T.K. Gireesh Kumar
Shivarama Rao K

# Digital Spaces and Opting Open Source Software: Issues and Challenges for Indian Libraries

**Abstract**

The growth and development of software domain has been changed dramatically over the past two decades. The working environment of libraries turn more collaborative and service oriented. There has been unimaginable largeness in knowledge and information and the documents in which it is recorded hence inducing their management more complex and composite over the years. Library professionals need to be molded accordingly to tackle the new technological challenges to manage the ever-growing information industry. Library automation is one such area where the application of rapidly evolving technologies are being implemented and practiced to better handle the resources and to serve their users. Selection and use of suitable library automation tools are one of the crucial steps to be focused by the library professionals, which sometimes demand the confluence of librarian and IT experts. The study examines the perceptions of library professionals towards some of the major aspects in adopting integrated library systems available both in proprietary as well as open source streams. A survey among selected library professionals in India using any of the automation software was carried out to collect the primary data. The final analysis shows that Open Source Integrated Library Systems (OSILS) are more suitable for long term use as they are being featured with a strong research and development support and developed over many years in a collaborative manner supplement

with frequent updates, hence can have more advanced and updated features for long term sustainability.

## Introduction

The term 'open source' was coined in the late 1990s because of a bigger need to share free software with various individuals to drive wider innovation and structure[1]. The revolution in open source in sync with information technology has forced libraries and information centers to adopt technologies in library automation, digital libraries, content management system, journal publishing, information management, social media management and management of digital resources. Library automation is one of the sensible aspects of any type of library and it considerably improves the speed, quality, effectiveness of functions and services and helps to manage physical, electronic and digital resources of a library.The process of library automation using an Integrated Library System (ILS) is growing in a rapidly increasing rate and getting much attention in Indian libraries for the last few years. To manage different kinds of information and resources and to deal with the local requirements, libraries require sophisticated, highly qualitative and customizable ILS. Further, it is necessary for the libraries to adopt an ILS, which consists of basic modules like acquisition, cataloguing, circulation, OPAC, administration, serials control etc., for its effectiveness and accuracy. Selection and implementation of an ILS to computerize and manage its housekeeping operations and to provide effective service is a challenge that lies on the shoulders of librarians.

There are many ILS available in the software industry to manage the housekeeping operations and information retrieval in a library and are either labeled as open source/free or commercial. Among them available, Koha, LibSys, SOUL, SLIM, NewGenLib, AutoLib, EasyLib and e-Granthalaya are the most popular packages used by Indian libraries. The importance of OSILS for library automation is being realized and its adoption and use have changed the landscape of library automation.Some libraries have directly adopted and some are migrated to OSILS from their legacy commercial ILS. Indian libraries are also adopting OSILS for their libraries being realized of its enormous advantages in handling resources and introducing innovative services with minimal cost. Cost effectiveness of OSILS is said to be one of the main reasons for adoption. Many of the libraries using commercial ILS experienced dissatisfaction with their legacy proprietary system due to poor support from the vendors, expensive maintenance and updation charges, customization inefficiency, and

inflexibility. There are many initiatives and efforts from organizations, associations, stakeholders and Government to promote and encourage libraries to adopt OSILS. It has been observed that state governments also support and made it mandatory to adopt OSILS in libraries in their respective states as a policy measures.

## Significance of the Study

At present, there are more than seventy software solutions are named to be Integrated Library System (ILS) used in Indian libraries. But many of such solutions are highly priced packages. In commercial ILS packages the source code of the software remains with the developer and they differ in the development and distribution environment in comparison with open source. Unlike open source, commercial ILS are finished products and distributed without much changes over time and will be static in regard to those who have once purchased it and there is no control over the evaluation process. Commercial software requires license, which demands cost and reduces the freedom. Nevertheless, the survey found that most of the earlier installations of ILS are proprietary ILS packages and some of them like LibSys have achieved wide popularity. Now numerous OSS packages for ILS have become available from national and international organizations. OSS movement has now evolved into a sophisticated movement that has given us some of the more stable and widely used open software packages for ILS ever produced.OSS is community-driven and its development is collaborative. They have an enhanced participation of user community in development and they can be downloaded without cost. Libraries are using open source applications for various information-handling activities such as Digital Library, Institutional Repository, Integrated Library Systems, Content Management, and E-Learning etc.

