Open Source Initiatives in Public Libraries in Sri Lanka: Study of Expert's Perception

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Abstract

Libraries gradually integrate technology into library operations to provide an effective service. In this process, Open Source Software (OSS) is a great solution public libraries initiate with existing limited resources. This paper attempts to present an account on major open source initiatives of the public libraries of Sri Lanka, factors affecting the popularity of some OSS, and challenges faced in moving to and adopting OSS by public libraries of Sri Lanka. The study was based on the qualitative research method, and an expert sampling technique was employed. Five national level experts in library technology were identified based on a predefined set of criteria. The findings revealed that 10.7% of public libraries in Sri Lanka have currently automated their functions. Koha Integrated Library Management System (ILMS) is the main OSS used in public library automation during the last ten years from 2011-2021. The study identified factors motivating public libraries to adopt some OSS, mainly Koha ILMS, such as advanced features and functions of Koha, lower funding requirement, its compliance with many international standards, availability of subject experts, Unicode

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compatibility, high system quality, high user friendliness, and integrating Koha ILMS into the LIS courses. The main challenge faced by public libraries in adopting OSS was the lack of technical knowledge for installation and maintenance, which makes them depending on external sources in implementing open source initiatives. The study suggested the need for a proper national or regional level mechanism to provide continuous support for public libraries in Sri Lanka in technological developments.

Keywords: Library Automation, Open Source Software, Public Libraries, Technology Adoption

Introduction

Libraries worldwide gradually transform their functions, library resources, and library services from traditional to digital in reaction to technological advancement. Adoption of new technologies by the libraries is essential to ensure their survival. Open Source Software (OSS) is a great approach that libraries can adapt with the existing resources due to its accompanying benefits. Therefore, the use of OSS in public libraries is becoming more popular around the world. Breeding (2017, FOLIO advances a new vision section, para. 7) mentioned that "OSS is well established as a main branch of the library technology industry". Rathi (2018) stated that OSS had become a strong competitor of the proprietary software application in libraries.

According to the definition given by Randhawa (2008, p. 369), OSS is a "computer software whose source code is available under a license (or arrangement such as the public domain) that permits users to study, change, and improve the software, and to redistribute it in a modified or unmodified form".

The benefits of OSS over proprietary software have made it increasingly popular among libraries. These benefits include reduced acquisition, implementation, and support costs, increased accessibility, and better prospects for the long-term preservation of scholarly works (Corrado, 2005). Randhawa (2008) reported the advantages of OSS as lower software costs, simplified license management, lower hardware costs, scaling/consolidation potential, freely available support, escape vendor lock-in, unified management, and quality of software.

With these advantages of the OSS, a number of OSS initiatives are being adopted by the libraries worldwide. Payne and Singh (2010) stated

that libraries are motivated to employ cost-effective solutions and participate in the development and distribution of OSS. OSS products are increasingly becoming available for library and professional use, and Payne and Singh (2010) highlighted the need for more research studies to address issues about the dependability, sustainability, and support for these new products.

However, according to Choi (2021), limited research has been conducted in the context of OSS in public libraries compared to academic libraries. Based on the literature, the study identified a few research studies that have been carried out in Sri Lanka focusing on OSS adoption in public libraries.

Talagala and Gamage (2003) surveyed the automation activities of libraries to examine the development of library automation in Sri Lanka, the use of software in library automation, and its present status as at 2002. Ravikumar and Ramanan (2015) studied the issues faced by public libraries in Batticaloa district of Sri Lanka in establishing an automated system using Koha open source ILMS and presented the solutions to overcome these issues.

The availability of fewer research studies on OSS initiatives in public libraries of Sri Lanka, and none of the studies have explored the different types of OSS used by public libraries after 2002 emphasizing the need for further research studies to investigate the automation status and OSS adoption in public libraries of Sri Lanka. Therefore, the present study was carried out to discover the significant open source initiatives undertaken in public libraries in Sri Lanka over the past ten (10) years and their current status.

The findings of the study would be beneficial for the governing bodies of the public libraries in making decisions on the technology development using OSS, designing public library automation projects, and developing necessary policies and strategies for the future directions of public libraries in Sri Lanka. Additionally, despite the limited availability of research studies on OSS adoption and use in public libraries of Sri Lanka, this study would serve as a point of reference for future research.

