

3.1 Introduction:

The development in networking and information communication technology is providing an opportunity to the library professionals to show their skills by using various applications to provide advance library services to their users by automating the libraries. This theoretical chapter divided into two parts; one is information of 'Library Automation' and about different type of open source Library Management Softwares (LMS). This chapter also includes comparison of various open source library management softwares in tabular format and concept of centralized library system. At the same time, researcher has tried to focus on new technologies, its utilization in library house-keeping operations.

3.2 Library Automation:

The word "automation" is derived from Greek word "Automose" means something which has power of self-movement or spontaneous motion. In 1936 D.S. Harder has used the term "automation" to mean automatic handling of parts between progressive production processes (Kumar, 2002). Library automation is the use of computers for library house-keeping operations, through the applications of library software. Library automation is applicable for library house-keeping operations, which includes acquisition, serial control, cataloguing and circulation, etc.

3.2.1 Definitions of Library Automation:

There are many definitions given by various scholars. According to Webster's Third New International Dictionary of English languages, "automation is the techniques of making an apparatus, a process or a system operate automatically". In other words, it is the machinery that mathematically manipulates information storing, selects, presents and records input data or internally generated data. Mechanization of library house-keeping operations predominantly by computers is known as library automation (Gove, 1986).

According to Encyclopedia of Library and Information Science, “Automation is the technology concerned with the design and development of process and system that minimize the necessity of human intervention in operation”(Kent, 1997).

According to McGraw Hill Encyclopedia of Science and Technology, Automation is “a coined word having no precise generally accepted technical meaning but widely used to imply the concept, development, or use of highly automatic machinery or control systems” (McGraw, 1982).

According to Oxford English Dictionary, Automation is “application of automatic control to any branch of industry or science by extension, the use of electronic or mechanical devices to replace human labour” (Simpson & Weiner, 1989).

After understanding all these definitions, researcher confines Library automation is nothing but use of technology in library house-keeping operations.

3.2.2 An Overview and Historical Background:

Automation of the library has passed through several developments, which can be divided into three parts or phases. First phase called the “Experimental” and the period was 1930-1960, the second phase called the “Local system” and the period was 1960-1970 and the third phase called the “Co-operative System” and the period was 1970- onwards. The period 1930-1960 which was considered experimental phase, moreover begins in 1936, there was the first equipment which was used in libraries for data processing. The University of Texas had adapted a mechanical system for its circulation function. In 1960, i.e. the first half of the 20th century, library automation began in the U.S.A. after the World War II. During this period, many libraries in North America and U.K. had started the use computers for processing of information. Many techniques were introduced in the universities along with national libraries. Several of these systems were like tabulators, sorters and punched cards were used in circulation section i.e. it has been used in providing books on loan, serial control, acquisition, cataloguing etc. (Laxminarayan, 1986). In the U.K., the public libraries of Camden, West Sussex (country of south England), the University libraries of Newcastle and Southampton were involved in the experimental phase. Many systems such as

edge-notched cards, optical coincidence, punched cards, and early computers developed during this phase and failed due to computer technology. At that time computer technologies were not developed up to desired expectations and librarians were not sufficiently definitive in their requirements of the computer based system. IT professionals thought that they knew the librarians' requirements of the computer based system. It was thought that all the individual systems in a library should be simultaneously converted to computer based systems (Tedd, 1977). Then the local systems phase in the period (1960-1970) of the digital computers was applied offline for general purpose as well as retrieval of information. During this period, many librarians have used computer as a tool in their organization. Most of these systems were developed locally, either in an academic library, special library or public library. In this phase the focus was mostly on acquisition, cataloguing and circulation process. During this phase, Online Public Access Catalogue (OPAC) was in an experimental stage in the U.S.A. In 1963, MARC i.e. Machine Readable Catalogue have come into existence at the Library of Congress, U.S.A for providing standardization in library automation. In 1967, Ohio College Library Centre (OCLC) was set up as an online system, which has marked the beginning of cooperative systems and union catalogue. In 1969, the Library of Congress had started distribution of records in the new MARC II format (Tedd, 1977). The cooperative systems phase considered starting at 1970 onwards. In 1970s there had been tremendous growth in library cooperation and resource sharing practices with the help of computer based systems. In this phase, designing of online systems and conversion of batch systems into online mode was done and also focused on library network and databases. The magnetic tapes and floppy disks were used for storing the information. In the 1980s there was little bit intensive use of online systems networks, optical disks, CD-ROMs and microcomputers have been came in libraries (Rajagopalan, 1986).

3.2.3 Growth of Library Automation:

Kaul (1999) has written information about the growth of library automation from 1940. The period 1940-1949 was the period of semi-mechanical applications was introduced for including edge-notched cards, optical coincidence, and peek-a-boo cards. Then the period 1950-1959 was started for to use of punched cards, data

processing equipment, early computers and micro image searching systems. Then the period between 1960 to 1969 was for use of digital computers used for general purpose and feasibility studies of online interactive and advance micro image systems as well as in experiments for library networking. In 1970-1979 the period was for design of online systems and conversion of batch systems into online mode, growth of library network and databases. 1980-1989 intensive use of online systems, networks, mini and microcomputers, optical disks, CD-ROMs, FAX etc. In 1990s, use of internet and library networks aimed towards higher levels of computer applications such as recording through electronic media, artificial intelligence, etc. (Sharma, 1995). However, researcher has stated following objectives, to support this section.

3.2.4 Objectives of Library Automation:

According to Faisal & Surendran (2008) the main objectives of library automation are, to improve control over collection, to have an effective control over the entire operation, to use and improve the existing services effectively, to share the resources among various libraries in a region, to reduce the duplication in the technical processes of library house-keeping operations and to share the existing resources. Hence, it is clear that, the library automation objectives are the entire process related to library administration work.

3.2.5 Advantages of Library Automation:

Faisal & Surendran (2008) stated the advantages of library automation. Author writes, automation may provide users the timely access of library materials, it eliminates routine tasks or performs them more efficiently, it may reduce the amount of time spent on material acquisition, serials management, budget administration and record keeping, and it supports new means of information retrieval by introducing patrons to global information. It allows patrons to use search strategies that can be used with card catalogue, it allows patrons to search library material from various locations outside the libraries, and it motivates users, equips them with problem solving and information retrieval skills, and provides them with lifelong learning experiences. However, few minor disadvantages are also expressed by many scholars.

3.2.6 Disadvantages of Library Automation:

There are some disadvantages of library automation expressed by scholars,

1. Budget problem from organization: India is a developing country, and many research scholars wrote about, the budget cut problems regarding library. Organization cannot able to provide sufficient budgets to the libraries.
2. Technology is not economical: Hardware and software technology is not born in India and all the required material is costly.
3. Fear of Employment Retention: This problem is unique in India, because peoples / library professionals frightened to lose their jobs due to computer entering in the library.
4. Need training: It is observed that, this technology is fast growing and moving technology so there is need to get more and more training as per technology driven.

3.3 Types of Library Automation:

There are three major ways to automate the libraries described by (Phadke, 2010). The first type of library automation method is, using in-house library management software; second library automation method is using commercial library management software and third is using open source software which has been discussed shortly in introduction of chapter number first.

3.3.1 In-house Software: These softwares are basically developed by local expertise. Many organizations or colleges have used their own skills and efforts for developing library management software. These types of softwares name or their index or any information is not available or it is totally unpublished work. There are so many reasons behind in-house softwares being replaced by commercial software. The main reasons are mobility of IT expert towards IT industry and changing technology was affected to update LMS versions and reducing prices as compare to old prices.

3.3.2 Commercial Software (National)

These commercial softwares are also introduced with good features, more security and advanced technology but the cost of the software, updating charges, AMC charges, service problems and benefits taken by library, instead of paid amount is

creating headache to the organizations. There are so many commercial softwares developing in India, some of these are, developing in India to fulfill the changing needs of library automation.

Sr. No.	Commercial LMS Name	Sr. No.	Commercial LMS Name
1	AutoLib	9	Libris
2	EasyLib	10	Libex.Net
3	SLIM	11	LIBSIS
4	Librarian	12	Nalanda
5	SOUL	13	NexLib
6	Libra 2000	14	SWIRL
7	Library Manager	15	Gyanodaya
8	LIBSUITE	16	Biyani-Tecno
Source: (Phadke, 2012)			

3.3.3 Commercial Software (International)

On the international platform there are many commercial software developers who have developed commercial software on international platform. Some of them are given below. The commercial software is also changing their interface as per driven technology, but developers cannot able to success to reduce the cost of aspects related to library automation. Now a days the trend is moving towards OSS and web 2.0 applications are attracting librarians towards open source software.

Sr. No.	Name of LMS	Sr. No.	Name of LMS
1	DLib	10	MINISIS
2	Alice	11	OLIB
3	My Librarian	12	Sagebrush
4	CDS/ISIS	13	Mandarin M3
5	Endeavor Voyager	14	STAR/ Libraries
6	EOS	15	Surpass
7	KeyStone	16	Techlib
8	Millennium innovative	17	TLC
9	Micro Librarian System	18	URICA
Source: (Phadke, 2012)			

3.3.4 Open Source Software (OSS):

Now a days open source softwares are very popular in society. The programme applications are available through internet to the common peoples. It is also part of technological advancement with the collaborative efforts which is taking place

around the world. Open source software has two basic properties, the first one is 'Source Code' or programme and another is, it is illegal to convert an open source software into proprietary version or commercial version. Open source software is similar to a peer review, which is used to the progress of LMS. The open source model replaces central control with collaborative networks of contributors. Every contributor can build on the work that has been done by others in the network, to reduce time span 'reinventing the wheel'. The following table shows some open source library management softwares.

Sr.	Name of Free/OSS : ILMS
1	Koha
2	NewGenLib
3	e-Granthalaya
4	PMB
5	Evergreen
Source: for ILMS: (Kumar, 2005)	

The following table shows some open source Digital Library Management Softwares (DLMS)

Sr.	Name of Free/OSS: DLMS
1	DSpace
2	EPrints
3	Fedora Commons
4	Greenstone
5	Drupal
Source: for DLMS: http://www.researchgate.net	

3.4 Steps Derived in Library Automation:

According to Faisal & Surendran (2008), the main steps in the process of library automation are feasibility study of project implantation, selection of software package, software and hardware requirements, determine the collection for the automating system, installation of the software, data entry, allocation of authorities, arrangement of OPAC availability to the users, arrangements for training to staff and users, evaluation of the System, and future planning, etc.

3.5 Open Source Software:

As already discussed in chapter number one, there are two types of softwares in Open source environment one is called 'free software' and another is Open Source Software (OSS). The free software, which has a readymade programmes, which are made available by the developer through internet, user can download, install and use without any modification, another one is OSS, whereas source code is available, user can download, install, able to modify, distribute the programme as per his need.

3.5.1 Brief History of Open Source Software:

When IBM and others sold the first large-scale commercial computers, in the year 1960s, they came with some software which was free (libre), in the sense that it could be freely shared among users, it came with source code, and it could be improved and modified. The history of open source initiated by Open Source Initiative (OSI) begins with evolution of UNIX. Author states, in 1969, there was a creation of UNIX in AT & T Bell Labs and development of ARPANET. In the year 1973, the time was for growth and popularity of UNIX and AT & T was prohibited by law to start any other business than telephone, and hence AT & T started licensing without UNIX without support. In 1974-1975 user groups were starting to grow wherever UNIX introduced to share ideas, information, programmes, bug fixes and hardware fixes. In 1983 there was a development of ARPANET into what is today known as internet. In 1985, Richard Stallman, a programmer at the MIT AI Lab, starts free software foundation in response to trends in software world towards propriety software packages and non-access to source code. Start to design on new operating system called GNU, (General Public License) developed to allow individuals to incorporate their own rights in "free Software". During the 1980s and early 1990s, open source software continued its development, initially in several relatively isolated groups. USENET and the internet helped to coordinate transnational efforts, and to build up strong user communities. Slowly, much of the software already developed was integrated, merging the work of many of these groups. As a result of this integration, complete environments could be built on top of UNIX using open source software. In many cases, system admins even replaced the standard tools with GNU programs. At that time, many applications were already the best ones in

their field (UNIX utilities, compilers, etc.). In 1990 most components of GNU complete except for Kernal. In 1991 Linus Torvalds, student in Finland developed the Unix- Compatible Kernal called Linux under the GPL, releasing the source code freely and later compatible with GNU with Linux to create operating system. In 1994, Linux is first distributed by Torvalds led to an explosion of new Linux based open source operating system. In 1998, the free software idea did not immediately become main stream and hackers Bruce Perens and Eric Raymond agreed that the problem lay in the term free. After that they founded the Open Source Initiative (Pandey & Verma, 2010).

3.5.2 Open Source Software Movement:

It was started by Richard Stallman in 1983 and the term “Open Source” was given by Christine Peterson of Foresight Institute in 1997. Open source has covered its foot after the evolution of UNIX. Eric Raymond had grown wings in 1997 by publishing article “Open source software is not covered under individual Intellectual Property Rights” (Mishra, 2010). The ‘Cathedral and the Bazar’ and O’Reilly trained in to fly in the sky by his ‘Free Software Summit’, A Splinter group of this movement advocated that the term “Free” software should be replaced by “Open source software” because of cost but in reality open source software is not Zero cost software. The problem arise from “free” i.e. Zero cost, but open source indicates the attention towards “freedom.” Open source software has become an international phenomenon, during the last decade; the open source software phenomenon has become a trend in information systems because of fast growing number of open source software users and software products in large variety of domains. Open source software is already being adopted and used as a software platform in a number of fields including library and information management. Then in the 1985, Richard Stallman, a programmer at the MIT AI Lab, starts the free software foundation, intended the word 'free' to mean "free as in free speech" and not "free as in free beer." Since a great deal of free software already was free of charge, such free software became associated with zero cost, which seemed anti-commercial response to trends in software world towards proprietary software packages and non-access to source code. He starts to design a new operating system called, GNU. New license called General public license (GPL) developed to allow individuals to incorporate their own rights in “free

software”. In 1990 most components of GNU complete except for the operating system Kernel.

