Factors affecting librarians’ attitudes toward IT application in libraries

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Abstract
Purpose – The purpose of this paper is to investigate the factors affecting librarians’ attitudes toward IT application in libraries. It also aims to identify common underlying factors, which could be used to predict the probable behavior of librarians toward IT innovation in their libraries.

Design/methodology/approach – Primary data were collected through a questionnaire survey of 288 (sample of 682) head librarians working in academic libraries across Pakistan. In total, 76 per cent valid responses were used for factor analysis. Principal components analysis was deployed to extract the underlying factors using SPSS.

Findings – The study found that the intensity of librarians’ fears in IT handling, ability to cope with the ever-changing IT innovations and their level of understanding of IT-based rules and regulations were good predictors of librarians’ attitudes toward information technology.

Practical implications – The findings can be utilized to improve the librarians’ attitudes toward IT applications, their role in IT-related decision making, their ownership of IT application in libraries and for success of library IT projects and innovations.

Originality/value – The study is the first of its type in this region, particularly in Pakistan. The paper provides insight into the people responsible for IT application in libraries.

Keywords Librarians, Attitudes, Library automation, Libraries, Pakistan

Paper type Research paper

Introduction
Information technology innovations are influencing the library functions, operations, processes, infrastructure and services at an ever-increasing rate. It is important for the library leadership to make changes and innovations in the functions and roles of libraries for the ultimate benefit of its users (Moyo, 2004; Melchionda, 2007; Tsakonas and Papatheodorou, 2008). The librarians’ role in this change process has been noted as central as champion of the library technology by several writers (Callahan, 1991; Griffiths, 1995; Lewis, 2007). Because technology in itself does not bring changes, it is the librarian who uses the technology as a strategic resource to innovate library infrastructure, systems, services and resources and who assists the users in the effective use of technology that makes the difference. A number of studies (Yaacob, 1992; Su, 1993; Finlay and Finlay, 1996; Janes, 2002; Ramzan, 2004; Pors, 2005; Kari, 2006; Genoni et al., 2006; and Hendrix, 2007) have identified that the attitudes of librarians toward IT innovations play a fundamental role in determining their response.
toward implementation of these technologies in their libraries. They have further mentioned that the success or failure of IT application in libraries depends on the attitudes of the librarians, because, they are the key responsible persons for initiating changes, innovations and for planning and implementation of IT projects in their libraries.

Attitude in this study represents librarians’ extent of favourability or unfavourably for application of IT in their libraries. Ajzen (2001) has mentioned that people learn attitudes over time by being exposed to the object directly or through receiving information about the object from peers and colleagues. This means that attitudes are open to influence through a persons’ personal characteristics, personality traits, and the environmental and other factors. Correspondingly, librarians’ personal characteristics, and environmental factors affect their attitudes towards IT applications. It is evident, that to understand the librarians’ perceptions toward IT, we need to first examine and determine the possible factors that can influence their attitudes.

There is hardly any study available to explain the underlying factors that could affect the librarians’ attitudes toward IT application in their libraries, particularly in Pakistan. Identification of these factors is of significance as they help understand the dynamics of the existing attitudes and predict future behaviour of librarians toward IT innovations. It is hoped that the findings of this study will be used to identify the factors that can assist library managers, patrons, government officials, administrators, policy planners and decision-makers in predicting the success or failure of IT projects in libraries.

Literature review

It is important for the librarians to provide sufficient hardware, software, network facilities, electronic resources and continuously innovative user services. Malone et al. (2008) listed key factors that can influence the decision to provide computers in libraries. These are:

1. Users’ ownership of computers, laptops, pdas, internet enabled cell phones.
2. Presence or absence of wireless network.
3. Presence or absence of IT/library collaboration.
4. Space and cost issue.
5. Availability of computers in other departments.
6. Availability of electronic resources in libraries.

Moreover, one time provision of hardware, software, network infrastructure, and electronic resources is not sufficient. It requires continuous improvement and upgradation of systems and resources to pace with the fast changing information technologies (Holland, 1997). In addition, Sreenivasulu (2000) noted that the success of librarians in this digital age depends on their human and technology management competencies. A study by Chan and Auster (2003) reported that managerial and organizational support for updating knowledge and skills, age, job status (being part-time), organizational reward system was key factors contributing to the professional development of librarians.

