Evaluation of ICT-based Library Services of PDEU, Gandhinagar: User Perception and Usage Analysis

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Abstract

Background

ICT has resulted in some transformations in the realm of academic libraries with regard to information access and delivery of library services. This study seeks to bridge this gap by providing an evaluation of user attitudes, utilization patterns and problems encountered in ICT based library services.

Method

This research adopted a descriptive survey design that entailed collection of data through the use of structured questionnaires sent through Google Forms. From the total population of 450 questionnaire administered, 405 valid questionnaires were returned.

Key Findings

The findings of the study indicate that 57.7% of users have positive attitude to ICT based library services whereas 35.8% have no attitude on the matter. While some tools like OPAC and online resources have been moderately utilized, more advanced tools like library mobile applications have not been widely used because 41.23% of users have never used them. The major problems highlighted include poor internet connection (53.1%) and inadequacy of required infrastructures (31.4%). Despite this problem, easy accessibility is one benefit mentioned by 57% of users.

Conclusion

In conclusion, although there are positive attitudes toward ICT services, better infrastructure, connectivity and adequate training will be required.

Keywords: Information and Communication Technology (ICT), Library Services, User Perception, Digital Library, PDEU.

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1. Introduction

It is necessary to acknowledge that Information and Communication Technology (ICT) has become an integral part of any modern academic library. ICT has significantly changed the nature of information processing, access, and distribution. In educational establishments, ICT makes the process of information searching more productive, provides opportunities for distant access to different sources, and increases the engagement rate (Kumar & Singh, 2021; Mishra, 2020).

Nowadays, many Indian academic libraries implement different ICT-based library services. For example, one can mention automated library management systems, institutional repositories, databases, and web services. Recent studies prove that the implementation of ICT has made the work of libraries more efficient and has led to the increase in digital resource availability beyond their premises (Sharma & Kaur, 2022; Ramesh & Kumar, 2019). Moreover, ICT has positively impacted user experience since they can gain access to scholarly articles quickly and learn flexibly using online sources (Patel & Desai, 2023). Nevertheless, some studies have shown that the use of ICT-based services varies depending on a number of factors. Specifically, they include insufficient infrastructure, lack of necessary skills, insufficient user awareness about ICT capabilities, and the absence of proper internet connection (Gupta & Verma, 2021; Singh et al., 2020). Furthermore, although users have mostly positive attitudes towards the use of digital libraries, they are not willing to embrace new ICT technologies, which include mobile applications and self-service solutions (Joshi & Patel, 2022).

To date, there has been numerous research focused on the influence of ICT on the work of academic libraries and its impact on users. However, there is still a gap concerning the analysis of users' perceptions and their engagement with ICT tools within certain institutions. Specifically, it is necessary to explore the frequency of ICT tool use, the users' attitudes towards them, and possible barriers to their access (Joshi & Patel, 2022). Therefore, this study aims to fill the existing gap by analyzing users' perceptions and their interaction with ICT-based library services at Pandit

Deendayal Energy University (PDEU), Gandhinagar.

2. Literature Review

There is a considerable necessity of carrying out focused literature in the sphere of the use of ICT-based library services in a particular institution such as PDEU, Gandhinagar. Thus, the purpose of this research is to investigate users' awareness and attitudes towards ICT-based library services as well as to identify the difficulties in using such services.

