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Adoption of ICT's For Library Operations and Services: A Comparison of Public and Private University Libraries of Pakistan

INTRODUCTION

Information and communication technologies (ICT) are the most influencing factors of today's information society. The term of ICT is used to express the hardware and software usability for information transportation and conducting communications linked by a vast array of technological protocols. It also covers internet service provision, information technology equipment and services, media and broadcasting, library and documentation centers, network based information services and other related communication activities (Anie and Achugbue, 2009). The rapid implementation of information technology in our society has changed and continues to change in all areas of our life (Ramzan, 2004). Education, research & development sectors are highly affected with these technologies. New opportunities for teaching, learning and training through the delivery of digital contents (Harrods's glossary) are now widespread. ICT facilitates the information storage, retrieval, acquisition, searching, viewing and information handling. The main function of ICT is availability of right information to the user at the right time for appeasing his thrust of knowledge. ICTs have brought dramatic change the traditional ways of library profession and practice, both challenging and full of opportunity at same time (Omoniwa, 2001).

LITERATURE REVIEW

Importance of adoption of ICT in university libraries –

The library has an important role to play within a university to support its objectives of learning, teaching, research and community services. The extent, to which the university is able to carry out its laudable objectives, portrays how the university library has been supportive to it in the provision of all the essential information resources (Okiy, 2005). Proliferation of new technologies opens a number of challenges for higher institutions of learning (Mutula, 2007; Onyekwelu, 1999). University libraries are in a state of transition in terms of resources and users in the past two decades due to the applications of IT (Ramzan, 2004; Ani, Esin & Edem, 2005). University libraries in the countries with developed educational, library systems and infrastructure are using ICT for both library operations and services. This is aimed at ensuring quick and easy access of the large numbers of library users to relevant accurate and current information from both remote and immediate databases to facilitate learning, teaching and research in the universities. Adeleke & Olorunsola (2010) and Odero-Musakali & Mutula (2007) emphasize that libraries must take a more proactive response to ICT to function effectively in the present age, the manual processes or methods will have to give way to information and communication technologies (ICT) and a computer driven environment.

Libraries are using information and communication technologies for book and serial acquisitions, money transition, classification and cataloguing, reference service, user orientation service, circulation service, inter library loan, document delivery service, electronic contents, e-mail and chat assistance, web 2.0 interactive sharing, bibliographic service and photocopies services. These opportunities not only enable libraries to provide quick information to users but also benefiting remote libraries. (Gulati, 2004; Ramzan and Singh, 2009; Adeleke and Olorunsola, 2010). Onyekwelu (1999) named the internet as the greatest wonder of the century. Fitzgerald and Savage (2004) discussed the influence of the World Wide Web on the logistics of service delivery in libraries. The availability of e-mail and internet facilities in academic libraries offers a wide range of access to information globally without geographical barrier and timely (Ani, Esin, & Edem, 2005). Reding (2006) noted the rapid growth of that blogs and their influences on libraries users experiences.

Okiy (2005) found that acquisition of ICT facilities is demanded by users and is the way to enable the university libraries of developing countries to provide the services expected in present

electronic age. Mahmood and Khan (2007) observed that in recent years, work for the library and information profession is characterized by fast-paced change and new skills requirements. ICT's applications in library operations require professional's motivation of continuing education and acquisition of new skills in LIS; training and retraining on the part of the practicing librarians. So university librarians themselves need to avail the facilities of the computer training centers to update their ICT knowledge (Adeleke and Olorunsola, 2010; Onyekwelu, 1999).

Factors influencing the full operation of ICT in university libraries are being observed in many developing countries i.e. inadequate ICT infrastructural facilities, low bandwidth, Internet downtime, inconsistent power supply, ignorance on the part of the government, absence of a national information policy, lack of library policies, high rates of technology especially soft wares, irrelevant collections existence without any weeding out, shortage of competent manpower for information technology operation and maintenance, increased economic pressure and budget cuts are forcing fee based services by libraries to counting the technological (Okuy, 2005; Odero-Musakali & Mutula, 2007; Adeleke & Olorunsola, 2010; Kumar & Biradar, 2010).

