2.1 Introduction:
Reviewing of the literature in the area of research is the preliminary step before attempting to plan the study. A critical review is a means of evaluating and interpreting all available research relevant to a particular research question, topic, area or phenomenon of interests. It contains three phases, planning of review, conducting of reviews and reporting of the reviews. A review of literature gives, in-depth knowledge related to the subject matter which helps to reveal the gaps remained in the available literature and provides direction, guidance and sometimes even different perspectives to look at the particular question. In a nutshell, it serves the purpose of providing a background related to the earlier studies, reports, articles, books etc. It gives a proof that the present study has already taken note of what others have done and written in the concerned area. Therefore, it is necessary to review all kinds of literature related to the subject matter.

In this chapter researcher has reviewed the literature that is available through books, Ph.D. thesis, M. Phil. dissertations, research papers, reports, articles, various websites and other published sources in the field of chosen research problem. This chapter further deals with literature reviews related to history and evolution of library automation, case studies on library automation, case studies related to OSS and comparative studies on OSS and their problems. Researcher has also reviewed thoughts and definitions expressed by various authors towards OSS concept and OSS movement at national and international level and benefits of OSS. In the last point the evaluation of the reviewed literature has been also discussed in this chapter.

2.2 Library Automation:
In 1936, D.S. Harder has used the term “automation” to mean automatic handling of parts between progressive production processes. The word “automation” has
been derived from Greek word “Automose” it means something, which has power of self-movement or spontaneous motion.

**History and Evolution of Library Automation:**

Phadke (2012) states the history and evolution of library automation. Author writes, in 1936 the first efforts were taken for library automation by the University of Texas, in which they used a mechanical system in their circulation function. Then in the year 1940-1949 IBM has introduced computers in circulation function for semi mechanical applications by including edge-notched cards, optical coincidence and Peek-a-boo card system. The library automation first introduced in 1950s in America (USA) but it has really grown in the next decade after reducing prices of computers. In 1950-1959 the period of punched cards has been known for development of data processing equipment’s and micro image searching systems. In which Dr. H.P. Lune has made the first computational index in 1957, at that time the first step of library automation was completed by making computerization of the cataloguing cards and developing their indexes.

Raizada (1965) According to the author, in the Indian scenario the first attempt of library automation can be traced after 1960. The Indian libraries and information centers had made efforts to ‘automate’ their libraries for providing information services with punched card systems. A couple of second generation computers were used at Kanpur and Bombay. In 1964, INSDOC was the leader in experimenting with computers for their application in documentation and informational work. Initially they made use 72 of the IBM 1620 Model- I and that was available at IIT Kanpur. Initially the first attempt was to collect the data for union catalogue of scientific serial.

Haravu & Raizada (1967) Haravu and Raizada carried out an experiment with IBM 1620 in computerized data retrieval, as part of this course in documentation and reprography conducted by INSDOC, with the cooperation of Raizada who initiated computerization in INSDOC. The objective of his experiment was to find out the suitability of IBM 1620 computer for storage and retrieval of data. The program for this experiment was written in FORTRAN 11 D language. The programming done in this experiment may be considered under three heads like
for storage of data, retrieval of data and presenting the data in an intelligible form. The data on the code sheets was key punched and verified.

Murty & Arora (1974) According to the authors, the next experiment carried out at INSDOC. The computerization was on preparing for author and subject indexes to Indian Science Abstracts. In 1969, an attempt was made to develop and complete an integrated program deck (level) to process the union catalogues for Mysore (now Karnataka) using the computer facility at Delhi School of Economics. It is said that the computer system posed certain problems for this data file, though finally the main part with indexes was produced. To overcome the problem of online storage limitations, the INSDOC completely redesigned the work to suit the IBM 360/44 computer at the Delhi University computer center.

Harold (1966) this research paper submitted on “Experimental Studies in Automated Document Classification” (Development Corporation Santa Monica, California) where as he presented his studies in the use of factor analysis a mathematical technique for deriving classification categories for a set of documents. Author writes, in an automated classification, the class membership is determined on the basis of the words contained in the documents and the documents can be ordered into classes on the basis of similarities or differences in vocabulary. He had investigated the applications of factor analysis to these problems of document classification. He concluded that the techniques of automated document classification can be used to organize the specialized document collections.

Pandey & Sharma (1995) in this research paper history of library of automation is given very well. Author writes H.P. Luhn had organized computerized indexes in 1950s. Computers were entered and found some place in American libraries during this decade. However their use and applications was very limited and restricted due to the high cost of hardware and non-availability of application software packages. During 1960s the cost of hardware was reduced (slashed) down and appreciable attempts were made towards development of library application packages. This led to increased use of computers in libraries and printing industries. In April 1960 the American Chemical Society published its
‘Chemical Titles’ through computers. In this direction effort was seen through MARC-I. In the year 1963 W.K. Gilbert prepared a report on computerization of Library of Congress. On the basis of this report of MARC-I project was started in 1966, and the work of bringing out of the Library of Congress Catalog in Machine Readable Catalog (MARC) form was started and completed.