It is well established that librarians’ attitudes towards new information technologies play a fundamental role in the provision and application of these technologies in libraries. Their positive attitudes result in high morale, motivated
response to innovations and enhanced use of IT, while negative attitudes produce low morale and resistance to changes in the status quo. A number of factors influence these attitudes and perceptions. Ostrow (1998) identified the factors that often contribute to the receptivity or resistance to innovations in libraries. These are:

1. Members’ participation in decision-making and implementation.
2. Perceived availability of training and skills enhancement opportunities.
4. Gender and age.
5. Prior experience with technology.
6. Specialization within the organization.
7. Degree of professionalism.
8. Organizational slack.
10. Fear of change.
11. Perceived threats to job security or status.

Winstead (1994) identified ergonomic factors of automation, style of management during implementation of automation projects and communication skills of library administrators as essential factors in successful implementation of library automation projects.

Prior knowledge and experience with information technology may also be related to the acceptance or rejection of technological innovations. Research by Finlay and Finlay (1996) revealed that technical and procedural knowledge of IT tools, innovativeness, encouraging management and learning opportunities are key factors that influence librarians’ attitudes toward internet. However, age, education, job position and location were not significantly correlated with their internet attitudes. A study by Ramzan (2004) revealed IT utilization, level of IT knowledge, and awareness about the potential of technology as good predictors of librarians’ IT attitudes. Potosky and Bobko (2001) found individual’s personal relationship with computers, attitudes about computers use, and general attitudes about computers in society as significant predictors of their perceptions about computers.

Librarians’ role in IT related decision-making and their level of familiarity with the new system and rank of librarian in the hierarchy of the organization and their overall technology orientation are important factors affecting the acceptance or rejection of automation in libraries. Idowu (1999) found that computer training and a practical knowledge of computer applications were significant factors, which influence librarians’ attitudes toward library automation. Tella and Ayeni (2006) indicated that self-efficacy and prior computer experience significantly predict and contribute to the creativity of the librarians. Studies by Adelej et al. (2005) and Uwaifo (2007) revealed that the respondents’ age, gender and computer experience does not significantly influence librarians’ attitudes towards the use of computerized information systems. A cognitive process research by Au and Enderwick (2000) determined that an attitude toward technology adoption is affected by compatibility; enhanced value, perceived benefits, adaptive experiences, perceived difficulty, and supplier’s commitment.

The previous studies identify a number of personal and environmental factors that can affect librarians’ attitudes toward IT innovations. This present study focussed on
examining the factors that influence the attitudes of librarians toward use of IT in Pakistani libraries.

**Methodology – target and assumptions**

The data used in this paper has been collected through a questionnaire survey. Respondents were asked to describe their personal opinions, beliefs and attitudes on a five-point Likert scale. Forty-two statements were used to elicit the librarians’ attitudes regarding impact of IT on different library operations and services, cost of IT tools, equipments and electronic resources, allocation of resources for IT, and staff and user IT training, and general aspects of IT relevant to libraries and librarianship. These statements were selected from previous studies after discussions with library scholars, IT experts and behavioural scientists. There are multiple stakeholders responsible for application of IT in libraries. The subjects of this study are head librarians’ working in academic libraries across the country. Consequently, they were targeted for the collection of primary data. The choice of respondents was based on a number of factors and assumptions. These were as follows:

1. The head librarian was deemed to be the person with a comprehensive overview and understanding of the initiatives, developments, and implementation status of the various programs and activities being undertaken at the library.

2. He is most likely to be the person to lead all significant initiatives. Thus, he could be termed as the champions of all major changes taking place in the library. Without his leadership role, it is unlikely that major developments could be conceived and executed. This is, perhaps particularly true in the context of libraries in less-advanced countries. Given the nature of relatively more hierarchical organizational setup in most local institutions, particularly those in the public sector, the need for the head to lead the department/institution becomes more understandable. Although, one could argue that some other senior person in the institution could champion the cause of certain significant developments in the library, this seems practically unlikely, especially in more professionally managed institutions where departments and their roles are more formally established.

3. This study also assumed that the attitude of head librarian is a critical factor in the induction and successful implementation of IT innovations. Because being the ‘champion’ of major initiatives head librarians, attitude is likely to impact significantly on the final outcome of all major developments and endeavours with regard to IT and other innovations undertaken at the library. Of course, the role of librarians and other staff at the library is also paramount in the successful execution of different library projects.

4. The cost, time and effort constraints also necessitated the choice of head librarian as the target respondent. The cost factor became particularly important given the geographical dispersion of sample libraries.