Objectives of the Study

The general objective of the study was to explore the present status of public library automation process and the use of OSS in public libraries in Sri Lanka.

Specific objectives were

- to identify the major open source initiatives of the public libraries of Sri Lanka
- to explore the popular OSS among public libraries in Sri Lanka
- to discover the factors affecting to use of OSS for library automation in public libraries of Sri Lanka
- to elaborate on the challenges faced by public libraries in using OSS.

Literature Review

Information and Communication Technology (ICT) plays a vital role in the present world, and it makes a significant change in most of the activities, operations, procedures, and functions of the society. Hence technology usage is becoming a necessity in human life in carrying out day-to-day operations. Libraries gradually integrate technological

advancements into library procedures and processes as technology supports providing more effective and sophisticated services.

In the process of adopting ICT by the libraries, focusing on low-cost solutions to deliver an effective service would be benefited with the current resources as most libraries provide nonprofit service to their users. Accordingly, the use of OSS could be recognized as a great solution for libraries with the existing limited resources. Sherikar and Jange (2006) stated that many librarians consider OSS because of its low buying costs as it has no initial purchase fees, licensing fees, or upgrade fees compared to proprietary software.

Choi (2021) found the low cost, possibility to tailor to your library's specific needs, avoidance of vendor lock-in, ability to download and test the software in advance, greater flexibility and functionality of OSS, and independence from suppliers in choosing support and maintenance, as the drivers to OSS adoption while lack of staffing to maintain OSS, lack of technical expertise to implement and customize OSS, lack of employees who possess an understanding of OSS and assist its introduction, concern over receiving support, concern over the compatibility of OSS with the current systems, prior investments in proprietary software, concern over the quality of OSS, as the prominent issues that the public libraries consider in adopting OSS.

Koha (https://koha-community.org/), Evergreen (https://evergreen-ils.org/), OPALS (https://opalsinfo.net/), OpenBiblio (http://obiblio.sourceforge.net/), Invenio (https://inveniosoftware.org/), NewGenLib (http://www.verussolutions.biz/web/), CodeAchi (https://codeachi.com/product/library-management-system/), and BiblioteQ (https://textbrowser.github.io/biblioteq/) are

some of the popular open and free library management software in the world (Basu, 2020). Koha is "the first open source Integrated Library Management System (ILMS) developed in New Zealand by Katipo Communications Ltd. and maintained by a team of volunteers from across the world. Koha system comprises a full catalogue, Online Public Access Catalogue (OPAC), circulation and acquisitions system" (Sherikar & Jange, 2006). A study by Asim and Mairaj (2019) on the adoption of Koha open source ILMS in libraries of Punjab, Pakistan, discovered the availability of a web OPAC, the MARC 21 standard, free availability, and multilingual support as the main reasons for adopting the Koha open source ILMS in libraries. The study further identified lack of technical skills, lack of knowledge about the Linux operating system, shortage of skilled manpower, and need for good internet access to provide optimum benefits as the main problems librarians faced in implementing the Koha ILMS.

With regard to OSS use in Sri Lankan libraries, Talagala and Gamage (2003) identified automation activities of libraries of Sri Lanka in 2002 and examined the development of library automation in Sri Lanka and its status. Ravikumar and Ramanan (2014) found 15 university libraries of Sri Lanka that had been partially or fully automated with different types of systems both commercial and open-source. The study further identified shortage of financial support, lack of ICT equipment, insufficient staff competency, lack of power backup, inadequate post-sale support and inadequate features/modules in the current Integrated Library Systems as the challenges faced in automation. Malkanthi (2017) stated that OSS usage in Sri Lanka became increasingly popular after 2000, and university libraries have been tended to utilize OSS for library automation.

The study also indicated that OSS was used by 80% of university libraries at the time of the study, with Koha ILMS (70%) being the most popular. These findings imply that the libraries of Sri Lanka are moving towards the adoption of OSS due to the associated benefits. However, no research has focused entirely on public libraries of Sri Lanka to examine their present automation status.