During the 1990s, many open source projects have produced a good quantity of useful software. Some of them are Apache (widely used as a WWW server), Perl (an interpreted language with lots of libraries), XFree86 (the most widely used X11 implementation for PC-based machines), GNOME and KDE (both providing a consistent set of libraries and applications to present the casual user with an easy to use and friendly desktop environment). The "open source" label came out of a strategy session held in Palo Alto in reaction to Netscape, January 1998 announcement of a source code release for Navigator Mozilla (the free software project funded by Netscape to build a www browser), etc. (Randhawa, 2013) of all these projects, GNOME and KDE are especially important, because they address usability by non-technical people. Their results are already visible and of good quality, finally allowing everybody to benefit from Open source software. The software being produced by these projects dispels the common legend that open source software is mainly focused on server and developer-oriented systems. In fact, both projects are currently producing lots of desktop personal productivity applications. In 1991 Linus Torvalds, then student in Finland developed the UNIX compatible Kernel called Linux under the GPL, releasing the source code freely and later combined with GNU with Linux to create the operating system Linux. User communities helped to modify the source code to make operating system function better. During 1991-1992, the whole landscape of open source software and of software development in general, was ready to change. Two very exciting events were taking place, although in different communities. In California, Bill Jolitz was implementing the missing portions to complete the Net/2 distribution, until it was ready to run on i386-class machines. Net/2 was the result of the effort of the CSRG to make an unencumbered version of BSD Unix (free of AT & T copyrighted code). Bill called his work 386BSD, and it quickly became appreciated within the BSD and UNIX communities. It included not only a kernel, but also many utilities, making a complete operating system. The work was covered by the BSD license, which also made it a completely free software platform. It also included free software under other licenses (like for instance the GNU compiler). In Finland, Linus Torvalds, a student of computer science,

unhappy with Tanenbaum's Minix, was implementing the first versions of the Linux kernel. Soon, many people were collaborating to make that kernel more and more usable, and adding many utilities to complete GNU/Linux, a real operating system. The Linux kernel and the GNU applications used on top of it are covered by GPL. In 1993, both GNU/Linux and 386BSD were reasonably stable platforms. Since then, 386BSD has evolved into a family of BSD based operating systems (NetBSD, FreeBSD, and OpenBSD), while the Linux kernel is healthy evolving and being used in many GNU/Linux distributions (Slackware, Debian, Red Hat, Suse, Mandrake, and many more). The late 1990s are very exciting times with respect to open source software. Open source systems based on GNU/Linux or BSD are gaining public acceptance, and have become a real alternative to proprietary systems, competing head to head with the market leaders. In many niches, the best choice is already open source. The announcement of the liberation of Netscape Communicator, in 1998, was the starting point of a rush of many big companies to understand open source software. Apple, Corel and IBM, for instance, are trying different approaches to use, promotion or development of open source software. Many companies of all sizes are exploring new economic models to succeed in the competitive software market. The media has also started to give attention to the formerly marginal open source software movement, which is now composed not only of individuals and non-profit organizations, but also of small and medium companies (Jesus, 2000).

In 1994 launching of the first Linux distribution by Torvalds Led to an explosion of new Linux based on open source operating systems and application software to run on Linux platform. In 1998 the “free software” idea did not immediately become main stream and hackers Bruce Perens and Eric Raymond agreed that the problem lay in the term “Free” together with other prominent hackers, they founded the “open source” software movement and called it the Open Source Initiative (Pandey & Verma, 2010).

3.5.3 Definitions of Open Source Software:

In 1986 the definition was published for free software by Richard Stallman, President of free software foundation (FSF). The definition codifies four essential freedoms that computer software users should be entitled to, run the program for

any purpose, study how the program was and adopt into your needs, redistribute copies, improve the programme and review your improvements to the public.

According to Chudnov; Open source software is typically created and maintained by developers crossing constitutional and national boundaries, collaborating by using internet based communication and development tools. Output is generally a certain kind of `free`, often through a license that specifies that applications and source code are free to use, modify, and redistribute it as long as all users, modifications are similarly licensed. Quality, not profit, drives open source developers who take personal pride in seeing their working solution adopted” (Dangi & Kumar, 2010). In 1998 Open Source Initiative (OSI) has also defined open source software by giving ten characteristics description for software product considered as OSS which are,

1. Free redistribution: The license must allow end user to redistribute the software, even as part of long software package and may not charge royalties for this right.
2. Source code: The distribution must make the source code freely available to developers.
3. Derived works: The license must permit modifications to be made to the software for redistribution under the same licenses.
4. Integrity of the authors’ source code: The licenses may require that modified distribution be renamed, or that modifications be made via patch file (Service Pack) rather than modifying the source code.
5. No discrimination against persons or groups: The OSS software license not be discriminated against any person or group of persons.
6. No discrimination against field of endeavor: This includes commercial or controversial endeavor
7. Distribution of license: the same license must be passed on to others when programme is redistributed.
8. License must not be specific to a product: A programme may be extracted from a large distribution and used under the same license.
9. License must not restrict other software: This license cannot prescribe the terms of other software with which it is distributed.

10. License must be a technology (Neutral): The license cannot restrict the use of the programme to any individual interface or platform (Singh & Barik, 2010).

3.5.4 Core Working Aspects of OSI Organization:

The Open source Initiative (OSI) is established in 1998 for advertising and introducing Open Source Software worldwide. The first president of this organization was Aeric Raymond. He was president of OSI up to 2005; Headquarters of the OSI organization is in San-Francisco, USA. There are two organizations namely OSI and Free Software Foundation working actively for open source technology. The main working aspects of these organizations are, to promote and distribute open source software, to give approvals to OSS and Software tools, to create awareness about OSS among the users worldwide, to provide education about OSS to the users, to develop some postulates to provide licenses under open standard requirements. The main postulates are also laid by Open Source Initiative for getting open source licenses; these are No International Secret, Open Source: on Web technology, No Cost, if patent taken: no royalty should be charged, no agreement required for using OSS, no need of any technology for using OSS, at the time of distribution of OSS; it is necessary to announce particular software is followed open source compliance / open source postulates laid by open source Initiative (Phadke, 2010).

3.5.5 Attributes of Open Source Software:

The following first four characteristics of the open source softwares are discussed by Altenhoner & Bibliothek (2005) at Proceeding of World Library and Information Congress: 71th IFLA General Conference and Council at Norway. Which are given below, and remaining characteristics are stated by Ferraro (2005) which are also explained below,

Programme Source Code: It generally open conducted development corresponds to the academic tradition to directly exchange results of (scientific) work, provide research data etc. So far, that “rule” attaches itself to the experiences of many people uses established communication channels and co-operation methods.

Technical Flexibility: Many OSS projects integrate a large number of developers with very different emphasis and background. That facilitates the understanding for special requirements and, at the same time, offers the potential to quickly implement needed adjustments.

Increasing Speed: The speed by which there is a reaction to problems, errors or security leaks of the software is legendary. A large group of people that want to make a product successful and immediately undertake the tasks and test new versions is significantly faster and more successful than the proprietary competitors.

Motivation: OSS developers are technically sound as part of a community that works on a collaborative success to product. Often they are the professional developers that create OSS for the society. They maintain standards for government financed projects to provide the resulting software cost-free to motivation support purpose.

Library Standards: The superimposition on mostly international based (Internet) standards generally ensures a greater independence from the single suppliers. The accessibility of a code allows, at least in theory, to hand over oncoming tasks to others – though that is, in practice, mostly less realistic. In a broader perspective that also applies for the long-term readability and usability of the software, because the open, to standards related approach acknowledges the needed sustainability on the developer's side from the beginning. Now a day's most of LMS developers are trying to introduce library standards related to Cataloguing, Classification System, Communication protocol etc. Some additional attributes are added by Ferraro (2005) these are given below,

Towards Reduced Cost: Open source software is free. Libraries pay only for the product support and training (if any) that they need. Whole community of software users are benefited, when user or sponsor contribute any development or new functionality. Software functions are paid for only once making open-source software extremely cost-efficient. Libraries are using open source software benefit from many advanced technology solutions that they otherwise could not afford to

develop themselves yet they still have the option to steer development if they so desire. Moreover, since open-source software developers like Lib-Lime use a business model that relies on providing support and training for software rather than selling the right to use the software, the per library support costs go down.

Innovative and Collaborative: Open source empowers libraries to innovate and collaborate. Not only can libraries download and use open source software for free but also libraries are able to modify it as per the requirement, provided redistribute the result for free. This is not just a theoretical model; libraries worldwide are actively involved in improving open source Systems.

Outsourcing Services for Maintaining System: In a proprietary software development model, libraries had to pay high license fees to use the software. If a vendor is not providing library with adequate support or is not allowing library the freedom to customize and improve the software to meet library's needs, switching vendors means switching software. And then there is the matter of migrating data from one vendor to another vendor. Open source software, since all you're paying for support, switching to another service provider or migrating to an in-house solution is also simple way but open source software model means that your data is your proprietary.

3.5.6 Open Source Software Licenses:

Most of the peoples don't know about copy-right act or patent. Patent can be issued only for any procedure or algorithms while software's can be protected by copy right act. The Open Source Initiative (www.opensource.org) has been put up to constitute upon the open source license. According to Open Source Initiative (OSI) for licenses to be considered as open source software it must have following attributes, Allow free distribution of the code, Make the source code available to the public, Allow code modification, May allow redistribution of the code as original plus patches, Should not make any discrimination against specific users, Should not make a discrimination against usage fields, Must allow for distribution of original license, The licenses must not restrict any other Software (Koohgoli, 2012). Under these definitions there are 70+ licenses are listed in Open Source

Initiative (OSI) as reorganized open source licenses, mainly it can be categorized into two categories; one is Permissive licenses and another is GNU licenses.

Permissive Licenses: It may generally put no restrictions on the licensing of the derivative code, except generally a citation and requirement that the license text is kept in its original form in the modified or distributed code.

Restrictive Open Source Licenses: It is also called protective copy left license it generally aims to keep their code and their modified versions as an open source. They do so by requiring that, all programs with modified versions be provided under the same licenses as the original software that was obtained.

GNU: The GNU public licenses is one of the stronger licenses, either as EPL or LGPL are not stronger. Under the restrictive or permissive license all the programmes are protected under copy right laws, and copy right owner always remains the author of the software. All the licenses required that you identify the copyright owner and include the original licenses in your derivative project. None of the recognized open source licenses are approved by Open Source Initiative (Koohgoli, 2012). The evaluation of open source software is different from commercial software. A major difference for evaluating the open source software is that the information available for open source programs is usually different than for proprietary programs; source code, analysis by others of the program design, communication between users and developers on the performance of the software. Often proprietary programs always hide source code and other information from customers and only allow operating the software.

3.5.7 Advantages of Using Open Source Software:

OSS is beginning to have a long term effect on smaller and medium size libraries. Those libraries are not able to purchase commercial software due to high cost of the LMS they can have an option as an alternative of OSS for library automation. The users of the open sources software have an authority to download, use, modify and also redistribute the versions of the software. The OSS features are developing and updating on collaborative and open efforts. The following points express some reasons.

1. Open source software helps librarians to be self-dependent.
2. Librarians can change the software according to the requirements of their library and library users.
3. It helps libraries to manage their libraries in a cost effective manner. Open source solutions generally require no licensing fees. The only expenditure on outsourcing support for media and documentation.
4. There's no need for license compliance. Once you obtain the OSS you can install it as many times and in as many locations as you need.
5. Open source support is freely available and accessible through the internet via the Internet. As well as many IT companies are now supporting open source with free online and multiple levels of paid support. For example Lib-Lime, Koha community.
6. Technical support is available for open source—often superior to proprietary solutions. First,
7. In open source software the bugs are identified by the users.
8. Collaborative intelligence discovers the new advanced to the services to grow status of the library professionals.
9. Open source software is self-governing and suitable for any type of small as well as big library.
10. OSS gives opportunity to upgrades the skills of the librarians who implement, and supports to the immense variety of constantly developing information products and services.
11. Escape from AMCs and Vendor Lock: Open source exists as a declaration of freedom of choice, in addition to AMCs, there is lack of portability and the inability to customize software to meet specific needs..
12. Continuous quality improvement of Software: Evidence and research indicate that open source software is good stuff. The peer review process and community standards, plus the fact that source code is out there for the world to see, tend to drive excellence in design and efficiency in coding.
13. The web based enterprise management provides the capability to integrate or consolidate server, service, application and workstation management for powerful administration of the work (Randhawa, 2013). However there are some limitations discussed by some scholars for using open source software.

3.5.8 Limitations of Using Open Source Software:

According to Kamble (2012) Open source softwares required more training to operate it, for any up-gradation or changes required outsourcing support, it provides more authority to users and fully web based applications may dependent on Internet.

