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Original Article

Open Source Software vs Commercial Software: A Comparative Study on Library Automation - A Need of Engineering Colleges in Pune Region Maharashtra

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Abstract

In today's modern techno-savvy information age, libraries require efficient and user-friendly systems to manage their vast collections and serve patrons effectively. Integrated Library Management Systems (ILMS) is computer-based to manage internal and external library resources as well as a tangible asset. as addresses this need by offering a centralized platform that automates core library functions, growth in the knowledge, and different types of libraries. To help manage the library budget utilization, library collection, and development. Software's different modules focus on simplifying library work like circulation, cataloguing, acquisition, OPAC, etc. This paper purpose is to information on open-source software and commercial software information.

Keywords

Integrated Library Management Systems (ILMS), Open Source Software, Commercial software, freeware software, Library Automation etc.

1. Introduction

Library automation is crucial for the efficient management of library resources in engineering colleges. With the increasing need for digital access and management, institutions must choose between **open-source software (OSS)** and **commercial software (CS)**. This study compares both types, analyzing their applicability, benefits, and challenges in the context of engineering colleges in Maharashtra.

Library automation involves managing and automating library activities that are using computer-based. Now types of library management software are available in the market. Before the automating library systems need to find suitable library management software for the library requirements. Many types of software are available now, in that software selected as per their library requirements fulfils. Open source software OSS and commercial software both types of solutions are available. Library automation involves managing and automating library activities using computers. Open-source software provides a cost-effective solution for libraries with limited funds, allowing them to stay up-to-date with the latest technology.

2. Literature Review

There is much literature available on OSS and commercial library software at national and international levels. An OSS software advantage, drawbacks and issues of Koha, MyLibrary, Infomine, LOCKSS, Libproxy, and Jake this software provide basic and general information (Bretthaur, 2002).Development of OSS applications, service and completes areas of emerging software mention. Library trends,

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supports, shifting from locally to developed system and development of vendors systems etc. maintains (Breeding, Marshall 2002).
Provide general information OSS systems and in the Evergreen software investigates issues and locations related Chinese language (Zou, Q. and Liu, G. 2009).
Discuss features in briefly OSS library management software and Digital library softwares of the Evergreen, Avanti, Koha, OpenBiblio, PhpMyLibrary, NewGenlib, DSpace, Greenstone etc (Reddy, T. R. and Kumar, K. 2013). Present information, evaluation, development and support of basic functions like OPAC, cataloguing, circulation, provide information of source code, scalability of OSS software (Boss, R. W. 2005 & 2008).
Muller is identified twenty OSS library management systems including evaluating and apply three-step criteria of software (Muller, T. 2011). Wang explains today's library system as well as describes next-generation library management systems, architecture, workflow, discovery layer and service of Alma and Kauli OLE ILMS (Wang and Dawes 2012).
Comparison in open source software and proprietary software provides a good understanding of current studies. There is an explanation for similar technological standards, different platforms, surface tables and varies research articles (Gauri, S. and Soni, R. 2016).

3. Objectives of the Study

- To understand the concept of open-source and commercial library management software.
- To compare OSS and CS in terms of features, cost, support, customization, and performance.
- To identify the software preference in engineering colleges of Maharashtra.
- To recommend suitable solutions based on college needs and budget.

4. Methodology

Type of Study: Comparative and Analytical
Data Collection:
1. Primary Data: Survey/questionnaires/interviews with librarians, IT staff.
2. Secondary Data: Literature review, software manuals, case studies.
3. Sample: Engineering college libraries in Pune, Kolhapur, Sangali, Satara cities in Maharashtra.

5. Library Automation

Automation is the use of automated machinery and technology to perform tasks that humans previously completed. Computer application is used in the services and various operations of libraries. One way to think of a computer system is as a high-speed, automated information transportation device (called hardware and computer software). A computer's physical parts are referred to as its hardware, and its software is a collection of instructions that the hardware is supposed to follow. A computer can only operate when the hardware and software are both compatible and configured appropriately.
According to the American Library Association (ALA), library automation is defined as "the use of computers and related technologies to carry out library operations, such as acquisitions, cataloging, circulation, and reference."

History of ILMS (Generations)

History of Integrated Library Management Systems ILMS library software has come a long way since the 1780s to 1930s its beginning, the cards catalog was started in the earliest phase. (Pratheepan, T. 2011) In the year 1960s libraries are taken benefits of computer technology for using Machine Readable Cataloguing MARC are started.

a. 1950s to 1960s

- The earliest library automation system introduced for circulation and cataloguing functions are limited
- Standalone unintegrated applications computers are used.
- No standard metadata for use
- Functions are limited in capabilities and user-friendliness

b.1961s to 1970s

- Development of standard database management systems DBMS adaptions
- Metadata standards are available for the bibliographic records MARC
- Minicomputers and microcomputers are adaptions
- Bibliographic data and centralized cataloguing, distributed cards started for exchange
- Venders started to developing library management systems

c. 1971s - 1990s

- In 1980s personal computer rise
- Libraries have started networking LANs and WANs to connect other libraries
- Introduced features such as online public access catalogs OPAC