The public library sector in Sri Lanka is one of the significant library service sectors, with about 1080 public libraries, which are governed by the public authorities (National Library of Sri Lanka, 2020). Public libraries function as the major and easily accessible information centers of the country, delivering information services to the general public to meet a variety of information needs. Therefore, strengthening the public library sector using technological developments is a timely need in providing an effective service. The adoption of OSS can be identified as a great approach for public libraries with their existing resources. Therefore, investigating the present automation status of public libraries of Sri Lanka, factors affecting the use of OSS and challenges faced by public libraries in using OSS would be important in devising necessary strategies for further development of public library sector.

Methodology

The study used the qualitative research method with an expert sampling technique. According to Frey (2018), expert sampling means "identifying key informants who can inform an inquiry through their knowledge, experience, and expertise". Expert sampling is a simple sub-type of purposive sampling, which is used when the researcher needs to

gain knowledge from individuals who have particular expertise. The sampling procedure was carried out in 03 steps.

1. Setting up criteria to define national-level experts in library automation
2. Purposively selecting 05 national level-experts in the field of library automation
3. Examining the conformity of the selected 05 experts with the predefined criteria

A predefined set of criteria are listed below.

1. Minimum ten (10) years of working experience in the library technology sector, including OSS
2. Minimum ten (10) years of teaching experience in the certificate to postgraduate programs of library and information sciences (LIS)
3. Contribution as a resource person and consultant for national-level open source initiatives of public libraries during the last ten (10) years

A sample of 05 experts was purposively selected and the information collected from institutional profiles, google profiles, and ResearchGate were used in examining their conformity to the defined criteria. The contribution of each expert to the field of library technology, including OSS, was summarized.

Table 1

Five (05) expert's contribution for library technology sector and open source initiatives

Expert	Their Contribution
E1	1. Technical consultant in automating around 85 public libraries using Koha open source ILMS

	2. Consultant in developing e-library centre in Colombo public library of Sri Lanka
	3. Visiting lecturer in the field of library technology of the several LIS programs of Sri Lanka
E2	1. Consultant of the national initiative launched by the Information and Communication Technology Agency (ICTA) with the collaboration of the national library of Sri Lanka to build model libraries in each district
	2. Visiting lecturer in library technology of the several LIS programs of Sri Lanka
E3	1. Pioneer in introducing Koha open source ILMS to the libraries of Sri Lanka
	2. Consultant on a project for the library service board of central province that aimed to improve ICT of public libraries in the central province
	3. Visiting lecturer in library technology of the several LIS programs of Sri Lanka
E4	1. Resource person in conducting training programs for public libraries on open source Openbiblio through the national library of Sri Lanka and the National Institute of Library and Information Sciences during the period 2016-2018
	2. Conduct lectures in diversified subjects of LIS in several higher education institutes of Sri Lanka

E5	1. Resource person in national-level public library projects in developing public libraries with Koha open source ILMS
	2. Consultant in automating 23 public libraries in the northern province of Sri Lanka and providing sole lifelong technological support for northern province public libraries
	3. Visiting lecturer in library technology of the several LIS programs of Sri Lanka

The above facts confirmed the suitability of the given 05 experts for interviewing to explore the current status and future trends of OSS usage by public libraries in Sri Lanka.

Data were collected in November 2021, conducting open-ended semi-structured interviews (Appendix I). A flexible interview guide consisting of open-ended questions was developed. The interview guide primarily consisted of questions underpinning the research objectives, i.e. (a) open source initiatives of the public libraries in Sri Lanka, (b) reasons for the popularity of some OSS, (c) challenges faced during usage of OSS (d) future of the public library open source initiatives. Interviews were conducted to gather experts' perceptions on the above questions and were audio-recorded with the permission of each participant. All sessions were transcribed after completing the interviews, and these transcriptions were used as the research data.

Summary of the transcriptions with major findings was inserted into a spreadsheet in a manner that it expressed a visual summary and allowed for explanations.

Results and Discussion

The major open source initiatives targeting public libraries of Sri Lanka were explored from the literature sources and interviews. Table 2 shows the important open source initiatives completed during the last ten years (10) from 2011-2021, and ongoing projects as of November 2021. The activities are sorted in ascending order of their completion year. The findings indicated that Koha ILMS is the main OSS used for public library automation during the last ten years from 2011-2021. Based on the results, the Open University of Sri Lanka (OUSL) can be identified as the main higher education institution involved in public library automation using Koha open source ILMS.