3.6 Open Source Software: International Scenario

Open source software has been used extensively in information technology (IT) industry. In the library science field many open source initiatives, such as OSS like, Koha, NewGenLib, Evergreen, Invenio, Senayan are used for library management system, in which Koha is maintained by and used by libraries all over the world, addition to this, the web site (www.capterra.com) shows, that currently it is used in more than twenty countries like Australia, Colombia, Canada, England, France, Germany, India, Italy, Mexico, Nigeria, New Zealand, Norway, Pakistan, Portugal, South Africa, Spain, Taiwan, and United states. If we think about digital library management software and content management softwares the main softwares like, OPALS, Greenstone, DSpace, Plone, and Drupal, EPrint, Joomla etc. are available on web using OSS technology (Breeding, 2002).

3.7 Open Source Software: Indian Scenario

In India, use of OSS (open source software) is in initial stage and still not implemented up to the desired extent. In India the first installation of OSS (Koha) was deployed in St. Joseph's College, Devanagari in the Indian state of Kerala. Delhi Public Library has started using OSS (Koha) from 2007. Most of the Government organizations like (CSIR), private organizations, universities are organizing seminars, conferences and workshops in the field of OSS, with the purpose of providing technical knowledge to the library professionals to become an expert in using OSS. In research sector, Now CSIR (Council of scientific and Industrial Research) is also moving towards OSS. CSIR, National Environmental Engineering Research Institute, Nagpur had published an advertisement for recruitment of Project Asst. (Library) on 16.08.2013 on their official website: www.neeri.res.in/recruit.html and the job requirements are good knowledge of library Management software and also OSS. CSIR, National Institute of

Oceanography, Goa has also published an advertisement for recruitment of Senior Technical Asst. (Library) on their official website: www.itg.nio.org and the job requirements are, working knowledge of OSS based on Linux operating system. (www.itg.nio.org).

In academics Mahatma Gandhi University Library, Kottayam, Kerala officially moved to Koha, Open Source Library Management system on 13th August 2013. Dr. Sheena Shukkur, Pro-Vice-Chancellor of Mahatma Gandhi University, Kerala inaugurated Koha system at MGU Library (Kumar, 2012).

Central Library and other Departmental libraries in Cochin University of Science and Technology adopted OSS in 2009 by installing Koha. In Tamilnadu, 32 district libraries and Connemara Public Library were automated and networked using OSS, (Koha). Anna Centenary Library in Chennai also selected using OSS, (Koha) for its automation. From 2010, Mysore University is also using OSS, (Koha). Educational institutions under Institute of Human Resources Development (IHRD) have adopted OSS, in their libraries by providing in-house training for library staff & professionals as well as Symbiosis college of Management, Pune (Maharashtra) is also going through OSS this year. In corporate sector, Jain Irrigation Pvt. Ltd. is moving towards open source software (Kulkarni & Shewale, 2014).

3.8 Open Source Software: LMS Packages:

There are so many library management open source softwares, available on the Internet. Researcher has tried to find out the list of some open sources library management softwares from the literature. Breeding (2002) has carried a study on some OSS packages with their theoretical background, with the help of this study; researcher has given the following information regarding OSS library management software packages. Researcher has also taken a help of literature and official web sites of this LMS packages, to state the information on OSS library management software which are given below,

3.8.1 Koha:

This is the first open source library management software, originated in New Zealand (1999) by a small team of programmers which was working for a consulting company (Katipo communications). Katipo communications, suggested during the proposal process, that the software they developed should be released under the GNU General Public License (GPL) to ensure the project lived on and would be able to be supported by other companies (Raymond, 2001). During the development process the new integrated library system was playfully named C4 or “Cheap and Cheerful Copy of C... which is old name of the system, but the library wanted to come up with a name that meant something and so they decided on the name Koha (Ransom, Chris and Rosalie, 2009).

A. Features and Facilities:

The features and facilities are discussed below,

1. Zero Capital Cost:

The capital cost of the programme is Zero but in actual, to install the Koha in your system some technical knowledge is required for installation. Many smaller libraries cannot afford to purchase, install, and maintain an ILS. And Koha is a usually preferred by libraries. Koha Installs more than one operating system platform. At present Koha is running on multiple operating systems like, Windows, Linux and Mac OSX operating system in conjunction with the Apache Web server. It requires minimum hardware resource support.

2. Latest Frontend and Backend Technology:

Koha is using MySQL backend database for storing the unlimited data entries and Java for the front end means for programming language. This system is using,

3. Perl Module

(Date::manip, DBI, Set:: scalar, DBM :: MySQL of other SQL database module, Authen DBI for optional security, CDK for optional telnet interface).

4. Multi Locational LMS:

Koha has an multitasking capacity, multitasking refers to the capacity of the system to allow more than one user to have simultaneous access to the same database and allow them to carry out the work of their choice in any module.

5. Web Based System:

Koha is basically web based system, supports all the applications based on Web technology. This system supports web 2.0 utilities in the form of library services.

6. Updates unlike Commercial:

The KOHA contributors are frequently working to update the software features as per their need.

7. Cloud Compatible:

Koha has cloud computing facility that's why it attracts libraries to install Koha in their libraries, Koha is using Amazon C-2 cloud server to facilitate to the libraries.

8. RFID Compatible:

Koha is compatible for RFID by installing SIP2 server.

9. Able to Customize LMS:

It is completely menu driven in all functions, able to customize as per our need.

10. Multilingual Support:

It has multilingual language support gives it international appeal especially since the developer base is so diffuse around the globe.

11. Library Standards:

Koha is built using library ILS standards like MARC 21, UNIMARC or USMARC support along with Z39.50 standard. Koha is able to provide world-cat, Google scholar and amazon.com for searching the other relevant books with the help of OPAC.

12. Koha User Group:

The technical support is available from web as well as from Katipo Communications Limited, e-mail, and mailing lists also it has email discussion group of users on the web.

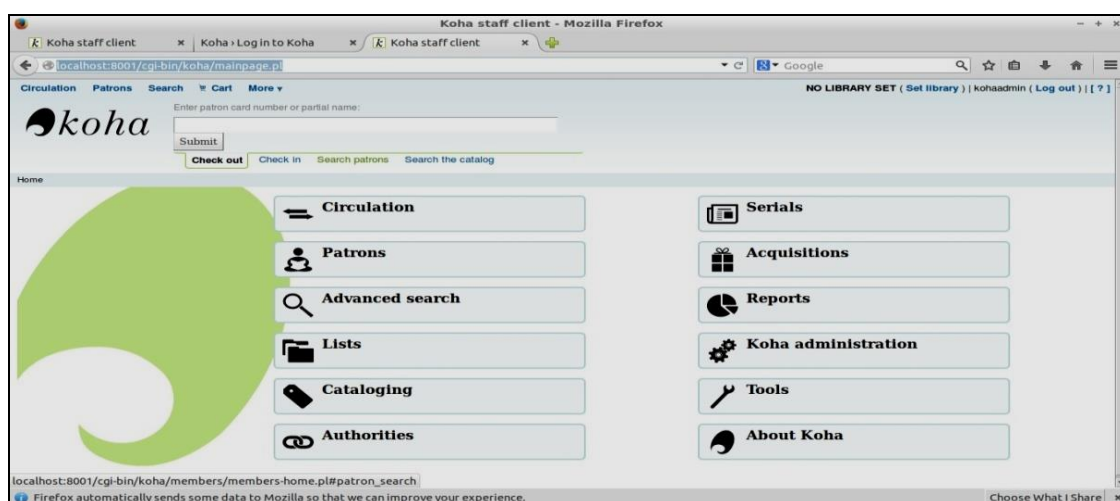
13. Availability of outsourcing the troubleshooting services :

Koha has no vendor lock in, so libraries can receive tech support from any party they choose. If librarian or Koha user is not able to install Koha, there are some organizations as well as professionals available to provide support in Koha installation. The Informatics, Bangalore, M/s. Nucsoft OSS Labs, Bangalore, DELNET, these companies are providing help for Koha installation.

B. The Main Modules of Koha LMS:

The following figure given below shows the first look of the main modules in Koha. This LMS containing twelve modules like, Acquisition, Serials,

Cataloguing, Circulation, Patrons/Members, Authorities, Koha Administration, Advance Search or OPAC, Lists, Reports, Tools, System Information.
(<http://www.Koha.org>)



The details of each module is described theoretically as well as tabular format as per necessity,

1. Acquisition Module:

This module basically distributed in ordering, receipt monitoring invoice processing, accessioning and payment monitoring. the sequence of options provided in this module is almost in the order of the workflow involved in the activity, all this type of work is done by this module, brief description of the operations is given below in tabular format,

Sr.	Acquisition Module	Short Information
1	Acquisition Module	Manage purchase orders
2	Suggestions Management	New purchase suggestion
3	Late Orders	This module shows late orders and non-receiving order of subscription
4	Budget	Budget administration
	Manage Orders	
	Add Vendors	
	Order Search	
5	Funds	Funds for
6	Currencies	Currencies and exchange
7	History Search	In this module history of the book supplier Along with book author, Book name can be searched as well as demanded books with a specific period with its price etc. Can be searched by history search sub module. Report can also be generated.

2. Serials Module:

This module basically helps in serial control management; it consists of following sub modules,

Sr.	Serials Module	Short Information
1	Add New Subscription	Periodical & Journal etc.
2	Claims	There is a link from main serials page to 'Claims, Koha can able to send email to serial vendors if you have late issues.
3	Check Expiration	Subscription period

3. Cataloguing Module:

Cataloguing module basically allows entering the cataloguing details into the records created in acquisition, cataloguing is done in MARC 21 format. For cataloguing data can be imported through Library of Congress database with the help of Z39.50 server facility. This facility can run only with Linux Operating System. Cataloging module works with following additional sub modules. This module consist of following sub modules,

Sr.	Cataloguing Module	Short Information
1	Search	Helps for searching words, title, author, subject, item type, branch etc.
	Add bibliographic details	Cataloguing of accessing item
	Subscription	Purchasing management to circulation Mgt. of periodical subscription related work done with this module.
	Late Issue	Monitoring of subscribed issues
	Virtual Shelves	User / Staff able to generates his own virtual shelve
2	Add New Records	Books, Periodical, etc.
3	Z 39.50 Search	Import Export Data (International Standard)

▪ Search:

The search module helps for searching words, title, author, subject, item type, branch etc. search can be done, as well as in other option Item barcode, call number, IBSN and Publisher search is also possible. For search bullion search facility is also provided by Koha.

▪ **Add Bibliographic details:**

In this module cataloguing of accessing item is being done. In add bibliographic mandatory fields have to be filled up. If the book is donated then direct entry of that book can be done.

▪ **Subscription:**

The Subscription module of Koha provides control of periodical subscription and subsequent monitoring of the schedule arrival of individual. It maintains a record of budget sanction for serial under different categories. The system is capable of handling serials which may be gratis. The subscription process for a new serial is initiated by entering its details and starting subscription year. The journals name, publisher, country of publication and starting subscription year are the pieces of information which are mandatory and must be entered to initiate the subscription process of a new serial.

▪ **Late Issue: (Related to Subscription)**

This module monitoring of issue to be received as per respective frequency of each subscribed serial. It shows the late issues and not received issues.

▪ **Virtual Shelves:**

With the help of this module virtual shelves can be generated for the users as well as users can also generate their virtual shelves. A private bookshelf is managed by library staff and can be seen only by library staff. A public shelf can be seen by everybody, but managed only by library staff. It can be managed freely by any user.

4. Circulation Module:

Circulation system module includes most of the elements of circulation section required in a library. Each sub module includes activities of different aspects of work normally carried in the circulation section. It has got a provision to automatically calculate overdue charges. This module helps to have effective control over financial as well as circulation activities. Some another sub module of Circulation module includes: The circulation module consist of following sub modules, which are given below,

Sr.	Circulation Module	Short Information
1	Check In	Issue
2	Check Out	Return
3	Search the Catalogue	Web OPAC, OPAC
4	Branch Transfers	Within Group Libraries
5	Reserves Pending	Given by users to the Literature
6	Over Due items	Details of outstanding dues against a member

▪ **Issue/Return (Check-in and Check-Out):**

It is also called as charging and discharging process of items. In this, checking out of document is initiated by entering the valid borrower's identification number or membership number and document or items are identified by accession number. If the documents/items which are already borrowed or not in the database at the checkout time, the system automatically provides a data screen to enter bibliographical details of the document. Checking in is a simple and straight forward operation. Inputting document identification number invokes the process by displaying the details of the borrower. Issuing can be done with the help of barcode reader as well as manual.

▪ **Branch Transfer:**

This model helps for transferring of reading material from one branch library to another branch library is possible.

▪ **Pending Reservation:**

The reservation can be made either at copy specific level or title specific level. Once the document of reserve is returned a suitable message will be displayed and the system can produce a notice to the concerned member about the availability of the item for borrowing. The system can also maintain a reservation queue and proper monitoring of it is done automatically.

5. Patrons/Membership Module:

Membership module of Koha software enables registration, cancellation, and modification of membership having varied borrowing privileges can be maintained. Similarly, different categories of items having varied loan period can be defined in Koha. Membership module includes,

Sr.	Membership Module	Short Information
1	Search Patrons	Verification of Membership
	Check Out	Issue
	Check in	Return
2	Add Member	This facility is provided to enroll members to the library and create new membership records
3	Add organization	This facility enables to create records of college or institute members.

▪ **Search:**

This facility enables to find whether a member has got any dues of borrowed material outstanding against user name, staff can find these outstanding dues by member name and code.

