Management Information Systems in University Libraries of Chhattisgarh

Mohammed Imtiaz Ahmed
Assistant Librarian
Pt. Ravishankar Shukla University
Raipur (C.G.), India
e-mail ID imtiazexplores@gmail.com

Abstract

Management Information Systems are tools designed to improve management decisions. A changing user population, technology enhancement transformation of scholarly communication system, digital libraries, new approaches to management, renewed commitment to planning and assessment, financial constraints, declining budget, information gluts, constant change in IT ,web services, reader's expectations for 24 x 7 services, time shortage etc are compelling MIS to be mandatory in libraries. The present Study offers measures to library effectiveness & automation, offers tools for better reader services through integrated & collaborative working of neighboring libraries, and projects Management Information System as the tool for realizing expectations from libraries of modern world.

As per guidelines of National Knowledge Commission Report 2009 , UGC and NAAC recommendations, creation of Knowledge Grid and resource sharing among university libraries of Chhattisgarh has been suggested. Present status of MIS in 8 University Libraries of Chhattisgarh has been studied and model has been proposed for MIS and resource sharing among them. Impact of IT on libraries, exponential growth of information, applications of MIS in libraries, and its significance and performance measurement has been elaborated. A Software has been designed that enables MIS through integrated database.

Keywords: *MIS, performance measurements, resource sharing, University Libraries, knowledge grid.*

Introduction

Libraries are the carriers of civilization. Without books, history is silent, literature dumb, science crippled, thought and speculation at a standstill. Without libraries, the development of civilization would have been impossible; they are the engines of change.

National Knowledge Commission Report (2006-2009) has very clearly mentioned that Academic libraries play a pivotal role in dissemination of knowledge and are an extremely important element of the foundation of a knowledge economy. There is widespread agreement that there is an urgent need for reform in the Libraries and Information Service (LIS) sector. Several initiatives in this regard have already been taken by the Government. NKC has consulted extensively with diverse stakeholders including a Working Group of experts and professionals. NKC's recommendations for formulating strategies in the LIS sector are as follows:

Libraries should be so organized and the staff so trained that they become relevant to user communities (including special groups) in every respect. Also, to optimize resources, efforts should be made to synergize the strengths of different types of libraries through innovative collaboration. NKC proposes the creation of a model Library Charter, a list of services to be performed by libraries, a Library Network and a National Repository for Bibliographic Records.

NKC also recommends that the catalogues of all libraries should be put on local state and national website with necessary linkages. This will enable networking of different types of libraries and setting up of a National Repository of Bibliographic Records and a centralized collaborative virtual enquiry-handling system using the latest ICT. To enable equitable and universal access to knowledge resources, libraries should be encouraged to create more digital resources by digital resources by digitizing relevant reading material in different languages, which can be shared at all levels. Peer-reviewed research papers resulting from publicly funded research should also be made available through open access channels, subject to copyright regulations. It is recommended that open standards and free and open source software may be used for the above.

Indian Higher Education System comprises of 116.12 Lakh students, 431 universities and 5.05 Lakh Teachers. However, census 2001 confirms a Gross Enrollment Ratio of merely 13.6% in higher education,

(*gross enrollment ratio (GER) is a ratio of total students enrolled out of the total population in 18 to 23 years of age group*).

The present study measures effectiveness of libraries for their services to readers (the 13.6% of population as GER) and offers solutions for capacity enhancement to extend their reach to non readers (remaining 86.4% beyond GER). There is widespread agreement that there is an urgent need for reform in the Libraries and Information Service (LIS) sector.

Living in an age of information explosion it is estimated that the amount of information in the world doubles every 20 months. Libraries, as centres of learning are experiencing unprecedented rates of change, both internally and from external sources (Brophy & Couling, 1996). A changing user population, technology enhancement, transformation of the scholarly communication system, digital libraries, new approaches to planning and assessment throughout the library are propelling the new environment.

We find that global changes through the information and communication technologies (ICT), have had an impact on the functioning of academic libraries. Integrated library system, or ILS, is another enterprise resource planning system for a library. One word, 'INTERNET' has completely changed the way Libraries operate. Today's libraries are having a paradigm shift towards web-based e-resources. The conventional bibliographic resources are now fast supplemented by the e-resources. It is huge task for librarians to maintain a supply chain that moves shoulder to shoulder with a global information generation rate that doubles at every 20 months.

