

Challenges in Information Technology Adoption in Pakistani University Libraries

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ABSTRACT

Use of information technology in providing efficient library services is inevitable in today's information world. Its implementation causes many challenges for all the stake holders. This study is an attempt to identify challenges faced by university libraries of Pakistan in information technology adoption. To elucidate the research problem, a combination of quantitative and qualitative research methods was used. Valid returned questionnaires (N=52) and recorded interviews of 51 LIS professionals with experience in library automation were analyzed to draw the results. The study determined that 'lack of training opportunities for LIS professionals' and 'lack of IT skills among the majority of LIS professionals' are major challenges to the adaptation of IT. Similarities were found in the results of this study and some previous studies conducted at national and international levels.

1. Introduction and Literature Review

Adoption of Information technology (IT) is considered mandatory in contemporary librarianship. The American Library Association (1983) has defined information technology (IT) as "the application of computers and other technologies to the acquisition, organization, storage, retrieval, and dissemination of information". Its use has opened new avenues in the modern library world but at the same time has caused some challenges. The nature of these challenges varies from continent to continent, region to region, country to country, sector to sector and organization to organization. Proliferation of new technologies opens a number of challenges for higher institutions of learning (Onyekwelu, 1999). According to Butler and Sellbom (2002) many factors affect the rate of adoption, including characteristics of innovations and various economic, sociological, organizational, and psychological variables. Peres, Muller, and Mahajan (2010) stated that innovation diffusion of a new technology is "the process of the market penetration of new products and services that is driven by social influences, which include all interdependencies among consumers that affect various market players

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with or without their explicit knowledge”.

Mulimila (2000) stated that lack of funds and lack of trained human resources in IT remained the most critical obstacles in the application of information technology in East African government-owned university libraries. Engstrom (2001) stated financial difficulties as a big problem, especially for the University of Costa Rica. The library was in constant need of more computers and other equipment. Nyamboga and Kemparaju (2002) cited that the high cost of acquiring IT equipment, cost of maintenance of IT equipments, constant breakdown of IT equipment, improper handling of IT equipment, lack of network facilities, cost of staff training, lack of user interest and insufficient funds were the obstacles in deploying IT in university libraries of Karnataka.

According to Ramana and Rao (2003), the highest ranked issues in implementing IT in Central University Libraries in India were inadequate financial resources, lack of well-accepted standard software and non-availability of IT trained human resources. Chandrakar (2003) discussed the challenges and problems faced by university libraries in India in developing automated bibliographic databases. He also described the role of INFLIBNET in supporting university library automation activities in the country. Badu (2004) found a lack of personnel skilled in IT applications, inadequate IT infrastructure and intermitted electric power cuts as the major barriers to the successful implementation of IT in university libraries of Ghana.

Younis (2005) identified a lack of IT skilled staff, insufficient funding, and a lack of hardware as the main barriers in utilizing online information sources and services. Outdated databases, cost, and user incompetence were other problems preventing the optimal use of online systems. Serious efforts were needed to overcome these problems, and to ensure that Jordanian university libraries kept their place in the information age. Ani, Esin, and Edem (2005) had also found that inadequate funds and the lack of trained personnel in IT were the major problems in adoption of ICT in university libraries of Nigeria.

Oduwole (2005) mentioned the high cost of maintenance of the TINLIB software as the major constrain to the use of software for cataloguing in twenty-two federal and state university libraries, while other constraints included poor computer literacy on the part of the librarians, continual power-cuts and a lack of infrastructures. Ghanaian university libraries were facing problems in introducing automation such as apathy on the part of university and library management; a lack of funds; the lack of IT expertise in human resources; a lack of training for staff; frequent break downs of computers and the Internet; an inadequate number of computers and a lack of good maintenance (Amekuedee, 2005).

Raza and Nath (2007) identified inadequate financial assistance, non-availability of experienced personnel, a lack of IT policy, low priority given to libraries and the non-availability of consultancy services as the significant problems being faced by university libraries of Punjab, Chandigarh and Himachal Pradesh for IT applications.

Pakistani LIS literature indicates that adoption of new technology started in the late 1960s and, since 1990, has been the main focus of the LIS profession in the country (Haider, 2003). According to Mirza and Mahmood (2014) a vast majority of Pakistani university libraries have initiated IT service.

