



Evaluation of ICT resources and barriers to adoption in improving library service delivery for higher user satisfaction in Tanzania

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ABSTRACT

It is impossible to understate the use of Information Communication and Technologies (ICTs) resources and the challenges they present in university libraries in underdeveloped countries like Tanzania. Thus, this study investigated the quality of library services in Tanzanian universities, focusing on ICT facilities and removing adoption hurdles. The ServQual framework forms the theoretical basis for evaluating how ICT-related library services contribute to user satisfaction in Tanzanian university libraries. This study was guided by two specific objectives: (1) to determine the barriers to ICT technology adoption in Tanzanian university libraries, and (2) to evaluate the availability of ICT facilities for improving library service offering. The study employed the cross-sectional research design, the quantitative and qualitative research approach, and the pragmatic philosophical framework. A systematic questionnaire and interview were used to gather the data, and Statistical Package for Social Sciences (SPSS) was used for both descriptive and content analysis of the qualitative data. The findings indicated that despite the presence of computers, projectors, photocopiers, and internet connectivity, the quality of these fundamental ICT resources was inconsistent. Although a sizable percentage of respondents said that internet facilities were sufficient, there were several substantial obstacles to using ICT. These difficulties included subpar computer systems, erratic power supplies, inadequate ICT infrastructure, and student abuse of ICT resources. These challenges have a detrimental effect on patron satisfaction and severely impair the caliber of library services. The study comes to the conclusion that although certain ICT facilities are there, their efficient usage is restricted by deficiencies in infrastructure, resource sufficiency, and management. Resolving these issues is essential to enhancing customer happiness and library service delivery. Enhancing computer facilities, enhancing internet connectivity, guaranteeing a steady power supply, offering staff training, boosting management support for ICT efforts, and putting procedures in place that stop ICT resource exploitation are some of the recommendations made by the study.

Keywords: ICT Facilities, ICT Infrastructure, Library Service Provision, Obstacles to ICT Adoption, University Libraries, User Satisfaction

I. INTRODUCTION

All across the world, academic libraries are gradually switching from manual to automated methods. This change aims to balance the evolving needs of their clients with the developments in information and communication technologies (ICTs) (Akinola, 2022; Emasealu, 2019). The development of ICT has radically changed how university libraries operate, increasing the caliber and volume of services they provide. According to Okonedo *et al.* (2014), these changes are most noticeable in the fields of mass storage, computing, and communication technologies. According to the authors, continuous advancements in these domains have significantly changed the strategies used by university libraries for information collection, preservation, retrieval, and distribution. Similarly, Wema (2018) highlights the importance of online services, e-learning platforms, and electronic databases as critical technological innovations that are changing library services.

Tanzanian university libraries are increasingly utilizing ICT-driven services to enhance their core functions in research, instruction, and learning (Wema, 2018). This transition is being driven by the need to improve overall educational experience, operational effectiveness, and service delivery. The use of technologies such as Web 2.0 tools, artificial intelligence (AI), and other digital advancements is a crucial part of this shift. Academic libraries may now operate more efficiently and offer better services at a lesser cost thanks to technologies. However, despite their high awareness of ICTs, only 23% of Tanzanian librarians have used them (Bakiri *et al.*, 2023). The high degree of demand and readiness for adoption indicates a bright future for ICT integration in library services (Bakiri *et al.*, 2023). This

observation is also supported by Mosha and Ngulube (2024), who note that library staff members utilize Web 2.0 applications extensively for both personal and professional purposes. These applications allow for online communication, knowledge sharing, and the promotion of library services. According to Zhu *et al.*, (2023), these technologies are intended to enhance student skills, facilitate classroom modifications, and strengthen university libraries' competitive edge. The implementation of ICT-driven services in Tanzanian university libraries is progressing, although there are still challenges, such as a lack of resources and differences in technological readiness. These problems must be fixed in order to optimize the benefits of ICT in enhancing library services and encouraging academic success.