ICT in Pakistani Libraries –

The literature indicate that some university libraries of Pakistan are not behind in adoption of ICT for their library operations and services provisions but the level of use vary in public and private sector. Some studies were conducted in Pakistan on different aspects of information technologies i.e. Mahmood & Khan (2007) investigated the ICT training needs for LIS professionals; Ramzan & Singh (2009) surveyed the statues of IT applications in libraries of Pakistan; Rafiq (2009) studied the perceptions of OSS in LIS community; Qutab & Mahmood (2009) conducted a survey of the library websites of the Pakistan; Warraich & Ameen (2010) assessed perceptions of librarians regarding use of Pakistan national digital library etc. None of those investigated the overall situation of the ICT amenities and adoption for library operations and services to compare public and private sector universities. Ramzan & Singh (2009) studied the status of IT applications in Pakistani academic libraries and revealed that academic libraries across Pakistan are far behind in achieving excellent IT levels, despite the efforts of both the government and the private sector to make the technology available to all the libraries under their jurisdiction. Warraich & Ameen (2010) found that LIS professionals of Pakistan were not currently taking full advantages of available databases, e-books or other open access e-sources to facilitate their end users to the maximum extent. Lack of awareness on the part of end-users and sometimes even librarians are major factor behind this low use.

Research Methodology

Quantitative research methods of study were used for this study. A structured questionnaire with closed ended questions was developed. The survey form was posted, emailed and personally distributed.

Research Questions –

1. What is the state of ICT infrastructure in public and private university libraries of Pakistan?
2. What is the level of usage and awareness of ICT in university libraries?
3. What is a current status of ICT adoption for library operations and services?
4. What problems are being faced by libraries in ICT adoption?

Questionnaire –

Questionnaires were sent to 55 university libraries (17 Islamabad and 38 Punjab province) with 38 (69%) respond rate. Only the main libraries of these universities were contacted for data collections. There were three main parts of the questionnaire. First part's questions were set to inquire the ICT infrastructural settings of library i.e. basic information of the institution, statistical

information of computer and internet facilities along with automation level, state of different available hardware facilities. Second part contains questions regarding library operations i.e. acquisition, technical processing, trainings and promotion; library services i.e. circulation, reference services, digital contents and social media. Third and last part of questionnaire consists of questions regarding reasons causing hurdles in full ICT application for library operations. Likert-type scale of 5=always, 4=frequently, 3=sometimes, 2=rarely and 1=never was used to rank the level of ICT use for these library operations, services and problems. Data was analyzed descriptively by calculating (frequencies, simple mean and standard deviation) with help of Statistical Package for Social Sciences (SPSS) 17.

Data Analysis

Demographic information indicate that there were 12 (28%) libraries from Islamabad, 17 (40%) from Lahore, 3(7%) from Faisalabad and one library from each city; Bahawalpur, Gujranwala, Gujrat, Multan, and Rawalpindi. Data was collected from 22(59%) public and 15(40%) of private sector university libraries. IT skills of LIS professional can make ICT implementation possible. It was found that 22(60%) libraries have 1 to 5; 9(24%) have 6 to 10; 3(1%) have 11 to 15 or above 15 ICT trained library professionals. Computerization of library operations and services was started in 1980's in two (1%) libraries; 7(18%) started in 1990's; 20(54%) started in 2000's and two libraries started in 2011. Number of computer was inquired and found that 7(19%) libraries have less than 10; 6(16%) have 11 to 20; 11(30%) have 21 to 30 and 13(35%) have above 30 computers. Highest number of computers was found in main library of University of the Punjab, Lahore as 245. Internet availability was checked and found that all computers in Pakistani libraries are not connected to internet. It was found that in one library less than 10 computers were connected with internet; 19(51%) libraries' have internet connection on 11 to 20 computers; 4(10%) on 21 to 20 and 13(35%) on more than 30 computers. Different types of internet connections were used by university libraries. LAN was used by 28(65%); WiFi by 25(58%); Cable network by 9(21%); PERN by 16(37%); Dial up and Leased line by one library and DSL by three libraries. It is also notable that sometimes even more than one type of connections is available in one library. Internet speed is important to get rapid and timely information. It was found that 9(20%) libraries possess 128-1.5 mbps internet speed; one library has 64 – 128kbps and less than 56mbps; 20(47%) have more than 1.5mbps; 5(12%) have other internet speed level and 7(16%) did not answer.

Completely computerization state was claimed by 17(40%); about to be computerization state by 17(40%) and planning to be computerized by three libraries. Types of automation software was questioned and found that 15(35%) libraries are using in-house library software; 5(12%) purchased; and 16(37%) are using either open source or free soft wares and 7(16%). KOHA was used by four libraries; LIMS by 14; LMS by three; WINSIS and VIRTUA by two and evergreen by one library. OPAC was developed by 31(72%) libraries yet among them 13(30%) OPAC were on local area network (LAN) and 18(41%) world wide area network (WAN).