Riaz (1990) (as cited in Mahmood, 1997) described the problems faced by Pakistani libraries in automating their operations and services. She singled out computer illiteracy, lack of proper planning, unavailability of library software, retrospective conversion, lack of standards and quality control,

the bureaucratic set-up and lack of technical expertise as major barriers. Anwar (1993) stated that libraries in Pakistan had faced many problems in automating their functions, but lack of computer literacy among librarians, the bureaucratic administration, lack of cooperation in experience sharing and lack of standards were the main problems. Ramzan (2004) stated the lack of an adequate budget, standard library software, and IT literate human resources, as well as bureaucratic management attitudes as the major obstacles that hindered the promotion and development of information technology in Pakistani libraries. Qutab, Bhatti, and Ullah (2014) identified a lack of funding as a major challenge in adoption of ICT among the public and private university libraries of the Federal area and Punjab province. These studies have identified problems faced by libraries in IT adoption on small scales but this research, for the first time, has explored this phenomena at a national level with a focus on public and private sector's universities of Pakistan.

2. Research Objectives

- i . To identify the problems faced by university libraries of Pakistan in using information technology.
- ii . To propose implications to resolve the problems for effective use of IT in Pakistani university libraries.

3. Methodology

To solve the research problem, a combination of quantitative and qualitative research method was used. To collect quantitative data, a questionnaire comprised on 19 statements about problems in IT Applications was delivered to the Chief/head librarians of 82 public and private sector's university libraries of the country through email/surface mail/by hand. Respondents were requested to give their opinion on a five point Likert Scale from strongly agree to strongly disagree. Fifty six libraries responded to the questionnaire; four questionnaires were excluded due to incomplete information. The valid response rate was 63.41%.

Qualitative data was collected by conducting interviews of 51 LIS professionals and faculty members having expertise in library automation. They were requested to identify the problems being faced by the university libraries in implementing IT and to provide suggestions to resolve the problems for effective use of IT in Pakistani university libraries.

The interviewees were from Islamabad, Rawalpindi, Karachi, Lahore, Peshawar, Bahawalpur, Jamshoro and Quetta. Recorded interviews were transcribed for analysis.

To check the scale's reliability, the researcher calculated Cronbach's alpha coefficient through SPSS software. Cronbach's alpha is the most famous and commonly used coefficient. The researcher examined the internal reliability of the variables. Calculations showed a high internal consistency and reliability (i.e. 0.96,) because Cronbach alpha (Cronbach, 1951) coefficients for the variables were adequately greater than the value of 0.65.

The collected data was analyzed by SPSS 16 software to calculate descriptive statistics.

4. Delimitation and Limitations

In this study information technology (IT) means “the application of computers and other technologies to the acquisition, organization, storage, retrieval, and dissemination of information” (American Library Association, 1983).

In spite of utmost efforts literature about a few countries i.e., Costa Rica, Nigeria, Ghana, India, and Jordan was retrieved and reviewed to understand the problem in international context.

5. Results

5.1 Questionnaire Survey

Descriptive statistics presented in Table 1 has ranked the problems faced by university libraries in IT adoption on the basis of mean value. The median value i.e., 4 showed the agreement of the respondents regarding the statements (ranked at 1-16 and 18) as a problem in the adoption of IT.

Table 1. Problems in Information Technology Adoption

Rank	Problems	N	Min.	Max.	Mean	Median	Mode
1	Lack of training opportunities for LIS professionals	52	1	5	3.79	4	5
2	Interrupted power supply	52	1	5	3.77	4	4
3	Lack of IT expertise among library users	52	1	5	3.75	4	4
4	Inadequate IT infrastructure	52	1	5	3.71	4	4
5	Lack of financial resources	52	1	5	3.69	4	4
6	Non-availability of technical support	52	1	5	3.63	4	4
7	Absence of IT policy	52	1	5	3.63	4	4
8	Fear of recurring costs involved in IT based projects	52	2	5	3.62	4	4
9	Insufficient IT literate/experienced LIS professionals	52	1	5	3.58	4	4
10	Lack of adequate in-house planning	52	1	5	3.56	4	4
11	Lack of consultancy services	52	1	5	3.5	4	4
12	Lack of awareness about the potential of IT among LIS professionals	52	1	5	3.44	4	4
13	Non-availability of standard integrated library software on affordable price	52	1	5	3.44	4	4
14	Lack of networks & cooperation	52	1	5	3.44	4	4
15	Lack of initiative among LIS professionals in introducing IT based resources & services	52	1	5	3.42	4	4
16	Lack of telecommunications links	52	1	5	3.4	4	4
17	Lack of commitment from university management	52	1	5	3.27	3.5	2
18	Reluctance among LIS professionals to use IT	52	1	5	3.21	4	4

