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# A Guide for the Optimum Selection of a Free Open Source Integrated Library System

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**Abstract:** Many major studies have concluded that over the past years, Free Open Source Software (FOSS) projects have been growing exponentially. At the same time, a considerable number of companies, government organisations and libraries are taking advantage of the many merits of FOSS. The number of libraries that adopt open source tools, and more importantly migrate from their commercial system to a free open source Integrated Library System (ILS) keeps on increasing. In this paper, we performed a quantitative and qualitative analysis by examining the literature concerned with the use of FOS ILS in libraries, in order to identify the specifics, the characteristics, the utilities of these systems and we provide a walkthrough guide that will aid librarians to make the optimum selection for a FOS ILS.

**Keywords:** FOSS, ILS, ILS evaluation, ILS selection, Quantitative analysis

## 1. Introduction

There are many studies like Deshpande and Riehle (2008), Y. Wang, Guo, and Shi (2007), Jones and Ng (2011), Giri (2012), Li (2014) that have concluded that there is an exponential rise on the number of Free Open Source Software (FOSS) projects. According to Reddy and Kumar (2013), the major reasons for the success of open source software are openness, flexibility, speed and motivation. Within Wikipedia's list of hundreds of free and open-source software packages (2017) appear six integrated library management systems: Evergreen, Koha, NewGenLib, OpenBiblio, PMB and refbase. In ZDNet's (2015) on-line article, we're living in an "*open-source world*" as 78% of companies run open-source software. It's not just companies, Paulson (2001), that are taking advantage of the many merits of FOSS Zivtech (2016), Noyes (2010), Von Hippel and Krogh (2003), Von Hippel (2001), Riewe (2008) but also government structures, as found in Waring and Maddocks (2005), Rossi,

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Russo, and Succi, (2012), Keats, (2008) and health care organisations Bissels (2008), Chalon, Alexandre-Joaquim, Naget, and Becquart (2006). The main benefits of FOSS as mentioned by More Open Source for America (2012), GBdirect (2006) are its cost, its flexibility and freedom, its support and accountability, its constant evolution and many. Subsequently, all these organisations that are shifting to FOSS and they are utilising their functionalities in order to fulfill their needs. Libraries worldwide, M. Singh and Sanaman (2012), no matter their size, from school libraries, Buchanan and Krasnoff (2005), to small college libraries, Dennison (2011), up to large-scaled libraries, Breeding (2009a) and (2016) are following this tendency as well. They even are developing products themselves, Bucknall and Thomas B (2010), like Journal Finder and Evergreen. The number of libraries that adopt open source tools, and more importantly migrate from proprietary systems to a FOS Integrated Library System (ILS) keeps on increasing according to Breeding (2009a) and (2016). In this paper, we performed a quantitative and qualitative analysis and review by examining the literature concerned with the use of FOS ILS in libraries, in order to identify the specifics, the characteristics and the utilities of these systems. We followed a multi-prong approach and we provided a valuable walkthrough guide/tool that will aid librarians, decision makers and library patrons to understand better the FOS ILS and that will help them to make the best possible decision of whether to adopt a free or stay with a proprietary ILS. Initially, by reviewing the literature we cited the advantages and the disadvantages of the free ILS software and we explored their major functions and capabilities. Then, we examined studies that have followed diverse approaches and methodologies for evaluating these systems. The next step was to accumulate and analyse the criteria used by those studies and then arrange and classify them. Finally, we focused on the most popular systems, like Koha, Evergreen, ABCD, NewGenLib, OpenBiblio, PMB and a few more that received the best reviews and evaluations.

This paper is structured as following: the advantages of FOS ILS are cited, then the criteria of testing and evaluating those systems are analysed and finally according to the previous tests, the most prominent, steady and popular FOS ILS are highlighted.