Management Information Systems (MIS) have emerged as a solution to this capacity expansion requirement of Academic Libraries. According to McClure (1990), Management information systems are *tools designed to improve management decisions*. Library Automation stands as a major prerequisite for the Management Information System. The present study aims to focus on Library Automation status for successful implementation of MIS.

In the present day, the MIS based libraries maintain customer (reader) focus as their central idea during all performances. The objective of an MIS based Library is to be an effective library through:

(1) Providing convenience and justice to its readers.

(2) Attract non-readers to become readers.

The five cardinal laws of Library Management, as enunciated by Dr S.R. Ranganathan (1892 – 1972), state that:

1. Books are for use

2. Every reader his book

3. Every book its reader

4. Save the time of the reader

5. Library is a growing organism.

Living in the age of information explosion, MIS based libraries, powered by automation; I humbly propose (on the lines of the 36th Chamber of Shaolin) the sixth law for library management, that is: "One library for all"

Maintaining this sixth law in letter and spirit allows us to further the scope of our performance to be extended through integration with all neighbouring libraries through resource sharing that again provides achievement of aforesaid library objectives of convenience and justice to readers, and, attracting non-readers to become readers.

Methodology and Objectives of the Study

Taking into consideration the recommendations of the National Knowledge Commission, the present study is therefore an attempt to propose collaborative partnership with neighboring university libraries of Chhattisgarh in order to make better use of common resources and to improve services to Readers. The Study offers software as the tool to enable such collaborative working. However offering any tool to facilitate Library operations shall be incomplete until it bears a strong Customer focus.

It was also decided to conduct a survey of readers (Teachers and Students) on Library Automation and Library Effectiveness at eight University Libraries of Chattisgarh namely Pandit Ravishankar Shukla University, Guru Ghasidas University, Indira Gandhi Krishi Vishwavidyalaya, Indira Kala Sangeet Vishwavidyalaya, Hidayatullah National Law University, Chhattisgarh Swami Vivekanand Technical University, Pandit Sundarlal Sharma (Open) University and, Kushabhau Thakre Patrakarita Avam Jansanchar Vishwavidyalaya.

Automation is a state of replacing the human performance of activities with mechanical or electronic processes. Library Automation is a process of adding electronic resources to its bibliographic resources and replacing its human performances with electronic processes.

Effectiveness is a state of accomplishment of a predefined purpose or producing the intended or expected result. 'Library Effectiveness' is a continuous process of facilitating its readers with desired bibliographic and web graphic resources at lowest cost & time.

It was thus hypothesised, firstly, that "Libraries with higher automation level will show more effectiveness than libraries with lower level of automation".

Secondly, that, "Teachers will perceive higher library effectiveness compared to Students".

Subjects

The present study collected responses of 240 readers including Teachers and Students of eight university libraries of Chhattisgarh

The respondents were asked about their perceptions on Automation Level and resulting Effectiveness of their University Library. The sample distribution of the present study was summarized.

The present research was conducted by using the three-way ANOVA (analysis of variance) technique with the 3 x 2 x 8 factorial design revealing the three independent variables as three levels of Library Automation as high, moderate and low; two types of Readers as Teachers and Students; and eight University Libraries as PRSU, GGU, IGKV, IKSV, HNLU, CSVTU, PSOU and KBTV. Library Effectiveness was the sole dependent variable of this study.

The combined effect of these three independent variables i.e. effect of various levels of 'Library Automation' in all eight 'University Libraries' on both 'Types of Readers' (Teachers and Students)] were studied for the resulting 'Library Effectiveness'.

Tools
Two scales 'LAS' (Library Automation Scale) and 'LES' (Library Effectiveness Scale) were used in the present study.

The first scale 'LAS' carried fifteen items measuring the four factors as "Commitment, Infrastructure, Services and Staff Training".

The second scale, 'Library Effectiveness Scale' (LES) was specifically constructed for the present study.

In the present study, Library Effectiveness is measured through factors of Library Performance, Reader's Satisfaction, and Staff's Competence. 'LES' carried fifty five items measuring the aforesaid three factors.