Hardware Facilities –

Today, variety of equipment are available that can make the use of ICT for library operations possible. Digital camera was owned by 16(37%); photocopier by 30(70%); multimedia by 17(40%); audio players by 16(37%); backup drives by 23(54%); barcode readers by 27(63%); CD/DVD players by 27(63%); microfilm readers and slide projectors by 6(14%); scanners by 29(67%); television/LCD by 19(44%); UPS by 31(83%); USB pen drives 34(79%); VCR/VCP by 11(25%); servers by 28(65%); dot-matrix printers by 12(28%); laser printer by 33(77%); and inkjet printers possessed by 12(30%) libraries.

Library Operations –

Library operation included acquisitions, technical processing, trainings and promotions. Use of ICT for book acquisition is largely found in private sector university libraries than public sector (mean = private: 3.70, public: 2.67); search for purchasing information (mean = Private: 3.20, Public: 3.90); placing orders (mean = private: 2.07, public: 3.05); inquiry of orders in case of delays etc. (mean = private: 2.93, public: 3.05); electronic money transaction for payments (mean = private: 2.55, public: 1.80) and acquisition of serial controls (mean = private: 2.19, public: 1.27). Technical processing includes the subject heading, classification and cataloguing. IT has completely changed old manual technical processing systems of books within libraries with OCLC applications, copy cataloguing and LC subject headings. Practices of copy cataloguing is adopted by public sector university libraries more than private sector (mean = private: 2.33, public: 2.62); subject heading by (mean = private: 1.80, public: 2.62); online classification schemes usage by (mean = private: 3.60, public: 2.62) and classification schemes on CD or DVD is used by (mean = private: 3.70, public: 4.07) libraries.

Libraries play important role in ICT related trainings of students, teachers, researchers and LIS professional. Information and communication technologies are being used for universities' staff training more at public than private sector university libraries (mean = private: 1.87, public: 2.70); users orientation done by (mean = private: 2.27, public: 2.76); trainings for LIS professionals (mean = private: 1.73, public: 2.19); training through video conferencing (mean = private: 1.87, public: 2.67) and webinars are used by (mean = private: 1.73, public: 2.43). World Wide Web is great competitor of the libraries yet a good tool for promotion and services. Public libraries are using ICT for advisement more than private sector university libraries (mean = private: 1.07, public: 1.71); for fundraising (mean = private: 1.13, public: 1.76); for public relations (mean = private: 1.73, public: 2.48); for library electronic newsletter and bulletins (mean = private: 1.47, public: 2.05); for over all library management (mean = private: 1.47, public: 1.78). Use of library website is most popular among both private and public sector (mean = private: 3.53, public: 4.30).

Table 1: Library Operations

Variables	Private University		Public University	
	Mean	Std. D	Mean	Std. D
Acquisition				
Books	4.58	.961	2.67	1.676
Searching	3.20	1.935	3.90	1.518
Ordering	2.07	1.335	3.05	1.465
Inquiry	2.93	1.944	3.20	1.436
Money transaction (credit card)	1.80	1.373	2.55	1.731
Serial control	1.27	.594	2.19	1.123
Technical processing				
Copy cataloging	2.33	1.589	2.62	1.532
Subject heading	1.80	1.207	2.62	1.284
Online classification schemes	2.62	1.284	3.60	1.844
Classification schemes on CD/DVD	3.70	1.455	4.07	1.624
Trainings				
Staff	1.87	1.407	2.70	1.809
Users orientation	2.27	1.792	2.76	1.446
Professional trainings (LIS and others)	1.73	1.335	2.19	1.209
Video conferencing	1.87	1.125	2.67	1.390
Webinars	1.73	1.033	2.43	1.326
Promotion				
Advertisements	1.07	.258	1.71	.902
Fundraising	1.13	.352	1.76	1.136
Public relation	1.73	1.163	2.48	1.401
Library e-newsletter/bulletins etc.	1.47	.834	2.05	1.276
Library website	3.53	1.807	4.30	1.218
Overall library management	1.47	.834	1.78	1.218

Library Services –

Library services include circulation, reference services, digital contents and social media. Circulation services are often done with use of computer or internet in many Pakistani libraries. Results shown that ICT are highly used for library membership equally by public and private sector university libraries (mean = private: 3.67, public: 3.85); book reservation is being done by (mean = private: 3.87, public: 4.55); overdue fines (mean = private: 3.60, public: 4.60); for reminders (mean = private: 3.00, public: 4.60); interlibrary loan practices are not very popular with (mean = private: 1.13, public: 1.76) and online chat is done by (mean = private: 3.73, public: 3.95) libraries.