6. Authorities Module:

Authorities module of Koha LMS enables to allocation of rights or access privilege associated with various files of directories in a networking environment, these access rights determine which users / staff can access rights to various functions viz. Acquisition, cataloguing, circulation and so on. Access rights will enable the staff is responsible to undertake work in a particular field of module. User or staff will have access only to selected module/modules on which he is supported to work. To enable the staff to perform their duties and functions access rights will have to be given by librarian of section head. The software design ensures that different module is accessed by only authorized person. The Koha authorities' module consists of following sub modules,

7. Koha Administration Module:

This module consists of following main and sub modules, which are given in tabular format,

Sr.	Administration Module	Short Information
1	Basic Parameters	
	Libraries and Groups	Able to create libraries and their branches with code.
	Item Types	Coding to library items
	Authorized Values	It is related to MARC frameworks in Koha
2	Patrons and Circulation	
	Patron Categories	Able to create patrons categories
	Cities and Towns	Relevant information regarding patrons

	Road Types	Enables to help for entering street, boulevard, Avenue, into this section, you will save your time from typing.
	Patron Attribute Types	User profile
	Circulation and fines rule	Define circulation and fines rule
	Library trans for limit	Define circulations limit
	Items circulation	Define, Permissions & restrictions on item circulation
3	Catalogue:	
	MARC bibliographic framework	Define bibliographic framework
	Koha to MARC mapping	To add the right MARC fields
	Keywords to MARC mapping	This related to Keywords display in OPAC as we like them.
	Authority type	Stop some words like wait, what, etc. theoretically help stop this sort of junk from happening.
	Classification sources	Define classification sources
	Record matching rules	This is online help or these rules are the burly bouncer for the backend of cataloguing
	OAI self-configuration	
4	Acquisition Parameters	
	Currencies and exchange rates	Able to select currencies and exchange rates as per necessity
	Budgets	Able to create budget files
	Funds	Allocation of funds
5	Additional Parameters	
	Z39.50 Client Targets	Data exchanges: Standard i.e. one catalogue talk to another.

8. OPAC Module:

Koha has a user-friendly web based OPAC search module. In a multi-user and multi-locational environment, a terminal could be dedicated to the users so that they could access the OPAC. Koha provides suitable and sufficient security to ensure that the users are given only read-only access to the database. Further, it is possible to define the database that can be thrown open to the public for consultation. The database can be searched virtually by any field. OPAC module functions are given below,

Sr.	OPAC Module	Short Information
1	Catalogue Home	This facility enables users to search reading material, as well as recent additions in library. This enable user to login to OPAC.
2	Advanced Search	Search: Title, Author, Subject, Serials titles etc.

3	Suggestions	Online Suggestions can be made by authentic user.
4	Customization of OPAC	User can see his personal page on OPAC
5	My Reading History	Enables reader to see his own reading history

▪ **Advanced Search:**

This facility enable users to search with any word, title, author, subject, serials titles, item type and branch. Other options enable user to search with call number, ISBN, publisher and published between a time periods.

9. Lists:

Sr.	List Module	Short Information
1	Lists	Most issuing borrowers, Most issued items

10. Reports Module:

This module provides facility to generate various reports; this module is divided into four key modules. This module also having sub modules like, Guided Reports, Statistics Wizards, Top Lists, Inactive, Other (SQL Reports) is included.

Sr.	Reports Module	Short Information
1	Stat Wizard	This sub module generate statistical reports, Related following sub modules
	Acquisition	Facility enables to see report of placed order, receive order form particular book seller
	Borrowers	It generates reports of borrower's category, borrower's
	Catalogue	Various reports which are needed in catalogue sections.
	Circulation	Provides reports on aspect of activity carried under circulation section of library
2	Outsider	This facility enables user to see reports of borrowers without issues, Item not issued
3	Top Lists	This facility enables to see reports of most issuing borrowers and most issued item in a period.
4	Other Statistics	This facility provided other statistical information useful for library house-keeping work
	Inventory/ Stocktaking	Helps to do stock verification with the help of barcode
	Catalogue by item type	Item wise catalogue can be done along with Print facility
	Till Reconciliation	It helps to withdraw daily Reports, yesterday and Daily Report: today can be generated.
	Overdue items	This facility provides details of outstanding dues against a member
	Average loan item	This facility provides to see average circulation of different departments in a time period.

11. SQL Reports:

The reports like, duplicate holds, list of patrons with holds awaiting pickup, patrons with holds waiting at library, count of hold filled by another branch, list of all patrons from a single branch with open hold requests, list of all items currently on loan to another library, list of all items currently borrowed from another library, holds placed in date range, holds filled in date range, monthly holds placed by branch, monthly holds placed and filled by branch, monthly holds filled by branch, over dues with holds waiting, top 10 titles placed on hold in the last 6 months, holds to pull, holds to pull at branch, count of holds by month, cancelled holds, single title holds, holds ratio by home branches, holds queue workaround, average wait time on holds, titles with more than x holds, stale holds, these features are covered.

Sr.	SQL Reports	Short Information
1	Patron Reports	Patron related various reports are covered in this,
2	Circulation Reports	Statistical various reports related to issue / return of items
3	Cataloging/ Bibliographic Reports	Barcode search report, Accession register sorted by barcode number report etc.
4	Accounting Reports	Related to fines and credits etc.
5	Statistical Reports	Related to total number of items circulated from a branch other branch, Patrons with most checkouts in date range,
6	Notices Reports	Overdue notices to the patrons to be sent
7	Acquisition Reports	Related to purchasing, orders of items etc.
8	Serial Reports	Related to serial Mgt. i.e. Serials during the month, Late issues, Latest issues, Issues received in a range
9	Miscuing Reports	Troubleshooting, Backup, Share OPAC etc.

▪ Patron Reports:

The reports related to, new patron list, patron birthday report, patrons of specific age range, patrons with staff permissions, super librarians, patrons with staff permission, and if they are super librarians, new patrons by category at branch new patrons by category in date range, expired patrons w/out checkouts, missing emails, patrons w/ checked out items, new patron count (previous month), new patron count (by branch/category), new patrons by branch (year to date), count of new patrons, count of expired patrons, patrons with all attribute values, patrons with a specific attribute value, duplicate patrons, restricted patrons, patrons with notes or messages, patrons with no checkouts, patron with messages but no email,

count active patrons, count active patrons by category for a specific month, list active patrons, patron search by sort1, expired patrons, guarantor list patron permissions, permissions check, patron without image, missing or invalid email format, ex heavy borrowers, these features are covered.

▪ **Circulation Reports:**

The reports related to date wise list of checked in books, circulation numbers in a time frame for all item types, per branch, circulation of two call numbers, track in house use, track in house use hourly, track in house use in hourly range, checkouts by hour in selected date range, all checked out books, over dues contact information, over dues call list or guarantor, over dues by attribute, over dues w/item info when patron has no email, over dues by item type, checkouts by call number (previous month), renewals by call number (previous month), checkouts by item type (previous month), previous day's circulation stats, previous month's circulation stats, previous month's checkouts/renewals by collection code, previous month checkouts/renews by patron category, all circulation actions on date, all circulation actions on patron categories and date, checkouts & renewals in date range, weekly checked out by branch number of checkouts by branch, not circulating items (date specific), non-circulating items, non-circulating items in x years, patrons w/ books due tomorrow, patrons w/ items issued today, count of transfers by other branches list of transfers to other branches, transfers as interlibrary loans, transfers as interlibrary borrows, materials checked out to other libraries, list that totals the circulation of each section, overdue materials, long over dues, count of circulation by alpha call number prefix, circulation by literary form, top 10 circulating books, low circulating items, over dues at a specific branch, items with no circs in a specific timeframe, checkout by shelving location, checking by shelving location, renewals by shelving location, local use by shelving location, circulation transaction counts, checkouts & renewal counts by call number, detailed report of long-over dues charged-off in the last week, average checkouts, self-check circulation stats, old circulation issues since the beginning, list of total check-out books (which are not returned, sort date wise and branch wise), list of total holds placed at a specific branch during a specified period, issues placed at a specific branch during a specified period, percentage of circs by collection code, these features are covered.

▪ **Catalog / Bibliographic Reports:**

The reports related to, the cataloging related reports which is, barcode search report, accession register sorted by barcode number report, total collection size, total collection size by date, URLs in catalog, null item type, null barcodes, items with "X" C Code, Items with "X" and "Y" IT types, call numbers, complete shelf list, all barcodes, new bib records, average age by collection code, bibs marked on order, list new items, another new items report list of items added to catalog in last 30 days, count of all items, count of all items by item type, count of all items and broken down by branch, count of all titles, count of all bibs and items per branch, count of all bibs and items by item type statistical count of total number of items held by each branch, all bibs without items, all bibs where last item deleted, all bibs where last item deleted in time frame, weeding tool, inventory report, inventory report by location, items added by collection, damaged items with title, action log entries of items damaged within the last day, count by call number, count by call number for items added last month, items added in date range, previous month items created, previous month items deleted, items deleted in date range at branch, previous month items created by item type, previous month items deleted by item type, withdrawn items with details, records without items, call number shelf list, duplicate titles, duplicate titles with same date, duplicate ISBN, duplicate ISBN alternative, duplicate titles using title and ISBN, duplicate ISBN with links to bib records, duplicate ISBN in time frame, duplicate bibs using the 001, bibs with specific keyword in subjects, bibs without subjects, bibs without RDA specific fields, bibs suppressed in OPAC, list of items marked lost/missing, list of items marked lost/missing w/ hold info, validate coda bar barcodes used by north American libraries, find unused sequential barcode ranges title or subtitle list, records cataloged with a specific framework, withdrawn titles list to send to OCLC, deleted titles list to send to OCLC, collection evaluation report, titles by general materials designation, count of items added by cataloger, count of items added by cataloger, count of bibs modified by cataloger, titles on a particular branch and shelving location, language material bibs, materials based on biblio item type, authors not in the authorities, terms not in the authorities, lost items & who lost them, basic item information by call number range, biblio items without a Koha item type, bib records added/deleted in time frame, item records added/deleted in time frame, authorities' records added/deleted in time frame, all

titles with 008 for continuing resource, bibs with different item types, author list by branch, biblio with like data in a subfield of a field, mismatches between two fields and two subfields, list all records with at least one subject, bibs with different item types attached, bibs with series info, percentage of collection by collection code, these features are covered.

▪ **Accounting Reports:**

The reports related to accounting work is likely to, fines patron and item information, patrons fines, patrons fines at branch, patrons more than an amount in fines, patrons credits, collections report for unique management, total forgiven fines today, total fines paid today, yesterday's fines by branch, yesterday's lost item charges by branch, yesterday's lost item charges, yesterday's account management fees by branch, yesterday's account management fees, yesterday's forgiven charges by branch, yesterday's forgiven charges of the entire system, yesterday's various fees by branch, yesterday's sundry fees of entire system, yesterday's credits by branch, yesterday's credits of entire system, yesterday's new card fees by branch, yesterday's new card fees of entire system, yesterday's payments by branch, yesterday's payments of entire system, year to date fines by branch, year to date fines of entire system, total fines owed, write-off fine by date range, payment or fine detail with date range, yesterday's amount collected of entire system, amount collected in specific date range of the entire system, accounting for date range, payments collected at a branch in a date range, these features are covered.

▪ **Statistical Reports:-**

The reports related to statistics of library which are, shows the total number of items circulated from a branch other branch, patrons with most checkouts in date range, new materials added inactive borrowers, number of links clicked in the last month, list of links clicked in the last month, statistic for daily catalogers achievement in date range for bib records, statistic for daily catalogers achievement in date range for item records are covered.

▪ Acquisition Reports:-

The reports related to acquisition, which are as, orders in date range, all orders ledger, titles ordered in a fund, amount encumbered, amount spent, tax receipt, orders with like data in a subfield of a field, etc. are covered.

▪ Serial Reports:-

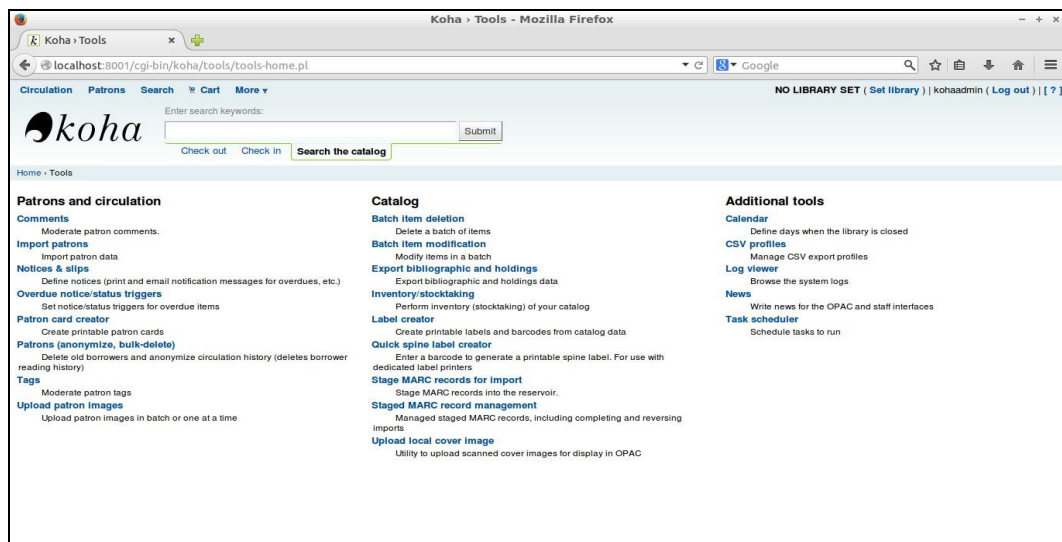
In this module, the reports related to, the total serial received during the month, missing/late/claimed serial during the month, late issues, latest issues, issues received in a range, year range of serials holdings, etc. are covered.