Methodology
The present study intended to investigate about Library Effectiveness by maintaining higher Automation Level in the University Libraries of Chhattisgarh. Using appropriate statistical tables, common reference of F-ratio was applied to test the significance of differences for verification of various hypotheses. On prima-facie the assumptions for applying F-test i.e. normalcy and homogeneity of data were tested.

The study further used a three-dimensional (3 x 2 x 8) ANOVA technique at SPSS to analyze the data.

Procedure
Once the two scales were constructed, a total of 240 Readers (Teachers and Students) from all eight University Libraries of Chhattisgarh were asked to respond on the given scales. The collection of responses was then followed by scoring and compilation of data. Finally the SPSS software was used for application of statistical tools and tables for the purpose of data analysis.

Library Effectiveness Tools
The present study therefore offers software as a tool that fulfills all requirements of an effective library as addressed under all dimensions of the LAS and LES. Through the use of integrated database, the proposed MIS based software provides solution to all limitations of the conventional library management systems. The integrated database comprises Membership Data, Bibliographic Data, Circulation Data and the Maintenance Data.

For the Bibliographic data, 13 resource types were identified as Books, Serials, Theses, Textual Data, Reports, Meetings, Special Edition, News Papers, Patents, Standards, Annual Reviews, Irregular Serials, and Monographic Serials.

For the Membership data, members were classified in two categories: Institutional Members and Individual Members. The Individual Members were further sub divided in two categories as Direct Members and Indirect Members.

- Entitlements for all members can be defined in the type and number of bibliographic resources to be issued at a time and for the duration for which it can be issued.

- For the Circulation function, the Issue, Re-Issue and Return of all bibliographic resources are enabled with a cross reference of the integrated database having predefined Bibliographic and Membership records.

- The proposed MIS based software also features the Library Maintenance assistance through records and automatically generated reminders as per predefined schedules of physical verification, Shelf Rectification, Dusting and Preservation of Bibliographic resources. Finally the software shall also generate various reports as and when required to facilitate routine and policy decisions of library administration.

With the installation of the proposed software, no doubt, library effectiveness shall improve. However, continuous improvement still remains the key. The proposed study therefore provides with the "Library Audit Checklist", which makes library performance measurable in terms of Budgetary Allocation, Cost Effectiveness, Income Substitution, Staffing, Training, Services, Overall Equipment Effectiveness (OEE), Readership & Circulation, Maintenance, and Continuous Improvement.

Information Technology and its Impact on Libraries
The Internet has had a profound impact on society in general and on the field of library and information science in particular. Information Technologies through Internet has had a vital impact on academic scenario. The avenues for exploitation of Internet by library and information centres (L&ICs) are unlimited and endless.

Internet provides access to a variety of commercial and non-commercial information sources which include: bibliographic and full-text databases; and table of contents.

Advances in Information Technology of primary journals; electronic and online journals, books and newsletters; almost all OPACs, graphics databases, multimedia walk through programs, audio clip art databases; e-mail, directories, product and library catalogues, campus information systems, etc. Internet is also a test bed for electronic document delivery, electronic publishing, publicity and marketing of products and services, and integrated access to local and external information.

E-resources and the revolution of IT in academics, in addition to the bibliographic resources have brought the literature to the researchers on their mouse clicks. The uses, impact and implications of electronic publishing and online journals on libraries and information centres has been discussed by various scientists.

Services like 'Uncover' of Blackwell and 'Contents First' of OCLC offers Internet access to table of contents of several thousand journals, followed by online ordering of papers. Major publishers like American Chemical Society and Elsevier are offering their journals on Internet and OCLC. Many libraries maintain an online catalogue of their publications over Internet/WWW which could be searched using navigational tools.

McGraw-Hill is offering electronic version of its *Business Week* on America Online which has resulted in attracting new readers. It receives over half a million clicks on its pages every week and each 'click' generates revenue. This 'feedback' enabled editors to analyse and feel the pulse of the readers' interest to revise content Penthouse magazine of USA on Internet attracts about 2 million 'hits' daily, a record on Web. Now there are over 400 daily newspapers, 800 magazines, 1500 newsletters and other products are available, online via communication networks and the Internet.