## 2. Merits of FOS ILS

In this section we have specifically accumulated the many advantages, Randhawa (2013), Salve, Lihitkar and Lihitkar (2012), of FOS ILS. The main reason why libraries choose to shift to FOS ILS is due to the increasing annual costs like license, documentation, training, support, and maintenance contract of commercial software, Dennison (2011), Riewe (2008). Budgetary constraints were imposed especially after the economic downturn of 2008 Li (2014). Libraries that migrated to new ILS when asked to provide the funding for this migration they reported that this came from "Library's budget" (43.24%), "Special allowance from the institution" (37.84%), "Grant(s)" (8.11%) and "Jointly funded" (5.41%), Z. Wang (2009). At the same time, FOS ILS enables

them to have greater control over their working environment, Atri (2016), as it is less complicated, easier to use and demands less expertise that the proprietary systems, V. Singh (2013). Studies like Dennison (2011), Riewe (2008), Giri (2012) indicate that after the change, the FOS ILS met most of the library needs and it had an easy learning curve. In Riewe (2008) the conclusion of examining the benefits of free ILS was that they were more cost-effective than proprietary ILS. British Columbia, which installed Evergreen in three libraries, estimated the cost of the open source ILS as one fifth of a comparable proprietary ILS, leading to a savings of $8 million Canadian dollars over a five years period. The Georgia PINES (a public library service) program director reported that the savings over the previous proprietary ILS was more than $100,000 annually.

The main advantages of the FOS ILS according to our research can be found in Table 1 where they are grouped in 4 categories: Cost, Licence, Implementation and Functionality.

| **COST** | **IMPLEMENTATION** |
|---|---|
| Affordability | Easy learning curve |
| Low costs - maintenance | Easy conversion |
| Frees budget for other needs | Fast implemenation |
| No vendor lock-in | **FUNCTIONALITY** |
| Forces commercial vendors to keep their product price at a reasonable level | Stable and vibrant |
| | Improvement of on-line catalogue |
| **LICENCE** | Reliability |
| Free licence | Performance |
| Fewer conflicting priorities | Ease of use |
| Freedom to copy and share copies | Support |
| Freedom to study how the software works | Documentation |
| Source code can be modified | Interoperability |
| Easier to identify source code errors, and fix them | Security |
| | Customizability |
| Reusability | Portability |
| | Fulfills most current and future needs |

**Table 1 – Main advantages of FOS ILS**

Keats (2008) provides a helpful guide where not just ILS but also other areas like operating systems, desktop software and institutional repositories where a library can use corresponding FOSS tools. General features, requirements and support for selected institutional repository software are also presented by Salve et al. (2012).

Despite the many merits of free ILS library managers are still reluctant to use them, Atri (2016). In Z. Wang'a (2009) study only 19.23% reported that they considered an open source ILS. In Dalling and Rafferty (2013) whilst 73% of the respondents are observing open source ILS developments, 61% believe that support from a third-party company could encourage them to move to open source ILS, 54% agreed or strongly agreed that their institution lacked the staff to support OS ILS and 42% disagreed or strongly disagreed that the reputation of OS ILS is as high as that of commercial equivalents, while only 17 % agreed with the latter statement. Finally, 47% disagreed or strongly disagreed that OS ILS did not fit with their current institutional purchasing procedures. The main reason for this unwillingness is various disadvantages, as nebtion in Riewe (2008), Randhawa (2013), Uzomba, Oyebola, and Izuchukwu (2015), Dalling and Rafferty (2013), like complexity and difficulties during installation and maintenance, shortage of skilled staff to install and maintain, less ease of use and more need for technical expertise and technological sophistication, lack of promotional activities, higher labour costs, lack of scalability, fewer advanced features and that libraries are uncertain or they believe that FOS ILS does not fit with their needs. Kumar and Jayapradeep's (2015) study revealed that the first four issues gathered 51.38% as the most demanding challenges for adopting open source ILS in Indian libraries. Kinner and Rigda (2009) state that it could be very costly to start up and customize open source systems. However, Uzomba et al. (2015) proposes 12 possible solutions to the aforementioned problems.

## 3. Criteria evaluation

In this section we focused on the criteria and the evaluation of the FOS ILS. . In Z. Wang's (2009) study the top-5 reasons for migrating to a new ILS were: 1) better system/functionality in new system, 2) diminishing support of old system, 3) consortium requirement, 4) insufficient old system features, and 5) aging system/hardware, whilst other reasons included: cost, vendor merger, vendor stability and customer support.