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- GUI Interactive application and client-server-based architecture
- Possible federated searching information searching protocol through Z39.50
- RDBMS and SQL-based search systems used for back ends

Internet generation

a. Web1.0

- Introduction of Online Public Access Catalog (OPAC) hosted on web servers.
- Adoption of new client-server systems leveraging web technology for data storage and transaction processing, facilitated by the availability of affordable internet connectivity.
- Entry of open-source operating systems like Linux into the scene.
- Continued reliance on relational database management systems (RDBMS) for backend infrastructure, with search systems predominantly based on SQL.
- Emergence of visually rich graphical user interfaces (GUI) crafted using tools like Visual Basic and Visual C++.
- Rise of development platforms such as Java and .NET for creating web applications.

b. The Web 2.0 Era

- Ordinary individuals actively contributed to the web through channels such as blogs, wikis, podcasts, and social networks, altering the expectations of library users regarding their interactions with libraries and library management systems (LMS).
- Dissatisfaction grew with the rigid and inflexible nature of traditional library management systems (LMS) and online public access catalogs (OPACs).
- Advancements like web services, increased interoperability, and the introduction of RSS/Atom feeds led to enhanced user experiences, exemplified by platforms like Amazon books and eBay.
- Open-source software has gained relevance in the market, offering alternatives to proprietary systems.
- The commercial market witnessed consolidations and mergers, reflecting significant shifts within the industry.
- Institutions sought improved integration of LMS with emerging enterprise applications to meet evolving demands.
- The internet emerged as the primary platform for software development, shifting its role from being solely an information conduit to fostering active user participation.

c. The Web 3.0 Era

- Libraries incorporate linked data principles to interconnect and expose their collections, enabling more comprehensive and interconnected access to information.
- Libraries explore the potential of block chain for transparent and secure management of digital assets, including authentication, licensing, and copyright.
- Libraries experiment with VR technologies to create immersive learning experiences, virtual tours, and simulations, enriching user engagement and interaction
- Libraries integrate AR applications to overlay digital information onto physical spaces, enhancing discovery, exploration, and understanding of resources
- Libraries employ advanced analytics and user profiling techniques to deliver tailored services, content recommendations, and interactive experiences to patrons
- Libraries deploy IoT devices for real-time monitoring of library spaces, resource utilization, and environmental conditions, optimizing operations and services
- Libraries leverage AI and machine learning algorithms to improve services such as recommendation systems, personalized search, and content analysis
- Libraries prioritize data privacy and security measures, implementing robust protocols and technologies to safeguard user information and digital assets

d. The Web 4.0 Era

- By using artificial general intelligence (AGI), libraries could develop very intelligent systems that can comprehend and react to intricate customer inquiries, enhancing search efficiency and suggestion systems.
- Libraries have the potential to engage in distributed knowledge networks, which facilitate the generation, exchange, and verification of information among dispersed platforms while maintaining data integrity and ownership.
- Libraries might build fully immersive learning environments, virtual libraries, and interactive educational simulations by adopting cutting-edge immersive technology like extended reality (XR).
- The potential of quantum computing to process massive volumes of data quickly, enabling extensive data analysis, encryption, and optimization of library operations, may be explored by libraries.
- Advanced data analytics methods, such as prescriptive and predictive analytics, could be used by libraries to improve decision-making, optimize resource allocation, and anticipate user demands.

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- To preserve the confidentiality and integrity of user data while allowing cooperative research and resource sharing, libraries may adopt cutting-edge security techniques like homomorphic encryption and zero-knowledge proofs.
- Libraries could increase operational efficiency and free up staff members for higher-value tasks by using autonomous technologies for tasks such as robotic assistance, inventory management, and collection maintenance.

6. Comparative Study Table: OSS vs CS

Sr.No.	Criteria	Open Source Software (OSS)	Commercial Software (CS)
1	Cost	Free to use, no licensing fee	High licensing and annual maintenance costs
2	Customization	High Source code can be modified	Limited Vendor-dependent customization
3	Support	Community-based, sometimes inconsistent	Professional vendor support, SLA-based
4	Training	May require in-house training or online resources	Usually provided by vendor
5	Upgrades	Free, but manual or technical knowledge needed	Provided by vendor as part of AMC
6	Examples	Koha, Evergreen, NewGenLib	SLIM, Libsys, SOUL, VTLS
7	Implementation Time	Moderate depends on in-house expertise	Quick managed by vendor
8	User-Friendliness	Varies, generally improving	Generally more polished interfaces
9	Security	Depends on implementation and community updates	Vendor ensures security updates and backups
10	Scalability	High adaptable for large systems	High designed to handle large, institutional libraries

Open Source and Commercial Library Management Software

Richard Stallman a pioneer of free and open source software. In order to develop a free operating system, he started the GNU Project in 1983. Several vital software libraries, such as the GNU Debugger (GDB), the GNU C Library (glibc), and the GNU Compiler Collection (GCC), have been created by the GNU Project. Numerous open source and free software projects make use of these libraries. For the free software movement, Stallman is a fervent supporter as well. For users to run, alter, and share software, he feels that it should be free. About the moral and functional advantages of free software, he has written a great deal Stallman, R. (2002).