Note: 1=Strongly disagree, 2=Disagree, 3=Don't Know, 4=Agree, 5=Strongly agree

5.2 Audio Recorded Interview

The interviewees were asked to point out the problems faced to implement IT in the university libraries of Pakistan. The two interviewed LIS experts stated that “There is no legal framework and standardization in our country to provide information services in the higher education institution”. Some of the respondents pointed out that in our university libraries, IT related projects are being implemented without strategic planning (N=8).

One third of the interviewees stated that ‘lack of sufficient funds’ is a barrier in the use of IT”. Decision makers including academic councils, library committees, library leadership have no vision about IT applications in their libraries”, said three interviewees. Two of the interviewees pointed out that lack of interest of university and library leadership is a hindrance to introduce IT applications. Fifteen interviewees identified ‘lack of visionary and competent leadership’ as an obstacle. “Resistance against change by the senior staff members is a barrier”, said seven respondents.

Analysis found ‘lack of IT skills among the majority of LIS professionals’ as a vital problem highlighted by the majority of the interviewees (N=30), while one of the interviewees stated that if this problem persists, IT professionals will replace LIS professionals in the near future. Four LIS experts indicated that ‘lack of IT skills among LIS professionals especially who graduated before the introduction of computers in Pakistani university libraries’ is a problem in the introduction of IT. “Library schools are not providing proper training in IT applications to their graduates”, said one interviewee.

In the opinion of a few interviewed experts, ‘extraneous curricula of LIS schools’ is a bottleneck in the applications of IT in the Pakistani university libraries (N=6). Two of the interviewees indicated that “We have lack of competent faculty members at library schools to provide hands-on training to our students according to market needs”.

Three of the interviewees expressed that sufficient training opportunities for library professionals and staff are not available in the country. Library schools, associations and employers are not playing their role of continuing professional development (N=2). One of the office bearers of Pakistan Library Association said that “PLA had shortage of finances. The Govt. is not providing us any support to organize such activities, even though PLA has organized various in-service training courses for the community”.

According to three interviewees, information seekers are lacking information literacy skills. Only a few university libraries in the country are offering informal information literacy programs. There is no formal information literacy program yet in any higher education institution.

One of the interviewees indicated that LIS professionals are lacking commitment to modernize library services. “LIS professionals and university management believe in myths. For example, most of the university libraries are using free of cost software, which have not been developed for university libraries. Most of our libraries are using non-standard and pirated software. These libraries are not ready to purchase good software,” said one LIS expert. Few of the interviewees identified the ‘non-availability of standardized integrated library software’ as one of the acute problems being faced by the university libraries in the country (N=7). ‘Costly library software’ and ‘Unawareness about Free and Open-source library software’ are also found to be obstacles in the introduction of IT based services (N=3).

In the opinion of four respondents, lack of IT equipment and infrastructure is an issue faced by the university libraries. According to an interviewee, the main cause of poor IT applications in the university libraries is are not investing on the development of IT infrastructure.

Three of the interviewees said that lack of experience sharing and networking among university libraries may be considered as a hindrance. There is no professional platform of this sector of libraries in the country.

In Pakistani university libraries, there is no culture of incentives and appreciation for competent professionals. The Pakistan Library Association and other professional organization have no scheme of awards for those who deserve acknowledgement (N=2).

Library leadership is lacking skills in developing projects (N=2). There is a lack of cooperation between IT and LIS professionals at an organizational level (N=3). In the opinion of two interviewees, purchase procedures in our institutions are vague enough to subscribe electronic resources. "Electric load shedding is also affecting smooth library operations and services nowadays and is damaging IT hardware and equipment severely," expressed five LIS experts.