- The use of ICT in academic libraries has led to tremendous changes in the area. It is stated that ICT has positively affected the performance of libraries through making services easier, increasing the availability of information, and supporting the processes of knowledge management (Bhoi, 2018; Singh, 2018).
- At the same time, it should be admitted that the application of ICT in the Indian academic libraries has increased recently because there was an increased demand for electronic materials. According to several sources, ICT has positively influenced library management and improved accessibility through creating digital repositories, using integrated library systems and other software and hardware solutions (Rajput & Pandey, 2024). Moreover, in Indian universities, ICT adoption resulted in better administrative functions due to the use of computerised technology and websites (Choudhary, 2023).
- It is essential to state that the use of ICT-based library services among users is widely investigated in the literature. The findings prove that the most common tools are OPAC, electronic journals, and databases that give access to different academic materials (Husain, 2022). Still, it is necessary to admit that more complicated tools, namely Web 2.0, interactive platforms, and mobile services are not popular owing to a low level of user awareness and knowledge regarding these resources.
- The user perception and satisfaction were explored in multiple studies. Most scholars agree that ICT-based services are appreciated because these services allow users to save their time, access electronic books and journals easily, and avoid the limitations connected with physical access to the library (Addanki, 2024). It is important to mention that the level of users' satisfaction depends on numerous factors such as the availability of technical assistance, the speed of access to the Internet, etc.
- Despite the benefits mentioned above, there are some problems preventing the proper use of ICT in libraries. These problems were analysed in multiple articles and include the lack of technological infrastructure, poor connection to the Internet, shortage of qualified employees and users' poor digital skills (Chaudhari & Bhoye, 2024). At the same time, according to the recent survey focused on librarians in India, the lack of appropriate training is one of the major hindrances to the development of ICT (ShodhKosh Study, 2024).
- The modern trends that are implemented in ICT-based libraries include digitalisation, automation, gamification and digital knowledge management (D'Souza, 2024; Subaveerapandiyan et al., 2025). However, the studies show that despite the potential opportunities of these approaches to improving libraries' functions, there is a lot of work to do in terms of their further implementation. It is caused by the lack of financial and technical means.

Overall, above literature can be mentioned that ICT positively affects the activities of academic libraries by making the processes more convenient and flexible. Nevertheless, there are many challenges preventing users' active ICT use, including the lack of infrastructure, digital skills, and awareness.

2.1 Review Research Gap:

Based on the reviewed literature, the major themes, identified gaps, and corresponding focus of the present study are summarized in Table 1.

Table 1: Research Gap Analysis

Aspect	Findings from Literature	Identified Gap	Focus of the Present Study
ICT Adoption in Academic Libraries	Research shows that ICTs like digital repositories, OPAC, and e-resources are widely used in academic libraries (Bhoi, 2018; Rajput & Pandey, 2024).	Most research is concerned with general adoption and not with specific institutions.	Analyzes ICT adoption in the PDEU library.

User Perception of ICT Services	Research has shown generally favorable perceptions of ICT-enabled library services (Addanki, 2024; Sharma & Kaur, 2022).	Lack of analysis regarding perception in a specific institutional setup.	Studies user perception towards ICT services at PDEU.
Utilization of ICT Tools	The use of basic technologies such as OPAC and e-resources is moderate while the use of advanced technologies is low (Husain, 2022).	No analysis of usage pattern in detail through ICTs.	Studying usage patterns of various ICTs in PDEU.
Availability vs Utilization	There are ICT facilities present in various libraries, but the use rate varies (Gupta & Verma, 2021).	The relationship between availability and utilization of service lacks investigation.	Investigates the gap that exists between availability and use of ICT services.
Challenges in ICT Use	Examples of such problems include slow internet connections, lack of training, and limited infrastructure (Chaudhari & Bhoye, 2024).	Insufficient context-dependent analysis of problems facing users.	Problems specific to PDEU users have been identified.
User Awareness and Skills	The literature highlights the significance of digital literacy and awareness in ICT application (Singh et al., 2020).	Insufficiency of attention to the role played by awareness on usage behavior.	Evaluates user awareness and its effect on ICT adoption.
Institutional-Level Studies	Most of the studies are general in nature covering regions or different institutions.	There are no studies focusing specifically on emerging universities such as PDEU.	It is based on an institutional analysis of the university, i.e., PDEU.

3. Objectives of the study:

Considering the research gap found above, the objectives that the present research seeks to achieve include:

- Investigate the availability and extent of awareness regarding the use of ICT-based library facilities at Pandit Deendayal Energy University (PDEU).
- Evaluate the ways ICT-based tools and services are being utilized by library patrons.
- Conduct an analysis of users' perception and satisfaction about the ICT-enabled library facilities.
- Ascertain the difference between the availability and utilization of ICT-based library services.
- Study the obstacles encountered by users in making use of ICT-based library services.
- Suggest practical guidelines for better utilization of ICT-based library services.