The 'Internet fever' is slowly spreading in India also. One major development is the establishment of metropolitan library networks like DELNET, CALIBNET, ADINET, etc.; the national bibliographic information networks like INFLIBNET, BTIS, NICNET and the establishment of computer communications networks like ERNET, NICMAIL/RENNIC which can also be used for transmission of bibliographic information. The Internet is changing the notion of library from a walled place into a virtual library,

Information Explosion and its Management

"In Library and Information Science, information explosion is a term used for the ever increasing rate of publication" (Wikipedia, 2005). Information explosion is a term that describes the rapidly increasing amount of published information and the effects of this abundance of data. As the amount of available data grows, the problem of managing the information becomes more difficult, which can lead to information overload.

The idea of "Information Overload" has been discussed for decades, but never before has it seemed so relevant. According to market research firm IDC, by 2011 the digital universe will be 10 times the size it was in 2006. IDC forecasted that the amount of digital information we generate will exceed our ability to store it this year. This situation is despite amazing improvements (greater than 100% per year currently) in disk density and capacity over the last 50 years.

Over the last 50 years, the computer and communications revolution has changed radically the way many organizations do their business. According to Charles Jonscher (2000), we are now living in a wired world.

Information is growing exponentially. For instance let us take the examples of "Chemical Abstracts" and "Mathematical Reviews". During 1995, 5,62,955 Papers and 3,620 Books were abstracted which were published in total 1,55,910 pages in Chemical abstracts. But, during 2007, it increased to 8,16,778 Papers and 4,526 Books abstracts published in total 3,91,079 pages.

Digital futures are considered to be the new answer for the information age. Computers and access to the internet and local resources, together with generic computing applications, have enabled the user to access the library from anywhere in the world.

It is our belief that in this world of speed and continuous momentum, libraries and librarians can come into their
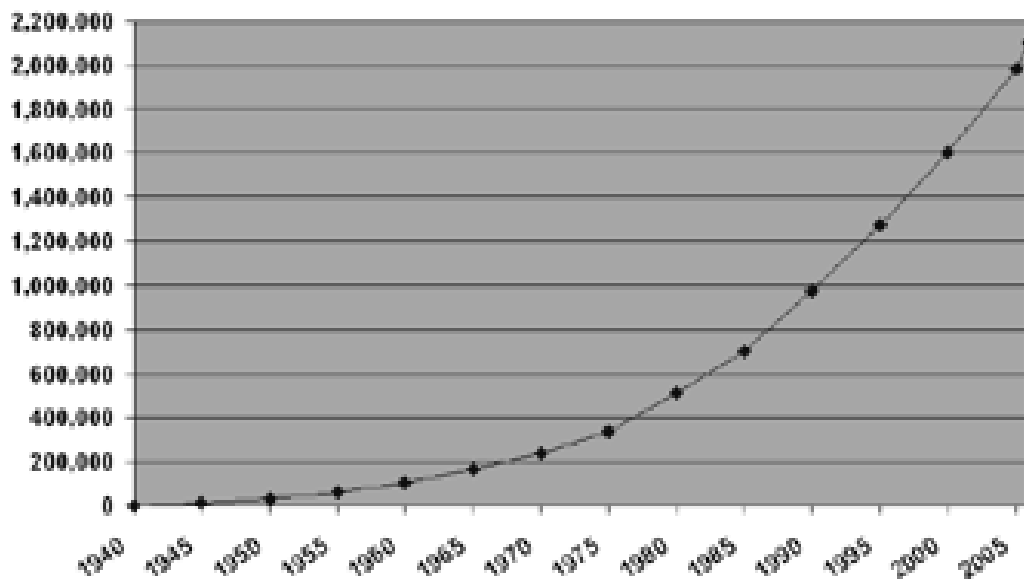
Chemical Abstracts Publication Record 1907-2007