Despite these developments, Tanzanian university libraries nevertheless face persistent obstacles that limit their ability to properly utilize ICTs. The COVID-19 epidemic has significantly hastened this shift, requiring a shift to digital approaches in administrative, instructional, and learning operations (Khamis, *et al.*, 2021). Consequently, as observed by Kumar *et al.* (2024) that there has been a significant increase in the usage of ICTs for online lectures, discussions, meetings, and library services. These challenges include a shortage of technical expertise, a lack of ICT competencies among staff, a lack of funding, a lack of training for professional development, and low awareness among library users.

According to Aina (2010), technology emphasizes how telecommunication-based Internet resources may facilitate the amazing immediacy of data production, organization, manipulation, and retrieval from remote locations. ICT integration into library operations is still uneven at Tanzanian universities, despite the fact that technology has presented new potential for libraries to increase their reach and improve service delivery. Lack of significant investment in ICT infrastructure, an unstable energy supply, insufficient training for librarians and patrons on improving digital literacy, using information resources, professional development programs, data management, and user-centric ICT strategies are some of the issues that impact library services (Ahmed & Sheikh, 2021). Additionally, librarians are better equipped to provide accurate guidance in a changing information environment when they receive training on topics like copyright laws, open access, and information privacy. Basic library user skills include utilizing e-resources, accessing online catalogues, and effectively using research tools should be covered in training programs. Workshops can also address topics like conducting scholarly research using library databases or evaluating the credibility of content accessible online. By providing comprehensive training to both librarians and users, libraries can foster a better-informed community that maximizes the benefits of current resources.

1.1 Statement of the Problem

In line with the institution's vision and mission, university libraries are essential for meeting the academic and research demands of researchers, instructors, students, and the larger scholarly community (Sukums *et al.*, 2023). To ensure user happiness and meet educational and personal information needs, effective library services must cater to these users' ICT needs (Hamad *et al.*, 2023). Nevertheless, despite ICT developments, research done in Tanzania, such as that done by Ndibalema (2020) and Samzugui (2019), has found serious gaps in access to information resources. Underdeveloped ICT infrastructure, a lack of finance, and a lack of technical skills in university libraries are the main causes of these difficulties (Zondi *et al.*, 2024). As a result, their academic and research endeavors have been hampered by the general discontent caused by libraries' incapacity to satisfy the growing information needs of their patrons. In order to improve user satisfaction, interventions are required to close the gap between ICT innovations and their applications in Tanzanian university libraries. In order to improve the quality of library services in Tanzanian university libraries, this study intends to evaluate the ICT resources that are currently accessible and identify the barriers to ICT adoption.

1.2 Research Objectives

This study was guided by two specific objectives;

- i. To determine the barriers to ICT technology adoption in Tanzanian university libraries
- ii. To evaluate the availability of ICT facilities for improving library service offering.

II. LITERATURE REVIEW

2.1 Theoretical Review

To explain patron satisfaction with library services, several models have been proposed in previous studies. These models provide insight into user satisfaction with Library Service Provision (LSP) and include Web-Qual, Lib-Qual, E-S-Qual, Site-Qual, Dig-Qual, and ServQual, among others. They have been widely used in empirical research (Mbua, 2024; Thokoa *et al.*, 2022) to assess how effectively libraries meet the expectations and needs of their patrons. For this study, the ServQual model was selected as the theoretical foundation because of its strong record in assessing the quality of library services globally.

The ServQual model posits that service quality and hence user satisfaction depends on five core dimensions, often referred to as RATER: Reliability, Assurance, Tangibles, Empathy, and Responsiveness. Reliability refers to the ability of a service provider to perform promised services dependably and accurately. Responsiveness reflects the



willingness to help customers promptly. Assurance relates to the knowledge, courtesy, and trustworthiness of service staff. Empathy involves providing caring, individualized attention to users. Tangibles denote the appearance of facilities, equipment, and communication materials.