## Literature Review

The OSS is gaining immense importance in libraries especially as an ILS for library automation representing a cost effective solution. According to Wallis and Kroski, since no library software applications are perfect, libraries might benefit from leveraging some of the OSS tools that are becoming more available, more common with a growing user community [2]. For libraries from developing countries where the budgetary restrictions hinder providing quality information services, OSILS is an apt choice. The factors associated with the successful adoption of free/open source applications include the match with an organization's culture, technical infrastructure, staff

skills, software functionality, and the extent of community support available [3]. When we observe the Indian libraries, we can see that even after the emergence of numerous OSILS, most are remaining un-automated due to lack of funds and among those automated majority continue with their expensive commercial software which are costly for purchase and installation as well as for maintenance of legacy data. A survey of engineering college libraries in Karnataka observed that 13.73% of the libraries were not automated for reasons, which varied from library to library such as lack of computer facility, financial problems, lack of trained manpower and inadequate library collection [4]. Many libraries could not identify an OSILS suitable for them and are still comparing the features and functionalities of different OSILS to reach a conclusion. Some libraries are still waiting for the result of using OSILS by other organizations. Keeping in view the advantages of OSILS, careful planning can help the professionals to successfully accomplish the adoption of right OSILS in their library.The better choice depends on the needs and requirements of the organization [5]. In both the commercial and OSILS arenas concrete steps are being taken to develop next-generation library systems that will manage all library resources [6]. LIS professionals should be able to choose appropriate technology depending upon their needs and acquire new skills for developing and managing the libraries using OSILS [7].

Considering the economic realities of libraries in India, library professionals need to consider technologies, which reduce the cost associated with the software and technologies to manage and retrieve the information resources and services. Free and open source software and systems and cloud-based initiatives can provide innovative approaches librarians should consider [8]. Implementation or adoption of OSILS requires a systematic approach. Selection of suitable software according to the specifications and requirements of the library is more important in the initial stage. Community participation and their activity in its development needs to be thoroughly checked before choosing an OSILS so that the implementation of updates, new features and the sustainability of the software can be guaranteed. Installation and customization according to the needs of library as well as users are the other processes to be considered seriously. Training and updating the staff with the software also needs to be considered. Updating and maintaining the system are the most essential factors to be considered when selecting an OSILS. According to Singh, to successfully migrate to OSILS, librarians must learn how to work with new technologies, how to evaluate projects,

how critical pieces of software fit together, and what key functions of their library systems are to be attended by it [9]. According to Hanumappa et al., in addition to cost advantage, collaborative development and sharing and freedom from vendor-lock in are some of the major advantages of OSS implementation as far as Indian libraries are concerned. Among the concerns, professional support and documentation and training need to be taken into account while implementing OSS solutions in India [10]. As OSILS requires strong technical knowledge to maintain the server and the systems, support of technical expertise is required for successful implementation and management. OSILS can enhance access to information and knowledge, enable collaborative research, as well as innovations and communication at inter and intra institution levels and shall also enable to meet the demands of the present and future generations for barrier-free information services.

There are several OSILS systems available, which are of domestic and foreign origin. Popularity of OSILS for libraries in India is growing day by day and majority of the libraries in the country are considering it as an alternative to expensive commercial ILS. In case of proprietary ILS, though they provide excellent technical support, library does not have any control over the data, software and the direction of its development. Each time library needs to pay for adding new features or for modifying the existing provisions or any customization according to their local changing requirements. However a country like India, with diverse languages, has numerous issues and concerns in adopting OSS than those countries having a single language or using one of the international languages. It is not easy to adopt suitable software, which supports and accommodates all the requirements of a particular library. Moreover, the wish list and technical criteria of one library may be different from the other. Selecting the right software for an organization or institution such as the library could be a challenging task considering the fact that organizations adopt these technologies with the aim of - increasing their productivity, addressing operational challenges, increasing their level of competitiveness and reducing their cost of operation [11]. Library professionals are concerned and confused about the selection of suitable software keeping in view their limited budget, inflation, rising cost of electronic resources etc.