In V. Singh (2013) a survey to library experts showed that migrating to an ILS should be a two-prong approach. Initially there must be general considerations when migrating to an Open-Source ILS like creating awareness about open-source culture in the library, developing IT skills internally, assess staff's abilities before committing, having a demonstration system, having a proper communication and to be prepared to spend a significant amount of staff time for testing, development, and migration. The second step is working with vendors and the manager should read the contracts carefully, ensure that there is

an explicit timeline and procedure for the release of usable source code, see that one is guaranteed and entitled to access the source code, provide specific examples when reporting problems, designate a liaison between library staff and developers and finally, set up regular meetings for those involved in the migration project. Finally in the same paper the seven stages for having a successful migration to the new system are described: 1) evaluation, 2) set up a demonstration site, 3) data preparation, 4) development/customisation, 5) migration process, 6) staff training and user testing and 7) "go live" and after.

In Müller (2011), 20 free and open source ILS platforms were evaluated, 800 functions were analysed and 68 criteria were categorized in 10 main categories. In M. Singh and Sanaman (2012), 223 criteria were categorized in 10 main categories. In Chalon et al. (2006) nine ILS were taking into consideration, criteria from 14 categories were evaluated. In Riewe (2008) 32 different criteria were evaluated. Breeding (2009a) provides a very comprehensive guide that includes types of libraries adopting product, license and distribution information, products and companies, underlying components, standards supported, sources of information on functionality, and functionalities for online catalog, circulation, cataloguing, acquisitions and serials of Koha, Evergreen, OPALS and NewGenLib. In Kumar and Raghunadha (2013) the authors made a list of 16 criteria that professionals must have subsequent information in order to select an ILS. In Reddy (2013), 140 criteria were divided in 11 major categories.

A different approach was followed by Jones and Ng (2011) as 7 functions such as 1) patron maintenance, 2) check-in/out, 3) renewing items, 4) bills, fines & payment, 5) holds, 6) changing status of items and 7) changing loading period along with the documentation and help of Koha and Evergreen were assessed.
There is indeed a plethora of studies that examined and analysed the evaluation criteria. Nearly all the papers and articles in our references list provide bits and pieces that helped us to create Table 2, where the most essential criteria are demonstrated. We have grouped the criteria that were used to evaluate and test the FOS ILS in 3 major categories: evaluation of software licensing and costs, evaluation of the community, evaluation of functionalities, Müller (2011). Since there are criteria that are common to the ones for the proprietary software on our analysis we focused to the ones concerned with the free open software.

| **LICENCE - COSTS** | **FUNCTIONALITIES (cont'd)** |
|---|---|
| Free open source | Downloads and documentation |
| Low costs - affordability | Other enhanced features |
| **ASISSTANCE – COMMUNITY** | Security |
| Attractiveness of community | Interface |
| Sustainablility of community | Flexibility |

| | |
|---|---|
| Technical Support | Integration |
| **FUNCTIONALITIES** | Norms |
| Commonly used | Easiness of development |
| Characteristics of ILMS (functions) | Code liability and robustness |
| Maturity | Language |
| Compatibility with common OS | Customisability |
| General essential specifications - features | Installation smoothness and time |
| Administration | Reliability |
| Authority control | Portability |
| Circulation | Interoperability |
| Technology in design and architecture - Appropriation | How it matches the library's requirements |
| Database features | Maintenance |
| Acquisition module | Product quality |
| Cataloguing module (ease, copy, completeness) | Hardware and software requirements |
| Circulation module | Staff training and support service |
| Serial module (ease, completeness) | Scalability |
| Reporting functionality | Migration of data or data transfer |
| OPAC/WebOPAC/searching functionality | Managing books (Check-in/out, renewing, holds, changing status) |
| Formats & standards implementation | Bills, Fines & Payment |
| Software and digital content | Cloud Computing |
| Ease to use and updates | Product quality |
| Help and Updates | |