Author writes, The Indian Statistical Institute, Calcutta was first in India who has installed computer systems in 1955 and to develop an indigenous computer in 1964. In India computers were used in library work for the first time possibly by INSDOC when they computerized the author and subject indexes of ‘Indian Science Abstract’ in 1965. Then in 1967 the INSDOC has brought out with the ‘Roster of Indian Scientific and Technical Translators’ with the help of computers. In 1978 INSDOC initiated SDI service as a NISSAT project with Chemical Abstracts and INSPEC data-bases, with the use of CAN/SDI software of IIT, Madras. In 1970s many libraries has attempted (ventured) in preparing computerized databases.

After, getting a financial support of NISSAT, many library networks were initiated and are operative, some of notable (famous) of these networks are CALIBNET (Calcutta Library Network) and DELNET (Delhi Libraries Network), INFLIBNET (Information and Library Network) PUNENET (Pune Library Network) etc. Among other networks notable are NICNET, INDONET, SIRNET etc. Nowadays many institutions such as DRTC, INSDOC, DESIDOC, NISSAT etc. are engaged in imparting training for computer application in library work through regular, sponsored and adhoc courses. The price of computer hardware and software has considerably reduced. Owing to these factors computers have become popular in Indian libraries.

Mahapatra & Chakrabarti (1997) in the book titled, “Redesigning the Library”, authors has discussed about, journey of printed bibliographical database and its conversion towards electronic format. In this book of third chapter authors has also discussed about technological growth in information technology sector and its impact on libraries, in fourth chapter, authors has expressed his views on implementation of library management software.
Haravu (2009) in this research paper entitled “Emerging Initiatives in Library Management Systems” the author has discussed about evolution of library management system, changes occurring in information technology, user expectations and searching behaviors. The evolution of library management system, first generation period was 1950-1960s, and it was stand alone and no standard metadata in use. In 1960-1970s, MARC standard (Machine Access Readable Catalogue) is used for bibliographic records. After the year 1971 to 1990 there was pre internet generation and LAN, WAN, MAN networks are introduced. After the year 1992 - 2000 internet based services were started, in which generally web 1.0 based service was introduced, with the help of this, it is possible to get OPAC on web server. After the year 2000 there was web 2.0 was the platform of choice for software. In the concluding remark author comments on changing technological growth in commercial and open source software by incorporating the ideas and features provided by web technologies for library automation system. Author says, there is no doubt that open source initiatives particularly the community-sourced ones are likely to expand the options for libraries worldwide. Services to libraries will probably be the next big opportunity rather than products.

Case Studies and Other Literature Published on Library Automation:
Faisal & Surendran (2008) this case study report is specially created for Kendriya Vidyalaya named a report on Automation of Library at Kendriya Vidyalaya, Pattom Thiruvananthapuram. In this report, authors has given an account of information about advantages of library automation, steps derived for library automation and draft of plan, to automate the library with “Libsoft” integrated library management system.

Choudhari (2010) in this research paper author is focusing on 21st century what are the challenges to manage the libraries. Author mainly discussed about the area of budget, extensive library services, e-resource management, and impact of IT in library administration. In the concluding remark he suggests, library automation is essential aspect for providing the services to the library users. Author also says libraries are no longer confined within walls of a physical building but are virtual
electronically omnipresent and librarian’s attitude is highly essential towards library automation.

Singh (2003) in this research paper researcher has discussed about library automation and the major role played by various library networks (INFLIBNET) for information dissemination. However author has discussed about the library automation efforts were being made in academic libraries especially in institution of special characters like IITS, IIMS etc.

Trapthi & Prasad (2010) in this book editor has mentioned the current situation in the preface, message about limitations in library budget, open source software movement, the implementation of OSS in e-governances, e-publishing and so on. In preface message editors especially writes that libraries have limited finance for serving the users against the increasing cost of software. The price of hardware is going down day-by-day, user demand for quick service affecting the library budget which appears to be shrinking day-by-day. The open source software technology is open source it is possible to reduce the cost involved in software and hardware and also it is a good technology for librarians for library automation. Lastly author writes, librarians have to keep on scratching their heads to have the cheapest solution with maximum features for library automation with open source software. Editor’s suggested “Koha” is the free and open source software as a automation tool to automate all the activities of a library.