Year	Papers	Books	Total Abstracts	Total Pages Published
1907	7994	0	11847	3437
1927	25037	582	33491	5511
1947	30461	902	39288	5547
1967	202684	3046	242527	39521
1987	386466	4493	476178	95187
2007	816778	4526	1086941	391079
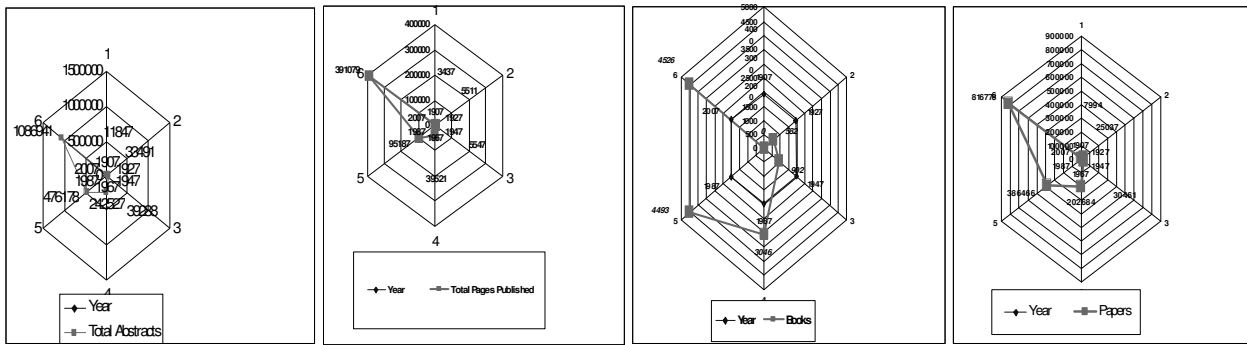
Mathematical Reviews Publication Records 1940-2008

own to create some order and some important signposts. The digital library is an important component for capturing the explicit knowledge. The 21st century is about the management of all knowledge and information we have generated and the value addition we bring to it.

The management of information in the 21st century is beyond the capacity of a single individual. The amount of information that we have around is overwhelming. The management of information therefore must move out of the realm of the individual and shift into the realm of networked groups.

The eight University libraries may consider creating Chhattisgarh Virtual University Library GRID by networking the Universities from Chhattisgarh, India is now in the process of creating virtual universities and institutions for knowledge sharing, knowledge dissemination and knowledge reuse.

The world is moving towards internet 2 applications. Internet 2 applications require advanced networks. That is, these applications will not run across commercial

Internet connections. Internet2 applications require enhanced networking functionality, such as high bandwidth, low latency (delay), or multicast not available on our commercial Internet connections. Internet2 is about everything we do in higher education.

India has established the Information GRID. ERNET is the Educational and Research Network of India connecting 1500 institutions for internet and intra connectivity for email and other collaboration.

Management Information Systems in Libraries

The contemporary approach casts academic librarians as managers within the higher education system. What academic librarians need, now much more than ever before, is the information which will allow them to plan properly, to know whether or not the library service is meeting the needs of the academic community.

The introduction of computers into academic libraries was largely a response to the problem of dealing with

increased workloads with fewer staff, and they are now able easily to handle most of the routine and repetitive work of the library staff. In addition, they have the capability to enhance the provision of management information, since automated data processing is able to present reports more accurately and much faster than manual systems.

Nonetheless, most librarians claim that they would now like to install decision support systems, even though they see the expense as a problem. Living in an age of such information explosion, Management Information Systems (MIS) have emerged as a solution to this capacity expansion requirement of Academic Libraries.

The MIS's function is to provide library Staff and Readers with data, information, analysis and tools that enhance the effectiveness and efficiency of library services and assist in the decision-making process.

The objectives of an MIS are to assist staff with the daily decision making process, to maintain better accountability and control of resources, to monitor budget allocations, to improve overall library effectiveness by focusing on outcomes to generate internal and external reports to improve long-term planning and to facilitate performance measures activities. Further, the MIS intervention offers utility to Readers too by means of a wider bibliographic database through e-resources.

The present study is therefore an attempt to propose collaborative partnership with neighboring university libraries of Chhattisgarh in order to make better use of common resources and to improve services to Readers.

A management information system (MIS) is a subset of the overall internal controls covering the application of people, documents, technologies, and procedures. According to McClure (1990), Management information systems are tools designed to improve management decisions. The terms MIS and *in*formation system are often confused. Information systems include systems that are not intended for decision making. The expansionary momentum of the 1960s and 1970s was followed by pressure for efficiency and economies. The 1980s was not a period in which academic libraries prospered.