Table 2

Major opensource initiatives carried out during the period from 2011-2021 and ongoing projects as at November 2021

S. No	Major Initiatives	Period	Implementation
01	Automation of 30 public libraries with Koha open source ILMS	2016-2017	Ministry of Provincial Councils and Local Government with the technical consultancy given by the OUSL
02	Training programs & workshops for introducing Openbiblio for public libraries	2015 -2018	National Institute of Library and Information Sciences (NILIS)and National Library and Documentation Services Board

03	Automation of 14 public libraries with Koha open source ILMS	2018	Ministry of Provincial Councils, and Local Government with the technical consultancy given by the OUSL
04	Automation of 19 public libraries with Koha open source ILMS	2015-2020	Provincial councils with the technical consultancy given by the OUSL
05	Establishment of 26 digital libraries, one in each District and at the national library. 07 public libraries are automated.	2017- 2021 Ongoing	Ministry of Education, Ministry of Provincial Councils & Local Government and National Library and Documentation Services Board
06	Automation of 10 public libraries with Koha open source ILMS	2021 Ongoing	Provincial councils with the technical consultancy given by the OUSL
07	Automaton of 16 public libraries in the northern province using open source Koha ILMS		Provincial councils with the technical consultancy given by the University of Jaffna

Use of OSS by Public Libraries of Sri Lanka

All the 05 experts remarked that the Koha ILMS is the most widely using OSS in Sri Lanka's public libraries at present (Response 1). According to experts' comments, approximately 100 public libraries are currently being automated with Koha open source ILMS. Few public libraries around 15 use both open source and proprietary software, namely Openbiblio, Granth A, Nekfa, and Purna ILMS. This indicated that open source solutions are popular among public libraries of Sri Lanka.

According to the National Library of Sri Lanka (2020), total number of public libraries of Sri Lanka was 1,080. Of the total, 10.7% of public libraries of Sri Lanka have automated their functions with an ILMS.

Response 1

Description of Use of ILMS by public libraries of Sri Lanka

ILMSs are divided into three types: proprietary systems, open-source systems, and free systems. Koha is the most popular ILMS among public libraries, with approximately 100 public libraries being automated with Koha, whereas a few public libraries use Openbiblio (~05-06 public libraries). Granth A and Nekfa proprietary systems are being adopted by few numbers of public libraries (E1).

Koha is the most commonly used OSS among public libraries, while Openbiblio has adopted by only a few public libraries (E2).

Most public libraries in Sri Lanka do not use an ILMS, and I have seen that many of them operate even without a computer. Overall,

less than 10% of public libraries are automated, and Koha is the most extensively used OSS, with roughly 100 public libraries out of all automated public libraries. Only a few public libraries adopt the Purna system based on WINISIS for the sole purpose of maintaining an online catalogue (E3).

Koha ILMS is the most commonly used OSS at present, and Openbiblio and its variants have been adopted by very few public libraries of Sri Lanka (E4).

All the automated public libraries scattered over 05 districts of the Northern Province of Sri Lanka adopt Koha OSS. In the past, just a few public libraries of Sri Lanka used Openbiblio. However, public libraries are no longer going for the Openbiblio due to the lack of supportive forums in Sri Lanka since 2014 (E5).

Factors Influencing the Popularity of some OSS Among Public Libraries of Sri Lanka

Experts were asked for their open perspectives on the factors influencing the popularity of particular OSS, most notably Koha open source ILMS, among Sri Lankan public libraries (Response 2). Table 3 shows a summary of their opinions. According to Table 3, features and functions of Koha ILMS, lower funding requirement associated with OSS, compliance of Koha ILMS with many international standards, availability of subject experts, Unicode compatibility, high system quality, high user friendliness, and ability to integrate Koha ILMS into the LIS courses as a practical component of the subject of library automation could be

identified as major factors influencing Koha open source ILMS becoming more popular among public libraries of Sri Lanka.