Tiwari (2010) in this book entitled “Library Automation” divided into nine chapters the author has given the definition of library automation in first chapter, author stated, library automation is the application of computers to perform traditional library housekeeping activities such as acquisition, serial control, administration, circulation OPAC and reports. Author says, library automation in India was slow process and got movement in 1980s. New professional library management software packages entered the Indian market and Indian companies have also tried to make it with an Indian flavor. Author also focuses on the impact of library automation can extent the quality of cataloguing information presented to the user choice. Author, directed towards automation can reduce amount of staff and time devoted to repetitive activities that must be done in any properly
functioning library. This book is designed to equip library professionals with basic knowledge about library automation. It also describes library networking, multimedia resources, online cataloguing and bibliographic databases in depth. In the last chapter author has discussed the problems and prospective of emerging library automation system.

Hopkinson (2009) in this research paper, researcher had discussed on last 25 years history regarding library automation and also find out the library automation research trends. For this purpose researcher had focused on developed and developing countries scenario, Nigeria, Thailand and India are taken as case studies. In this, researcher has said that open source software is the solution for realizing the economic problem.

Phadke (2010) this reference book is basically written in Marathi language. This book is divided into three sections; advance library computerization, library automation with advanced information technology and advanced librarianship. Author writes library automations first stage has been coming to an end now and starting a new phase, advance library automation, it contains web 2.0, open source, e-publishing and in advance librarianship contains information literacy. This book has given a lot of information on computer history, need of library automation, benefits of library automation, and information about various types of commercial as well as open source software. On page no. 323 – 334, author has discussed web 2.0 and its services like, RSS fields, Weblogs, Wikis, instant messaging, tagging, social bookmarking, and podcasting. In 16th chapter Page number 336 – 345, author has written on OSS and given information about installation of Koha, NewGenLib, and DSpace. Detailed descriptions about these library automation and OSS are discussed in theoretical background chapter of this thesis.

Bhardwaj & Shukla (2000) this paper entitled a “Practical approach to library automation” author describes the issues like explosion of information and shortage of space, the growth of users, cost hike in printed as well as electronic materials and benefits of resources sharing. Author also discusses the aims, objectives and need for the change of library tools and technique under the changing
environment. In this paper author has discussed the concepts of library automation, library automation areas such as acquisition, database management, classification, cataloguing, circulation, serial control, information retrieval, communication networks, and documentation services etc. The author simplifies the steps of software selection with the comparison in between some leading softwares.

**Methods of Library Automation:**

Phadke (2010) in this reference book author has discussed on three methods of library automation which are, library automation by in-house software, automation by commercial library management software and automation by open source software. In discussion of library automation by using in-house software, author writes, as a solution, the commercial software cost was highly expensive, the organizations used to develop the library systems by their own efforts. It is observed that, the database standards are absolutely ignored by such developers. The developer had concentrated only on basic facilities like issue-return and creation of master databases. But most of the cases, it did not bear fruit, the key reason behind that is mobility of IT expert towards IT industry and changing technology affects the updating of their versions. The gradual reduction in prices of commercial LMS led to replacement of in-house development approach by commercial LMS. In discussion about, library automation using commercial software, author writes, the commercial software 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 the library compared with amount paid for, create headache for the libraries. There are so many commercial software developing in India, at national and local level, AutoLib, EasyLib, SLIM, Librarian, SOUL (Software for University Libraries) Libra 2000, Library manager, LibSuite, Libris, Libex.net, Lybsis, Lalanda, Nexlib, Swirl (software for informational retrieval), Gyanodaya, Biyani Technologies. On the International platform, other options are available to choose commercial software brands i.e. ADLIB library for Windows, Alice Library Automation Software, Book Librarian for Windows (for Schools), CDS/ISIS, Endeavor Voyager (ORACLE RDBMS), EOS Library system (Windows), Keystone Library Automation System, Innovative Interfaces Millennium, Micro Librarian System,
MINISIS, OLIB, Sagebrush Library Automation System, SIRS Mandarin M3, SRIS/ Integrated Library Management System, STAR/ Libraries, Surpass Integrated Library Management system, Tech-Lib, TLC (Integrated Library System), URICA Version, VTLS (Phadke 2010). These LMS are also changing their interface as per driven technology, but they cannot able to successes reducing the cost of library automation. In the discussion of, library automation using open source software, author writes, there are two types of softwares in OSS, one is called ‘free software’ and another is ‘Open Source Software’. The open source softwares are free for downloading along with source code free softwares are not provides source code of the software. (Richard M Stallman).

**Challenges for Library Automation in India:**

Swar & Pandey (2008) this research paper author has discussed the challenges in the higher education system in India. Author says, Indian higher education system is suffering from lack of funds, autonomy, burden of affiliations etc. The real weak point of Indian higher education system is structural, and there is a need for rapid development in technology and communication. After the effect of globalization on education system brought rapid developments in technology and communication, we are foreseeing changes within learning systems across the world as ideas, values and knowledge, changing the roles of students and teachers, and producing a shift in society from industrialization towards an information based society, and researcher has sure that if libraries will made strong, it will be possible to make information based society.