The four main objectives for Management Information systems have been defined as: (1) to facilitate the decision making process in the library by providing the managers with accurate, timely, and selective information that assists them in determining a specific course of action. (2) to provide for the objective performance measurement and assessment of selected relevant areas of the library. The areas are to be determined during strategic planning. (3) to provide pertinent information about the library's internal and external environment and, (4) to provide information on alternative strategies and contingency plans.

In recent years, data processing for management information systems in business and industry has increasingly been undertaken by computers. In libraries, in contrast, the development of the use of computer has been modular, in the sense that it is based on a single library operation such as acquisitions, serials, control or cataloguing. The more general applications of management information lay hidden, as it is often seen only as a departmental resource. Technological changes have helped to ease this problem. As opposed to the use of mainframe and mini-computers, the advent of the microcomputer now provides an alternative to the dependence on large-scale centralized computer systems.

Data Analysis and Interpretation

The present study is intended to investigate about Library Effectiveness by maintaining Library Automation in the University Libraries of Chhattisgarh. Using appropriate statistical tables, common reference of F-ratio was applied to test the significance of differences for verification of various hypotheses. Scores for all the scales collected from all the samples were analyzed separately.

The study further uses a three-dimensional (3 x 2 x 8) ANOVA technique at SPSS to analyze the data whereby numerical values were assigned for various independent variables of the study. Three levels of Library Automations were studied as low, moderate and high respectively. For the dimension of Readers, the two categories were Teachers and Students respectively. For the dimension of Universities, the eight University Libraries of Chhattisgarh were studied.

Finally, Library Effectiveness was observed as the dependent variable.

For the first problem, results reveal the overall mean score of 129.62 making a favorable indication that Library Automations positively effects the Library Effectiveness perception of Readers. Further, for the effects of various levels of Library Automations on Library Effectiveness, the mean scores of 66.89, 130.33 and 191.64 respectively at the low, moderate and higher levels of Library Automation make it clearly evident that higher the Library Automation more will be the Library Effectiveness perception of the Readers.

For the second problem, the respective mean scores of Teachers and Students as 148.36 and 110.87 proved that the Teachers of all libraries perceived their library as more effective compared to their students.

Significant main effect value (F = 20.148, p=.000) was found thus there remained no two ways to accept the first hypothesis that Library Automations strongly affect the Library Effectiveness.

Significant main effect value (F = 16.52, p=.001) exhibited that there are significant differences between perceptions of Teachers and Students for the overall Library Effectiveness perceptions higher Library Automations in their University Library.

The third main effect, 'Libraries' i.e. the eight University Libraries of Chhattisgarh, studies the different levels of Automation in subjected Libraries and its effect on the perception of the Readers over its Effectiveness state. According to the study, again the significant main effect value (F = 24.15, p=.0001), indicated that the Libraries in the present study vary with their levels of Automation and resulting in a varying reader perception over their Effectiveness status.

All three first-order interactions were found to have significant results. Significant results as (F = 19.74, p =.000) for Level of Library Automation and Reader; (F = 19.21, p =.001) for Level of Library Automation and Libraries; (F = 27.168, p =.002) for Readers and Libraries.

Pandit Ravishankar Shukla University Library scored highest at all levels, followed by Guru Ghasidas University, Indira Gandhi Krishi Vishwavidyalaya, Indira Kala Sangeet Vishwavidyalaya, Hidayatullah National Law University, Chhattisgarh Swami Vivekanand Technical University, Pandit Sundarlal Sharma (Open) University and lastly Kushabhau Thakre Patrakarita Avam Jansanchar Vishwavidyalaya.

The second-order interaction giving the combined effect of Level of Library Automation, Readers and, Libraries with the dependent variable Library Effectiveness were also studied. Significant F-value for this second-order interaction (F = 14.114, p=.000) was obtained for this joint interaction indicating a significant interaction of all the independent variables together with the dependent variable 'Library Effectiveness'

The fact that some libraries claimed to have only 'informal' or 'partial' management information systems or to have no management information systems does not mean that they had no collection of external and internal data. They do collect and use information for establishing library objectives and priorities or for resources allocation, but they have not formalized their management information systems, typically because their institutions had not required them to do so. Organizational commitment therefore stands as major prerequisite for successful implementation of MIS in university libraries.