By applying this model, libraries can better understand user expectations, identify gaps in service quality, and plan interventions to improve overall satisfaction. Thus, the ServQual framework forms the theoretical basis for evaluating how ICT-related library services contribute to user satisfaction in Tanzanian university libraries.

2.2 Empirical Review

2.2.1 Barriers to ICT Technology Adoption in Tanzanian University Libraries

The main barrier to ICT adoption in university libraries is infrastructure limitations, according to empirical research conducted in Tanzania and other sub-Saharan African nations (Ndibalema 2020; Sejane 2017). They pointed out common issues that hinder the efficient implementation of library management systems, digital catalogs, and e-resources include unstable electricity, inadequate internet access, a shortage of working computers, and outdated equipment. For example, regular power outages and poor campus networks decrease the usage of online catalogs and postpone automating routine library activities, according to survey results from Tanzanian public universities. It is challenging for libraries to offer their patrons smooth ICT-based services because of these infrastructure deficiencies.

Financial and human resource limitations present another obstacle, where by many university libraries have little funding that hardly covers basic operations, leaving little left over for the purchase, upkeep, and modernization of ICT facilities (Siyao & Chishami, 2025). Librarians' and users' lack of ICT proficiency worsen this budgetary deficit. According to a number of studies, although some employees receive training on how to use integrated library management systems, many lack the sophisticated abilities needed to solve technical issues or provide users with efficient assistance (Okwu & Oporum, 2021). Furthermore, underutilization of the existing ICT tools frequently occurs when there are no technical support teams or ongoing professional development opportunities.

Organizational and policy difficulties are the subject of the third group of obstacles whereby according to empirical research conducted in Tanzanian institutions, some library staff members are resistance to change as opined by Mubofu (2025), also, lack of clear ICT adoption strategies, and inadequate managerial support are the main obstacles. According to studies, implementation attempts frequently stall in the absence of institutional policies that give priority to ICT integration, such as funding for technical maintenance, staff training, and licenses (Ntorukiri *et al.*, 2022). So the introduction of new technology is delayed by sluggish procurement processes and a lack of cooperation between university ICT departments and library management. These results imply that in addition to infrastructure and training investments, strong leadership, encouraging policies, and organizational commitment are necessary to overcome the obstacles to ICT adoption.

2.2.2 Availability of ICT Facilities for Improving Library Service Provision

The availability of ICT resources varies throughout Tanzanian universities, according to empirical evaluations of their libraries. Larger, well-funded universities often possess basic infrastructures such as computer laboratories, Online Public Access Catalogues (OPACs), and access to selected e-journals and databases, while many smaller institutions struggle to provide even a minimal level of ICT support for library operations (Kassim, 2024). According to studies, while some libraries have implemented Integrated Library Management Systems (ILMS), their implementation is occasionally lacking, leading to hybrid systems that continue to use manual procedures in addition to digital cataloguing. These differences have an impact on libraries' ability to provide its patrons with timely and effective services (Wema, 2018). The quality and usefulness of the ICT resources that are accessible have positive impact on how well they can improve services. For instance, employees and users can be discouraged from depending on computers that are old, have slow CPUs, or lack updated software. In a similar vein, having an institutional repository or OPAC does not guarantee better service unless the database is user-friendly and updated often (Mbughun *et al.*, 2023). While some students are aware of digital collections, their access is restricted by a lack of remote access to resources, a shortage of working workstations, and insufficient internet speed (Kaishe-Mulungu *et al.*, 2024)

Additionally, empirical research highlights the critical role that user engagement strategies and supportive infrastructure play in optimizing the advantages of ICT facilities. Higher user satisfaction and better use of digital services are typically reported by libraries that allow remote access to e-resources, keep dependable internet connections, offer dependable power backup, and regularly hold user training sessions (Ahmed & Buba, 2024). Conversely, even when the technology and software are available, libraries without such supportive measures have low ICT tool adoption (Wema, 2018). These results highlight the significance of assessing ICT availability holistically, taking into account not just the quantity of systems and devices in use but also their usability, accessibility, and the ability of employees and users to efficiently utilize them.