04 out of 05 experts stated that lower funding requirements as an OSS is the major factor influencing the popularity of Koha ILMS in Sri Lanka. As a developing country, Sri Lanka would be more economically benefited from adopting these open source technologies, particularly in the library sector, since most libraries provide nonprofit services to their patrons.

Table 3

Factors affecting popularity of Koha ILMS in public libraries of Sri Lanka

Factor	Number of Experts
Features and functions available in Koha	5
Open source software/ Less funding requirements	4
Support many international standards	4
Availability of subject experts	3
Unicode compatibility	3
High system quality in terms of data security, service provision to users, and user satisfaction	3
High user friendliness	3
Integration of Koha ILMS into the LIS courses as a practical component of the subject of library automation	3
High level of social acceptance	1
Availability of national level projects	1
High efficiency	1

Response 2

Description of factors influencing the popularity of OSS

> *The main reason is the high level of social acceptance emerged as a result of the involvement of several university sector libraries towards open source initiatives. Several university libraries have automated library functions with OSS, and library academic personnel conduct lectures on OSS in diploma to master's level programs of the Sri Lanka and provide consultancy for national-level library automation projects with OSS. Students enrolled for Bachelor of Arts Honors in Library and Information Studies offered through the Open University of Sri Lanka are able to learn on Koha ILMS under the subject of advanced library automation. Features and functions available in Koha, High efficiency, the availability of experts on the subject, global popularity of Koha as an OSS, the availability of national-level projects, Unicode compatibility of Koha ILMS, compliance with international standards, and high system quality gave rise to Koha ILMS among public libraries of Sri Lanka. Also, the interest of some public libraries to accept these technological inventions and the competitiveness of public libraries to upgrade to higher ranks given by the National Library affect to adopt OSS in public libraries (E1).*

> *The main factor influencing Koha ILMS becoming more popular is less funding requirements as an OSS. Most of the developed countries use commercial software than Koha ILMS for library*

automation, as they have enough funds. If we look at the Koha ILMS, the ability to manage all library functions, the availability of enough experts in Sri Lanka, the high quality of the system, the availability of powerful searching indexes, the support for multiple languages, the user friendliness of the platform, and compliance with international standards are major reasons for most public libraries in Sri Lanka to adopt Koha ILMS (E2).

Koha as an OSS, less fund requirement affects mainly for its popularity among public libraries of Sri Lanka. Koha ILMS is used for practical lessons in several library and information science courses in Sri Lanka from diploma to master's level also has impacted on becoming popular. It has a lot of features and functions compared to other OSS. The high user-friendliness and high customization capabilities of Koha ILMS also contributed to its popularity among public libraries of Sri Lanka. At present, an increased interest among public libraries in adopting technological innovations could be seen (E3).

Lower funding requirement associated with OSS is a main factor for the popularity. Although there is no subscription cost associated with OSS, public libraries must rely on an external source for service, which requires a certain investment. Compared to proprietary systems, where modifications must be made through the service provider, OSS allows changes to be made efficiently and effectively, as anyone can use OSS independently. Unicode compatibility feature of Koha ILMS is also an important element in

its acceptance because public libraries primarily operate with local languages. The features and functions of Koha ILMS are adequate for Sri Lankan libraries, and it supports international standards. Public libraries are encouraged to opt for library automation, with the grading process carried out by the National Library and performance evaluation by some provincial councils, which uses the status of library automation as an evaluation criterion. Currently, Koha ILMS is integrated into the majority of Sri Lankan LIS courses as a practical component of the subject of library automation. Course on Library Automation (COLA) offered by Sri Lanka Library Association (SLLA) also uses Koha ILMS as a practical component at present (E4).

Koha is an open and publicly available system, the first most influential aspect. The second factor is the availability of expertise. There are dedicated forums across the country to support public libraries with version updates and troubleshooting issues. The third aspect is enhanced features and functionalities, including more filtering options for patrons, the ability to customize patron forms easily, and the fact that Koha releases new versions regularly. Koha OSS can be used to manage all of the functions of the library. The system's popularity is also influenced by its high quality. It supports most international standards (AACR2, RDA, Sip protocol, MARC 21 framework etc.) and is a more user friendly platform (E5).