Conclusion and Suggestion

It is now an established fact that MIS in library and information sciences through automation has become inevitable. The environments in which libraries operate are under the constant pressure of change. Libraries have to create environments that enable successful assessment and the implementation of results based on these assessments. Considering the above requirements, the present study attempted to make the library operations measurable, improvable and thus effective. The survey of readers on Library Automation and Library Effectiveness provided feedback on their perceptions and expectations. Among the major findings of the present study the results for the first

hypothesis that "libraries with higher automation level will show more effectiveness than libraries with lower level of automation", revealed that maintaining Library Automation significantly influenced the overall Library Effectiveness state.

In addition to the Survey on Automation & Effectiveness, the present Study also lays stress on continuous improvement. The study therefore offers a ''Library Audit Checklist'. Compliance to the eleven criteria as mentioned therein for library operations shall add continuous value to the Library effectiveness.

Further, the study also offers software that enables MIS implementation through the use of an integrated database. The proposed software provides solution to all limitations of the conventional library management systems. Figure exhibits the decision flow used in the present software using integrated database comprising Membership Data, Bibliographic Data, Circulation Data and the Maintenance Data. The highlighted area in figure reveals the benefits that the execution of proposed MIS enabling software offers against the Conventional library system.
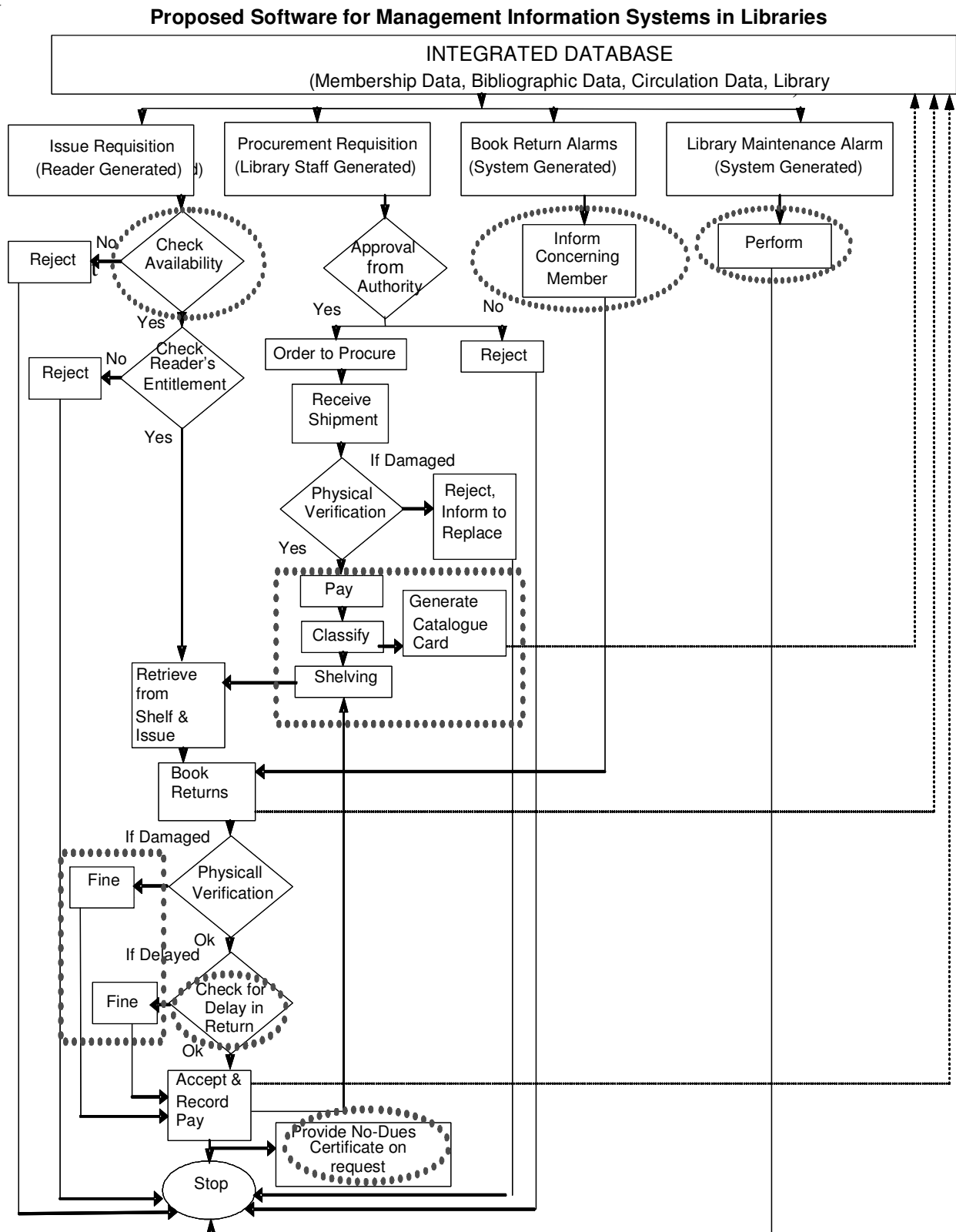
Availability checks, a purpose that was served by card catalogues in the conventional system can now be solved through electronic data with a value added output.