III. METHODOLOGY

3.1 Philosophical Paradigm

This study utilized a pragmatic philosophical paradigm because it emphasizes using a flexible and useful way to handle the research challenge. The use of several approaches and paradigms that are most effective in addressing the research issues is emphasized by pragmatics. The pragmatic approach it makes it easier to combine several research techniques, which enables scientists to more successfully tackle challenging issues. Instead than following strict paradigms, researchers that adopt a pragmatic approach can choose and combine qualitative and quantitative approaches according to their usefulness for certain research purposes (Paudel, 2024).

The relevance and applicability of research findings in a variety of sectors are improved by this flexibility. A more comprehensive approach to research design is promoted by methodological pragmatism, which pushes researchers to bridge the qualitative-quantitative gap (Foster, 2024). The difficulties brought on by the data revolution are addressed by this novel design, which makes it possible to analyze big qualitative datasets (Gillespie et al., 2024). Researchers can investigate answers in a creative and context-driven way thanks to pragmatism. This method is very appropriate for this study since it uses both qualitative and quantitative data to investigate various aspects of the research subject.

3.2 Research Approach

To align with the pragmatic paradigm, this study employed a quantitative and qualitative research approach, because they facilitate the collection of different kinds of data and generates great confidence in conclusions because the weakness of one method is complemented by the strength of other methods (Kothari, 2004). Data were collected exclusively through structured questionnaires and interviews. This approach facilitated the collection of numerical data, and narrative information providing a clear and objective understanding of the research problem. Utilizing quantitative and qualitative methods, the study ensured the reliability and validity of the findings, enabling robust analysis of the influence of ICT on library services. The use of questionnaires allowed for consistent data collection, minimizing subjectivity and enhancing the precision of the results (Kothari, 2004). This approach ensures a comprehensive and measurable insight into the research question.

3.3 Research Design

In line with the chosen research paradigm and approach, this study utilized a cross-sectional research design. This design allows for the collection of data at a single point in time, making it an efficient and cost-effective way to gather information from a large group of participants (Gupta *et al.*, 2020). A cross-sectional design is appropriate for capturing a snapshot of current perceptions and practices regarding ICT use in university libraries. It also aligns with the pragmatic focus on practical solutions, providing timely and relevant data that directly addresses the research questions.

3.4 The Study Area

The study was carried out in five selected Universities in Tanzania. These universities were the University of Dar-es-Salaam (UDSM), the University of Dodoma (UDOM) and St. Augustine University (SAUT) on Tanzania Mainland and the State University of Zanzibar (SUZA) and Zanzibar University (ZU) in Tanzania Islands. These universities were selected because basing on their age, they were considered potential to be able to provide the required data in terms of resources, experiences in services provision and infrastructure. In addition, the selected universities are located in island and mainland parts of the United Republic of Tanzania (URT). Also, the selected universities include private and public owned and provide services which differs in one way or another. Furthermore, the universities under the study are regulated by Tanzania Commission for Universities (TCU) thus they were thought to be appropriate for giving the required information for the study.