One more case study is sponsored by Red Hat Pvt, Ltd, On Economic Impact of Free and Open Source Software - A Study in India, by Rahul, De (2009). This study is basically focused on cost of operating system, cost of antivirus and other office tools, which is being using for servers and desktops selling in India. Researcher has evaluated their approx. cost consumption of selected ten companies and predicted the market value (up to 2013) of the operating system software industry. According to author, the PCs (computers) sale at different distribution channels across the country have grown exponentially from about 430000 units in 1998 to about 3.6 million units in 2008 and he predicted to be about 5.5 million units in 2010 and about 10.31 million units in 2013 only in India,
and approx. Rs. 3600/- considered for operating system the OS market may be in billions.

Bharti (2010) in this research paper, author has directed towards the challenges along with new developments in IT industry. Author writes, information technology is developing rapidly in various sectors. Library is also affected by the rising cost of technology, reduce in staff, devaluation of rupees against major currencies and budget cut are the major concern. The rising cost of implementations has compelled the libraries to use other options, if available i.e. open source software for library automation.

Altman (2001) One more study is focused that, many commercial library software developers have also ignored data entry support with library standards such as MARC 21, AACR-II, etc. that are available for cataloging and classification”.

Kulkarni & Shewale (2014) it is observed that there are variations in the cataloging and in classification numbers from library to library. In India, many university and college libraries are in the process of creating online public access catalogues (OPACs) after the automation, many software developers ignored the basic principles of classification and cataloging system at the time of library software development resulting in non-standardization of the library management system.

2.3 Open Source Software:

**History and Growth of Open Source Software:**

Many research scholars has studied and stated history and growth of open source software, Krishna (2001) has written the book entitled “Technological Future of Library and Information Science” which is further divided into eleven chapters. Each chapter shows various new aspects derived in library and information science technology, customer care, information education and evaluation are the major aspects discussed. Aim of this book is to bring out the role of new technologies in libraries in present day information environment and their new challenges and promises for library and information sciences. According to author, library sciences have two categories - public and technical. Operations
involving direct contact with the library users are considered as public services and all other operations are considered as technical services. Author says that 60% library staff is assigned to technical work.

Pandey & Verma (2010) in this research paper author has studied the definition given by open source foundation, open source tools like Linux, Apache Web server, Mozilla Web browser. Researcher has keenly focused on brief history of open source software. Researcher has pointed out year wise steps of evolution in the area of open source software. Researcher states, in 1969, there was a creation of UNIX in AT and T Bell Labs and development of ARPANET, first transcontinental high speed computer network was established. In 1973, there is a growth in popularity of UNIX. AT and T was prohibited by law to start any other business than telephone or telegram services. Hence AT and T started licensing UNIX without support. In 1974-1975 user groups were starting to grow wherever UNIX was 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 the Internet. Then 1985 Richard Stallman, a programmer at the MIT AI Lab, starts the free software foundation. The Free Software Foundation (FSF), started in 1985, 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 an anti-commercial response to trends in software world towards proprietary software packages and non-access to source code. He started to design a new operating system called, GNU. New license called General public license (GPL) was developed to allow individuals to incorporate their own rights in “free software”. In 1990 most components of GNU were complete except for Kernel (Kernel, is an innermost layer of the operating system). Then 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. Then 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. Then 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.

According to Coyle (2002) Open Source Software (OSS) has wider scope in software industry. Open source software has been used extensively in various industries for operating system (OS) like Linux, Mobile OS - Andriod, MySQL - database, application programming language- Java, Web scripting language - PHP, Web server - Tomcat etc. Bharti (2010) states that, the trend is moving towards OSS and web 2.0 applications are attracting librarians to use open source software, the areas where libraries can see the implementation of open source softwares are library automation; digital repositories, consortium planning, content management and office management etc. are the areas of automation. According to Coyle (2002) open source technology is used in creation of digital libraries with the help of open source digital library management software like, Greenstone, DSpace and EPrints etc.” On the other hand library management software like Koha, Evergreen, NewGenLib and e-Granthalaya are being used for library automation housekeeping activities. Open source software applications are made available freely from central pools like www.sourceforge.net whereas, the users can download, install, and use these software programs. They can also distribute, evaluate these software programs and provide feedback to the developers.

Randhawa (2013) the research paper entitled, open source library management softwares, which was presented in e-Library Science Research Journal, researcher has discussed on advantages, limitations of open source softwares. Researcher has majorly focused open source softwares like, Koha, Evergreen, ABCD, SENAYEN, BiblioteQ. In the concluding remark of this paper researcher has suggested, library science professionals should always update at accept changing the scenarios in IT sector. Researcher has also focused on worldwide growth in using OSS technology as more economical and effective. Researcher suggested, librarians and programmers should work together in order to implement open source integrated library systems and at the same time, library professional are
also required to acquire new skills for developing and managing the library by using open source LMS. For taking benefit from OSS additional training of advanced technology its education for the professionals is essentially required.

