ARTICLE

Overview of the Library Automation System in South Sulawesi Libraries

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ABSTRACT

Technology in libraries has played an essential role in serving today's communities. This study provides an overview of the integrated library systems/software (ILSs) used in libraries in South Sulawesi, Indonesia. It aims to highlight the strengths and possibilities of ILSs and briefly explain their advantages and disadvantages along with the cost of implementation. The data was gathered from questionnaires sent via an online survey and from direct interviews with certain academic libraries over the period of 2019 to 2020. Fifty-three of 67 libraries that fulfilled the study have implemented an ILS. To deeply understand the application, a direct interview with some libraries was conducted to learn the advantages and disadvantages. The result of the study showed that the most used ILSs are SLiMS and INLISlite and other programs like Apollo, Athenium Light, Simpus, Spektra, Jibas, KOHA, and Openlibrary. The budget spent is an average of 300 USD. While the ILSs have helped these libraries improve services, IT expertise and adequate resources are needed, especially when the systems present problems. An easy-to-use system that costs less will potentially be used in this area of research. This study will be particularly helpful for any library in Indonesia. These findings may also be generalized to libraries in other countries facing economic and technological similarities.

INTRODUCTION

Historically, the daily operations carried out by any library across the world have focused on organizing knowledge, known as knowledge management. Such processes include acquisitions, preservation, processing library resources, and making resources available to user communities. Libraries are still engaging in these daily operations; however, nowadays, a library's resources have taken on a new format to accommodate a patron's preference for digital access to resources. The number of electronic information resources has rapidly increased and may far exceed a library's printed counterparts. The management and maintenance of library services has also changed along with information communication and technology development. The presence of technology in the library will undoubtedly help to complete and improve such daily operations.

Currently, there are a variety of offerings for ILS software available on the market, either free open-source software (FOSS) or proprietary licensed software. Fundamentally, they offer the same principal function of improving and facilitating library management and services with the help of technology. As noted earlier, competition in the ILS market is applied in both types: FOSS and proprietary software. However, it is essential to note that each vendor or developer keeps improving their systems to ensure customers subscribe to their programs and equipment. This research will not further discuss the advantages and disadvantages of these two types of ILS developers or vendors.

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An ILS facilitates library management and services. Therefore, every library should consider implementing an ILS. Applying library automation needs proper planning, as written by Tabusum, Sz, and Batcha.[1] In his article, Tristan Muller stated three analyses that every library needs to be aware of when choosing an ILS, which are evaluation of software licensing, evaluation of the community, and evaluation of the functionalities.[2] As written by Ukachi et al., a study of the benefits of library automation systems stated that use of an ILS could reduce the stress level of the librarian's workload and even increase the reach of library services to users who live far away.[3] The implementation of an ILS undoubtedly provides very significant benefits in library management and services.

The application and increasing use of ILSs is current in developing countries. A study by Alan Hopkinson in 2009 showed that with the growing internet network, "library automation in developing countries will have the same capabilities as the industrial world, but will not have the finances to support it."[4] Noteworthy, Hopkinson's study mentioned that developing countries, even challenged with limited costs, continue striving for library automation systems until recent years. Numerous papers on the implementation of ILS in various types of libraries in developing countries have indicated that although cost poses a challenge, the implementation of ILS in developing countries continues to progress. However, free open-source software (FOSS) has become the preferred option for many libraries in developing countries, including Indonesia, due to library budget. Some related studies regarding ILS were written by Dennison;[5] Singh;[6] Singh;[7] Zou and Liu;[8] Tyagi and Senthil;[9] and Wang;[10] as well as a book by Engard.[11] These seven references contribute to a comprehensive understanding of open-source software ILS, covering both its potential benefits and the practical challenges that libraries may encounter. This synthesis not only highlights the current state of open-source ILS but also points towards areas of further exploration and improvement within the open-source library technology landscape.