A purposive sample of 288 head librarians was drawn from a countrywide population of 682 academic libraries. Of the 288 questionnaires administered, 236 (82 per cent) respondents returned completed questionnaires. A major part of the IT attitudes and demographic information was incomplete in 17 responses. Finally, 219 (76 per cent of the sample) valid questionnaires were selected for data analysis and interpretation.
The purpose of this study has been to find the variables that could help library planners and decision-makers in predicting attitudes of librarians toward information technology. Principal Components Analysis (PCA) method was deployed to carry out prediction analysis and to extract the underlying factors affecting the attitudes of librarians toward information technology. For prediction purposes, factor analysis was run on 42 statements regarding respondents’ attitudes and beliefs with respect to information technology. Initially 12 key/common factors with more than 1.00 Eigenvalue emerged out of 42 IT attitude statements. The researcher ignored the statements with less than 0.40 per cent coefficient values. The reason for this cut point was that statements with less than 0.40 per cent coefficient values were not conceptually relevant with the other grouped statements. A few commonly used terms in factor analysis are explained in the following for the benefit of general readers (Pohlmann, 2007):

- **Factor analysis** is a statistical technique used to: estimate factors or latent variables; or reduce the dimensionality of a large number of variables to a fewer number of factors. In this study, we used factor analysis to reduce the 42 IT attitude variables in to eight common factors.

- **Factor loading** is a term used to refer to factor pattern coefficients or structure coefficients. It is actually a Pearson correlation between a variable and a factor.

- **Data reduction** refers to reducing the number of variables or cases in a data matrix. This method is used to replace a large number of variables with a smaller number of factors.

- **An eigenvalue** is the variance in a set of variables explained by a factor or component. It is the sum of squared values in the column of a factor matrix.

- **Common factor** is that on which two or more variables are loaded. In this study, we have used the tern key variables to represent common factor.

- **Scree test** is a graphic method for determining the number of factors. The Eigenvalues are plotted in the sequence of the principal factors (Scree plot). The number of factors is chosen where the Scree plot levels off to a linear decreasing pattern.

The scree plot was also used to determine the importance of loaded factors and to put a cut-off point on the number of loaded factors. After analysis of statements loaded under each factor, the researcher labelled the loaded factors. The researchers used his judgement and outcome of the analysis of relationship of loaded statements to determine the titles of labels for loaded factors. In addition to the questionnaire responses on structured questions, some respondents made useful comments and remarks regarding different aspects of IT use in their libraries, which were also used to highlight the findings.

**Findings**

Data in Figure 1, Tables I and II indicate the loaded factors, their eigenvalue, variance, grouped statements under extracted components in order of coefficient value and factor labels. Initially, 16 statements were grouped under factor 1 with 5.028 (11.9 per cent of the total variance) eigenvalue based on their variability. However, 13 significantly relevant statements as per the previously stated criteria were considered for label assigning. Five statements were grouped under factor 2 with 2.708 (6.4 per cent of the total variance) eigenvalue based on their variability. However, four significantly relevant statements as per the previously stated criteria were considered for label assigning.
Four statements were grouped and used for labelling under factor 3 with 2.283 (5.4 per cent of the total variance) eigenvalue based on their variability. Two statements were grouped and used for labelling under factor 4 with 2.220 (5.3 per cent of the total variance) eigenvalue based on their variability. Factor 5 also comprised of two statements with 1.966 (4.7 per cent of the total variance) eigenvalue. Both statements were used for labelling, as per the set criteria. Two statements were grouped and used for labelling under factor 6 with 1.890 (4.5 per cent of the total variance) eigenvalue based on their variability. Three statements were grouped and used for labelling under factor 7 with 1.745 (4.1 per cent of the total variance) eigenvalue based on their variability.

Three statements were grouped under factor 8 with 1.612 (3.8 per cent of the total variance) eigenvalue based on their variability. However, two significantly relevant statements as per the previously stated criteria were considered for label assigning. The remaining factors were ignored because of the insignificance of the eigenvalues as well as the fact that researcher could not assign a conceptually relevant label because of the inconsistency of the grouped statements and in some cases single statement loading.