▪ Miscuing Reports:-

In this module the reports related to, the backup/share OPAC layout from system preferences, OCLC number lookup, troubleshoot accidental checkout when action logs are disabled etc. are covered.

12. Tools Module:

In this module catalogue related tools and calendar, log viewer etc. information cab able to get which is shown in the following figure.



13. About Koha :

Before using Koha system, the software has to be properly installed through a series of commands provided by expert. Then several default parameters as applicable to the individual libraries need to be defined for use. This default value

not only minimizes the number of keystrokes during the data entry but also ensure the proper function of various modules of the system according to individual requirements of a library. The system parameters are as follows;

Sr.	About Koha Module	Short Information
1	Library Branches	The different branch libraries can be able to manage with this Koha server. Branches can be added as pre library need, branch categories also defined with the help of this module.
2	Book Funds	Book fund administration is done with this parameter. Different budget heads can be added and managed by this parameter. Book fund administration remembers to edit your book funds before you start editing the budgets.
3	Currencies	In this module the currencies from different countries and their exchange rates can be converted. This parameter help in acquisition, system automatically convert the currency rate.
4	Item Types	Different types of reading material can be defined in this parameter
	Borrower categories	Various categories of borrowers, their enrollment period, age, enrollment fee, overdue notice, reservation charges
	Issuing rules	Define issuing rules for branches / borrowers / item types (no of issues, duration, cost...)
	Authorized values	Define categories and authorized values. Authorized values are used in MARC form to limit and help editing
	Thesaurus Structure	Define categories, thesaurus/authority in Structure MARC
5	Bibliographic framework	(MARC structure): The frameworks defined for the MARC editor. Create frameworks then define the MARC structure (fields & subfields)
6	Links Koha	MARC Data Base: Define links between the Koha standard DB and the MARC one. Note those links can be defined through MARC structure. This tool is just a shortcut to speed up linkage.
7	MARC Check	Checks the MARC structure, it shows mistakes that can break Koha's database
8	Printers	Various types of printer properties can be added to this parameter. It helps system when the print out is being
9	Stop Words	Words deleted during searches like a, and, the, of, and more words can be added to this parameter
10	Z39.50 Servers	Servers to query: for MARC Data
11	System Preferences	System preferences can be added and modified
12	Patron Picture Import	Photo of the member can be added to the system
13	MARC records export	Database can be exported in MARC format

Sr.	About Koha Module	Short Information
14	Upload MARC Data in Reservoir	MARC format Data can be imported in the database with the facility of this parameter.
15	Barcode Generator	Barcode facility is provided by this system, these parameters generate barcode

3.8.2 NewGenLib: (<http://www.newgenlib.com>)

NewGenLib (New Generation Library) software is developed by, The Kesavan Institute of Information and Knowledge Management and Verus Solutions Pvt Ltd. Hyderabad, India. In March 2005, NewGenLib version 1.0 was released and then 2.0 and 2.1 have come up, now 3.0.4 NewGenLib has been installed in several libraries in India. NewGenLib has been declared open source software on 9th January 2008 under GNU, GPL Licence by the Verus Solutions Pvt Ltd. NewGenLib is able to manage the entire library house-keeping operations, like acquisition of books and other materials, creation and maintenance of its catalogue database, circulation of its holdings, etc. NewGenLib allows a library to define its own network of libraries. One library in the network called the host library installs the software on its public-domain server and then configures other libraries as Associate libraries on its network. NewGenLib is a Web-based application. Databases created with it reside on web servers and can therefore be accessed by any client machine connected to the Internet. However, there are versions of NewGenLib which do not need to run as applications requiring access to the web. In such versions, the databases reside on local area network (LAN) or Intranet servers. NewGenLib uses Relational Database technology to manage databases created with it. Databases under NewGenLib can be hosted under much commercially available Relational Database Management Systems (RDBMS) Server software such as Oracle, MS SQL Server. However, NewGenLib can also be used under open source RDBMS such as PostgreSQL and Firebird. NewGenLib uses well-known and proven international standards: MARC 21, UNICODE, XML and the Dublin Core Metadata Standard. NewGenLib allows metadata records to have digital attachments and so users have access to these via the searchable online public access catalogue (OPAC). NewGenLib runs under Linux or Windows OS and using Java, and MySQL advanced technologies. It currently boasts a fully developed OPAC, circulation module with reserves support, and original cataloging with MARC 21 support. NewGenLib system runs on both stand alone as

well as in network and able to communicate with other libraries in the campus. In this system entire client server architecture protocol has been used.

NewGenLib is a metadata content management as well as library management software solution. Metadata is structured data about data. Content, means any carrier of information: textual materials (e.g. books, periodical articles, sound files, web pages, full text, CD-ROMs, training materials, PowerPoint presentations, video clips, images, etc.). NewGenLib is able to manage the entire library house-keeping operations, like acquisition of books and other materials, creation and maintenance of its catalogue database, circulation of its holdings, etc. At the time of developing this system the web based Java and J2EE programming languages are used in front end and MySQL database is used as backend to store the data. This system supports for Unicode 3.0 and UTF-8 and ready to handle English as well as other languages. In this system there is provision of online submission of suggestions and support for RFID system. This system generates the index database as per international standards like MARC 21, AACR- 2R, MARC- XML etc.

1. Acquisition:

The NewGenLib, Acquisitions module has all the features that are typically required in libraries of all kinds. The screen below shows the main menu options that are available in this module. Each of these menu options and sub-options, their purpose and how to accomplish acquisitions related tasks using these functions are explained in detail as follows.

Sr.	Acquisition Modules	Short Information
1	Search by Title	With the help of this sub module user can search title from the database
2	Process Request	Record the details of one or more requests received, refine the requests received, print requests for approvals to approving authorities
3	Process Approval-Supplies	Book demands on approval, print intimation to the approving authority, maintain records of approval reading material.
4	Firm orders	Generate purchase orders for, items requested, refined, received and approved, or on-approval items supplied, received, and approved etc.

5	Receive orders	Supplied have been received from one or more vendors
6	Delete Invoice	Cancellation or Revert Order
7	Gifts	Allows the library to actively seek gifts and also process unsolicited gifts.
8	Accession received items	The items received and paid for assign a unique barcode
9	Delete Accession number	Able to delete against wrong entry
10	Process Payment (Invoice received)	This function is invoked after items and invoices are received and the items are accessioned. With the help of this sub module payment process can be done.
11	Invoice payment details	Libraries require entering details of payments made against invoices received from vendors for the acquisition of items. This menu gives details of payment.
12	Claims for unsupplied Items	Claims for unsupplied, Unfulfilled Orders through letters.

▪ **Process Request:**

With the help of this sub-module the following tasks can be accomplished, record the details of one or more requests received, refine the requests received, print requests for approvals to approving authorities, record approvals/rejections of requests received, and search requests received.

▪ **Process Approval Supplies:**

The following tasks can be done with this sub module it does book demands on approval, print intimation to the approving authority, maintain records of approval reading material.

▪ **Firm Order:**

The firm orders function provides feature rich capabilities to generate purchase orders for, items requested, refined, received and approved, or on-approval items supplied, received, and approved, or new items for which orders are required to be directly raised.

▪ **Receive Order:**

This function enables library staff to locate the orders against which items supplied have been received from one or more vendors and then to record the receipt of items supplied against these orders.

- **Delete Invoice:**

Occasionally, it may be necessary to cancel an invoice that was received from a vendor. The invoice may have been recorded as received against items that were supplied. The need to cancel the invoice is accomplished by this menu option.

- **Gifts:**

Many libraries solicit gifts from institutions, societies and professional bodies for their publications which may be useful to library patrons. NewGenLib allows the library to actively seek gifts and also process unsolicited gifts.

- **Accession Received Item:**

The Accession received items function enables library staff to quickly and accurately record information about the items received and paid for or otherwise, assign a unique barcode to items so that these become ready for technical processing and later for circulation to library patrons.

- **Delete Accession Number:**

When entering accession numbers manually, library staff may make transposition errors, e.g. instead of entering 98361 they may enter the accession number as 98316. Other errors may also occur, e.g. one book's accession number is assigned to another and the error is noticed at a later date. In such a case, it may be necessary to delete the accession number of an item so that the right number could be assigned to it. The delete accession number allows this.

- **Claims for Unfulfilled Orders:**

The Claims function enables library staff to produce the following types of outputs. Claim letters to vendors for un-supplied items between two selected order dates, requester, title, vendor, or budget head, listings by request, or budget head.

2. Technical Processing: (Cataloguing) :

This module has several features which are important for the user. With this module catalogue of documentary materials (books, serials, theses, etc.) and non-book material like CD-ROMs, Web pages and audio as well as video materials can be done. This module basically allows one to input cataloguing details into the

records created in acquisition, cataloguing is done in MARC 21 format. For cataloguing data can be imported through Library of Congress database. Technical processing module works with following sub modules,

Sr.	Cataloguing Module: Technical Processing	Short Information
1	Item ready for technical processing	Items acquired via the acquisitions module and are ready for technical processing accessed through this menu option.
2	Import catalogue records	Facility to import into one or other template/ format
3	Primary cataloguing	It is basically related to MARC 21 format & other....
4	Modify catalogue records	Allow for editing, correction or delete records as per need. (created or imported during an earlier session)
5	Search catalogue	Functionality that is available in the online public access catalogue
6	Harvest OAI-PMH achieves	

▪ **Import Bibliographic Data:**

An important feature of NewGenLib software is technical processing in this library staff has a facility to import into one or other template, cataloguing data directly from a MARC 21 data source such as the LOC, National Agricultural Library, etc. In fact the library can configure one or more MARC data sources from where they plan to import catalogue records. The only requirement is that the source must export their MARC 21 data in ISO 2709 format.

▪ **Primary Cataloging:**

Sr.	Cataloguing Module : (Primary Cataloging) Short Information
1	Provides three different templates to cataloging as simple, General & as MARC 21 templates.
2	Compliant to MARC 21 for Bibliographic, Authority and Holdings Data
3	Supports all material types (By MARC 21)
4	Open Archive support (OAI-PMH protocol compliant)
5	Attach digital content along with catalog record
6	Customizable MARC 21 templates and Search indexes
7	Provides 3 different templates for Cataloging: Simple, General and MARC 21

▪ **Modify Catalogue Records:**

At times it becomes necessary for cataloguers to modify (edit, correct, delete) records created or imported during an earlier session. The Modify Catalogue records option allows this.

▪ **Search Catalogue Functionality:**

The next key function of the technical processing module is the Search catalogue function. This is the librarian's search interface and complements the search functionality that is available in the online public access catalogue.

Sr.	Cataloguing Module : (Search Catalogue): Short Information
1	Search catalog through various system defined Indexes
2	Library can also define custom indexes

- Cross walks available meta data standards like MODS 3.0 and Dublin Core
- Technical Processing of items received through Acquisitions and Serials Management

3. Circulations:

The circulation control module in NewGenLib has all the commonly used functions in this area of library work that most libraries, big and small provide. In addition, the module has many built-in controls and settable parameters to enable a library to ensure that library patrons are provided equitable access to the collections and that the library has reports that will enable it to take meaningful decisions about collection building, maintenance, weeding and use of its collection. Support for the Radio Frequency ID (RFID) protocol is also available with NewGenLib, but is provided specifically on payment to those libraries that need this. The figure shown below shows the menu options that are available in this module. This module works with following sub-modules.

Sr.	Circulation Module	Short Information
1	Check out	Circulation control module / Issue of Items
2	Check in	Return of items
3	Reserve items	Library to administer reservations made by patrons, at various Levels, Members can allowed reserve items through OPAC
4	Recall items on loan	Useful for library staff to send out recall notices to the borrower.
5	Renew items on loan	Users can able to renewal online library items
6	Inter Library Loans management	Inter Library loan of the items is provided by the system.

7	Process items lost	Processing of lost items through payments or fine as per policy to users instead of lost items.
8	Weed out process	It is applicable to irrelevant, unwanted items.
9	Binding management	Related to repair of items held generally in Circulation section
10	Automatic overdue notices and reminder for renewals	Possible to contact users through notices & reminders or renewals.

▪ **Check-out or issue of items:**

The check-out function is a basic one in any circulation control module and is to ensure that items held by the library are securely and accurately checked out or issued out to library patrons. The check-out ensures that the patron's privileges in respect of different types of library materials are respected, e.g. that user entitled to borrow the material. User has brought to the circulation desk that the borrower's loan limits are not over drawn, etc.

▪ **Check-in or return of items:**

The check-in function enables the library to accurately record the return of items previously loaned to patrons. The function discharges the patron of the loan of the item but maintains useful statistics that is later possible to be analyzed in making decisions concerning acquisitions, weeding out of stock, loss of books etc.

▪ **Reservations of items:**

The Reservations function is important in academic environments. NewGenLib provides many features that allow a library to administer reservations made by patrons. Patrons can place reservations from the OPAC. However, it is also possible for circulation staff to place reservations on behalf of patrons.

▪ **Renewal of loans:**

Patrons need not present themselves and items for which loan are to be renewed to the library to renew their loans. They can either renew loans via the OPAC or and request the library (via email, telephone) to renew a given item's loan. The library staff then invokes the Renew loan option in the Circulation module of NewGenLib.

- **Binding Management:**

The binding and repair of items held generally in Circulation section of the library. This function provides the following options. Separate item for binding, Check out items for binding and check in for binders.

- **Recall Document:**

Sometimes it is necessary for the library to recall an item on loan before the expiry of the loan period. The Recall document function enables library staff to send out recall notices to the borrower.