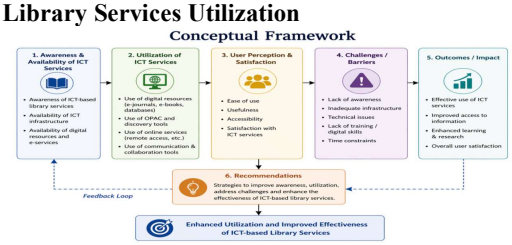
4. Conceptual Framework

The current research is conducted within the conceptual framework that describes the connection between awareness, utilization, user perception, obstacles and the effectiveness of library services based on ICT technology.

Specifically, the conceptual framework suggests that awareness and availability of ICT services affect how users use these services. Further increase in their utilization results in positive changes in user perceptions and satisfaction, which is an indicator of the effectiveness of ICT technologies and tools in general. Nevertheless, there are numerous obstacles that can impede the process of effective utilizing ICT services by library users.

What is more, overcoming all obstacles in an appropriate way through proper recommendations is vital for enhancing utilization of ICT services and increasing user satisfaction. The use of ICT technology helps enhance access to information sources and learning, as well as improves users' satisfaction. The proposed conceptual framework is depicted in Figure 1 below.

Figure 1: Conceptual Framework of ICT-Based Library Services Utilization



5. Methodology:

- **Research Design**

This study employs a descriptive survey research approach for the examination of the relationships among awareness, usage, perception, and problems related to ICT-enabled library services. The use of such an approach is suitable in order to analyze the behavior and perceptions of library users.

- **Population and Sampling**

The population for this study consists of students, lecturers, and research scholars of Pandit Deendayal Energy University (PDEU). For this study, 450 samples were randomly selected for participation in the study, and 405 responses were received and used.

- **Data Collection Method**

Data collection process was done by using structured questionnaire through Google forms. Questionnaires are randomly distributed among users belonging to various departments such as Science, Commerce, Arts, and Engineering. Among 450 distributed questionnaires, responses were received from 405 users.

- **Data Collection Instrument Design**

The structure of the questionnaire comprised sections on:

Table 2: Key components of the Conceptual Framework

Framework Component	Variables Measured
Awareness & Availability	ICT Awareness and Services Offered, Access to ICT Resources and Infrastructures
Utilization	ICT usage frequency, like OPAC, e-resources, online databases, mobile applications, etc.
User Perception	User ease, usefulness and satisfaction levels
Challenges/Barriers	Problems related to Internet, lack of skill and technical issue
Outcomes/Impact	Perceived advantages of using ICTs (time saving, convenience and improved learning, etc.)

- **Data Analysis Techniques**

The data collected were analyzed using descriptive statistical method, mainly:

- Percentage analysis
- Frequency distribution

The following were assessed using the above method:

1. Awareness levels
2. Usage patterns
3. User perceptions
4. Challenges and barriers

- **Conceptual Alignment**

The analysis process will follow the order suggested in the conceptual framework. This will involve assessing awareness and accessibility of ICT services first, then evaluating usage. Next, the perceptions and satisfaction levels of users will be evaluated together with challenges associated with usage. Lastly, the effects or achievements resulting from ICT-based services will be analyzed.

- **Reliability of the Instrument**

A test of the reliability of the questionnaire was done using Cronbach's Alpha coefficient in order to check the consistency of the questionnaire internally. The questions in the questionnaire have been developed based on the constructs used in this research which include awareness about ICT services, use patterns, perceptions of users and challenges associated with ICT services in libraries. Overall, the Cronbach's Alpha of the instrument has been observed to be 0.82. This suggests that there is a high level of consistency of the instrument internally. Generally, this score higher than 0.70 is acceptable, and higher than 0.80 means good consistency.

This shows that the questionnaire is consistent and reliable for this study.