3.5 Study Population

The population of this study was members of academic staff, students, heads of higher learning institutions, Directors of Libraries, quality assurance officials, Heads of Departments in the libraries and library staff amounting to 64,988 (Table 1). In addition, 68 respondents were selected purposely because they were considered to provide reliable information related to the positions they held in their institutions. Thus, they were considered important for enriching the research findings. Thus they were chosen because they were considered as potential for providing relevant information and answers for the study. The unit of analysis was the university's academic staff and students. They were selected by using systematic random sampling techniques as explained by (Kothari, 2004)

Table 1*Population of the Study*

Name of University		Number of Participants
UDSM	Staff	1,538
	Students	28,625
UDOM	Staff	867
	Students	16398
SAUT	Staff	434
	Students	10,957
SUZA	Staff	230
	Students	3,984
ZU	Staff	93
	Students	1,995
Total		64,988

3.6 Sampling Techniques

Respondents in this study were selected by using both probability and non-probability sampling techniques. Probability sampling techniques used were systematic random sampling, while non-probability sampling was purposive sampling techniques. Purposively technique was used to select five universes of this study.

3.7 Systematic Random Sampling:

This was used to obtain respondents of the population at regular intervals by selecting the 20th respondent on a list of the population.

3.8 Sample Size

The total population was 64,988 (see table 1). The sample size was obtained by using Sample Size Determination Table (Israel, 1992) which states that if the total population is between 50,000 to 100,000, the sample should be 397 respondents.

Table 2*The Sample Size of the Study*

	Precision level	Precision level	Precision level	Precision level
Population	±3%	±5%	±7%	±10%
15,000	1034	390	201	99
20,000	1053	392	204	100
25,000	1064	394	204	100
50,000	1087	397	204	100
100,000	1099	398	204	100
≥100,000	1111	400	204	100

Source: Israel (1992) Israel Sample Size Determination Table Sample size for ±3%, ±5%, ±7% and ±10% Precision Levels Where Confidence Level is 95% and P=.5

3.9 Sampling Frame

Table number 3 shows the sampling frame which indicate how many respondents were selected from each university. The respondents were selected by using a formula Number of Participants/total population*sample size= number of respondents in each university categories of staff and universities.

Table 3*Sampling Frame*

Name of University		Number of Participants
UDSM	Staff	9
	Students	175
UDOM	Staff	5
	Students	100
SAUT	Staff	3
	Students	67
SUZA	Staff	1
	Students	24
ZU	Staff	1
	Students	12
Total		397

3.10 Data Collection Methods and Instruments

The data for this study were collected through a structured questionnaire, which allowed for the comprehensive gathering of data from the respondents. Likert scale questions were used to ensure that all necessary information for analyzing the two specific objectives of the study was captured. To ensure the quality of the collected data, the questionnaire was pre-tested before being administered to the sample. The reliability of the instrument was confirmed with a coefficient of 0.72, indicating that the questionnaire was reliable for data collection. Furthermore, an interview guide was used to collect qualitative data. Quantitative data were analyzed using SPSS software, with results presented in tables highlighting frequencies and percentages. Qualitative data were subjected to content analysis and the findings were presented in narrative form.

IV. FINDINGS & DISCUSSION

4.1 To assess the Availability of ICT Facilities for Enhancing Library Service Provision

Determining the availability of ICT resources for improving the caliber of library service delivery was the study's first explicit goal. The respondents were asked to score the availability of ICT facilities in their university libraries on a four-point Likert scale: adequate, available but inadequate, not available, and unknown. The analysis's conclusions showed that participants used a four-point rating system: Available and Adequate, Available but Inadequate, Not Available, and Do Not Know to assess the availability of twelve electronic resources and facilities in their libraries. Additionally, participants were asked to name any additional ICT-related facilities that were not on the list. The findings were presented in Table 4.