<table>
<thead>
<tr>
<th>Factor Nos.</th>
<th>Labels for loaded factors</th>
<th>Initial eigenvalues of loadings</th>
<th>Total Variance (%)</th>
<th>Cumulative (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IT specialism (separate from librarianship)</td>
<td>5.028</td>
<td>11.973</td>
<td>11.973</td>
</tr>
<tr>
<td>2</td>
<td>Resource utilization and future IT use in libraries</td>
<td>2.708</td>
<td>6.448</td>
<td>18.421</td>
</tr>
<tr>
<td>3</td>
<td>Pace of IT changes (IT fears)</td>
<td>2.283</td>
<td>5.435</td>
<td>23.855</td>
</tr>
<tr>
<td>4</td>
<td>Resources for IT training</td>
<td>2.220</td>
<td>5.286</td>
<td>29.142</td>
</tr>
<tr>
<td>5</td>
<td>IT as an enabler and facilitator</td>
<td>1.966</td>
<td>4.682</td>
<td>33.823</td>
</tr>
<tr>
<td>6</td>
<td>IT based rules and processes</td>
<td>1.890</td>
<td>4.500</td>
<td>38.323</td>
</tr>
<tr>
<td>7</td>
<td>Librarians’ role in IT decision-making</td>
<td>1.745</td>
<td>4.155</td>
<td>42.478</td>
</tr>
<tr>
<td>8</td>
<td>In-depth and continuous IT education and training</td>
<td>1.612</td>
<td>3.839</td>
<td>46.318</td>
</tr>
<tr>
<td>Variable statements/components (factors)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>It is difficult … librarians to handle computer technology</td>
<td>0.59</td>
<td>0.27</td>
<td>0.20</td>
<td>0.04</td>
</tr>
<tr>
<td>Cost of IT tools is very high of … for Pakistani libraries</td>
<td>0.59</td>
<td>0.11</td>
<td>0.05</td>
<td>0.01</td>
</tr>
<tr>
<td>IT application in libraries is the responsibility of computer professionals not librarians</td>
<td>0.59</td>
<td>0.14</td>
<td>0.07</td>
<td>0.11</td>
</tr>
<tr>
<td>IT is still a luxury for Pakistani libraries</td>
<td>0.54</td>
<td>0.03</td>
<td>0.10</td>
<td>0.19</td>
</tr>
<tr>
<td>IT is a separate discipline librarians’ need not to learn</td>
<td>0.52</td>
<td>0.26</td>
<td>0.16</td>
<td>0.08</td>
</tr>
<tr>
<td>Card catalogue can be modified easily than OPAC</td>
<td>0.49</td>
<td>0.04</td>
<td>0.39</td>
<td>0.03</td>
</tr>
<tr>
<td>Each year librarians should increase IT expenditure</td>
<td>0.46</td>
<td>0.20</td>
<td>0.01</td>
<td>0.45</td>
</tr>
<tr>
<td>Computer creates health and environmental problems</td>
<td>0.46</td>
<td>0.02</td>
<td>0.16</td>
<td>0.28</td>
</tr>
<tr>
<td>IT is more useful for developed country libraries</td>
<td>0.45</td>
<td>0.01</td>
<td>0.36</td>
<td>0.33</td>
</tr>
<tr>
<td>Extensive IT use creates job fears among librarians</td>
<td>0.45</td>
<td>0.31</td>
<td>0.01</td>
<td>0.18</td>
</tr>
<tr>
<td>User must be given orientation of new IT systems</td>
<td>0.41</td>
<td>0.28</td>
<td>0.23</td>
<td>0.15</td>
</tr>
<tr>
<td>Online databases provide more up-to-date information</td>
<td>0.40</td>
<td>0.04</td>
<td>0.05</td>
<td>0.18</td>