Table 3: Reliability Analysis using Cronbach's Alpha

Variable	Cronbach's Alpha
Awareness	0.79
Utilization	0.81
User Perception	0.84
Challenges	0.78

These values suggest that there is good internal consistency on all variables measured.

In relation to the current research study, there are methods of surveys used to collect data for analysis.

6 Data Analysis, Interpretation and Findings:

Table 4: Age Group Wise Distribution

Sr No	Age group	Respondent (%)
1	18-22	370 (91.4)
2	23-27	31 (7.7)
3	28-32	01 (0.2)
4	Above 32	03 (0.7)
	Total	405 (100)

The demographic profile reveals that the vast majority of participants (91.4%) fall into the 18-22 age range, which means that the results obtained are mainly related to undergraduates. It means that the research focuses on the perceptions and behavior of beginner learners, who are usually quite tech-savvy but lack experience in scientific work.

Table 5: Gender wise Distribution

Sr No	Gender	Respondent (%)
1	Male	288 (71.1)
2	Female	117 (28.9)
	Total	**405 (100)**

Regarding the gender distribution, there is an overrepresentation of male participants (71.1%) compared to female participants (28.9%). The above observation can affect the general results and suggests that a greater balance should be made in future investigations.

Table 6: Academic Level wise Distribution

Sr.no	Academic level	Respondent (%)
1	Undergraduate	325 (80.24)
2	Postgraduate	42 (10.40)
3	Research Scholar	18 (4.44)
4	Faculty	20 (5)
	Total	**405 (100)**

The academic composition of participants shows that most of them (80.24%) were undergraduates, with a few postgraduate students, research scholars, and lecturers. It shows another limitation regarding the representation of advanced users who might use ICT facilities in a different manner.

Table 7: Library Usage Patterns

Sr No	Libraries	Users (%)
1	SOT	270 (66.67)
2	SLS	94 (23.21)
3	SOM	41 (10.12)
	Total	**405 (100)**

From the above table 7, it can be observed that SOT library is used more compared to the others, with 66.67% use compared to 23.21% and 10.12% for SLS and SOM respectively. This could be attributed to variations in requirements and resources in various disciplines.

Table 8: Frequency of library Visit

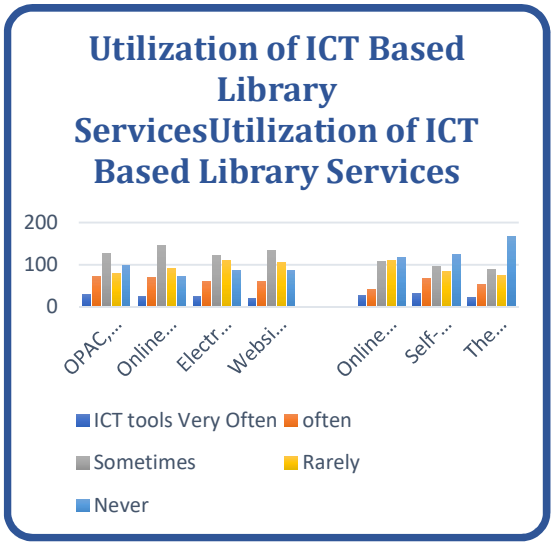
Sr No	Frequency	Respondent
1	Daily	34 (8.4)
2	2-3 times of week	115 (28.4)
3	Once's a week	64 (15.8)
4	Monthly	82 (20.2)
5	Rarely	110 (27.2)
	Total	405 (100)

The frequency of library use shows that there is less physical use of libraries; only 8.4% of respondents use the library on a daily basis, while a good number visit libraries infrequently.