03 experts pointed out that Koha ILMS has been introduced as a practical component to library automation subjects in most Sri Lanka's LIS

courses. Therefore, the study explored the structure of the LIS courses offered by higher education institutions of Sri Lanka to identify the basic composition of subjects related to library automation. According to Table 4, most LIS courses of Sri Lanka conduct practical lessons on Koha open source ILMS in teaching library automation at present.

Table 4

Use of Koha open source ILMS as a practical component in teaching library automation in LIS programs

Programme	Institute	Subject	Practical component as at 2021	Course duration	Source (Institutional website)
Course on Library Automation (COLA)	Sri Lanka Library Association (SLLA)	Library Automation	Koha ILMS	01 year	SLLA, 2021
Higher Diploma in Library and Information Science	University of Kelaniya	Library Automation	Koha ILMS,	01 year	University of Kelaniya, 2021
Bachelor of Arts (Special) in library and information Science	University of Kelaniya	Library Automation	Koha ILMS	04 years	University of Kelaniya, 2021

| Bachelor of Arts Honors in Library and Information Studies | The Open University of Sri Lanka | Advanced Library Automation | Koha ILMS | 02 years (offer for higher diploma holders) | The Open University of Sri Lanka, 2021 |
| Master of Social Science in library and information Science | University of Kelaniya | Information Technology | Koha ILMS | 02 Years | University of Kelaniya, 2021 |

In addition to the factors affecting the popularity of some OSS, two experts stated that, public libraries are currently encouraged to go for library automation, with the grading process carried out by the National Library of Sri Lanka, which uses the status of library automation as an evaluation criterion. This also could be a factor influencing the current trend toward automation in public libraries.

Challenges Faced by Public Libraries in Using OSS

The study revealed that only 10.7% of public libraries of Sri Lanka had taken a step ahead to automate their library functions, while 89.3% of libraries still carry out library functions manually using their traditional setup. Therefore, the study discovered the challenges confronted by public libraries of Sri Lanka in moving to and adopting OSS. 05 experts expressed their open viewpoints on the challenges faced by public libraries in moving to and using OSS (Response 3).

A summary of the expert's opinions on the factors impacting the public library's adoption of OSS is shown in Table 5. Accordingly, a lack of technical knowledge for installation and maintenance could be identified as the major challenge. In this context, the public libraries are forced to rely on external sources in implementing open source initiatives for their libraries. Continuous need for expert support, lack of documents on the subject, funding issues during implementation and maintenance, and lack of top management support could also be recognized as some major challenges faced by public libraries.

Table 5

Challenges faced by public libraries in moving to and adopting OSS

Challenges	Factor	Number of Experts
Lack of technical knowledge for installation and maintenance	Knowledge &skills	5
Continuous need for expert's support	Support	4
Lack of documents on the subject	Resources	4
Funding issues during implementation and maintenance	Cost	4
Lack of top management support	Top management support	3
Less interest of some of the librarians	Innovativeness	2
Giving less priority for some important operations	Knowledge & skills	2

Changing of the library staff regularly	Resources	2
Less quality of local servers cause server failures	Resources	1
Difficulty in getting support during technical failures	Support	1
Changing of top level management	Top management support	1
Lack of library staff, specially professional staff	Knowledge & skills	1
Hard Installation process	Support	1
High level of technical equipment requirement	Resources	1
Lack of innovativeness of the librarian	Innovativeness	1
Lack of previous experience	Knowledge & skills	1
Complex, less attractive system interfaces	Hedonic motivation	1
Infrastructures issues	Resources	1

According to the results, the study identified seven (07) different factors affecting the adoption of OSS in public libraries of Sri Lanka. These factors were: knowledge and skills, resources, support, cost, top management support, innovativeness, and hedonic motivation. Based on the frequency of responses, knowledge and skills, resources, support, cost, and top management support of the organization were the four (04) topmost factors affecting the adoption of OSS in public libraries of Sri Lanka.