Dangi, Kumar & Verma (2010) this research paper namely “Applications of OSS in development of libraries and information centers” has provided definitions of OSS by different views to reflect a string of ideas in OSS field. According to author, an OSS is typically created and maintained by developers crossing constitutional and national boundaries by collaborations 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 user, modifications are similarly licensed. Quality, not profit, drives OS developers who take personal pride in seeing their working solution adopted. This paper also focuses on ten commandments given by Open Source Initiatives (OSI) that is, free redistribution, source code, derived works, integrity of authors source code, no dissemination against fields of endeavor, distribution of licenses, licenses must not be specific to a producer, license must not restrict other software, and licenses must be technology-neutral. This paper also shows the benefits of OSS. According to authors view, the biggest advantage of OSS is, software can be converted into local languages to provide benefits for local peoples with the source code available. Author also says that, OSS saves time to provide distribute the software. This also brings down the cost of development and the time involved in upgrading the software. As in the concluding remark author writes, due to rising cost of automation of libraries and information centers OSS can be used as alternative to modernize the libraries.

Sudge (2012) this research project is submitted for Ph.D. degree course in Tilak Maharashtra Vidyapeeth, Pune In this research project entitled, “Modernization of libraries attached to the defense training and education institutes in India: A study with reference to services and sources”. Researcher has directed towards the present status in defense training and educational institutes in the light of information technology and its applications. Researcher has suggested a model for
defense education and training libraries for adopting benefits of electronic publications with the help of networking technology.

Tamane (2011) this study entitled “A study of library automation and library management softwares used in Sinhgad Technical Education Society Pune city” submitted for M.Phil. course. This research is basically presented in Marathi language. In this thesis researcher has focused on current situation of library automation in Sinhgad Institutes, Pune, as well as studied used library management software. Researcher has suggested commercial library management softwares are working properly for providing the services, but researcher was not able to focus on their expenditure due to limitations of study.

Gokhale (2008) this study entitled “Analytical study of library softwares used in various management institute libraries in Mumbai city” submitted for M.Phil. In this dissertation researcher has focused on library management softwares used in various Management institutes in Mumbai city Researcher has commercial library management softwares as well as in-house library management software, in the service point of view. In this research, researcher was not able to focus on their expenditure and benefits of LMS, due to limitations of study.

Kemdarne (2012) this study entitled “Study of library automation and networking in dental college libraries affiliated to Rajiv Gandhi University of Health Sciences, Bangalore” submitted for Ph.D. course. In this research researcher has used descriptive research method and survey technique for data collection. Researcher has focused on various library housekeeping operations and also studied various OSS packages and concluded ‘NewGenLib’ open source software is a good option for networking the libraries for reducing the cost of Library automation.

Chavan (2007) this study entitled “The study of open source library management softwares” submitted for M.Phil. course, in this research, researcher has focused on various open source software packages. Researcher has concluded NewGenLib and Koha softwares are good softwares for college libraries and both software fulfill maximum need of college libraries. Yet, NewGenLib software is better than Koha to use in Indian college libraries. Researcher has also given directions to the
future research by expressing the areas like comparative study of open source and proprietary library softwares and the study of proprietary (commercial) library softwares.

**Meaning and Definitions of OSS:**
Sasikala (2005) Open source software can be defined from different point of views to reflect a string of ideas in the field of open source software technology, open source software means:
- Open source software is typically created and maintained by developers crossing institutional and national boundaries, collaborative by using internet-based communication and development tools;
- Products are typically a certain kind of “free”, often through a license that specifies that application and source code (the programming instruction written to create the application) are free to use, modify, and redistribute as long as all users, modifications, and redistribution are similarly licensed;
- Successful application tend to develop more quickly and with better responsiveness to the needs of users who can readily use and evaluate open source application because they are free;
- Quality, not profit, drives open source developers who take personal pride in seeing their working solutions adopted.

Free Software Foundation (1986) published a definition for free software by Richard Stallman, who was 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 Open Source Initiative (OSI) 1998, open source software by giving ten characteristics description for software product considered as OSS which are, free redistribution, source code, derived works, integrity of the author’s source code, no discrimination against persons or groups, no discrimination against field
of endeavor, distribution of license, license must not be specific to a product, license must not restrict other software and license must be a technology (neutral).