Table 4

Availability of ICT Facilities (N = 397)

Variables	Available and adequate		Available but inadequate		Not available		Do not know	
	F	%	F	%	F	%	F	%
Internet facilities	171	43.0	143	36.1	45	9.7	38	11.2
Radio	58	14.6	73	18.5	126	31.8	139	35.1
Computers	148	37.4	141	35.5	41	10.3	67	16.8
Telephone	62	15.7	56	14.2	126	31.6	152	38.5
Fax machines	44	11.0	40	10.1	133	33.5	180	45.4
Tape recorders	46	11.6	59	14.8	119	29.9	172	43.4
Projectors	75	18.9	90	22.6	89	22.4	143	35.9
Video cassette	50	12.5	60	15.1	124	31.2	161	40.4
Printers	67	17.0	94	23.75	109	27.5	126	31.6
Scanner	69	17.4	87	21.9	103	26.0	136	34.4
Photocopier	78	19.6	90	22.6	93	23.4	135	34.0
T.V sets	59	14.8	67	16.8	126	31.6	145	36.6

As shown in Table 4, 79.1% and 72.9% of respondents, respectively, indicated that internet facilities were available and adequate, indicating that they were commonly accessible.

Some participants, however, pointed out that these features were still lacking, indicating that they could be improved to completely satisfy user needs. However, many respondents were either unaware of or unable to use technologies like radios (31.8%), fax machines (33.5%), and telephones (31.6%). Video cassettes and tape recorders were also cited as largely unknown or unavailable, underscoring their waning use in library services. Although 41.5% of participants reported that projectors were available, many still felt that they were insufficient (22.6%). As summed up in Table 4, the trend across different ICT facilities shows a combination of availability and inadequacy, indicating the need for improved resource allocation and usage.

Participants emphasized in their interview responses that having access to a variety of ICT resources has greatly improved user happiness and assisted in meeting their information demands. They pointed out that internet access is essential for gaining access to a wide range of digital resources, which facilitates effective study and education. The availability of telephones and radios guarantees that people can communicate efficiently and stay informed about current affairs.

From writing papers to accessing internet resources, computers are necessary for a variety of academic duties. Despite being seen as antiquated, tape recorders and fax machines continue to be used for some administrative and research tasks, satisfying users who are accustomed to these devices. By enabling multimedia presentations, projectors and television sets improve the educational process. These tools are especially helpful during seminars and group study sessions. In a similar vein, video cassette players are useful for accessing previously undigitized educational materials.



In order to create, digitize, and reproduce documents, printers, scanners, and photocopiers are essential, which makes both personal and academic work easier to do. By successfully satisfying a variety of user demands, these ICT resources help create a more inventive and inclusive library environment; which in turn raises user happiness.

4.2 Obstacles in Adaption ICTs Technology in Universities

The second goal was to identify the barriers to ICT adoption in higher education. The quality of library services as perceived by patrons is greatly impacted by the impediments that have been identified. The findings were presented in Table 5.

Table 5

Obstacles in Adaption ICTs Technology in University (N=397)

Variables	Most serious	Somehow serious	Less serious	Least serious	Not serious	Do not know
In adequate computers	133(33.5%)	85(21.5%)	41(10.3%)	29(7.3%)	68(17.2%)	40(10.1%)
Un computerized sections in library	82(20.6%)	90(22.8%)	90(22.8%)	42(10.5%)	60(15.1%)	62(15.7%)
Irregularities on power supply	102(25.8%)	71(17.8%)	66(16.6%)	44(11.2%)	59(14.8%)	55(13.8%)
Poor internet connectivity	86(21.7%)	84(21.1%)	73(18.5%)	47(11.8%)	56(14.2%)	50(12.7%)
Insufficient training support	79(19.8%)	74(18.7%)	71(18.1%)	48(12.0%)	60(15.1%)	65(16.3%)
Inadequate skills among library staff	76(19.1%)	73(18.3%)	58(14.6%)	45(11.4%)	79(19.8%)	66(16.65%)
Low support from university mgt on ICTs	79(19.4%)	61(15.3%)	61(15.5%)	44(11.0%)	67(16.8%)	88(22.2%)
Recycling outdated materials on e-learning forum	75(18.9%)	78(19.6%)	57(14.4%)	58(14.6%)	61(15.3%)	68(17.2%)
Poor ICT infrastructure	104(26.2%)	83(20.9%)	55(13.8%)	39(9.9%)	52(13.1%)	64(16.1%)
Student misuse of ICT infrastructure	85(21.3%)	71(17.8%)	61(15.5%)	43(10.85%)	75(18.9%)	62(15.7%)
Poor choosing appropriate software solution	82(20.6%)	70(17.6%)	61(15.5%)	42(10.5%)	66(16.6%)	80(20.2%)
Poor ACs in computers laboratories	80(20.2%)	146(36.8%)	31(7.7%)	22(5.6%)	66(16.6%)	52(13.1%)

