libraries of Islamabad and Rawalpindi. Descriptive survey method was selected since it provides a structured method of assessing the perception and experience of respondents.

The population to the target was library professionals both in the public and the private sector universities of Islamabad and Rawalpindi. These were the chief librarians, assistant librarians, cataloguers and others who were directly engaged in ICT based services. A purposive sampling was used due to the absence of a comprehensive sampling frame in order to cover respondents who had direct ICT experience. The survey was carried out among 100 respondents who were both in the public and the private universities.

A structured questionnaire based on literature review was used to collect the data. The instrument had Likert items that dealt with four broad dimensions that included (1) Level of automation and computerization, (2) Usefulness, efficiency and effectiveness of ICT resources, (3) ICT skills and competencies of staff, and (4) Challenges in ICT application. A pilot test was carried out using 20 participants to ensure that the tool was refined. Cronbachs Alpha of the reliability test was 0.902 which is high internal consistency. The analysis of data was performed with the help of SPSS. The responses were interpreted using descriptive statistics, which included mean, standard deviation, frequencies, and percentages.

**FINDINGS AND DISCUSSION**

The reversed Likert scale ensured that higher scores reflected stronger agreement or better performance. Overall, the findings highlight the significant role of ICT in improving user services in the university libraries of Islamabad and Rawalpindi.

Level of Computerization/Automation: Libraries have attained a high degree of computerization. Respondents strongly agreed that ICT has made operations efficient (M = 4.67) and effective (M = 4.47), with smooth integration (M = 4.47).

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| --- | --- | --- | --- | --- |
| **Variable** | **Mean** | **Std. Dev** | **Min** | **Max** |
| Efficiency | 4.67 | 0.55 | 2.0 | 5.0 |
| Effectiveness | 4.47 | 0.70 | 2.0 | 5.0 |
| Integration | 4.47 | 0.66 | 2.0 | 5.0 |

**Usefulness, Efficiency, and Effectiveness**: ICT resources were rated very positively, including usefulness (M = 4.58), support (M = 4.54), catalog services (M = 4.44), delivery of information (M = 4.35), and system speed (M = 4.22). Minor concerns about disconnections (M = 4.05) suggested occasional instability.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Mean** | **Std. Dev** | **Min** | **Max** |
| Usefulness | 4.58 | 0.62 | 2.0 | 5.0 |
| Efficiency | 4.35 | 0.77 | 2.0 | 5.0 |
| Effectiveness | 4.44 | 0.71 | 2.0 | 5.0 |

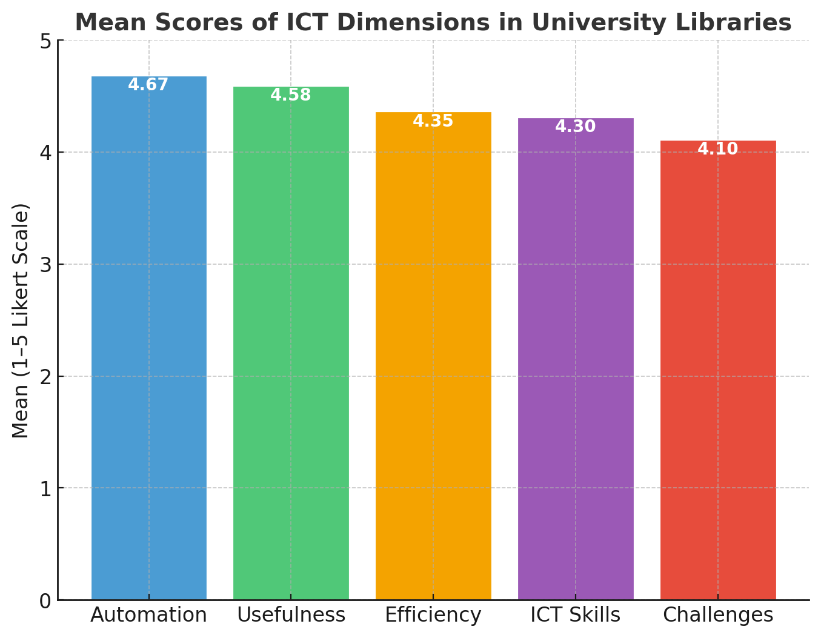
**ICT Skills**: Library staff reported strong ICT skills (M = 4.30) and application of ICT in their work (M = 4.25). Training opportunities were slightly lower (M = 4.00), indicating the need for more structured programs.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Mean** | **Std. Dev** | **Min** | **Max** |
| Knowledgeable | 4.33 | 0.68 | 2.0 | 5.0 |
| Skillful | 4.30 | 0.72 | 2.0 | 5.0 |
| Training Support | 4.28 | 0.75 | 2.0 | 5.0 |

**Challenges**: Respondents agreed that ICT-related problems (M = 4.10) and maintenance issues (M = 4.15) remain. While overall satisfaction was strong (M = 4.48), ongoing concerns about infrastructure and utility upgrades suggest the need for continued support.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Mean** | **Std. Dev** | **Min** | **Max** |
| Funding Issues | 4.10 | 0.80 | 2.0 | 5.0 |
| Infrastructure Gaps | 4.12 | 0.74 | 2.0 | 5.0 |
| Resistance to Change | 4.08 | 0.77 | 2.0 | 5.0 |

**Discussion**: The results confirm that ICT has enhanced efficiency, improved user access, and strengthened staff performance. However, challenges such as insufficient training and system breakdowns demonstrate that ICT integration is still evolving. Sustainable outcomes require infrastructure development, regular funding, and capacity building.



**CONCLUSION AND RECOMMENDATIONS**

**Conclusion**

The paper has explored how Information and Communication Technology (ICT) has influenced the services offered to the users in universities libraries in Islamabad and Rawalpindi. This is because the findings showed that automation and digital resources offered have significantly improved service delivery by increasing accessibility, efficiency, and accuracy. ICT has also enhanced the speed of information retrieval, online services (renewal and remote access) and minimized the use of manual operations. Besides, the library employees were usually skilled and willing to embrace ICT tools although the need to undergo constant training was found to have been a requirement in order to be abreast of the emerging technologies. Nevertheless, the following issues remain: inadequate funding, unreliable infrastructure, absence of policy forthcoming, opposition to change, etc., therefore, hindering the full Asian potential ICT in libraries.

Theoretically, the study contributes to the current knowledge on the role of ICT in changing the services of users in academic libraries thus filling the gap between the adoption and satisfaction of technology. Practically, the findings highlight the need to continue training and develop infrastructure and support policies to ensure ICT can be fully utilized in higher education libraries.

**Recommendations**

**Staff Training and Capacity Building**: ICT training activities that should be continuous should be implemented to the library staff to strengthen their capabilities and enable them to deliver their services better.

**Purchasing of Hardware and Updating of Software and Cable Internet**: Universities should invest in purchasing and updating hardware and software together with high-speed internet connections to provide the dependability of ICT-based services.

**Sustainable Funding**: There should be institutional and policy provisions on the setting up of a separate budgetary allocation to maintain and develop ICT infrastructure.

**Policy Formulation:** National and institutional library policies should put emphasis on the integration and standardization of ICT in the universities.

**User-Centered Services**: User feedbacks are advised to be regularly gathered and incorporated into the ICT-based services to enhance relevance and effectiveness.

**Collaborative Initiatives**: Universities must also transfer good practice and materials to consortia and digital networks to make cost reductions and increase access.

**Future Research**: Future research initiatives can explore the application of ICT in expert user services like research data management, integration of e-learning and training digital literacy.

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