Main Aspects of Open Source Software:
Altenhonner & Bibliothek (2005) this research paper has discussed the main aspects of open source software which are given below,

- Free re-distribution
- Accessibility of the quell code
- Changeability of the code and reuse in new software
- Inviolability of the original code
- No discrimination of certain persons or groups
- No restrictions for certain areas of usage (especially restrictions to commercial sectors)
- Distribution of the license, (no distribution with new rules!)
- License must not be valid for a certain product (e.g., as part of a software distribution)
- License must not compromise other software (that, e.g., is also included at the same data storage; disclosure agreements)

Need of Open Source Softwares (OSS):
Kumar (2005) in this research paper researcher has described the need of open source software, through expressing his views on OSS. The computer technology is changing rapidly and the problems and challenges are being created in library system. The Price of commercial library management softwares is very high and financially weak libraries cannot invest large amounts for library automation. Annual Maintenances Charges (AMC) is required for software updating and maintenance. Library community is largely made by not-for-profit, publicly funded agencies. The principles and practices of open source software are very similar to the principles and practices of modern librarianship. Both value free and equal access to data, information, and knowledge. On the other hand it is no doubt for adoption of OSS may lessen the time and manpower engaged in the library operation, so that the alternative is open sources software. Open source library
management softwares consist of the entire essential functional module which was available with proprietary or commercial softwares.

**Advantages & Limitations of OSS:**

Kumar (2005) in this research paper researcher has described the advantages of the OSS, through expressing his views regarding OSS. The open source software is free, more reliable, more secure, boasts faster development cycles, and better than commercial software in the area of features, performance and cost. The budget cuts, increased demand for services, lack of adequate staffing are creating hurdles to the librarians.

Randhawa (2013) in this research paper titled, open source library management softwares, author has expressed some limitations regarding OSS. According to Randhawa, at the time of upgradation of open source software, library needs support, for that library has to hire some experts help or make to arrangement with some big company.

**Comparative Studies of Commercial Software and OSS:**

Singh & Barik (2010) in this research paper authors has focused on open source software concept with some definitions, given by free software foundation (FSF) and Open Source Initiative (OSI). Author has discussed benefits of open source software, difference between open source software and commercial software, future of open source software. Author has also focused on some library automation software packages like, Koha, NewGenLib, Evergreen, PMB, Athenaeum Light, Avanti, Firefly, Java Book cataloguing system, ITIL Library management system, My Librarian, My Library, OpenBiblio, Open Book Open Source Library System, Open-LIS, PhpMyLibrary, Sean Soft Library Loan Management System. In the concluding remark author says, though open source concept is of one or two decades origin, it has taken a special place in the field of library automation. Most of the small and financially weak libraries are taking steps to accommodate this software. He also says, like commercial software it is most users friendly and flexible.
Mulla (2012) in this research paper, researcher has done survey in Mysore city, to find out current status of library automation. In that researcher has finds, there are more than 30 academic and research libraries. Researcher stated that, out of 23 libraries, only 17 libraries have computers and out of 17 libraries only 14 libraries have automated their library operations. In this study the investigators have touched various aspects related to library automation. The libraries that have not automated have given reasons for the delay to start automation work. Many libraries have network connections for sharing the information. The libraries operate with MYLIBNET, DELNET and INFLIBNET networking programmes.

Farzana & Khalid (2007) this research paper reviewed the current status of software used in the libraries of Lahore, to explore the satisfaction level of the software users, and to find out their problems and suggestions. To fulfill the research objectives, researcher has used survey technique. Researcher has conducted survey of automated libraries in Lahore for comparing academic (university, college, and school libraries), public and special libraries. Researcher has collected opinions from the whole population and collected data was analyzed quantitatively and qualitatively, and conclusions were drawn along with some recommendations. This research is limited to the automated libraries of Lahore and focuses on the comparison of software and determining librarian’s opinions. The comparative analysis of softwares is helpful for foreign and local vendors of library software. It will also provide guidelines for libraries in developing countries, which are planning to automate their library services, helpful in selecting and maintaining software and choosing the most suitable library automation software to fulfill their library needs.

Kushwah, Gautamand & Singh (2008) this research paper describes about the comparisons of library management softwares on the basis of discussions with the library community regarding software used in India. It also includes the information available in related literature. Features of library automation software, which are mostly in practice by libraries i.e. Libsys and SOUL, are compared with open source system KOHA. For this purpose researcher has done survey of 57 various types of libraries as a sample. While surveying libraries, we had a discussion with library managers where they expressed problems, in using,
Libsys, SOUL and other library management systems. These problems can be summarized as, high cost, new version or new feature, additions are charged heavily. 10% to 20% cost of total price is charged as a maintenance cost especially by commercial vendors, some software have not introduced any new addition after its first version is released.

Singh & Deka (2008) this research paper mainly focused on, the different open source software. In this paper researcher has discussed the problems of library automation in Assam in terms of economic, trained manpower, negative attitude of authorities and most cases the library professionals are not conversant (familiar) with the library automation environment. In this paper researcher had predicted, in the near future libraries may think to adopt open source software. According to researcher open source software has a very good prospect for automation of libraries and information centers in Assam, in economic and service point of view.