- **Collect Overdue:**

The collect overdue function enables library staff to accept partial or full overdue payments from a member and ensure that all such recoveries made and balances due are properly recorded for reference whenever needed, e.g. when the member requires a no-dues certificate.

- **Process Reported Loss of Item:**

It is quite common for members to loose books or other items borrowed by them. Such losses when reported need to be handled, i.e. information about the item's loss should be reflected in the library's catalogue database, and depending on the policy of the library, the member should be charged the cost of the item, over dues on the borrowed item, and any service charges that accrue because the library has to replace the lost item.

4. Serial Management:

The functionality in this module requires that the software must deal with several idiosyncrasies of the serial as a form of publication. Equally there are issues related to the cataloguing of newly subscribed serial titles, registration, display of serials holdings in the online public access catalogue (OPAC) and the prediction of the receipt of regular serials issues as well as that of supplements and indexes. Managing the subscriptions to serial titles in such a way that there is no interruption in the supplies is another important requirement. The binding of serials issues when the volume for a particular serial title has been fully received and ensuring that these are sent to binder are other tasks that the module must help

library staff to accomplish. Serial management module works with the following Sub-Modules.

Sr.	Serial Management Module	Short Information
1	Process New Subscription	This involves the addition of new titles
2	Order Subscription	Provides facility to place firm order
3	Receiving Invoice	Gives information about received subscription invoice and payment details
4	Register Serial issue	Issues can be registered in this sub module
5	Serial binding management	Binding management
6	Renewal Subscription	Renewing subscription of serials
7	Auto Generation Reminder:	For not issued issues to library
8	Preparation of Logical lists and Physical lists	Various types of lists related to members, library material etc.
9	Raising binding orders	To the determined vendor
10	Accessioning Bound Volumes	Processing / Data entry of bounds

▪ **Process New Subscription :**

This involves the addition of new titles to an existing list of subscriptions, ordering these with vendors, processing subscription invoices, receiving and registering issues, and binding these into suitable physical volumes.

▪ **Serial Binding Management:**

The serial binding management can be done by this section. It is a total solution for serials bindings it provides facility like list of binding materials, binding order, bound item receiving, accessioning of bound items.

5. Administration:

The administration module of NewGenLib allows librarians/system administrators to configure the software to suit the application environment of the library and so that it reflects the policies of the library in respect of its various operations, e.g., circulation policies, acquisitions modes, etc. This is the first module that requires to be invoked before other functional modules such as Acquisitions, Technical Processing and circulation etc. are automated. The definition of various parameters is done only by authorized personnel, usually the system administrator. The figure shown below shows the menu options that are available in Administration menu option.

Sr.	Administrative Module	Short Information
1	Configure System	Setting up of various parameters
2	Configure end of day	Related to admin work
3	View process form letters	Various types letters can be printed by this sub module
4	View/Edit proxy server setting	it facilities to change user name and password etc.

▪ **Configure System:**

This is the menu option that allows the setting up of various parameters, like authority files, patron (Member files), budget sources, budget heads, budget allocation, vendor etc.

6. Reports:

The report module provides facility to generate reports; the module is divided in four major sub modules, acquisition reports, technical processing, circulation and serial management.

▪ **Acquisition Reports:**

This sub module generate acquisition reports, it works with following module.

Sr.	Acquisition Reports	Relevant work
1	Generate Accession Register	Generate accession register
2	Generate Budget Expenditure	Generate budget expenditure reports
3	Generate Vendor: Performance Report	Administrator can see, vendor performance with the help of this sub module

▪ **Generate Accession Register:**

This facility enable to generate accession register, the four option are given date wise, accession number, budget head, and budget allocation with any of these condition user can generate accession register.

▪ **Technical Processing:**

This section covers various reports which are needed in catalogue section.

Sr.	Technical Processing Reports	Relevant work
1	Prepare customized list	Customized list of classification number, department, course etc.
2	List of addition	List of new additions in a time period can be generated

3	Documentation List	Enable user to see documentation list of various subject heads in a time period.
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▪ **Prepare customized list:**

The customized list of classification number, department, course, budget, authority files and statistics can be generated through this module.

▪ **Circulation:**

This section basically provides reports on aspect of activity carried under circulation section.

Sr.	Circulation Reports	Relevant work
1	Stock verification	Various stock verification reports.
2	Issued material details	This facility enable user to see issued item
3	Current reservations	This facility enable user to see current position report.
4	Detailed Circulation Transaction	It gives detailed information about transaction.
5	Overdue material	Details of outstanding dues against a member or department
6	Patron List (Users List)	Provides reports of borrowers
7	Items reported lost	Enable user to see list of lost items in a time period
8	Daily Circulation Transaction	Enable user to generate daily transaction report
9	Items under binding	Information of binding material and list of
10	Heavily Used Material Report	Facility enable user to see reports of most issued items in a time period.

▪ **Stock verification report:**

This section helps user to do stock verification of the library, it provide facility to complete stock verification and sectional stock verification. It gives various stock verification reports.

▪ **Detailed Circulation Transaction Report:**

This sub module provides information about circulation report. It gives detailed information about transaction.

▪ **Serial Management Reports:**

This sub module generates serial control reports; it works with following modules,

Sr.	Serial Management Reports	Relevant work
1	Current subscription report	Current subscription report shows current status of subscription in a library.
2	Duplicate issue report	Duplicate issue report generates list of duplicate issues
3	Missing issue report	List of missing report facility generates missing issues in a time period.
4	Unfulfilled subscription report	Generates list of unfulfilled subscription.
5	Current arrivals report	Generates report of current issues in a time period.
6	Budget expenditure report	Generates report of expenses for subscription, in the year.
7	List of subscription	Generates the list of subscription publisher wise, topical term wise and vendor wise.

▪ Utilities Related Reports:

Utility facility is provided by NewGenLib it works with the following sub modules.

Sr.	Utilities Reports	Relevant work
1	Print catalogue cards	With the help of this sub-module printout of catalogue cards can be taken
2	Built custom index	This sub-module provides a facility to create indexes
3	Built union catalogue	Software user can be able to create the records of union catalogue can be uploaded.
4	Database backup	User can take regular backup of the database

7. OPAC:

In multi user environment, a terminal could be dedicated to the public so that they could interact with the system themselves. NewGenLib provides suitable and sufficient security to ensure that user is given only read-only access to the database. The database can be searched virtually by any field. This OPAC (Online Public Access Catalogue) module functions as follows; NewGenLib has powerful web based and user friendly OPAC. The main sub modules are as follows:

Sr.	OPAC Modules	Short Information
1	Search Options	Free text (Google like search), Basic Search, Advanced search, Expert Search
2	Reservations on line	Reserve items on line and Cancel
3	Renewal literature	Renewal items on line
4	View circulation Data	Transacted and user privileges by the user on line
5	RSS feed Service	View headlines through RSS feeds configured
6	Define SDI	Selective Dissemination of Information Profile

7	List of new arrivals	List of new arrivals in a time period can be generated
8	Suggest new books	To be acquired on line
9	View special collections	With the help of this facility user can search the data of digital records
10	Supports Vu-find OPAC system	

▪ **Search Options:**

This facility enables users to free text search, basic search, advance search and expert search. With free search facility user can search with any word or phrase, whereas basic search facility provides user to search with author, title, publisher, Editor etc. Advance search facility provides user to use billion operations for search, and expert search can be searched by a query.

▪ **Reservation items on loan and cancel reservation:**

Online reservation can be made by using this facility. An authentic user can only use this facility He or She (User) must have user Id and password. Reservation can be cancelled by using this facility. An authentic user can only use this facility by providing Id and password.

▪ **Request renewal of loan:**

Online request for renew of loan can be made with this facility. A genuine user can only use this facility for this He or she must have user Id and password.

▪ **Circulation Data:**

This facility enables user to see his/her circulation history. A genuine member can only use this facility He or She (User) must have user Id and password.

▪ **list of new arrivals:**

List of new arrivals in a time period can be generated through this facility. A genuine user can only use this facility for this He or she must have user Id and password.

▪ **Request addition of new publication:**

On line suggestion can be made by a user. A genuine user can only use this facility for this He or she must have user Id and password.

▪ **Statistics:**

A report of use of OPAC in time period is made by this module.

8. NewGenLib: Android Applications

It is computable with Android application mobile application and tablets for following functions,

Sr.	NewGenLib on Andrioid Applications in Short
1	Search the collection
2	See the details of the records as well as their availability
3	Reserve items
4	Request for check-out
5	View their transaction history
6	View their current check outs and also renew them
7	View their current reservations and also cancel them
8	View their current requests for check-out and also cancel them
9	List of new arrivals
10	Login using their Library card number/Email id
Source : http://www.verussolutions.biz ,	

9. NewGenLib Supports Many Standards

Sr.	NewGenLib Supports Many Standards
1	MARC 21 for Bibliographic data: The database schema design of NewGenLib is based on MARC 21 for bibliographic data. Import/export of MARC 21 records is possible. These records are in MARC Communication Format, MARCXML or MARC Tagged View,
2	MARC 21 for Authority data: Import of MARC 21 for authority data is available. The database schema design of authority data is based on MARC 21.
3	MARC 21 for Holdings data: Database schema design of holdings data is based on MARC 21.
4	MODS 3.0: Export of data is available in MODS 3.0. In OAI-PMH and SRU/W records are available in MODS 3.0.
5	Z39.71: Holdings statement displays are based on this standard
6	ISBD: Bibliographic record displays are based on this standard
7	OAI-PMH: Allows harvesting (manual) from external repositories, Create Open archive collections, and items, search the repositories and also act as data provider, Metadata formats: MARC XML, DUBLIN CORE, MODS 3.0 and AGRIS AP
8	SRU/W: Federated search engines can search bibliographic databases using this protocol, Query language: CQL (Common Query Language), bench marking

9	Level 1 compliance, Profiles used: BATH, and DUBLIN CORE, Metadata standards: MARC XML and MODS 3.0
Source: http://www.verussolutions.biz	

10. Data Migration in NewGenLib:

This system supports for data migration you can get all your data imported into NewGenLib database from excel sheet of any in house library software or any commercial as well as local software. All new updates, upgrades, versions, and bug fixes of NewGenLib software are available in free of cost for life time.

(<http://www.verussolutions.biz>)

3.8.3 e-Granthalaya: (<http://www.egranthalaya.nic.in>)

General Information: e-Granthalaya is the popular library management software developed by National Informatics Centre, (NIC) Department of Electronics & Information Technology, Ministry of Communications and Information Technology, Bangalore, Government of India. The software has been designed and developed by a team of experts from software as well as Library and Information Science discipline. The e-Granthalaya LMS can automate all the in-house library operations and library user services. The software can be implemented in stand-alone or in client-server mode whereas database and Web-OPAC are installed on the server PC while the data entry program is installed on client computer terminals. The software provides LOCAL/LAN/WAN based data entry solutions for a cluster of libraries where a centralized database can be created with Union Catalog output. The software provides Web OPAC interface to publish the library catalog over Internet/Intranet. The software runs on Windows platform Only, UNICODE Compliant, thus, supports data entry in local language. At initial e-Granthalaya was developed for the Public Libraries in the Karnataka State. Later, NIC HQs 'Library and Informatics Services Division' took over the designing of the software where library professionals were involved in the designing process and, thus, improved the software with enhanced user interface and simplify the work-flow of library functions so that it can suit all kinds of libraries, following table shows main modules of e-Granthalaya LMS.

▪ **Main Modules of e-Granthalaya LMS :**

Sr.	Main Modules of e-Granthalaya	Short Information
1	Book Acquisition	Purchasing related work
2	Cataloguing Module	Cataloguing as per Standard: Generating the full catalog entry of the books.
3	Circulation Module	Control on issue return
4	Serials Module	Control on serials: Subscription & Other
5	Micro Documents Module	Work related to Micro document management, articles & indexing.
6	Budget Module	Financial control & bill processing work,
7	Search Module	Library material search in OPAC
8	Admin Module	Administrative work like, making users & Entering the default values.

Explanation: The main modules of e-Granthalaya includes, book acquisition, cataloguing module, circulation module, serials module, micro documents module, budget module, search module and admin module.

1. Sub Modules in Acquisition:

Sr.	Sub Modules in Acquisition
1	Authors Directory, Sub-Module of Books and Acquisition:
2	Check duplication title, sub-module of books and acquisition:
3	Add new title, sub-module of books and acquisition:
4	Add acquisition records
5	Generate approvals
6	Update approval
7	Add order details
8	Generate order
9	Receive documents
10	Accessioning
	Add bill details
	Add payment details

Explanation: Basically this module covers the activities related to new book purchasing. It controls works like, check duplication title, add new title, generate approvals, update approvals, Add order details, generate order, receive documents, accessioning, add bill details, add payment details etc.

▪ **Details of Cataloguing Module of e-Granthalaya:**

Sr.	Cataloguing Module	Short Information
1	Retro Conversion	Able to enter book records direct in existing collection of books, as well as from purchasing and copy details.
2	Full Catalogue Change Copy Status	Add additional data elements in the catalog records
3	Update Holdings	It enables to update/modify the holding records
4	Status wise collection	It enables to view the status wise collection of the library
5	Stock Verification	
6	Generate Barcode Labels	

Explanation: This cataloguing module basically helping for maintain cataloguing standard in database along with the activities like, retro conversion, full catalogue change copy status, update holdings, status wise collection, stack verification and generate bar codes etc.

▪ **Details of Circulation Module of e-Granthalaya:**

Sr.	Circulation Module
1	Member Categories
2	Sub Categories
3	Member Registration
4	Issue and Reverse
5	Return and Renewal
6	Circulation Transitions
7	Generate Overdue Notice

Explanation: this circulation module basically designed for issue / return of the library material. It maintains all these activities related to circulation, in which member registration, issue and reverse, return and renewal, circulation transitions, generate overdue notice etc. are included.