Table 9: Utilization of ICT Based Library Services

Sr No	ICT tools	Very Often (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
1	OPAC, or the Online Public Access Catalogue	29 (7.16)	72 (17.78)	126 (31.11)	79 (19.51)	99 (24.44)
2	Online books and journals	25 (6.17)	70 (17.28)	146 (36.05)	91 (22.47)	73 (18.02)
3	Electronic databases	25 (6.17)	61 (15.06)	122 (30.12)	111 (27.41)	86 (21.23)
4	Website of the Library	20 (4.94)	60 (14.81)	133 (32.84)	105 (25.93)	87 (21.48)
5	Online booking platform	27 (6.67)	42 (10.37)	108 (26.67)	111 (27.41)	117 (28.89)
6	Self-check-out and self-check-in kiosks	32 (7.90)	68 (16.79)	97 (23.95)	84 (20.74)	124 (30.62)
7	The library's mobile application	22 (5.43)	52 (12.84)	90 (22.22)	74 (18.27)	167 (41.23)

Chart 1: Utilization of ICT Based Library Services



The ICT tool usage pattern reflects that basic ICT services are moderately adopted but more advanced ICT services are rarely used. The use of ICT tools like OPAC and ebooks is sporadic among many users, indicating some level of inclusion in academic processes.

A considerable percentage of users have experienced using electronic databases, booking systems, and self-service machines only "sometimes" or "rarely." In particular, 41.23% have never used the library's mobile app; hence, this tool is the least adopted ICT tool.

In summary, there seems to be a gap between the provision of ICT services and their usage rate. Possible factors could be inadequate awareness, lack of training, or difficulty in operating the user interface.

Table 10: Challenges in Using ICT Services

Sr No	Challenges	Respondent
1	Slow internet connectivity	215 (53.1)
2	Lack of technical knowledge	102 (25.2)
3	Insufficient computers	127 (31.4)
4	Complex user interface	84 (20.7)
5	Limited access to resources	103 (25.4)
6	Lack of training	82 (20.2)
7	Technical glitch	102 (25.2)

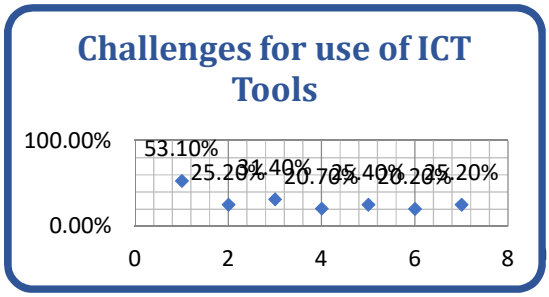


Chart 2: Challenges for use of ICT Tools

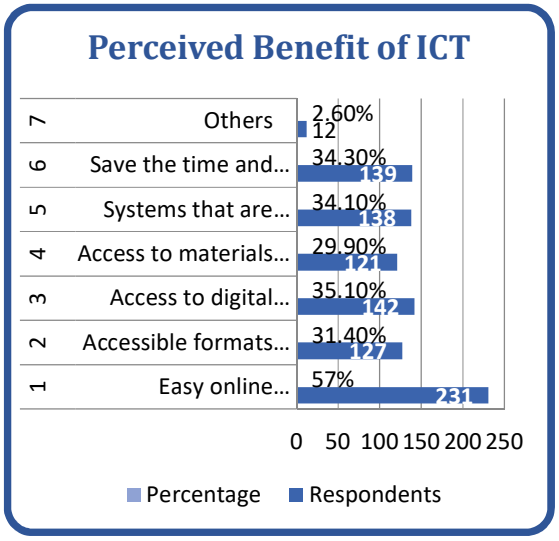
The analysis has brought to light several barriers that affect the proper use of ICT services. The first barrier is slow internet speed, which is faced by 53.1% of the respondents, reflecting a major infrastructure constraint.

The other barriers include inadequate numbers of computers (31.4%), lack of skills (25.2%) and limited access to resources (25.4%). The results highlight the need for appropriate infrastructure as well as adequate user skills for the proper adoption of ICTs. Other barriers such as complicated interfaces and lack of training reflect poor support services.