Among the other benefits of integrated database are vendor data management, classification, cataloguing, fine calculation, no-dues certificate, sending reminders to readers for delay in return, and timely system generated alarms for library maintenance.

In the light of above discussion; the general conclusions drawn and key lessons to be learned through this study are:

- MIS is possible – but only with dedicated staff resources.
- MIS Enables Executive Support
- Education and Training are Vital
- Openness and Trust must be built for Feedback and Continuous Improvement
- Collaboration between system staff and other stakeholders
- Information Flow
- Skill sets - continuous training on new tools
- Flexibility - Innovation encouraged
- Involve staff at each step
- Planning and Service Standards
- When possible start with a mature integrated system for Synergic Effects.

Further, to enable MIS successfully in libraries, following eight principles are recommended for realisation of library objectives

Proposed Software for Management Information Systems in Libraries

INTEGRATED DATABASE
(Membership Data, Bibliographic Data, Circulation Data, Library

Issue Requisition
(Reader Generated)

Procurement Requisition
(Library Staff Generated)

Book Return Alarms
(System Generated)

Library Maintenance Alarm
(System Generated)

Reject — No — Check Availability

Approval from Authority

Inform Concerning Member

Perform

Yes

No

Reject — No — Check Reader's Entitlement

Yes — Order to Procure

Reject

Yes

Receive Shipment

If Damaged

Physical Verification — Reject, Inform to Replace

Yes

Pay

Classify — Generate Catalogue Card

Retrieve from Shelf & Issue — Shelving

Book Returns

If Damaged

Fine — Physicall Verification

Ok

If Delayed

Fine — Check for Delay in Return

Ok

Accept & Record Pay

Provide No-Dues Certificate on request

Stop

Principle 1 - customer focus

Principle 2 – leadership

Principle 3 - involvement of people

Principle 4 - process approach

Principle 5 - system approach to management

Principle 6 - continual improvement

Principle 7 - factual approach to decision making

Principle 8 - mutually beneficial relationship

Obstacles to Effective, Efficient Use of MIS in Libraries

- The crude form of data provided by most ILS

- A general lack of agreement about what data are most useful for management purposes

- A general lack of expertise in interpreting data

- The perceived high cost of deploying MIS

- The frequent absence or underutilization of MIS in the parent organizations of many libraries

- A general sense that MIS devalues the less easily measured aspects of information storage and retrieval and/or the human art of management

- Some MIS may not distinguish easily and well between different levels of management within a library and various types of management activities

- Interoperability problems between data sets hinder efficient access

We are marching ahead fast, introduction of INFLIBNET, OPAC are success stories so far. With the launch of Edu-sat and Anusat (Micro Satellite) a new chapter in the area of information sciences in education has begun.

Libraries have to adapt to changing user requirements and expectations. Web 2.0 technologies can provide very useful tools in this transformation.

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2. *http://library.uwaterloo.ca/~aalakos/misbib97.html*
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4. *http://www.lib.washington.edu/assessment/*
5. *http://www.lib.virginia.edu/mis*
6. *http://www.lib.virginia.edu/bsc*
7. *http://libqual.org/documents/admin/vpohillerseff.pdf*
8. *http://www.cordis.lu/libraries/en/projects/decide.html*
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