</tr>
<tr>
<td>Data storage on computer is highly risky</td>
<td>0.40</td>
<td>0.27</td>
<td>0.13</td>
<td>0.14</td>
</tr>
<tr>
<td>More IT will be applied in Pakistani libraries in future</td>
<td>0.04</td>
<td>0.65</td>
<td>0.03</td>
<td>0.01</td>
</tr>
<tr>
<td>IT enables most effective ways of resource sharing</td>
<td>0.08</td>
<td>0.57</td>
<td>0.01</td>
<td>0.11</td>
</tr>
<tr>
<td>Pakistani libraries should take concrete steps to develop library networks</td>
<td>0.21</td>
<td>0.48</td>
<td>0.08</td>
<td>0.03</td>
</tr>
<tr>
<td>New information technology is exciting and fascinating</td>
<td>0.18</td>
<td>0.45</td>
<td>0.08</td>
<td>0.14</td>
</tr>
<tr>
<td>Changes occurring due to IT are out of control of librarian</td>
<td>0.02</td>
<td>0.06</td>
<td>0.54</td>
<td>0.25</td>
</tr>
<tr>
<td>All level of staff can easily work with IT based systems</td>
<td>0.10</td>
<td>0.05</td>
<td>0.54</td>
<td>0.23</td>
</tr>
<tr>
<td>Computers help eliminate repetitive … functions</td>
<td>0.27</td>
<td>0.26</td>
<td>0.45</td>
<td>0.39</td>
</tr>
<tr>
<td>Use of IT helps to make quick and correct decisions</td>
<td>0.09</td>
<td>0.35</td>
<td>0.41</td>
<td>0.07</td>
</tr>
<tr>
<td>Training fund allocation is must for … new technology</td>
<td>0.23</td>
<td>0.21</td>
<td>0.16</td>
<td>0.54</td>
</tr>
<tr>
<td>IT will not … reduce the number of library staff</td>
<td>0.14</td>
<td>0.13</td>
<td>0.25</td>
<td>0.49</td>
</tr>
<tr>
<td>IT helps provide specific information available</td>
<td>0.21</td>
<td>0.15</td>
<td>0.31</td>
<td>0.21</td>
</tr>
<tr>
<td>Each year IT offers more efficient ways to carry library operations</td>
<td>0.18</td>
<td>0.18</td>
<td>0.38</td>
<td>0.17</td>
</tr>
<tr>
<td>Rule … for print … have become obsolete now</td>
<td>0.22</td>
<td>0.44</td>
<td>0.01</td>
<td>0.10</td>
</tr>
<tr>
<td>Expenditure for IT maintenance is very high than print resources</td>
<td>0.39</td>
<td>0.03</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Only librarians should be committed towards IT innovation in libraries</td>
<td>0.04</td>
<td>0.05</td>
<td>0.09</td>
<td>0.25</td>
</tr>
<tr>
<td>Data retrieved through print resources is authentic than online resources</td>
<td>0.44</td>
<td>0.23</td>
<td>0.19</td>
<td>0.02</td>
</tr>
<tr>
<td>Extra fund allocations should be spent on IT</td>
<td>0.25</td>
<td>0.30</td>
<td>0.07</td>
<td>0.21</td>
</tr>
<tr>
<td>Attainment of theoretical and practical IT knowledge</td>
<td>0.30</td>
<td>0.22</td>
<td>0.02</td>
<td>0.22</td>
</tr>
<tr>
<td>… be core component of lib. edn.</td>
<td>0.31</td>
<td>0.29</td>
<td>0.15</td>
<td>0.27</td>
</tr>
<tr>
<td>Staff involved in IT should be given ongoing training</td>
<td>0.31</td>
<td>0.29</td>
<td>0.15</td>
<td>0.27</td>
</tr>
</tbody>
</table>