## Objectives of the Study

The primary objective of this study is to examine how the OSILS are presently being used in Indian libraries and discusses the possibilities

of choosing particular software, which is suitable for all kind of libraries with provision for in-house customization. The specific objectives are:

1. To study the major benefits and advantages of Open Source Integrated Library System (OSILS) as an alternative solution to proprietary software.

2. Identify the shortfalls in the areas of acquisitions, serials and other limited functionality of the OSILS.

3. Application profiles and development characteristics of open source software for integrated library system

## Methodology

Survey method is used to conduct the response. There were 133 responses received from professional who have directly adopted or migrated to OSILS. As part of the survey, the perceptions of LIS professionals towards the adoption of OSILS have been identified among the selected libraries. The major findings of the study are listed below.

## Findings and Recommendations

Based on the positive responses received from the respondents on OSILS, the facts identified can be summarized as follows:

**Spatial Reach of OSILS:** The Survey categorized the regions of India were ILS is used for automating their libraries. The survey conducted for the study revealed that rate of adoption of ILS either in commercial or in open source stream is significantly low in most of the North East States of India. In the case of most of the East Indian and North Indian states, the rate of adoption of any ILS is intermediate. However, the States of West India and South India have well recognized the importance of automation through ILS and adopted these packages.

**Category of Libraries:** The study found that ILS is being adopted by all types of libraries; however the types of libraries like school, public, non- profit institute and corporate libraries have given only little emphasis on adoption of ILSs. Larger libraries like university, college and special or research libraries are quickly and efficiently adopting technological changes in their libraries.

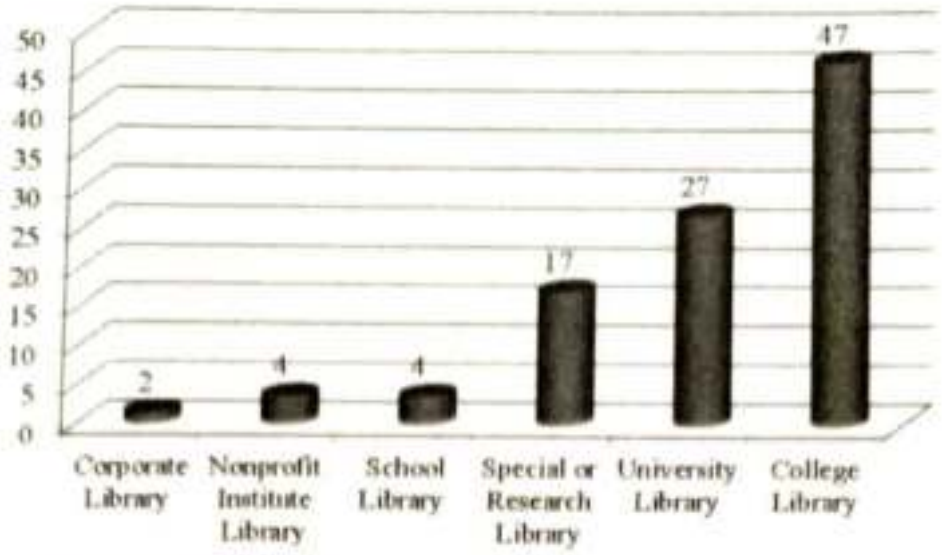


Figure 1. Type of Library

**Age Group and Gender Differences of Users:** Responses to the survey shows that large numbers of respondent are in the age group of 31-40 years. It revealed that young professionals with more awareness of current technologies are more involved in ILSs and are keen to adopt futuristic technologies. Survey also revealed that they are shouldering the responsibility of using ILS in their libraries. Out of the total respondents investigated, overwhelming majority of the respondents were found to be males. Data collected revealed that there was a gender difference between male and female respondents in the awareness and use of ILS. So it is to be assumed that male professionals are more inclined to technological innovations. Female professionals needs to be encouraged and trained to use ILS.