Table 2: Library services

Variables	Private university		Public university	
	Mean	Std. D	Mean	Std. D
Circulation				
Library membership	3.67	1.759	3.85	1.663
Book reservation	3.87	1.552	4.55	.887
Overdue fines	3.60	1.844	4.60	1.095
Reminders	3.00	1.890	4.60	.883
Interlibrary loans	1.13	.352	1.76	.995
Online chat	3.73	1.668	3.95	1.395
Reference services				
Emails	2.67	1.839	2.35	1.268
News clipping service	2.07	1.387	3.15	1.663
Indexing & abstracting services	1.50	.941	1.95	1.517
Bibliographic service	2.27	1.534	3.15	1.496
Selective Dissemination of Information (SDI)	2.33	1.397	2.45	1.356
Interlibrary loan	2.13	1.302	2.33	1.531
New arrivals alerts	1.53	.915	2.55	1.638
Current Awareness Services (CAS)	1.93	1.335	2.60	1.429
Electronic document delivery	3.00	1.648	3.25	1.618
Digital contents				
Books and reference material	3.87	1.685	3.65	1.387
Manuscripts & archival material	1.53	1.246	2.05	1.244
Institutional databases/digital library	1.07	.258	2.67	1.592
HEC databases	3.20	1.935	3.90	1.518
Subscribed databases	2.81	1.642	1.87	1.601
Open access material information	1.20	.561	2.19	1.504
Social media				
Library Face Book account	2.00	1.512	1.66	1.218
Twitter alerts for users	.96	.967	.67	.754
LinkedIn	1.27	.594	2.19	1.123
Library Blog(s)	1.73	1.280	2.52	1.537
List-serves e.g (Paklag, Libcoop etc)	4.40	1.298	4.35	1.268
Library RSS Feed for users	1.93	1.387	1.07	.258
Del.icio.us Bookmarks for users	1.20	.561	1.07	.276
Flicker account of library	1.07	.258	1.93	1.335

Reference services play very significant role in building good image of any library and these may be improved significantly with the help of information technology in the new era. Emails are sent by (mean = private: 2.67, public: 2.35); for news clipping services (mean = private: 2.07, public: 3.15); for indexing and abstracting services (mean = private: 1.50, public: 1.95); bibliographic services (mean = private: 2.27, public: 3.15); for selective dissemination of information (mean = private: 2.33, public: 2.45); for interlibrary loans (mean = private: 2.13, public: 2.33); for current awareness services (mean = private: 1.93, public: 2.60) and for electronic document delivery (mean = private: 3.00, public: 3.25) libraries use information and communication technologies.

Digital contents appear in any format and cover all types of information sources of past. Pakistani university libraries are using digital contents increasingly after support from higher

education commission and demand from users. Digital books and reference material is equally and highly used by both private and public sector (mean = private: 3.87, public: 3.65); digitized manuscripts and archival materials are mostly provided by public sector but still not as much as born digital contents (mean = private: 1.53, public: 2.05); institutional databases are provided by (mean = private: 1.07, public: 2.67); Higher Education Commission databases are used by (mean = private: 3.20, public: 3.90); subscribed databases are by (mean = private: 2.81, public: 1.87) and open access informational material is being offered by (mean = private: 1.20, public: 2.19) libraries. Use of social networking media has change the way of lives from every corner of the world. It is notable that librarians are somehow active users of social media applications but their use for library services is not very common in Pakistan. Library's facebook account (mean = private: 2.00, public: 1.66); twitter alters for users are provided by (mean = private: 0.96, public: 0.67); linkedin used by (mean = private: 1.27, public: 2.19); library blogs (mean = private: 1.73, public: 2.52); library RSS feed for users by (mean = private: 1.93, public: 1.07); Del.icio.us bookmarks for users by (mean = private: 1.20, public: 1.07) and flicker account of library is by (mean = private: 1.07, public: 1.93) libraries. Use of list-serves is most famous among both private and public libraries (mean = private: 4.40, public: 4.35) of Pakistan

Problems/challenges –

There are many challenges and problems faced by Pakistani university libraries for upgrading their traditional manual status into advance automated.