6. Discussion

The analysis of both the questionnaire survey and interviews disclosed that 'lack of training opportunities for LIS professionals' and 'lack of IT skills among the majority of LIS professionals' are major challenges in adaptation of IT. Both these statements show that lack of IT knowledge has affected technology adoption in the university libraries of Pakistan. Rogers (2003) Innovation-Decision Process Model stated knowledge as a first stage of innovation adoption. He stated that at the first stage potential adopters find out about an innovation and gain a basic understanding of what it is and how it works. Anwar (1993) also pointed out 'lack of computer literacy among librarians' as a hindrance in library automation. In the questionnaire survey, the respondents listed "Interrupted power supply" as the second major problem. This result verifies the Badu (2004) study in which he identified intermittent electric power cuts as the major barriers in the successful implementation of information technology in university libraries of Ghana. Oduwole (2005) has also included continual power-cuts as a challenge in effective use of technology in the university libraries. According to analysis of interviews, one third of the interviewees stated that 'lack of sufficient funds' is a barrier in the use of IT". The studies conducted by Mulimila (2000), Younis (2005), Engstrom (2001), Ani, Esin, and Edem (2005), Amekuedee (2005), Nyamboga and Kemparaju (2002), Ramana and Rao (2003), Raza and Nath (2007), Ramzan (2004), and Qutab, Bhatti, and Ullah (2014) have also found 'lack of funding' among major problems in the use of information technology in the libraries of the higher education sector. The analysis of interviews has found the 'lack of visionary and competent leadership' as a major obstacle in implementing technology in library services in university libraries of Pakistan, whereas the questionnaire survey ranked 'lack of IT expertise among library users' a third major barrier in utilizing IT in Pakistani university libraries.

7. Implications

In the light of the results and the above discussion, the following implications are proposed to address challenges faced by Pakistani university libraries for effective use and adoption of IT in their resources and services:

Capacity Building of LIS Professionals

This is most important area needed to be addressed to implement IT effectively in the university libraries of Pakistan, because libraries cannot provide quality services without staff having good qualification and ICT skills. Higher Education Commission of Pakistan, LIS Schools and Library Associations should organize continuing professional development programs with a focus on hands-on practice activities like short courses and workshops. Online courses may also fill the existing gap of lack of IT training programs. LIS professionals should be proactive and participate in these activities with full spirit. Heads of university libraries should also develop their managerial, marketing, project development and negotiation skills to present and justify their needs in front of senior management effectively.

To inculcate the market required skill set in LIS professionals, LIS schools should improve the theoretical and practical knowledge of their faculty involved in teaching of ICT related courses along with upgrading and extending of their existing ICT infrastructure available for the practice of students. Pakistan Library Association should reactivate and upgrade their computer training centers and should offer continuing professional development courses on a regular basis to improve the knowledge and skill of the members. Universities should also encourage LIS professionals to learn new trends in the field of library and information science.

Appropriate Funding

University libraries are facing severe financial constraints not only to initiate new services but also to sustain existing services, therefore universities should allocate separate funds on a priority basis to fully automate their libraries, if they are not already automated or to sustain existing IT based resources and services. University libraries may also search out alternate funding opportunities in the context of modernization of their services. University librarians should convince their higher authorities about the benefits of IT applications to obtain required funds. Universities should also allocate some budget for the capacity building of library staff particularly in IT applications.

Constant Power Supply

Interrupted power supply is a big barrier in the effective use of IT. It is not only affecting smooth library services but also damaging IT equipments. The government should exempt higher education institutions from electricity load shedding. University and higher education institution should also generate energy from alternative sources to be self-reliance and to continue smooth teaching and research activities.

Formal Information Literacy Program

Pakistani university libraries offer orientation sessions to their users about library resources and services but there is no formal information literacy program even in a single university. Keeping in mind global trends in higher education, it is proposed to initiate formal information literacy programs by the university libraries for the capacity building of its graduates to train them in areas such as: basic information technology, traditional and electronic resources, information searching techniques, evaluation of sources, copyright and plagiarism, and to prepare them to play an active role in a knowledge based economy. The Higher Education Commission should also develop a model of information literacy for higher education institutions.