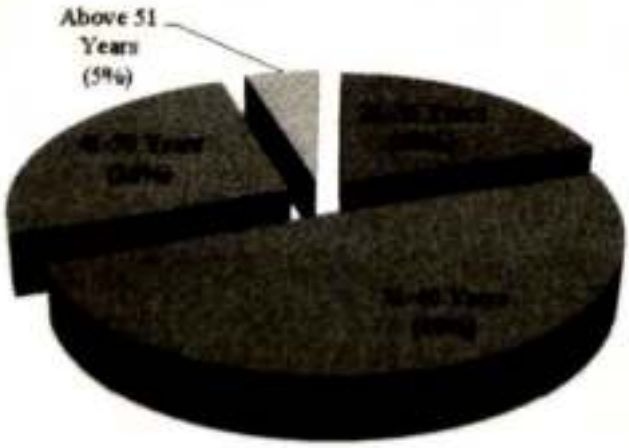


Figure 2. Respondents Age Group

**Positive Changes:** Libraries use commercial/proprietary, free/ open, in-house/individual developed software for automation.

The adoption rate of commercial/proprietary ILS is more than double when compared with open source ILS. The rate of adoption of software on open source, in-house and developed by others categories are found to be limited in Indian libraries. There is a drastic uplift in the rate of adoption of open source ILS also during the last decade among Indian libraries. One of the positive trends identified by the study is that one third of the total respondents of commercial ILS plans to migrate to OSILS because of features of OSILS like cost effectiveness, flexibility, control over the data and software, features supporting ease of use and capability for customization to local needs, technical/community support, freedom to develop it further, shrinking budget / pressure from the management, demand from users, etc. It is found from the analysis that most of the libraries in India are switching over to OSILS. It is a strong evidence of the capability of library professional to assess ILS and their continued interest in technology and Open Source. The survey also revealed that a majority of OSILS users expressed their interest to stick with the OSILS being used which shows that once the advantages and functionalities are realized, then the chance of switching over from OSILS to commercial ILS is very low.

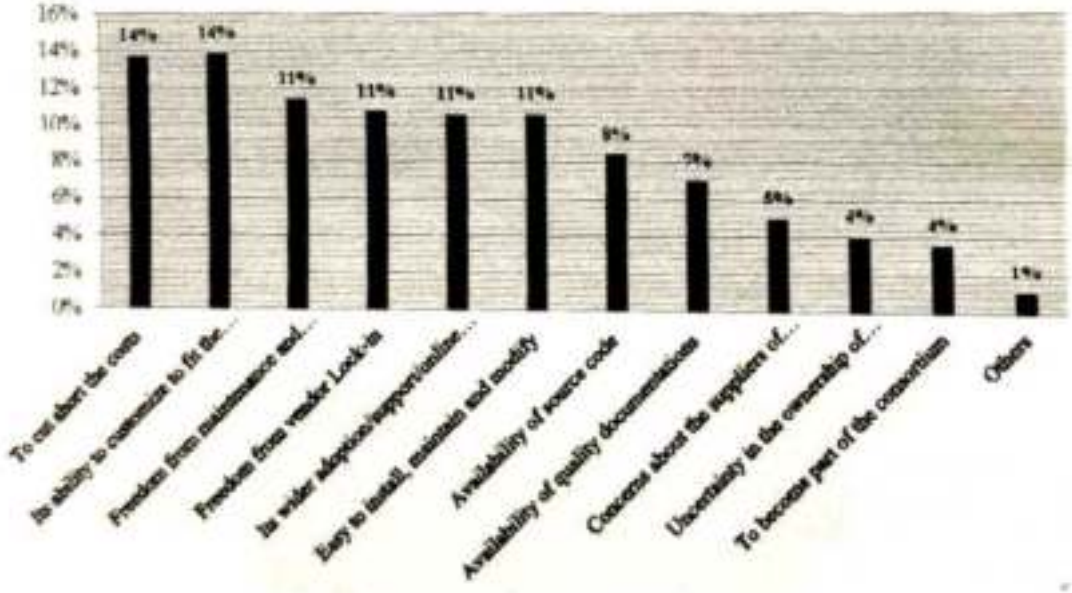


Figure 4. Factors for Adopting OSILS

**Cost Factors:** It is identified from the response received that, the OSILS provides significant economical and technological benefits. OSILS has created a promising atmosphere for libraries to compete with the unaffordable

financial commitments in purchase, license and up-gradation fee of commercial software. Libraries that adopt OSILS can make use of the software after customizing it according to their requirement. The survey revealed that majority of the respondents were aware of the cost effectiveness of OSILS and many of them were exploiting it.