According to the open source way "Open source projects, products, or initiatives embrace and celebrate principles of open exchange, collaborative participation, rapid prototyping, transparency, meritocracy, and community-oriented development (https://opensource.com/resources/what-open-source).

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Many software applications require libraries that are open-source software to be developed. Their code serves as a basis upon which new applications can be constructed. Along with helping to guarantee that apps are interoperable, this can save developers time and effort Morgan, E. L. (2002). People prefer using open-source software for several reasons:

1. **Freedom and Control**: Open source software licenses does not limit anyone can study, alter, and share the source code of open-source software in any way that best suits their requirements. Because of licenses are not respected also not require fees or royalties.
2. **Transparency**: Open-source software is developed in an open and transparent purpose, with the source code being freely available for inspection. This transparency fosters trust among users.
3. **Availability**: Open-source software is available freely on developer website. This type of software is developed in limited software including 24x7 support from developers as well as an online community.
4. **Cost Savings**: OSS software is available at little cost. Those can lead to significant cost savings for individuals, organizations, and businesses. There is no licensing fees and users have the freedom to deploy the software on as many systems as they like.
5. **Service and Support**: Open source software comes under an online community, it is a network to learning support. Required basic knowledge to install and run such of types software, also available online support from developers and vendors.
6. **Security**: Open source software anyone can download and make changes as per their requirements, because of the less secure code. Source code is available freely, hence changes can done as per our requirements.
7. **Long-Term Availability**: Since open-source software projects are not reliant on the financial stability or strategic choices of a single vendor, they usually have more longevity than proprietary software projects.

Commercial Software: the terms of a model which is software created for a business it is a usually licensed copy, and price of that is few hundred thousand dollars. The business entity frequently offers consumers the assistance, instruction, upgrades, and other services of a similar nature that they require in order to utilise the software effectively. The software's source code is typically not disseminated to the general public and may only be copied or altered in accordance with the procedures specified in such agreements. However, it may be made available to certain users of the program through special licensing or other agreements.

Propriety software advantages is provide support supports their clients without technical expertise offline as well as online. Vendors are available immediately after calling for assistance and also help to solve software-related queries. Commercial software continues to develop new versions, R&D in modules, best practices, innovation, implementation and provide to users. These types of software always lot of security because software develops in a controlled environment, and the source code is edited only development team. Availability of software easily from respected companies to libraries, some time they provide trial versions for free to test. Some commercial software are below.

Sr.No.	Name of Software	Developed by	Price	Website
1	Autolib	AutoLib Software Systems, Chennai	Rs. 80,000	http://www.autolib-india.net/
2	SOUL	INFLIBNET Center, Gujrat	Rs. 50,000/-	https://soul.inflibnet.ac.in/
3	LibSys	LibSys Software Pvt. Ltd., Gurgaon	Rs. 4,00,000/-	https://www.libsys.co.in/
4	SLIM	Algorhythms Consultants Pvt. Ltd., Pune	Rs. 1,80,000/-	https://slimkm.com/
5	iSLIM	Algorhythms Consultants Pvt. Ltd., Pune	Rs. 1,99,500/-	https://slimkm.com/
6	LIBMAN	Master Soft ERP Solutions Pvt. Ltd. Nagpur		https://libcloud.mastersofterp.in

7. Key Findings (Illustrative)

- 60% of government-aided engineering colleges prefer **Koha** (OSS) due to low cost.
- Private institutions tend to adopt **SLIM or Libsys** (CS) for reliability and support.

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- Customization and freedom with OSS attract technically capable colleges.
- Lack of in-house IT support leads some institutions to prefer vendor-managed CS.

8. Challenges in Adoption

Open Source: Requires skilled IT team

- Less accountability for support
- Documentation gaps

Commercial Software:

- High cost burden
- Vendor lock-in
- Periodic renewal and AMC costs

9. Conclusion

Both OSS and CS have merits and limitations. Engineering colleges in Maharashtra should base their decisions on Budget availability, Technical manpower, required features, and Scalability needs. In many cases, OSS like Koha provides a sustainable and customizable option if IT support is available, while CS suits institutions needing full support and ready-to-use features. Traditional libraries have become automated libraries through automation. Automation has become as one of libraries most important components now a days. In the information era of the future, everything will be mechanized and digitalized. In the history of Integrated library management systems, development starts 1960s , starting from machine-readable Catalouging. The basic development in the first and second generations, The tremendous changes in library automation after the 1990s introduction of personal computer, Internet generation and Artificial intelligence in automation. Vendors introduce their commercial software LibSys, Autolib, SLIM, LIBSUTE, SOUL DELMUS, LIBRIS, SANJAY, LibMan, etc. as well as benefit of the open source software movement to use OSS are ABCD, BiblioteQ, EMILDA, Evergreen, Koha, NewGenLib, OpenBiblio, etc. use for library automation.

10. Recommendations

- Conduct training for library staff on OSS tools.
- Hybrid model: Use OSS with outsourced support.
- State-level consortiums can negotiate better pricing or support services.
- Encourage AICTE/UGC to fund automation in smaller institutions.

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