**Table II.**

Component matrix of loaded variables for factor analysis

**Notes:** Extraction method: Principal components analysis. Eight components extracted from 42 IT attitudes statements, with data available on Likert scale
The data in Table I indicate eight labels allotted to factors loaded through data reduction comprised of 46 per cent of the total variance of the 42 IT attitudes statements. Further analysis of the grouped statements revealed the following extracted factors:

1. IT specialism (separate from librarianship).
3. Pace of IT changes (IT fears).
4. Resources for IT training.
5. IT as an enabler and facilitator.
6. IT-based rules and processes.
7. Librarian role in IT decision-making.
8. In-depth and continuous IT education and training.

These underlying factors affect the attitudes of librarians toward information technology. These factors could be used to assess librarians’ attitudes, intentions, perceptions, behaviours and capabilities toward IT application in Pakistani libraries. The analysis revealed that the intensity of librarians’ fears in IT handling, ability to cope with the ever changing IT innovations and their level of understanding of IT-based library rules and regulations were predictors of librarians’ attitudes toward information technology.

Discussion and implications

Results of factor analysis on librarians’ IT attitude statements helped understand the underlying factors that determine their attitudes toward IT. The emergent key factors indicate that librarians were still confused over ownership of IT implementation in libraries. They believed it was the responsibility of computer professionals to initiate and implement IT in libraries. This kind of behaviour indicates the librarians’ lack of confidence in their abilities and lack of required technology skills and leadership quality as proactive innovators. It also emerged that they still believed that IT was for the developed countries and was still a luxury for Pakistani libraries. One of the reasons could be that historically, our librarians have the habit of acting on the advice of foreign experts and consultants, they lack necessary confidence and courage to take risks, and they do not possess necessary skills to prepare and implement IT related library projects. The cost of IT tools, lack of professional staff, in-depth IT education and training, IT-based library rules and standards, ever changing IT, job fears (especially for older people) and librarians’ level of involvement in IT related decision-making also emerged as important factors in determining their attitudes toward information technology in academic libraries of Pakistan.

Principal Components Analysis (PCA) technique employed indicates that IT specialism (separate from librarianship), resource utilization and future IT use in libraries, fast changing information technology (IT fears), IT as an enabler and facilitator are the key common factors influencing the librarians’ IT attitudes. In addition the rules, standards and processes to manage IT systems, librarians’ role in IT decision-making and in-depth and continuous IT education and training are also determined as the key factors affecting attitudes of librarians toward application of IT in libraries. Findings of this study confirmed the results of earlier research by Yaacob (1992) and Ramzan (2004) that librarians’ level of knowledge in information technology is the key factor in determining their attitudes toward information technology. The head librarians’ job
experience in terms of age above 54 affects their IT attitudes negatively. Their expertise in information technology and libraries’ IT availability are important factors influencing their attitudes toward IT. These underlying factors are important predictors for the success or failure of any information technology project in libraries in Pakistan. In addition to the previously mentioned factors, the study found a need for regular but updated and formal information technology education for librarians. In consonance with Weiner (2003), the study found that librarians’ lack of information of innovations and an ineffective role in IT decision-making are the reasons for librarians’ resistance to change, their fear of change, fear of computers and insecurity.

This study has provided scientific data and evidence for local authors and international researchers to further probe into the different dimensions of attitudes of librarians toward information technology in this part of the world. The findings of this study will help planners and decision-makers, such as Higher Education Commission of Pakistan, Planning Commission, Ministry of Science and Technology, Ministry of Information Technology, Ministry of Education, library directorates, vice-chancellors of universities, heads of other academic institutions and members of library committees, educators and librarians. They will benefit by knowing and understanding the factors affecting attitudes of librarians toward IT. Through such an understanding, the decision-makers can review their existing library IT projects and can take concrete steps to improve attitudes of librarians toward information technology, which in turn, will enhance the effective and appropriate use of information technologies in libraries across Pakistan. The enhanced IT application and usage will help in achieving the all-important goal of constant improvement in teaching, learning and research standards of educational institutions in Pakistan. Librarians’ knowledge of IT, experience in computer use, age group, their professional commitment, working experience, level of awareness of technologies, recency in IT training, level of support from computer and other departments, project management abilities and their role in IT decision making are key factors influencing their attitudes toward information technology. These factors need to be addressed while planning and implementing any IT based project in libraries.

Conclusion
It is concluded from the findings of this study and review of literature that librarians’ attitudes are open to influence by their personality characteristics, professional IT competency level and through organizational environment. The most significant of these factors are the issues of ownership of IT application in libraries; who is in charge here; librarians’ fears of handling technologies and their involvement in IT-related decision making. First, this implies clearly defining and communicating the role of librarians in their departmental domain, and interrelationship with IT department and the institutions administration. Second, they need to be fully involved and empowered to initiate and make decision regarding IT innovations in their libraries. Third, their fears regarding handling of technologies need to be eliminated or reduced to a minimum through raising their level of knowledge, experience and exposure of emerging information technologies.

References


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Muhammad Ramzan is currently a Doctoral Candidate at the Faculty of Computer Science & Information Technology, University of Malaya, and serving as Chief Librarian, Lahore University of Management Sciences in Lahore, Pakistan. He is member of the Pakistan Library Association, IFLA, member Board of Governors, Punjab Library Foundation, as well as a member of the Board of Studies, Department of Library and Information Science, University of Punjab. He has been a consultant for modernization of some academic libraries, and architect of the National Digital Library Program launched by the Higher Education Commission in Pakistan. He has extensive experience in implementation of state-of-the-art information technology in library information management and retrieval systems, and electronic resources. The article is based on his PhD thesis submitted to the Faculty of Computer Science and Information Technology, University of Malaya, Kuala Lumpur, Malaysia. Muhammad Ramzan is the corresponding author and can be contacted at: mramzan@lums.edu.pk and mramzaninfo@gmail.com

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