**Size/Collection and Software:** OSILS are flexible and adaptable for all types of libraries with small or large collections. The data collected revealed that libraries ranging from low to high collections have adopted an ILS for the functions and services and majority of the libraries have a collection of less than fifty thousand. However, the size of the collection of the library does not have any impact on adopting an ILS.

**User's Satisfaction with Functional Modules:** It was also found that Libsys is the most used commercial software and Koha is the most used OSILS in Indian libraries. It is observed from the study that majority of users of commercial ILS were satisfied with features and functionalities meant for installation, maintenance, backups, customizations and integrations, database maintenance, documentation, housekeeping operations, installation, maintenance, managing print resources, report generation, responses of the users and vendor support etc. However, it is found that improvements in the efficiency of such ILS to handle technical and community support, availability of documentation, upgrades and enhancements, design and coordination of statistical reports and managing print and electronic resources. In the case of OSILS, OPAC and circulation are the modules found to be more efficient by the users. Serials Management and Acquisition are the two modules, which require extensive customization in most of the OSILS packages. It is also found that the design of the MIS Report module of the OSILS is commonly not streamlined as it could be. Majority also opined that OSILS gives more control over data and software. Many respondents opined that Koha necessitates better options to deal with different aspects of print and electronic contents. Even though not equal to OSILS the circulation, OPAC and cataloguing modules of commercial ILS seems to be more efficient than the other modules as the respondents are highly satisfied with these modules compared to other modules.

**Facility to Customize**: The characteristics of OSILS to fit to the needs of the library is an important reason for its adoption by most users. Surprisingly, the wider adoption/support/ online community of OSILS and the availability of source code in OSILS along with ease in installing, maintaining and modifying the software have also attracted many libraries to shift to OSILS. Freedom from vendor lock and availability of source code along with quality of documentation drove some libraries to adopt OSILS

**Human Resource:** The decision on the right software determines the success of library automation. The responses to the survey revealed that the process of selection and implementation of software requires the confluence of librarian and IT experts. Library Advisory Committee, which is a team of librarian, head of the institution and IT experts also should closely involve in selection and implementation. Study found that majority of the libraries did not have minimum number of qualified professionals to perform ICT based activities and services. Further, lack of sufficient number of semi professionals and supporting staff hinder the activities associated with the technological advancements. Analysis also showed that staff with certain amount of technical expertise within the library can routinely provide support and perform implementation and basic maintenance of the library software. It was also found that OSILS enhances the technical and technological expertise of library professionals and develops new skills.

**Training:** It is found from the study that training on OSILS undergone by the library professionals in India is encouraging and further they took efforts to organize programs like workshops, training programs, lectures etc., to enhance awareness among the professionals thereby empowering them to become self-sufficient to adopt OSILS instead of always relying on commercial vendors for installation and implementation. Most of the respondents in the opinion that professionals and professional associations need to help the individual libraries for installation, migration, customization, maintenance etc., free or by charging nominal fee. Library fraternity should be involved in conducting training programs and workshop. Library professionals needs to be given more opportunity to attend free awareness and training programs on OSILS

**Documentation**: Documentation available for many OSILS is found to be insufficient. Most of the respondents suggested that the quality of documentations available on OSILS are poor and needs to be developed. Respondents are opined that high quality documentation on OSILS should be available in the public domain and the documentation must be prepared by a team of software experts as well as the library professionals. Documentation is one of the major issues associated with the adoption of OSILS and availability of poor quality documentation discourages the OSILS as option of choice and simplified documentation is required for customization and data migration.