Table 3: Problems in ICT adoption

Variables	Private university		Public university	
	Mean	Std. D	Mean	Std. D
Lack of Funding	2.05	1.234	2.86	1.236
Lack of space	3.33	1.676	2.29	1.288
Lack of manpower	2.62	1.359	3.00	1.104
Lack of trained staff	2.62	1.431	3.87	1.642
Un-availability of computers	2.10	1.179	3.93	1.438
Un-availability/slow internet connection	2.09	1.245	3.62	1.195
Un-availability of related soft wares	2.17	1.432	3.00	1.069
Un-availability of back up services i.e. electricity/generator	2.56	1.187	3.24	1.179
Staff's attitude towards ICT adoptability	2.98	1.223	4.07	1.223
Administration/management attitude towards ICT adoption	1.89	1.107	3.10	1.221
Lack of interest by library users	1.09	.978	3.40	1.314
Lack of co-operation within libraries	2.09	1.176	3.00	1.304

Lack of funding is the problem mostly faced by public sector libraries than the private sector (mean = private: 2.05, public: 2.86); lack of space is faced by (mean = private: 3.33, public: 2.29); lack of manpower by (mean = private: 2.62, public: 3.00); lack of trained staff by (mean = private: 2.62, public: 3.87); un-availability of computers by (mean = private: 2.10, public: 3.93); slow and disconnected internet connection (mean = private: 2.09, public: 3.62); un-availability of related software by (mean = private: 2.17, public: 3.00); un-availability of back up services by (mean = private: 2.56, public: 3.24); staff attitude for adoption of ICT applications by (mean = private: 2.98, public: 4.07); administration's attitude by (mean = private: 1.80, public: 3.10); lack of interest by users by (mean = private: 1.09, public: 3.40) and lack of library cooperation by (mean = private: 2.09, public: 3.00) libraries.

CONCLUSIONS

Like many other developing countries Pakistan is also taking many initiatives to build an IT infrastructure. Higher Education Commission of Pakistan took many steps to ensure ICT promotion in universities. Provision of IT equipment, soft wares, internet connection, funding and trainings are sustaining universities and research. Libraries are no exceptions. Results of this survey show that

university libraries' level of adoption of ICT for operations and services is improving. Many libraries started automation in 2000 and later. Most libraries are going through first ever experience of automation while some are fully automated. It is noticed that acquisition, technical processing and circulation services are performed by using computer and internet. The fully utilization of ICT for all library operations and services is shown in very few libraries whereas mostly are still using it for the basic activities like searching of books and serial publications for purchase or recommendation, online subject heading and classification. Book circulation is mostly done with computers while online book circulation operations are performed by only few libraries.

Use of internet and computer for training staff, students and LIS professionals is also increasing among public sector libraries. Library promotion activities i.e. advertisement, fundraising and public relation are not popular either manually or electronically. Reference services are provided in ICT environment but mostly limited to emails, chat, CAS, SDI and bulletins. Electronic books, subscribed journal's databases, HEC digital library and open access contents are used and spread by librarians. Use of social networking media for libraries is still not very popular in Pakistani environment expect the list-serves.

The study showed that public sector libraries are behind in adoption of ICT for complete library operations than private sector libraries. Many problems i.e. low funding, skilled and willing staff, less supportive administration, less number of computers, poor internet connections as well as insufficient cooperation among libraries are faced by public sector libraries more than private sector. Literature review showed similar problems faced by libraries at Nigeria, India, Thailand and other developing countries. Current ICT adoption situation of Pakistani university libraries is quite better than ten years ago when Saeed et al (2000) studied use of internet in and found only 50% university libraries have internet connections.

However this low level of ICT usage for library operations and services is alarming. As the university libraries in developed countries have been completely automated since more than a couple of decade and now preparing for paper less services and web 3.0. Comparing that to Pakistani university libraries are still on initiation stage for introducing and developing advanced library automation and electronic operations. The findings and recommendations of the study are helpful for the policy makers, Higher Education Commission of Pakistan, library professionals and management authorities to solve the problems causing low level of ICT applications by university libraries of Pakistan.

SUGGESTIONS –

Effective adoption of ICT in university libraries in Pakistan will accelerate the level of knowledge acquisition, research and consequently promote academic and research activities for national development. Following are some suggestion to improve the state:

1. Foundation of minimum ICT requirements list for a university library by HEC to ensure standardization of infrastructure and operations.
2. Sufficient funds are required for better IT facilities and infrastructure.
3. Acquisition of library soft wares for university libraries by HEC or any other consortium.
4. ICT skills of LIS professionals needed to be improved by incorporating more ICT related course at the LIS schools and continuous training programmes.
5. Specialized ICT related in-service training should be provided to library staff by HEC, PLA or other library platforms.
6. Library professionals' training needs should be assessed properly for relevant provision.
7. It is observed that library users are not being taught about the use of computerised library services, it should be done on priority basis so as to derive maximum benefits.
8. More computers should be provided and internet connectivity should be enhanced.
9. Opening definite ICT related library posts to ensure consistency in automated operations and services.

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