▪ **Details of Serials Module of e-Granthalaya:**

Sr.	Serials Module
1	Check Duplicate Title
2	Add New Serials
3	Serial Start Details
4	Subscription Start Details
5	Add Acquisition Record

6	Generate Approval
7	Update Approval
8	Add Order Details
9	Generate Order
10	Subscription Maintenances
11	Schedule Maintenances
12	Receive Loose Issues
13	Generate Reminders
14	Add Bill Details
15	Add Payment Details
16	Update Journal History
17	Add Bound Volume Journals

Explanation: in which serial management related works are doing i.e. starting from check duplicate title to add bound volume journals. It serially contains work like, check duplicate title, add new serials, serial start details, subscription start details, add acquisition record, generate approval, update approval, add order details, generate order, subscription maintenances, schedule maintenances, receive loose issues, generate reminders, add bill details, add payment details, update journal history, add bound volume journals etc.

▪ **Details of Micro Documents Module of e-Granthalaya:**

Sr.	Micro Document Module	Short Information
1	Add Micro Documents	Addition of Micro Documents
2	Search Micro Documents	Able to Search Micro Documents
3	News clipping Manager	Search News clippings

Explanation: this module is used for articles, chapter and news. This module contains work like, add micro documents, search micro documents, news clipping manager, etc.

▪ **Details of Budget Module of e-Granthalaya:**

Sr.	Budget Module	Short Information
1	Library Budgets	Determine Library budgets
2	Invoice Details	Entering Invoice details
3	Generate Payment Request	Letters, regarding payment request
4	Update Payment Request	Follow-up.. Payment request
5	Cheque delivery form	Letter, regarding mode of payment
6	Budget Analysis	Evaluation of budget analysis.

Explanation: This module is used for budget control and bill processing, in which allocation of library budgets, invoice details, payment release and budget analysis are main concern.

▪ **Details of Search Module of e-Granthalaya:**

Sr.	Search Module
1	Basic Search
2	Advance Search
3	Authority Based Search
4	View Index
5	Catalogue Quires
6	Acquisition
7	Approval Queries
8	Vender Queries
9	Invoice Queries
10	Current Awareness
11	SDI, Sub-Module of Search:
12	Holding Search
13	Current Journals
14	Search Serials:
15	Search Z 39.50 server, Sub-Module of Search:
16	Accession Register
17	Documentation Bulletin

Explanation: It contains the facilities like, basic search, advance search, authority based, view index, catalogue quires, acquisition, approval queries, vender queries, invoice queries, CAS and SDI sub-module of search, holding search, current journals, search serials, search Z39.50 server, sub-module of search, accession register and documentation bulletin.

▪ **OPAC Module of e-Granthalaya:**

Sr.	OPAC Module
1	Various types of searches: i.e. Basic search, Advanced search etc.
2	Free text (Google like search) Basic, Advanced and Expert
3	Reserve items on-line and cancel
4	View circulation transactions
5	Top stories i.e. View headlines through RSS feeds configured
6	Define SDI : Selective Dissemination of Information (SDI) profile
7	List of new arrivals
8	Suggest new books on line
9	View special collections in the library.

Explanation: The OPAC module of this software provides internet search services, which involves links to various electronic journals and the reports like research articles, technical reports are made available in the search along with the transaction information of the borrower is also provided. It also contains, reserve items on line and cancel, renew literature/ items on-line, view circulation transactions, list of new arrivals, suggest new books on line, view special collections in the library.

▪ **Details of Admin Module:**

Sr.	Admin Module
1	System Data
2	Sub-Module of Admin: Generates, user and library accounts, create letter text for letters, reminders, create subject, publisher, vendor directory.
3	Master Data
4	Database Utilities

Explanation: The admin module is basically used for setting user's authorities and permissions, making entry of the default values in the master tables and then using such values in the subsequent modules. This module contains of the system data and master data sub modules. It gives users to add, edit, and delete records as per need, who will operates the software, it contains works like, bibliographic level/document type, acquisition modes / copy status, countries / types of binding, currency codes, publishers details / vendor details, journal frequencies / languages, messages and text for reports/letter, sections/subjects/library committee, etc.

3.8.4 PMB:

This software is also popular open source software originated from France in 2002 by Francois Lemarchand. Majority of documentation of this software interface and web site are in French language. PBM has modules of circulation, OPAC, cataloguing, with UNIMARC supports to serial control and an SDI system. Installation and maintenance of PBM is easy to use in Window and Linux compared to the installation of other open source ILS. It is an easy to use graphical interface for database back up, maintenance, import and export of bibliographic records is available with PBM. Using these applications librarians can maintain the daily database back up without the help of computer administrator. Other key

features are user friendly web interface for librarian and users, UNIMARC, Z39.50, in-built barcode generator, multi-language support (French, English, Spanish, Italian and Portuguese), import and export of bibliographic records in different formats, detailed documentation for user and administrator (Kumar, 2005).

3.8.5 OpenBiblio:

This open source software has been consistently developed since 2002 to be the most user friendly, intuitive open source ILS available on the free market. Like some of its open sources counterparts, it makes use of CSS and PHP templates to assist content management for unskilled librarians in college of web maintenance. Although no pilot libraries have expressed interest in adopting it, the number of active developers has grown and functionality has improved proportionally. Its target audiences are “Private collections, clubs, churches, school or public libraries”, but it has the potential to be universal if enough work it put into it over time. Unfortunately at the present time, the circulation module can only handle U.S. postal codes so internationalization is limited to multilingual templates. OpenBiblio runs under Linux or Windows, any web server, PHP, and MySQL. It currently boasts a fully developed OPAC, circulation module with reserves support, and original cataloging with USMARC support (Sasikala, 2005).

3.8.6 Emilda:

This open source software which is another well designed for integrated library management system, which suits libraries of all sizes and is developed by Real Node Ltd. Features of Emilda are OPAC, MARC support, extensive configuration and full customization. Development of Emilda seems to have been stopped; no updates or new versions have been published since June / mid 2005 (Kumar, 2005).

3.8.7 PhyMyLibrary:

This open source software project started in 2001 as the hobby of a single developer in the Philippines as a means of providing a low-cost solution to library automation in that country. Its progress has gathered momentum gradually since then with many localized public, academic and special pilot libraries. Its target audience is “small academic and special libraries”. Although offered in English,

the feature set and development roadmap seem to indicate localization rather than internationalization in mind. The development model is highly centralized with ultimate control of the source code solely in the hands of the projects founder, however a CVS repository databases exist which should be collaborative in coding for adopting later. To make matter worse, documentation is poor however technical support is available via email or mailing list. PhyMyLibrary runs on Linux and Windows operating system. It supports PHP, and MySQL Database system, phpMyAdmin, and python (optional). Its catalogue (original only), circulation (including reserve), and OPAC modules are fully implemented with USMARC support and CDS/ISIS conversion (Babao, 2006).

3.8.8 Learning Access ILS:

This is also one of the popular open source software was discovered by Nonprofit Foundation relying on patronage and donation from individual as well as the government of Washington State. In 2000, J. G. Bell “forked” programming code from the Koha project hardly resemble one another in source code or visual look. Despite bankruptcy setbacks, the same developers have done hard work on improving Learning Access ILS for the North America library market. They have four pilot public libraries that have undergone retrospective conversion using their Open Recon tool under a state sponsorship program. Its intended audience is “small to medium public and school libraries” which makes sense given that it was designed to handle small collections up to 25,000 items. Like Koha, it has the potential to become a universal ILS so long as it can make a name for itself in the public librarian first. One core advantage is its Unicode support, which demonstrates an international scope. In spite of the above issue, it remains the most viable solution next to Koha for libraries to adopt as a next generation ILS. System requirements are as follows: Linux or Windows, Apache, PHP, YAZ, and MySQL. Learning Access ILS boasts fully implemented OPAC, cataloguing (Original and copy of full MARC 21), and 39.50 client/server and circulation module (Sasikala, 2005).

3.8.9 Gnuteca:

This is also a small project of open source software was first started by three Brazilian programmers in 2001 and has become highly popular among public,

academic, and governmental special libraries in that country. From what can be gathered on its web site. Gnuteca targets “small academic and special libraries”. One of its greatest libraries is that the software itself and the accompanying documentation have not been translated from Brazilian Portuguese for international use. The language barrier made effective testing of this software package difficult, if not impossible in certain areas. The good news is that the number of developer had grown since its release, it is an academic subsidized project, and it contains a CVS repository to encourage contribution from outside programmers. Official releases are made at periodic intervals, but modification in CVS indicates active development. Despite its young age, it has achieved national coverage with full implementation of OPAC, original cataloguing with MARC 21 support, circulation with reserves/booking support and CDS/ISIS conversion. It is assumed that acquisition, serials, interlibrary loans, and report generator module have been implemented since academic libraries have adopted the software in production use. Gnuteca only runs under Linux, Apache, PHP and PostgreSQL. It also runs on a homegrown database component called MIOLO which is only native to the Portuguese open source community. Optional support for GTK-based X-Windows staff client is provided through PHP-GTK, however the primary means of access for patron and staff is through their web browser (Sasikala, 2005).

3.8.10 PhpMyBibli:

In 2002, PhpMyBibli was the most recent open source integrated library management software. Most of the underlying programming has been done by the first programmer with recent developers joining the project to assist in translation efforts such as English and Spanish, giving it international appeal. This kind of cooperation has been facilitated through the use of mailing lists and CVS repository. The project is still in the planning stages and issues frequent without version numbering, however has accomplished a considerable amount of work in areas like OPAC, circulation with reserves support, original cataloguing with UNIMARK support, and serials. USMARC of MARC 21 support is the next logical step if the project heads want to captivate the North America library market. Barcode input is conveniently included as well. It runs under Linux or Windows using any web server, PHP, and MySQL. The standard approach in terms of a flexible SQL-based relational database and web-based staff client model have

potentially put this project on the cutting edge of IT software trends, as well as being in good company with similar approaches undertaken by production/stable projects like Koha and Learning Access ILS. One of the best features of this package is its intuitive, user friendly interface especially module. Unfortunately, some of the assisting popup menus utilize JavaScript which means older browsers need not apply (Sasikala, 2005).

3.8.11 Firefly:

Firefly is the latest effort to redefine the traditional ILS under an open source software process with its target audience being public libraries. There is very little to discuss given that the project is still in the early planning stages. Active participation is encouraged through a mailing list e-mail, online chat via IRC, and CVS repository. Nevertheless it is still documentation or a web site. A white paper is being drafted and the project administrator is seeking some means of funding. The major problem with this project is the software dependencies on which the system will eventually be built: Perl and Python. Although subject to change the developers are not well versed in librarianship practices or ILS fundamentals. Another issue is a lack of willingness to plan before programming which leads to redundancy on the development roadmap later. For instance, the decision to design a proprietary database which stores records as XML files in spite of the known risks associated with multiple concerned with relying on programming languages that reflects their skill base rather than considering more standardized cross-platform means used in other counterpart projects. Positive elements include: internationalization and web-based services that auto-update (Sasikala, 2005).

3.8.12 Evergreen ILS:

The Evergreen ILS developed and maintained by the Georgia Public Library Services for use by the Georgia Library PINES program, a consortium of 252 public libraries. Evergreen ILS is the open-source library automation system designed from scratch for large scale development in very large public library and state-wise consortium environments. The Evergreen ILS use Linux, MySQL, Mozilla and jabber (Kumar, 2005). Evergreen ILS is developed by Equinox Software, Evergreen is a robust, enterprise level ILS solution developed to be capable of supporting the workload of large libraries in a fault-tolerant system. It

too is standards compliant and uses the OPAC interface, and offers many features including flexible administration, work-flow customization, adaptable programming interfaces, and because its open source, cannot be locked away and can benefit from any software (Randhawa, 2013).

3.9 Comparative analysis of open source and free LMS:

The following tables show the information about comparative analysis of open source/ free LMS in terms of their features. Researcher has already determined **three** open source / free softwares to check out their features by comparison. The table consist the information about availability of the function in the module / software, if function is available digit 1 is stated and digit 0 stated for non-availability of the function.

Table No. 3.1: General considerable aspects of LMS:

Sr. No.	General Considered Aspects	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
1.1	System Popularity	1	1	1
1.2	Less hardware & software requirement	1	1	1
1.3	Latest Technology : Frontend & Backend	1	1	1
1.4	Web based system	1	1	1
1.5	Source code freely available	1	1	1
1.6	No Updating /Up gradations & AMC	1	1	1
1.7	Computable for Multi Operating System	1	1	0
1.8	Training Frequency	1	1	1
	Total Points	8	8	7

Observation: The above table number shows general availability of the features along with open source/ free LMS. The table information shows that library management systems like Koha and NewGenLib are scored better.