**Table 2 – Main evaluation criteria**

## 4. Research results

There are studies and sources like Randhawa (2013), Salve et al. (2012), Reddy and Kumar (2013) that describe various FOS ILS by providing their history, general information like the developer, the licence, the site, the then current downloadable version and finally their features like the programming language used to develop, the requirements, platform, standards and functional modules . In this section we will demonstrate results from comparison results and we will try to identify which one seems the most popular and has received the best reviews and evaluations. Müller (2011) determined that the 3 best FOS ILS were Koha, PMB and Evergreen with 83%, 70% and 59% overall score

evaluation respectively. In Dennison (2011) the Paine College Library, a small private college that serves a campus of 900 students selected Koha as the ILS that could meet their needs. In M. Singh and Sanaman (2012) a comparative study of Koha and NewGenLib was performed and in the 10 categories that were evaluated Koha outclassed NewGenLib with a total score 300 vs. 281 as it prevailed in five categories compared to NewGenLib's four and one tie. In Chalon et al. (2006) after a thorough wish-list procedure, a Belgian Health Care Knowledge Centre selected Koha and PMB as the best candidates and they finally choose PMB as the best ILS. In Riewe (2008) the survey was answered by respondents using Koha, Evergreen and proprietary ILSs. The survey's goal was not the comparison of the two free ILS – however it demonstrated a balance between the free ILS – but the comparison of free vs. proprietary ILS and showed that the satisfaction of open source ILS respondents was slightly higher than that of proprietary ILS respondents. Giri (2012) has compared the easiness of independent installation of Koha, ABCD and NewGenLib and according to the survey the latter was the easiest to install and Koha was the most difficult. Another ILS with positive reviews according to De Smet and Dhamdhere (2010) is ABCD as it "it carries with it strong textual data management features and a very large users-community". In Kumar and Raghunadha (2013) a survey of 7 ILS, in the top 50 engineering institutional libraries was conducted and according to the results about the positive opinion of OSS ILS, Koha (48.72%) was, followed by NewGenlib (30.77%) and then by Evergreen (12.82%). In Reddy (2013) the evaluation of Koha, and NewGenLib showed that overall NewGenLib is more advanced and has more features than the other two. In Kumar and Jayapradeep (2015) it was found that most of the Koha respondents were "extremely satisfied" in eight categories in comparison with the LibSys users.

In Jones and Ng (2011) a head-to-head comparison of Koha and Evergreen was conducted and Evergreen was found to be superior to Koha whilst in Macan, Vanesa Fernández and Stojanovski (2013) Koha prevailed ABCD as "it is continuously improving its existing functionalities and developing a new ones, it has a larger and very active community, and it also has a wider range of free and paid support".

## 5. Conclusions and discussion

In 2007 Breeding stated that libraries should "come to grips with how automation systems should work and focus especially in three things: 1. Increased digital collections; 2. Changed expectations regarding interfaces; 3. Shifted attitudes toward more openness of data and software. In the same study he identified four challenges that the next-generation libraries faces: 1. Breaking out of aging moulds; 2. The dissatisfaction with the current status quo; 3. The gaps in Functionality, an issue he had also pointed out in another article two years earlier Breeding (2005); 4. The need for a more lightweight approach. It seems that FOSS ILS have managed to meet these challenges Li (2014). Breeding (2009b) looked at open source ILS viability from four perspectives:

market acceptance, support options, product development and functionality and risk factors and in his conclusions he mentioned "The open source ILS movement has progressed past the point where its viability can seriously be questioned. The current momentum of open source ILS adoption makes it almost inevitable that it will represent an increasing portion of the library automation landscape".

Migrating to a new ILS system is very challenging therefore one consider the 10 advice list given by Z. Wang (2009). 1) Allow plenty of time, 2) Careful analysis of the migration data and coding of the data, 3) Consider priorities and stability of each vendor, 4) Evaluate all options and consider future needs, 5) Spend time researching and obtaining references, 6) Be prepared for staff resistance to change and provide ample training, 7) Don't expect the vendor to tell you all the problems, 8) Not everything with the new system will be perfect, 9) Consider open source ILS and 10) Listen to Marshall Breeding.

Nevertheless there are many library managers that are reluctant to use FOS ILS. Therefore we gathered their concerns and FOS ILS companies should evaluate them and try to improve any software or even marketing limitation and convince the library decision makers that their products are equally good or even better than proprietary systems.