ICT Infrastructure: A Foundation for Hybrid Library and Information Services

Pakistani university libraries are needed to develop a strong ICT infrastructure to cope with the growing needs of systems, staff and patrons. They should implement standardized and integrated application and system software. Internet facilities, local area and wireless networks are mandatory to provide access to online resources and services. University libraries should also appoint IT professionals to look after the entire systems.

Coordination between University Library and IT Center for Efficient Technical Support

University libraries can never effectively implement and utilize their IT resources without the help of IT Centers/Computer Centers. University libraries should develop close coordination with an IT Center for the smooth functioning of hardware, software, networks and other peripherals.

IT Policy and Strategic Planning

Presently our university libraries are implementing technology without proper planning. Except for a few libraries, the vast majority have no IT policy and strategic plan. Therefore every university library should formulate its IT policy including 'Internet and e-resources use policy', 'Infrastructure development policy', 'IT security policy', 'Acquisition and marketing of e-resources policy', 'Library web publishing policy', and 'Human resource development policy.' It should prepare its short and long term strategic plans keeping in mind its present and future needs and resources. This initiative will maximize the benefits of financial investments in IT related projects.

Constitution of Inter-University Center for Libraries

It is unfortunate that there is no coordination among the university libraries in the country. Every library is working in isolation and reinventing the wheel. There is no culture of resource sharing which causes wastage of all types of resources even in these days of global and national financial crunches. No legal framework and standardization exists in the country to provide information services in the higher education institution. No system exists for the accreditation, monitoring and evaluation of university library services. With this scenario in mind, it is proposed to constitute an autonomous inter-university center under the umbrella of the Higher Education Commission of Pakistan. Its responsibilities will be: to develop standards and propose legislation, to assist resources sharing, to modernize resources and services, to build a center for LIS professionals and to provide consultancy

services to the university libraries.

Various resources sharing and consortia networks may also be constituted at regional and metropolitan levels. Establishment of specialized networks may also be beneficial for the academia.

Availability of Standardized Integrated Library Software

Non availability of standardized integrated library software for on economical price as well as technical support is a one of the most important issue faced by the university libraries in the country. Most of the libraries are using free of cost software designed for small academic and public libraries or in-house developed non-standardized and non-integrated packages to automate their house keeping operations and services. Very few libraries have standardized integrated library software which are very costly. Because of this situation, it is proposed that the Higher Education Commission should constitute a committee of University librarians and IT professionals to decide about the suitable software for Pakistani university libraries taking into account financial, support, and data conversion issues. After the decision, this project should be handed over to the proposed 'Inter-University Center for Libraries' for its execution.

Expansion in IT Based Resources and Services

Very few university libraries have fully automated services, while the majority of them have considered development of automated catalogue for library automation. University libraries should expand the circle of IT based resources and services. To achieve this target, they should implement standardized integrated library software after assessment of the existing system, identifying priorities, and determining specifications for the required system.

Libraries should develop a balanced collection both in print and electronic formats. University libraries should also subscribe to online databases of journals and e-books from their own resources, in addition to the HEC-National Digital Library Program. University libraries should also develop their own dynamic websites to provide web-based resources and services particularly Web-OPACs to their remote users. University administration should revise their procurement rules to facilitate to online payments to subscribe online resources.

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[Appendix] Questionnaire

- Please provide your response by ticking (✓) or writing in the space provided.
- Definitions of the Terms marked with * have been given at the end of the questionnaire.

General Information

Name of the University: _____

Problems in IT Applications

Please indicate the problems being faced by your library in the applications of information technology:
 Please tick the relevant box.

Problems	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
Lack of financial resources.					
Inadequate IT infrastructure.					
Reluctance among LIS professionals to use IT.					
Insufficient IT literate/experienced LIS professionals.					
Lack of initiative among LIS professionals in introducing IT based resources & services.					
Lack of awareness about the potential of IT among LIS professionals.					
Lack of IT expertise among library users.					
Fear of recurring costs involved in IT based projects.					
Lack of commitment from university management.					
Non-availability of standard integrated library software on affordable price.					
Non-availability of technical support.					
Lack of consultancy services.					
Absence of IT policy.					
Lack of networks & cooperation.					
Lack of adequate inhouse planning.					
Lack of telecommunications links.					
Interrupted power supply.					
Lack of training opportunities for LIS professionals					
Any other (Pls. specify) _____					