Hasan (2009) in this research paper researcher has tried to find out the list of open source software, its characteristics, its benefits, drawbacks and future challenges. This paper also gives an introduction of the OSS concept, describes the open source software and explains the meaning and definition of the term open source software. It also explains some important issues with reference to the explanation of the open source software. Researcher has also focused on some reasons, in use of OSS and its need to the library in current scenario.

Vasupongayya & Keawneam (2011) this research paper, researcher has focuses on various OSS by reviewing 15 open source library management system packages which are useful for library automation along with open source digital library software. The review focuses on the abilities to perform four basic components which are traditional services, interlibrary loan management, managing electronic materials and basic common management system such as security. In addition this, environment, basic requirement and supporting aspects of each open source package are also mentioned in detail.
Don (2011) this research paper aims to examine the adoption of the open source library management system, Koha, amongst Australian special libraries. This paper shows several Australian health libraries and special libraries have decided to join the Koha community. Author suggests, although libraries are adopting open source technology, they aware that open source is free and reduction in costs and time. Koha software is highly and continued adoption and development of open source library systems in Australia appears certain. Most Australian Koha installations have occurred in the last 3 years and few libraries have long-term experience with open source products. As the number of open source system users increases, there will be increased pressure on support companies and developers for further enhancements of open source software. These developments will need to be managed efficiently and effectively to maintain the currently very high client satisfaction levels. Koha can be strongly recommended as an open source system worthy of consideration by librarians seeking a low cost web-based alternative to conventional library systems.

Egunjobi & Awoyemi (2012) the purpose of this paper is to make a strong case for the adoption of open source software in various libraries and information centers. Researcher had find out there are several challenges and problems/constrains in the development of library automation system with open source software in Nigeria, i.e. poor information and communication technology (ICT) infrastructure, poor funding, and poor ICT skills among library staff, as well as choosing appropriate software solutions. This paper discusses, Adeyemi College of education library automation processes using the Koha library management software. It highlights the strategy adopted, major automation areas, and various factors to be considered by librarians when developing automation processes for their libraries. This paper also shows that, automation can improve the libraries relevance to the academic community. It further reveals that, library staff enjoy working in an automated environment and the patrons enjoy services rendered using an OPAC instead of a card catalogue. The introduction of open source software such as Koha is therefore a positive revolution in libraries in Nigeria and other countries.
Reddy (2013) this research paper, researcher has mainly focused on the study of Free/Open source integrated LMS like, Koha, NewGenLib and e-Granthalaya. A thorough analysis of all these three LMS has been done and listed the features available in all the three softwares, in findings, researcher stated that, Koha and NewGenLib has more advanced and varied features than e-Granthalaya. According to the author, overall NewGenLib has more enhanced features which are significant for library automation and it can be selected as ILMS and e-Granthalaya has simple interface with less options and easy to use and install.

Singh (2012) this study is funded by “Institute of Museum and Library Services” (IMLS). In the abstract of this study, it is clear that, this study is related to comparison of open source softwares, Koha and Evergreen integrated library systems (ILS) to improve and understanding the OSS and getting the information about technical support from the community. In this study researcher has focused on benefits of open source products to gain the benefits related to customization, flexibility, the lack of vendor lock-in.

Brave & Dahibhate (2012) this research paper has discussed about an information account on different types of OSS and their updating date. Authors has also discussed about OSS benefits and drawbacks. In this paper researcher has mainly focused on D-Space, E-prints (Digital library management software), Drupal (Web site Designing software), Koha (Library management software), Zotero (Citation Management Software) etc. Researcher says that, out of these softwares KOHA has been installed widely across the world. This paper has also expressed that; many commercial library software developers have ignored data entry support with library standards (such as MARC 21-21, AACR-II, etc.) The Researchers have also put the future of next generation catalogue that, these catalogues will display images / covers of book, CD, audio/video files, table of contents, summaries, reviews, relevance ranking, Faceted search, spell checking, Amazon like contents, RSS feeds (which deliver new acquisitions of books and search updates) also readers can be able to write reviews /comments about a book, initiate, discussions about a book, ratings and tag clouds, create reading lists and share with others through a more versatile web OPAC interfaces, mobile / e-mail notices of overdue/return/reserved, books as well as access to library web OPAC,
Users may be interested in knowing what their neighbors are reading, listening and watching, user ratings bookmark and share. In the concluding remarks the researcher has written OSS is useful for saving time, money, and resources. Now libraries have been completely dependent on providing new services to its users based on computer applications.