In this study we focused on FOS ILS and according to our research, Koha and less Evergreen are gaining a corresponding increase in interest among public, school, and special libraries in the US and Canada M. Singh and Sanaman (2012). By 2012 1,579 libraries were using Koha and 1,092 were using Evergreen Ahammad (2014). Virtual and interactive maps of the libraries that are currently using Evergreen, Koha, NewGenLib, OpenBiblio and PMB can be found at Libraries.org (2017). The majority of the studies that we analysed, along with the above maps demonstrate the dominance of Koha as the FOSS ILS of preference.

**References**

Ahammad, N. (2014). Implementing the Koha integrated library system at the Independent University, Bangladesh: A practical experience. *The Electronic Library*, *32*(5), 642-658.

Atri, Y. K. (2016). A Study on the free Open Source Library management Softwares: Special Reference to KOHA, ABCD, Avanti and Greenstone.

Bissels, G. (2008). Implementation of an open source library management system: Experiences with Koha 3.0 at the Royal London Homoeopathic Hospital. *Program*, *42*(3), 303-314.

Breeding, M. (2005). Re-Integrating the integrated library system. *Computers in Libraries* 25 (1), 28-31.

Breeding, M. (2007). It's Time to Break the Mold of the Original ILS. *Computers in Libraries* 27 (10), 39-42.

Breeding, M. (2009a). Major open source ILS products. *Library technology reports*, *44*(8), 16-31.

Breeding, M. (2009b). The viability of open source ILS. *Bulletin of the American Society for Information Science and Technology*, *35*(2), 20-25.

Buchanan, K., & Krasnoff, B. (2005). Can open source software save school libraries time and money. *Knowledge Quest*, *33*(3), 32-34.

Bucknall. T., & Thomas B. (2010). Integrated Library System Selection Plan Medium Sized Academic Library in North Carolina. Retrieved January 10, 2017, from https://earthtobetty.files.wordpress.com/2011/07/integrated-library-system-selection-plan.pdf

Chalon, P. X., Alexandre-Joaquim, L., Naget, C., & Becquart, C. (2006). Open your mind! Selecting and implementing an integrated library system: the open-source opportunity.

Dalling, J., & Rafferty, P. (2013). Open source, open minds? An investigation into attitudes towards open source library management systems in UK higher education libraries. *Program*, *47*(4), 399-423.

De Smet, E., & Dhamdhere, S. (2010). ABCD: an open source automation tool for libraries. *Pearl: a journal of library and information science*, *4*(4), 215-219.

Dennison, L. (2011). Small and open source: Decisions and implementation of an open source integrated library system in a small private college. *Georgia Library Quarterly*, *48*(2), 3.

Deshpande, A., & Riehle, D. (2008, September). The total growth of open source. In *IFIP International Conference on Open Source Systems* (pp. 197-209). Springer US.

Giri, R. (2012). NewGenLib 3: an integrated open source library management system that makes your library visible in web. *Library Hi Tech News*, *29*(10), 4-12.

GBdirect, (2006). *Benefits of Using Open Source Software*. Retrieved January 8, 2017, from http://open-source.gbdirect.co.uk/migration/benefit.html

Jones, A. & Ng, C. (2011), "Comparing Open Source Integrated Library Systems: The Circulation Module of Evergreen & Koha", *LIBR 551: Library Automation & Systems.*

Keats, D. (2008). Free and Open Source Software for librarians and libraries. *Innovation*, *36*(1).

Kinner, L., & Rigda, C. (2009). The integrated library system: from daring to dinosaur?. *Journal of Library Administration*, *49*(4), 401-417.

Kumar, K., & Raghunadha, R. T. (2013). Analytical study on knowledge about open source software in technological institutional LIS professionals. *International Journal of Library and Information Science*, *5*(11), 439-446.

Kumar, T. G., & Jayapradeep, M. (2015). Perceptions of LIS Professionals on open source integrated library system and adoptability of Koha over LibSys in India. *International Journal of Information Dissemination and Technology*, *5*(2), 100.

Li, X. C. (2014). What would be the future of the Integrated Library Systems?.