According to 47.1% of respondents, users' access to dependable technology is directly impacted by the inadequate ICT infrastructure, which restricts their usage of library resources. According to 55% of respondents, users' capacity to use digital services is limited when they lack access to sufficient computers, which causes them to become frustrated and less satisfied. According to 57% of respondents, inadequate air conditioning in computer laboratories has a detrimental impact on the overall user experience by affecting not only user comfort but also the longevity and functionality of ICT equipment (Hamad *et al.*, 2023).

42.8% of respondents said that poor internet connectivity is a severe problem since it interferes with access to online resources, making it hard for users to efficiently do research or access learning materials. The effectiveness of ICT services is further reduced by moderate issues including inconsistent power supply (43.6%), inadequate training support (38.5%), and low staff skills (37.4%), which prevent users from making the most of the resources that are available. Poor software selections (38.2%) and student ICT usage (39.1%) point to management and policy flaws that undermine user happiness and confidence. Furthermore, systemic problems that hinder the expansion and modernization of ICT services are highlighted by inadequate support from university administration (34.7%) and recycling of outmoded resources (38.5%).

Several obstacles to the successful integration of ICT technology in higher education were identified by interviewees. When ICT infrastructure is misused by students, it wears down and becomes less dependable and accessible for usage in the classroom. Students become frustrated and less productive when they cannot access essential digital materials due to inadequate PCs. Users' academic performance suffers when they are unable to access online learning resources and do research due to poor internet connectivity.

It was also discovered that staff and students lack the necessary training and support to effectively utilize the ICT resources at their disposal, which reduces the potential advantages these technologies could provide. The problems are made worse by the university administration's lack of support for ICT-related concerns, which also prevents investment and advancements in ICT infrastructure. When taken as a whole, these issues limit patrons' capacity to utilize library services efficiently and lower patron satisfaction levels.

Table 6*Obstacles in Adaption ICTs Technology in University (N=397)*

Variables	Most serious	Somehow serious	Less serious	Least serious	Not serious	Do not know
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4.2 Discussion

Even though there are still some classic ICT facilities in use, their presence is justified by their accessibility. Because of familiarity, restricted access to newer gadgets, or personal preference, it was thought that some users might rely on this older technology. In order to serve a wide range of user demands, libraries strive to be inclusive. The results showed a significant degree of ambiguity among participants on the accessibility of particular resources, suggesting a lack of knowledge or communication regarding ICT technologies in libraries. This finding is in line with earlier studies that highlighted the necessity of enhancing ICT infrastructure to better support learning and library services (Bachynska *et al.*, 2024 and Mubofu, 2023). The results point to important areas for improving the administration and availability of ICT resources in university libraries.

By meeting a variety of user demands and enhancing user happiness, traditional ICTs like fax machines, tape recorders, projectors, video cassettes, printers, scanners, photocopiers, and TV sets continue to be used in libraries. For users who prefer or depend on these tools because of familiarity, accessibility concerns, or particular research needs, they remain important even when they appear to be outdated. For instance, although projectors and TV sets improve learning experiences through multimedia presentations (Nwosu, *et al.*, 2024), fax machines and tape recorders are necessary for historical research or specific administrative chores (Bachynska *et al.*, 2024; Mubofu, 2023).