Response 3

Description of Challenges faced by public libraries

The initial investment is a significant challenge for public libraries of Sri Lanka. Despite the fact that Koha ILMS is an open source system, public libraries require funding for infrastructure development, system installation, and staff training. This serves as a major barrier to adopting of technological systems for library operations in the public library sector. Lack of top management support also causes stepping down of public libraries from adoption of OSS. Less interest of some of the librarians prevents them from adopting technologies. Requirements for high level technical equipment and technical knowledge for installation, maintenance, and support during technical failures, internal staff problems, lack of innovativeness of some librarians, lack of previous experience on library automation and lack of documentation on the subjects can be highlighted as the challenges faced by public libraries. Having complex, less attractive system interfaces also hinder public libraries moving towards OSS adoption. Some public libraries give less priority for some important operations like taking backups and image management, which makes several issues (E1).

I think limited ICT knowledge of most public library employees, makes it difficult in installing, administering, executing the customizations of OSS, and maintaining hardware by public libraries. This is the most significant barrier that public libraries of Sri Lanka face in using OSS. Insufficient funding for system

maintenance is another challenge for public libraries. Public libraries need the support of experts who have knowledge on both ICT and library and information sciences. Lack of support from top management, lack of interest of some public libraries for adopting OSS also prevents the movement of public libraries towards open source initiatives. Top management gives less priority for public library development as most public libraries are not directly involved in money generation (E2).

Less technical knowledge of some of the staff members of the public libraries makes the self-installation of the systems and maintenance difficult, which might be considered a serious problem. Public libraries have difficulty obtaining the finances essential for library automation as most public libraries do not have enough self-funding options. Server maintenance is a major concern with their existing resources. It's hard for public libraries to update the versions of ILMS on their own. Without the support of outside sources, public libraries are unable to correct technical failures and repairs on their own. Less support from top management is another challenge that some public libraries are dealing with. Another problem is the lack of documentation required in acquiring the necessary knowledge and skills (E3).

Obtaining the necessary funds is a most challenging task. The public libraries are also affected by the lack of library staff, particularly professional staff members. Casual staff members perform the majority of public library professional works, which impacts the

quality of the library process in some circumstances. Some public libraries do not use ILMS to carry out all their library functions even though they are automated. For example, as some public libraries haven't finished cataloging all of the library materials, they have to perform circulation services manually. Infrastructure issues are also a concern. Lack of technical knowledge is a problem. However, some public libraries acquire the necessary skills and knowledge while implementing the OSS. Public libraries need maintenance support from external parties. Documentation on the OSS and library automation is not sufficient. Most Sri Lankan libraries use Koha ILMS for various library functions, except for ordering library resources. The ordering process is carried out manually in the majority of libraries. This is another matter of concern, and it emphasizes the need for Koha ILMS to be further developed (E4).

According to my experience, the hard installation process of Koha ILMS is a major challenge for Sri Lankan public libraries with their level of knowledge because it employs handling four operating systems: MySQL, Apache, Pearl, and Linux. As a result, they are unable to complete the installation on their own. Public libraries require expert support constantly in using open source software. But, obtaining continuous support is difficult due to several reasons. Server failures are caused by low-quality local servers, which is a problem that public libraries are currently dealing with. Lack of proper attention of public libraries to certain critical procedures, such as backups and image management, creates problems for them.

> *Changing top management positions from time to time also create problems for public libraries in adopting OSS. Lack of available documents on OSS in native languages could be identified as another problem (E5).*

Sustainability of OSS of Public Libraries of Sri Lanka

The experts were asked to give their perspectives on the requirements to ensure the sustainability of OSS adopted by public libraries of Sri Lanka. Experts stressed the need for a proper mechanism that focuses on maintaining OSS adopted by public libraries. Maintenance of OSS includes updating the OSS with their new versions, careful handling of hardware, especially servers, taking backups and addressing technical failures (Response 4). Additionally, experts highlighted the need for a national level or regional level plan to provide continuous support for the ICT developments of public libraries.

Response 4

Description of requirements for sustainability of OSS adoptions

> *It is important to make aware the governing top management of the public libraries on the OSS adoption, requirements during the process, its benefits and challenges, in order to minimize many barriers. Maintenance of hardware is the most important area to consider in ensuring the sustainability of OSS adoption. It would be important to have a proper national plan that focuses on allocating funds for system maintenance and providing frequent training sessions for public libraries (E1).*

Koha ILMS normally releases two versions per year. Public libraries require updating the versions periodically. Not only that, they should properly maintain the servers to ensure their long-term functionality. Therefore, continuous support from external bodies is importantly needed. There should be a national level mechanism to provide them with continuous support. It would be better for the long-term sustainability if all of these operations could be managed through a central hub led by a team of ICT and Library science experts (E2).