Libraries.org. (2017). *Map of Libraries: the library automation system used is Koha*. Retrieved February 1, 2017, from https://librarytechnology.org/libraries/map.pl?ILS=Koha.

Macan, B., Vanesa Fernández, G., & Stojanovski, J. (2013). Open source solutions for libraries: ABCD vs Koha. *Program*, *47*(2), 136-154.

Müller, T. (2011). How to choose a free and open source integrated library system. *OCLC Systems & Services: International digital library perspectives*, *27*(1), 57-78.

Noyes, K. (2010). 10 Reasons Open Source Is Good for Business. *PCWorld*. Retrieved January 13, 2017, from http://www.pcworld.com/article/209891/10_reasons_open_source_is_good_for_business.html

Open Source for America. (2012). *Benefits of Open Source Software*. Retrieved January 8, 2017, from http://opensourceforamerica.org/learn-more/benefits-of-open-source-software/

Paulson, J. (2001). *An empirical study on the growth of open source and commercial software products*. University of Calgary.

Pruett, J., & Choi, N. (2013). A comparison between select open source and proprietary integrated library systems. *Library Hi Tech*, *31*(3), 435-454.

Randhawa, S. (2013). Open Source Library Management Softwares. *E-Library Science Research Journal*.

Reddy, C.S.V. (2013), "Comparative study of free/open source integrated library management systems (fosilms) with reference to koha, newgenlib and E-granthalaya", *E-Library Science Research Journal* , Vol. 1 No. 12.

Reddy, T. R., & Kumar, K. (2013). Open source softwares and their impact on library and information centre: An overview. *International Journal of Library and Information Science*, *5*(4), 90-96.

Riewe, L. M. (2008). Survey of open source integrated library systems.

Rossi, B., Russo, B., & Succi, G. (2012). Adoption of free/libre open source software in public organizations: factors of impact. *Information Technology & People*, *25*(2), 156-187.

Salve, A., Lihitkar, S. R., & Lihitkar, R. (2012). Open source software as tools for libraries: an overview. *DESIDOC Journal of Library & Information Technology*, *32*(5).

Singh, M., & Sanaman, G. (2012). Open source integrated library management systems: Comparative analysis of Koha and NewGenLib. *The Electronic Library*, *30*(6), 809-832.

Singh, V. (2013). Experiences of migrating to an open-source integrated library system. *Information Technology and Libraries (Online)*, *32*(1), 36.

Syeed, M. M., Hammouda, I., & Systä, T. (2013). Evolution of open source software projects: A systematic literature review. *JSW*, *8*(11), 2815-2829.

Uzomba, E. C., Oyebola, O. J., & Izuchukwu, A. C. (2015). The use and application of open source integrated library system in academic libraries in Nigeria: Koha example. *Library Philosophy and Practice*, 1.

Von Hippel, E. (2001). Innovation by user communities: Learning from open-source software. *MIT Sloan management review*, *42*(4), 82.

Von Hippel, E., & Krogh, G. V. (2003). Open source software and the "private-collective" innovation model: Issues for organization science. *Organization science*, *14*(2), 209-223.

Wang, Y., Guo, D., & Shi, H. (2007). Measuring the evolution of open source software systems with their communities. *ACM SIGSOFT Software Engineering Notes*, *32*(6), 7

Wang, Z. (2009). Integrated library system (ILS) challenges and opportunities: a survey of US academic libraries with migration projects. *The Journal of Academic Librarianship*, *35*(3), 207-220.

Waring, T., & Maddocks, P. (2005). Open Source Software implementation in the UK public sector: Evidence from the field and implications for the future. *International journal of information management*, *25*(5), 411-428.

Wikipedia, (2017). *List of free and open-source software packages*. Retrieved January 7, 2017, from
https://en.wikipedia.org/wiki/List_of_free_and_open-source_software_packages

ZDNet (2015). *It's an open-source world: 78 percent of companies run open-source software*. Retrieved January 7, 2017, from
http://www.zdnet.com/article/its-an-open-source-world-78-percent-of-companies-run-open-source-software/

Zivtech, (2016). *The Benefits of Open Source Software*. Retrieved January 10, 2017, from https://www.zivtech.com/benefits-open-source-software