Table No. 3.2: Additional advanced features in LMS:

Sr. No.	Additional Advanced Features	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
2.1	Access to Bibliographical Database	1	1	1
2.2	Support for Android applications	1	1	0
2.3	System supports: Library standards	1	1	1
2.4	Information about Due Date	1	1	1
2.5	Messaging by SMS	1	1	0
2.6	Messaging by e-mail	1	1	1

Sr. No.	Additional Advanced Features	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
2.7	SMS alert in circulation	1	0	0
2.8	Claim Activation	1	1	1
2.9	Online/ Self Renewing (if there is no claim)	1	1	0
2.10	Circulation details browsing by ID	1	1	1
2.11	OPAC through Intranet	1	1	1
2.12	Web OPAC (Internet)	1	1	1
2.13	Web OPAC on Mobile / Tablet	1	1	0
2.14	Consortium (Central OPAC)	1	0	0
2.15	Web based CAS, SDI	1	1	1
2.16	Bulletin Board Service	0	0	0
2.17	Book Marking	0	0	0
2.18	Tagging	0	0	0
2.19	RSS feed for new Acquisition	0	0	0
2.20	Manage online & offline resources with same	1	0	0
2.21	Customize of the display of home page	1	0	0
2.22	Customization of the Reports	1	0	0
2.23	About Data migration	1	1	1
2.24	Multilingualism support	1	1	1
2.25	Compatible to Bar code technology	1	1	1
2.26	Compatible to RFID technology	1	1	1
2.27	Compatible for Cloud computing	1	0	0
2.28	Customization of various screens/ menus	1	0	0
2.29	User can define keywords for book	1	0	0
2.30	Show cover image of the books	1	1	0
2.31	Virtual display of book sequence	1	0	0
2.32	Able to withdraw Spine labels & Barcode	1	1	1
2.33	Able to withdraw Book card & Book labels	1	1	1
2.34	Link to accompanying material	1	0	0
2.35	LMS + DLS on one platform	0	0	0
2.36	Local trouble-shooting is possible?	1	0	0
2.37	E-mail group of the software users on web	1	1	0
2.38	Ask A Librarian/ Help	0	0	0
2.39	Provided User Manual	1	1	1
Total Points		33	22	16

Observation: The above table shows additional and advance features availability along with open source/ free LMS. The information shows, Koha is scored more than NewGenLib and e-Granthalaya.

Table No. 3.3: Other required facilities from LMS:

Sr. No.	Other Required Facilities	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
3.1	Centralize Budgetary Control	1	0	0

Sr. No.	Other Required Facilities	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
3.2	Centralize Purchase	1	0	0
3.3	Centralize Acquisition (Editing/Entry)	1	0	0
3.4	Centralize Cataloguing / Classification	1	0	0
3.5	Inter Library Loan	1	1	1
3.6	Use of Web catalogue of other libraries	1	1	1
3.7	Use of Web OPAC of other libraries	1	1	1
3.8	Branch Management	1	1	1
3.9	Users Management	1	1	1
3.10	Newspaper Management	1	1	1
3.11	Project report Management	0	1	0
3.12	Information About software	1	1	1
3.13	Feedback	1	1	0
3.14	Integrated search OPAC for Book, Serials,	0	0	0
3.15	Link to Bibliographical details for showing	1	0	0
3.16	LMS : Information Transparency or Right to	0	0	0
3.17	Online Purchasing System :	0	0	0
3.18	Online Committee Suggestion Processing			
	Total Points	13	9	7

Observation: The above table shows other required features availability along with open source/ free LMS. The information shows, Koha is scored more than NewGenLib and e-Granthalaya LMS.

Table No. 3.4: Various Modules in LMS:

Sr. No.	Various Main Modules	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
4.1	Acquisition	1	1	1
4.2	Budget / Purchase Module	1	1	1
4.3	Cataloguing	1	1	1
4.4	Serial controls	1	1	1
4.5	Circulation	1	1	1
4.6	Administration / Authorities	1	1	1
4.7	OPAC	1	1	1
4.8	Reports	1	1	1
	Total Points	8	8	8

Observation: The above table shows availability of various main modules along with open source/ free LMS. The information shows, Koha and NewGenLib scored more compared to e-Granthalaya LMS.

Table No. 3.5 Budget/ Purchase Module of LMS:

Sr. No.	Budget / Purchase Module	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
5.1	Department wise/ subject wise/Year wise Budget	1	1	1
5.2	Processing of the Invoice	1	1	1
5.3	Generating Payment Request to be sent to the Accounts Section	1	1	1
5.4	Updating Payment Request / DD delivery to the Vendors, etc.	1	1	1
	Total Points	4	4	4

Observation: The above table shows availability of budget related features along with open source/ free LMS. The information shows, all the library management systems get equal score.

Table No. 3.6: Acquisition Module of LMS

Sr. No.	Acquisition Module	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
6.1	Duplicating checking	1	1	1
6.2	Generating Acquisition Records from Parching	1	1	1
6.3	Generate Approval list from suggestions, stage file	1	1	1
6.4	Process on Approval list from Venders	1	1	1
6.5	Updating Approval List (selected/Rejected)	1	1	1
6.6	Addition of Order Information	1	1	1
6.7	Quotation Process	0	1	0
6.8	Order placing / cancelling / follow-up, etc.	1	1	1
6.9	Receiving Books / Documents	1	1	1
6.10	Book Entries / Data Entries/ Accessioning	1	1	1
6.11	Data editing	1	1	1
6.12	Approving invoice for payment	1	1	1
6.13	Adding Payment / Billing Information	1	1	1
6.14	Acquisition Reports	1	1	1
	Total Points	13	14	13

Observation: The above table shows availability of acquisition related features along with open source/ free LMS. The information shows, NewGenLib is scored more than Koha and e-Granthalaya. As well as NewGenLib open source software has done very well for acquisition module and then after Koha and e-Granthalaya is also good for acquisition.

Table No. 3.7: Cataloguing Module of LMS

Sr. No.	Cataloguing Module	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
7.1	Duplicate checking	1	1	1
7.2	Record Creation/ Cataloguing New Entry	1	1	1
7.3	Record Editing	1	1	1
7.4	Delete Record	1	1	1
7.5	Authority control	1	1	0
7.6	Copy Catalogue & Z39.50 functionality	1	0	0
7.7	Bibliographic framework – MARC 21 Framework	1	1	0
7.8	Import - Export Data Cataloguing Data	1	0	1
7.9	Union Catalogue	1	1	1
7.10	Cataloging of different items	1	1	1
7.11	Cataloguing Reports	1	1	1
	Total Points	11	9	8

Observation: The above table shows availability of cataloguing related features along with open source/ free LMS. The information shows, Koha has got more score compare to NewGenLib and e- Granthalaya LMS.

Table No. 3.8: Serial Control Module of LMS

Sr. No.	Serial Control Module	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
8.1	Suggestions	1	0	0
8.2	Check Duplicate Title	1	1	1
8.3	Add New Journal	1	1	1
8.4	Subscription Start Details	1	1	1
8.5	Add Acquisition Information	1	1	1
8.6	Generate Approval	1	1	0
8.7	Update Approval	1	1	0
8.8	Add Order Information	1	1	0
8.9	Generate Order form / Ordering	1	1	1
8.10	Subscription maintenance	1	1	1
8.11	Schedule maintenance	1	1	0
8.12	Receive Loose Issues	1	1	1
8.13	Generate Reminder	1	1	1
8.14	Add Billing Information	1	1	1
8.15	Add Payment Information	1	1	1
8.16	Update Journal History	1	1	0
8.17	Payment Processing	1	1	0
8.18	Reminder through email (Non receiving)	1	1	1
8.19	Binding / Bound Volumes	1	1	1
8.20	Import / Export	1	1	1
8.21	Serials Reports	1	1	1
	Total Points	21	20	14

Observation: The above table shows availability of serial control related features along with open source/ free LMS. The information shows, Koha is scored more than NewGenLib and e-Granthalaya LMS.

Table No. 3.9: Circulation Module of LMS

Sr. No.	Circulation Module	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
9.1	Member Details	1	1	1
9.2	Member / User categories	1	1	1
9.3	Setting Preferences	1	1	1
9.4	Issue / Return / Renewal Transactions	1	1	1
9.5	Fines and over dues notices	1	1	1
9.6	Book Reservations	1	1	1
9.7	Users - Renewal of Items Physically	1	1	1
9.8	Users - Renewal of Items: Online	1	1	1
9.9	Over Due Charges	1	1	1
9.10	Inter Library Loans (ILL)	1	1	1
9.11	Facility to Weed Out	1	1	1
9.12	Circulation Statistics / Reports	1	1	1
	Total Points	12	12	12

Observation: The above table shows availability of circulation related features along with open source/ free LMS. The information shows, all the selected library management systems get equal score.

Table No. 3.10: Administration Module of LMS:

Sr. No.	Administration Module	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
10.1	User Rights	1	1	1
10.2	Various Codes Control (Acc. No. Bar Code)	1	1	1
10.3	Update database	1	1	1
10.4	Bulk Updating	1	1	1
10.5	Data Migration	1	1	1
10.6	Stock Verification	1	1	1
10.7	Back Up	1	1	1
10.8	Administrative Reports	1	1	1
	Total Points	8	8	8

Observation: The above table shows availability of administration related features along with open source/ free LMS. The information shows, all the selected library management systems get equal score.

Table No. 3.11: OPAC Module of LMS

Sr.	OPAC Module	Open source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
	Books and Periodicals			
11.1	Easy / Simple Search:	1	1	1
	Title/ Author/Call No./ Accession No./ Subject etc.			
11.2	Advance search:	1	1	1
	Corporate Author / Keyword/ Sub-Subject/ ISBN/ Language/ Publisher/ Book Published in Specific Period/ Specific Country etc.			
11.3	Advance search: Subject Keywords/ ISSN/ Language/ Publisher/ Serial Published in Specific Period/ Issue Date/Specific Country etc.	1	1	1
11.4	Non - Book Material	1	1	0
	Easy / Simple Search: Title/ Organization Name/ Author/Call No./ Standard No./ Patent No./Report No.			
11.5	Advance search: Subject Keywords/ ISSN/ Language/ Publisher/ Serial Published in Specific Period/ Specific Country etc.	1	1	0
11.6	Boolean Search : by using AND/OR/NOT	1	1	1
11.7	Z39.50 search	1	1	0
11.8	Stop word Generation	1	1	1
11.9	Availability of OPAC on Web	1	1	1
11.10	Circulation Status on OPAC	1	1	0
11.11	Reservation through OPAC	1	1	1
11.12	OPAC customization by end-user	1	0	0
11.13	Mobile Compatible OPAC	1	1	0
11.14	Display of Search History	1	1	0
11.15	Save Search Results	1	0	0
11.16	Access to Multimedia materials	1	1	0
11.17	Print OPAC results	1	1	1
11.18	Virtual shelf of books	1	0	0
11.19	End User Book Suggestions	1	0	0
	Total Points	19	15	8

Observation: The above table shows availability of OPAC related features along with open source/ free LMS. The information shows, Koha is scored more than NewGenLib and e-Granthalaya.

Table No. 3.12: Various Types of Reports:

Sr. No.	Types of Reports	Open Source/ Free LMS		
		Koha	NewGenLib	e-Granthalaya
12.1	Member list	1	1	1
12.2	Batch wise Member list	1	0	1
12.3	Acquisition Reports	1	1	1
12.4	Accession Register	1	1	1
12.5	Accession Registers with selected fields	1	0	0
12.6	Book Title list	1	1	1
12.7	Periodical/ Journal Subscription list	1	1	1
12.8	Missing Issue Report	1	1	1
12.9	Circulation Statistics	1	1	1
12.10	Borrower list	1	1	1
12.11	Reservations	1	1	1
12.12	Overdue report of member	1	1	1
12.13	Stack Verification Report	1	1	1
12.14	Email Reminders	1	1	1
12.15	Catalogue cards printing	1	1	1
12.16	No Dues Certificate	1	1	1
12.17	Batch wise No dues Certificate	1	0	0
12.18	Book sent for Binding list	1	1	1
12.19	Customization of Reports	1	0	0
	Total Points	19	15	16

Observation; The above table shows availability of reports related features along with open source/ free LMS. The information shows, Koha is scored more than NewGenLib and e-Granthalaya LMS.

3.10 OSS for developing prototype model of centralized LMS:

Development a prototype model is main aspect of this research so that, it was necessary to study and compare the features of open source library management software with help of literature, to understand which software features are suitable to develop a model for centralized LMS, and understood the following features observed in Koha open source LMS, which are given below,

- Generally we have handled one automatized library with adopting one LMS; Koha open source software facilitates to automatize many libraries with one application software.
- Koha runs on OSS licenses (availability of Source code with Apache)
- It is suitable for Intranet and Internet.
- It is compatible for Linux, Windows and Mac operating system

- It is able to create profile for group of libraries.
- It is able to add libraries participating in integration.
- It is able to create types of material.
- Koha able to create types of patrons.
- Creating attributes for patrons.
- Providing borrowing privileges.
- Able to add circulation rules for respective libraries.
- Able to add patron bulk, import and individuals.
- It has a facility to select MARC frame work and having MARC tags for different types of materials.
- It has a facility to add books and other materials by bulk or individual.
- Creating OPAC for group
- It has a facility to provide search facility by individual library or whole group.
- Having circulation for respective library.
- Marinating systems by saving back-up.
- Adding recurring data of collection and patrons.
- It has a facility to give no-dues for whole passing out batch of students.
- Local trouble shooting possible.

The above situation is prominently available with Koha open source library management system, so researcher has selected Koha LMS to develop centralized library system, which has been further discussed in chapter number Seven.

3.11 Conclusion:

Library automation is the process in which proper planning, timely implementation and evaluation is more important. The librarian who has the good administrator has to set the working tasks and give priorities after analyzing the present situation for the future. The librarian's role is important in the selection of the suitable integrated library management system according to the requirements of the users. Emergence of open source software is a new ray of hope in the field of library automation. It offers many opportunities for government organizations, private sector, and educational institutions. Organizations in developing nations that take advantage of free and open source software by implementing them appropriately stand to gain much, while those that fail to take the advantage of this opportunity may find their Information and

Communication Technology (ICT) development lagging behind comparable organizations.

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