Table 11: Perceived Benefit of ICT

Sr. No	Benefits	Respondents (%)
1	Easy online searches, borrowing, and renewal of materials through digital platforms	231 (57)
2	Accessible formats for users with disabilities (e.g., audiobooks, screen readers)	127 (31.4)
3	Access to digital resources remotely 24/7 like videos, podcasts, and online tutorials for learning.	142 (35.1)
4	Access to materials from other libraries worldwide through interlibrary loans and online databases	121 (29.9)
5	Systems that are easy to use and browse for handling resources	138 (34.1)
6	Save the time and Money of the users through Digital Resources	139 (34.3)
7	Others	12 (2.6)

Chart 3: Perceived Benefit of ICT



However, despite the problems, users have identified several advantages of ICT library services. Ease of searching, borrowing, and renewing is the topmost benefit mentioned by users (57%), emphasizing the relevance of efficiency and availability.

Other benefits are having access to materials from far away (35.1%), saving time and money (34.3%), and being user-friendly (34.1%). It is clear from these results that ICT services enhance user satisfaction and improve academic work when properly employed.

Table 12: User Perception towards ICT Services

Sr. No	Opinion	Respondent (%)
1	Very Positive	82 (20.2)
2	Positive	152 (37.5)
3	Neutral	145 (35.8)
4	Negative	17 (4.2)
5	Very Negative	09 (2.2)
	Total	**405 (100)**

Table 1 Opinion about ICT in Library

Positive attitude of the users towards ICT-based library services has been reported by 57.7% of respondents while 35.8% are still on the neutral side.

This is an indication that their attitude is not negative but rather indifference and/or unawareness. The problem therefore seems to lie in making them use the services actively.

- **Key Insight: Bridging the Gap between Availability and Utilization**

One of the important findings from the research is the gap between the availability of ICT services and their efficient use. Though ICT services are highly regarded by users and the benefits are known, ICT services are actually used by few people.

The study reveals that merely building infrastructure is not enough. Attention should be paid to enhancing awareness among users about ICT services and making them easily accessible through adequate training.

7. Recommendations:

Considering the results of this research, the following recommendations are proposed in order to make the services provided by ICT-based libraries at PDEU, Gandhinagar even more powerful and efficient:

- **Increasing Speed of Internet:** The improvement of the mentioned parameters would have a positive impact on the experience of library users.
- **Extending ICT Infrastructure:** Providing computers would make it possible for more users to utilize the ICT infrastructure effectively.
- **Providing Users Training Programmes:** Through training programmes it would become easier for users to learn how to use ICT-based technologies efficiently.
- **Awareness about ICT Resources for the Users:** Promoting various ICT services through different means would ensure that users know what is available to them.
- **User-Friendliness of ICT Services:** Ensuring that the ICT resources used are simple and easy-to-use would benefit all users of the library equally.
- **Technical Assistance:** Providing continuous technical assistance and making the process of overcoming any issues much easier for users.
- **Encourage Adoption of Mobile-Based Services:** Encouraging the usage of mobile applications developed by PDEU Library would allow users to access the library information from anywhere.
- **Develop Strategic ICT Policies**: Following a certain policy with regard to ICT usage would make sure that the process goes smoothly.
- **User-Oriented Approach:** Gathering opinions from users could allow improving services continuously.

8. Conclusion:

In the current investigation, user perception and usage of ICT based library services at PDEU, Gandhinagar, were analyzed. It was found out that ICT is integrated in library services efficiently. With the help of ICT, digital resources have become accessible to library users, thus, making library services more efficient. As seen from the analysis, a positive attitude towards ICT-based services is shown by a great majority of users. It means that they accept the offered ICT-based services as convenient and useful in their academic work.

It should also be admitted that several ICT tools are not used intensively enough. For example, mobile

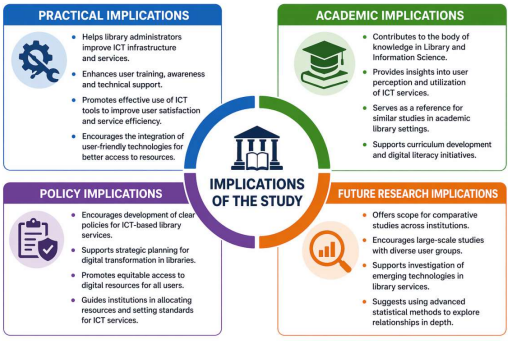
applications and self-services are underused by users. Such facts as a weak level of internet connection, lack of user awareness, and poor technical support serve as barriers to efficient use of ICT services. Therefore, it should be emphasized that there exists some gaps between ICT infrastructure implementation and user experience.