**Hindrances for OSILS Adoption:** OSILS facilitates free customization and that can be performed to fulfill the local requirements of the library, which cannot be done with commercial/ proprietary software. Difficulties in maintenance, lack of support from vendors and community, lack of in-house technical expertise, complex installation procedures, lack of reliability, lack of motivation from the management and organizational policies etc., are the issues found to be hindering the adoption of OSILS. Managerial issues such as knowledge in open source technology at the decision-making level, IT infrastructure, adequate library collection, in-house technical expertise, motivation from the management and organization, experience and training, sufficient work force etc., are also major concerns in adopting OSILS. Majority of the respondents expressed lack of sufficient technical knowledge to install and maintain the OSILS. Lack of promotional activities is another reason why respondents were hesitant to adopt OSILS. Competencies in implementing, maintaining and servicing OSS and OSILS are to be acquired by LIS professionals.

**Curriculum:** One of the important suggestions evolved from the responses received from the respondents and subject experts is that OSILS should form as part of the academic curriculum with strong coverage for theory and practical. Detailed picture on the functionalities and services of major OSILS are to be included in the curriculum. A project pertaining to the OSILS should also be incorporated.

**Research and Development:** Priority needs to be given in the research and development program on the implementation, development and customization activities of OSILS packages.

Different languages and locales will need to be addressed differently in a system, especially in an entire ILS and having another language version of an ILS does not simply require the translation from one language to another [13]. Research and developments also needs to be concentrated on developing or customizing ILS packages to comply with Indian languages. User-friendly front end in local language can promote use OSILS to a large extent.

**Collaboration:** Respondents opined that application of OSILS in libraries could lead to greater innovations and collaboration among the communities. Indian libraries need to consider consortia model for wider adoption of OSILS. Survey revealed that support for OSILS has increased from both Library professional organizations and Government. So government or any of the governmental organization could take up the development of customized versions of single OSILS that could be used for any type of library in Indian situations.

**Futuristic Package:** Majority of respondents also opined that OSILS are more suitable for long-term use compared to proprietary systems. Commercial ILS users also opined that OSILS products have strong research and development support, are developed over many years in a collaborative manner and are updated frequently, hence can have more advanced and updated features. One third of the total respondents of commercial ILS agreed that OSILS is scalable solution to handle the housekeeping operations and are capable of meeting the current and future demands of any library.

## Endnote

It is clear that the primary reasons for most libraries deciding to migrate to OSILS are reduced cost of the software and the ability of the package to facilitate the library professionals to customize the software according to their needs. Other reasons include freedom from maintenance, license fees, vendor lock-in and the wider adoption, support and online community as well as eases of installation, maintenance and modification. Some libraries opted for OSILS due to frustration with the suppliers of their current commercial ILS. Results of the survey shows that majority of the respondents showed a positive agreement with the statements in the questionnaire and considered migrating to an OSILS. It also revealed that there are many issues and challenges associated with the adoption of OSILS in Indian libraries from its installation or migration to customization. Library community in the country had positive perception towards the adoption of OSILS and there are many

promotional activities such as seminars, workshops, training programs etc., organized to increase the awareness and understanding of the importance of OSILS and improve the adoption of OSILS among the library professionals. Study also identified that there should be more promotional activities to encourage the libraries in India to adopt OSILS on a wider scale.

Public libraries in India are generally categorized under poorly funded organizations. It is also clear from the study that many libraries, especially public and school libraries lack quality automation systems due to its high cost on one hand and because they are not able to make use of OSILS. Though OSS based automation initiatives provide an innovative approach to librarians as an economically viable solution for automation, these libraries need to be made aware of the advantages of implementing OSILS. In order to meet the information needs of the users efficiently library professionals should have the ability to install, maintain and customize the software according to their local requirements. However, it is seen that the level of technical knowledge required for LIS professionals to install and maintain OSILS is absent in school and public libraries. Hence, motivation, co-ordination, and diffusion of technology are a must for libraries, which are lagging behind in implementing and usage of open source software. Finally, open source technologies makes things better for people and when we freely share, it makes things better for everyone.●

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