Tripathi & Prasad (2010) In this book editors have collected twenty two selected research papers and case studies presented in the national level seminar on OSS library solutions held by department of LIS, Banaras Hindu University, Varanasi. These papers contain introduction of OSS, applications of OSS, e-resources knowledge management, future of open sources library solutions etc. In this book foreword message is written by A.R.D. Prasad, he writes OSS has come up to liberate library community. Librarians can implement OSS in the areas of library management system, digital libraries, e-publishing consortium management system. On page no. xiv is suggests that librarians have to keep on scratching their heads to have the cheapest solution with maximum features for library automation. Koha is free and OSS (FOSS) automation tool to automate all activities of library. He also observed that many of the librarians hesitate to work with the OSS. They find it difficult to adopt OSS model with a fear of handling such systems. Apart from this many library professionals find they are uncomfortable with new technology and want someone else to handle on their behalf. This dependency creates monopoly in favors of vendors and often leads to kind of blackmail situation for library system customers.

Kumar (2005) in this research paper author has discussed on free and open source softwares. Author has also compared Koha, PhyMyLibrary and OpenBiblio library management system in terms of facilities.

2.4 Library Services and Facilities Using Various LMS:
Thorave (2012) this study entitled “Implications of Web 2.0 for library and information centers: a new dimensions towards building advanced academic libraries” submitted for M.Phil. course. This research project is divided into six chapters; the main focus is on web 2.0 and its applications in library. Researcher suggests that, web 2.0 might be useful to LIS professionals for dissemination of
information and also to provide advanced services. Web 2.0 is all about user participation, it follows users need at central stage, model thought participation, open applications and services. The term “Open” in this context has two meanings, i.e. Open Architecture, and Open Standard. Researcher has also discussed the tools related to web 2.0 technologies, i.e. Flicker, or cut, Face book, YouTube, Blogs, Wikis, RSS feeds, Podcasts, Scribed, weblogs, Instant Messaging, Tagging, Social Book marking etc.

Kumar (2005) in this research paper, author has discussed the open source software features, which are under open license i.e. General Public License (GPL). They are compatible with Linux, Windows and Mac Operating system, Web interface, MARC support, Z39.50 standard, Barcode input and generator, Entire software is customizable, Active development status and worldwide user community, Multi-language support.

**Installation of OSS: Koha**

Shewale & Barve (2011) in this research paper titled, Lib live CD for Novice Users; researcher has provided information regarding Koha installation with the help of live CD along with hardware requirements and software requirements for installing the Koha system.

Omeluzor & Others (2012) in this research paper titled, Implementation of Koha Integrated Library Management Software (ILMS): The Babcock University Experience. Researcher has shared his experience about installation of Koha. In concluding remark researcher has expressed that, this work was based on facts and experiences gathered before and during the implementation period. It elaborates the basics and suggests steps toward successful implementation of ILS.

**Data Migration Case Study:**

Matoria & Upadhyay (2005) in this research paper researcher has described his experience about data migration. The purpose of this study is to share the experience gained during the migration of library data from one LMS to another LMS. Researcher has expressed his experience regarding MINISIS, CDS/ISIS, TECHLIB PLUS etc. to switchover to e-Granthalaya OSS. According to him, step
by step approach is useful to migrate the data from one system to another will be gives successful result.

2.5 Centralized Library Management System (CLMS) Using OSS:
The growth and development in information technology along with hardware and software results to get more facilities from the software programmes and these programmes can be runs with the help of new advanced technological tools on the web. Normally we are using one commercial software programme (One License copy) for one library. The development in software, hardware and technology; it is possible to run one software programme for multi locational libraries. The centralized library system using OSS can be runs on more platforms of operating systems. It can be used to reduce duplication of work for similar category libraries with more facilities along with library database standards. It can be use resources of other group libraries for inter library loan. It may be helping to reduce the capital cost of the library automation. This type of experiment can get a control on budgetary and administrative work for getting more transference in the library automation era. This type of experiment is doing in Symbiosis international University, Pune (Maharashtra). Pillai Institute of Technology, Panvel (Mumbai, Maharashtra) is one more example of using multi locational LMS for their institutes. Both the institutes are using one open source library management system for multi locational libraries.

2.6 Evaluation of Reviewed Literature:
The various studies have been carried out by the experts, researchers, and academicians in the field of library automation. There are a number of research articles; project reports as well as thesis submitted for Ph.D. and M.Phil degree level in the area of open source software and library automation. There is also availability of comparative studies of commercial library software packages vs. OSS. Most of the Ph.D. scholars have conducted the comparative study of commercial library software packages. But till now, nobody has checked the practical aspects for implementing open source software for centralized library management system by doing feasibility of proposed model by developing prototype LMS using open source software in this institute.
On the basis of above discussed literature disclose the broad conclusion as a review of literature helps the researcher to determine the precise subject area. It helps to understand the importance, background and the present situation related to the subject selected for the research. So the investigation presents the first attempt and it would be an original and significant contribution to the literature on the concerned subject. It is revealed through review literature that the area of present study is unexplored and no study as on same to this topic has been done.

References:


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39. Ibid.