From what has been stated above, one can conclude that ICT brings great advantages to academic libraries. In other words, the usage of ICT is quite beneficial as it allows using library services remotely, efficiently, and quickly. To make the services even more popular and useful, academic libraries should improve ICT infrastructure, raise user awareness, and focus on user needs.

9. Implications of the Study

The results of this study have a number of important implications for the improvement of ICT-based library services in educational settings. They are significant from the point of view of practice, development of policies, and future research.

Figure 2: Implications for Improving ICT Utilization in Academic Libraries



- **Practical Implications**

The results of the study are very useful for librarians and institutional policymakers when it comes to improving ICT-based library services. The improvements in infrastructure, access to digital content, and provision of user training can lead to greater utilization of these facilities. User-friendliness and continuous technical assistance also play a vital role here.

- **Academic Implications**

The findings of the study make a valuable contribution to the field of library and information science by providing a specific example of ICT utilization and its analysis in an academic environment. The study emphasizes the connection between awareness, usage, perception, and challenges associated with using ICTs.

- **Policy Implications**

ICT policy is necessary for successful adoption and utilization of ICTs in any organization, including academic libraries. These results can be used by institutions to develop a strategic plan in terms of their digital transformation.

- **Future Research Implications**

Further research can be done on the topic since there is a possibility to conduct comparative research at different institutions, expand the sample size, and use more advanced statistical techniques to reveal the relations between the analyzed variables.**References:**

Addanki, R. (2024). User perception and satisfaction towards ICT-based library services in academic institutions. *International Journal of Research in Library Science, 10*(2), 45–53.

Bhoi, N. K. (2018). Use of information and communication technology (ICT) and its impact on library services. *Library Philosophy and Practice*, 1–12.

Chaudhari, P. D., & Bhoye, M. (2024). Challenges in the adoption of ICT in academic libraries: A user perspective. *International Journal of Information Technology, 14*(1), 35–42.

Choudhary, R. (2023). ICT integration in university library administration: A comparative study. *International Journal of Advanced Research in Science, Engineering and Management, 8*(5), 112–118.

Gupta, S., & Verma, R. (2021). Barriers to effective utilization of ICT in academic libraries in India. *Journal of Library and Information Technology, 41*(3), 189–195.

Joshi, M., & Patel, K. (2022). Adoption of digital library services and user engagement in higher education institutions. *DESIDOC Journal of Library & Information Technology, 42*(4), 256–263.

Kumar, R., & Singh, P. (2021). Role of ICT in transforming academic libraries in India. *International Journal of Library and Information Studies, 11*(1), 67–75.

Mishra, S. (2020). Digital transformation of academic libraries through ICT: Opportunities and challenges. *Library Philosophy and Practice*, 1–15.

Patel, D., & Desai, H. (2023). Impact of ICT-based services on user satisfaction in academic libraries. *International Journal of Information Studies and Libraries, 8*(2), 101–109.

Rajput, P., & Pandey, S. (2024). Digital transformation of academic libraries in India: Exploring ICT integration for knowledge sharing. *Journal of Information and Knowledge Management, 23*(1), 1–14.

Ramesh, K., & Kumar, V. (2019). ICT-based services and their impact on academic library users. *International Journal of Library Science, 8*(2), 34–40.

Sharma, N., & Kaur, P. (2022). User satisfaction with ICT-enabled library services in

higher education institutions. *Journal of Academic Librarianship, 48*(3), 102–110.

Singh, J., & Kaur, T. (2020). ICT applications in academic libraries: Challenges and opportunities. *International Journal of Library and Information Science, 12*(4), 45–52.