It is necessary to develop a special plan focusing on the long-term maintenance of OSS. Public libraries can discuss this with the consultancy agency to build up a maintenance agreement that will last for a few years. It would also be advisable to develop new cadre positions for public libraries focusing ICT requirements and recruit ICT-skilled workers for public libraries to maintain the long-term viability of OSS (E3).

Public libraries must have an appropriate investment plan that focuses on maintaining the OSS that they have adopted. Currently, there is a growing trend of libraries adopting technological interventions in parallel with the global increase in technology usage and the country's prevailing situation (E4).

In fact, establishing national or regional forums to provide continuous support for public libraries is required. Public libraries can take the lead to establish these forums with subject specialists (E5).

Conclusion

Despite the fact that public libraries of Sri Lanka are moving towards adoption of OSS, the study observed the lack of studies that have explored the present status of open source initiatives of public libraries in the Sri Lankan context. Hence, the current study was carried out to explore the present status of public library automation and the use of OSS in public libraries in Sri Lanka. The findings made several contributions to the literature and to the awareness of governing bodies of public libraries in Sri Lanka. Further, this will serve as a reference document for future research on public library automation since exists a lack of research studies on OSS adoption and use in public libraries of Sri Lanka.

Koha ILMS was the major OSS used for public library automation activities during the past ten (10) years, from 2011-2021. The Open University of Sri Lanka has been the main higher education institution engaged in automating public libraries using Koha open source ILMS. Based on the experts' opinions, the study revealed many motivating factors and challenging factors in implementing OSS adoption in public libraries. Considering the motivational factors, OSS adoption is a socio economically effective solution, especially for Sri Lanka as a developing country. OSS offers public libraries to move forward with technology to provide an effective service for library users without investing a significant capital. However, since public libraries of Sri Lanka face a major challenge in technical knowledge in installation and maintenance, it would be important for the libraries to depend on external sources in implementing open source initiatives.

The study identified the need for a proper mechanism focused on the maintenance of OSS adopted by public libraries, such as updating the

OSS with new versions regularly, providing proper care on hardware specially the servers, taking backups and addressing technical failures to ensure the sustainability of open source initiatives of public libraries.

Suggestions

There is a growing trend among Sri Lankan public libraries to adopt open source initiatives. However, it is important to take appropriate measures to overcome the problems that public libraries experience in moving to and adopting open source initiatives. The study identified maintaining OSS as the most challenging task faced by Sri Lankan public libraries. According to experts' opinions, developing a proper mechanism concentrating on OSS maintenance is essential in ensuring the long-term sustainability of open source initiatives. It is also suggested that a national or regional plan be developed to provide continuous ongoing support for public library ICT developments. The leading and controlling body of the public libraries of Sri Lanka may take the leadership in addressing the challenges that public libraries face when adopting new technologies, and in developing necessary solutions to these problems.

Future Research

This study is a preliminary study carried out to explore the present status of open source initiatives of public libraries of Sri Lanka. The study identified the factors motivating public libraries to adopt open source initiatives and challenges faced during the process based on the viewpoints of the experts of the library technology sector. However, further studies are required to verify the findings of this study and to explore different aspects such as level of OSS adoption, management, sustainability, future trends, and measures for supporting public libraries.

Acknowledgement

Appendix I

Following set of Open ended questions were asked from five (05) experts to collect data for the study.

1. How do you contribute to the open source software initiatives of Sri Lanka?

2. What are the Library management software used by public Libraries of Sri Lanka

3. Among them, what are the popular Library management software?

4. What are the Open source software used in public library automation?

5. What Open source software became popular among public libraries?

6. Why these open source software have become more popular among public libraries of Sri Lanka?

7. What are the challenges faced by public libraries of Sri Lanka in using OSS?

8. What do you think about the future of these open source initiatives?

9. What kinds of strategies are required to ensure the sustainability of these open source initiatives?

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