By meeting a variety of user demands and enhancing user happiness, traditional ICTs like fax machines, tape recorders, projectors, video cassettes, printers, scanners, photocopiers, and TV sets continue to be used in libraries. For users who prefer or depend on these tools because of familiarity, accessibility concerns, or particular research needs, they remain important even when they appear to be outdated. Projectors and TV sets, for example, improve learning experiences through multimedia presentations whereas fax machines and tape recorders are necessary for historical research or specific administrative chores (Bachynska *et al.*, 2024; Mubofu, 2023). In order to efficiently create and reproduce documents, printers, scanners, and photocopiers are essential tools for both personal and academic duties (Breeding, 2023). According to recent research highlighting the significance of ICT infrastructure in enhancing library services and user satisfaction, libraries' dedication to inclusivity and resourcefulness is demonstrated by their maintenance of a mix of old and new technology (Bachynska *et al.*, 2024; Mubofu & Chaula, 2023).

The impact of ICT resources in university libraries has been shown in recent studies. For instance, Breeding (2023) discovered that by facilitating easy access to digital knowledge resources, sophisticated ICT facilities like fast internet and contemporary computer facilities significantly increase user happiness. Furthermore, it was noted by Idiegbeyan-ose *et al.* (2017) that the incorporation of automation and artificial intelligence (AI) into library services not only increases efficiency but also satisfies changing customer expectations, which raises overall satisfaction. These results highlight how crucial ICT is in determining the caliber of library services and how crucial it is to continuously invest in and update ICT infrastructure in order to properly satisfy user needs.

4.2.1 Obstacles in adaption ICTs technology in university

These issues, together with some respondents' ignorance of the difficulties, highlight a lack of communication and transparency that impedes attempts to enhance library services. Samzug (2019) in general, these challenges show how crucial dependable, modern, and easily accessible ICT infrastructure is to determining user pleasure. Improving user experiences requires addressing important concerns like inadequate infrastructure, poor internet access, and



unfavorable ambient conditions. To create a library environment that is more responsive and user-centered, it is imperative to improve staff abilities, provide training support, and strengthen management commitment. Universities can greatly improve user satisfaction and encourage greater use of library services and resources by addressing these problems.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

This study, specifically, aimed to assess the availability of ICT facilities and identify obstacles to ICT adaptation in Tanzanian university libraries, with a focus on enhancing the quality of library services. The findings revealed a mix of positive and negative aspects regarding the state of ICT infrastructure in these libraries. While some essential facilities like internet access were deemed adequate by a significant portion of respondents, critical issues such as inadequate computer systems, irregular power supply, poor internet connectivity, and environmental challenges like inadequate air conditioning in computer labs emerged as major obstacles. These issues have a direct impact on user satisfaction, limiting the effectiveness of library services and hindering students, researchers, and faculty from fully benefiting from available resources. The study also highlighted gaps in staff skills, management support, and the proper use of ICT facilities, further complicating the process of integrating technology into library services. These barriers underline the need for continuous improvements in both infrastructure and human resource development to ensure that ICTs contribute effectively to library services and user satisfaction.

5.2 Recommendations

Based on the findings and the conclusions provided the study recommends the following to university library stakeholders. Improve internet connectivity in university library by strengthening physical infrastructure and remote access mechanism and enhance users' engagement through mobile access, online chats and SMS alerts. Provide regular ICT training for library staff and general users by offering continuous professional development through seminars, workshops, online modules and orientation to new users and staff. Increasing management involvement in ICT by prioritize it in integrating with library services in acquiring, organizing and dissemination the learning resources to users, support the adoption of automated system that is e-lending and online cataloging and circulation. Regular update systems by modernizing software and hardware to ensure efficiency, security and reliability, integrating emerging technologies and automate library processes, expand support for digital resources like e-books, databases, online account and open access. Develop clear policies to govern proper use of library resources by establishing specific policy on ICT resources misuse aligned with international and national legal framework like Crime Act, 2025 and intellectual property rights.

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