Although in 2022 there were 164,610 libraries in Indonesia, there has been no comprehensive report with how many libraries in this country have implemented an ILS.[12] However, there is undoubtedly an increase in the use of technology in this nation, including ILS usage. The use of computer applications that started in Indonesia 50 years ago, the activity of several librarians related to technology, and the abundance of publications associated with ILSs in Indonesian libraries have shown that there is a high possibility of such implementation.[13] Of course, it might take some time and suitable methods to count every ILS used in more than 164,000 libraries in Indonesia. Therefore, this survey focuses on the implementation of ILSs in South Sulawesi libraries and lays the ground for further research. South Sulawesi is a province situated in the eastern part of Indonesia, known for its diverse geography that includes mountains, plateaus, and coastal areas. Its capital is Makassar, a bustling port city. The region boasts a rich cultural heritage, with a mix of traditional customs, dances, and cuisines, and it plays a significant role in Indonesia's economic landscape, particularly in the sectors of agriculture, fisheries, and trade.

An online survey was administered to any type of library throughout South Sulawesi over the period of 2019 to 2020 on how they dealt with an integrated library system. Sixty-seven participants gave feedback; 50% of the participants came from school libraries, followed by academic, public, and special libraries.

Figure 1. Number of participant libraries that filled out the form by type

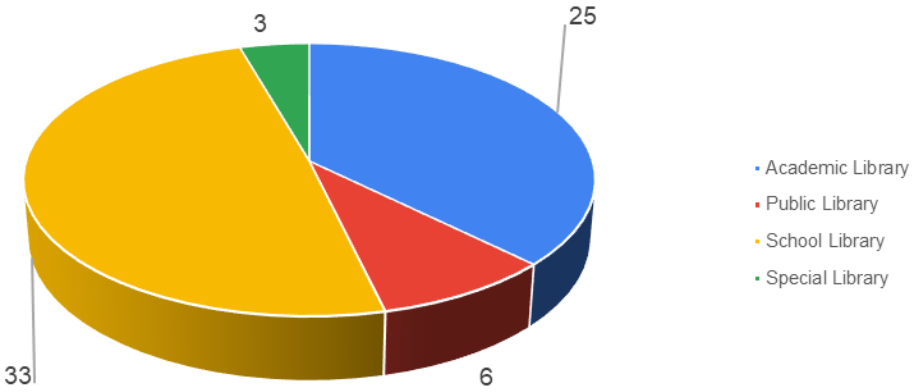


Figure 1 illustrates the distribution of survey respondents across different library types. Notably, out of the total participants, only 53 have integrated an integrated library system (ILS) into their libraries. Consequently, this study aims to present a comprehensive overview of ILS implementation across all participating libraries, regardless of their type. The analysis will encompass details such as the system's name, its advantages and disadvantages, and the associated budget allocations.

LITERATURE REVIEW

Integrated Library System (ILS)

An integrated library system (ILS) is a set of components that are interconnected with each other. Integrated library systems are those interrelated tools in the library that have functions to enhance library services or are, as defined by Breeding in 2008, software applications and hardware that organize, track, and make accessible library information resources.[14] ILSs first appeared in the late 1970s. Since then, improvements in functionality and the inclusion of new features that can be interconnected with one another have continued. In an ILS, modules are provided for specific functions, for instance there may be bibliographic, circulation, membership, online public access catalog (OPAC), authority control, interlibrary loan, serials control modules, etc. All these modules are connected so a library can work in the same single ILS.

The application of an ILS within the library provides many practical benefits. For instance, an ILS reduces the drudgery of repeated manual efforts in library routines.[15] It might also reduce the level of job stress on the staff, even though in some libraries, some librarians are worried about the presence of this kind of technology.[16] Hence, it is essential to note some critical considerations for every library in selecting and choosing an ILS. Salter (2003) explored the steps and questions, including financial factors, involved in making a selection for an ILS, e.g., establishing an ILS planning committee, identifying any sacred cows, analyzing current work flow, etc.[17] Koneru also examined how important the design and selection of an ILS is. It is imperative for libraries to design and develop an ILS that meets not only the present but also future demands and challenges.[18] Muller provided some criteria for choosing an ILS, particularly open-source software, stating that technology reinforces its primary mission of disseminating information while further

justifying its choice of technology in the context of public service.[19] He added that a library should carefully consider the software community first before selecting a product.

The adoption and expansion of integrated library systems (ILSs) continue to grow in all types of libraries, in tandem with the advancements in sophisticated technology in the present era. The increasing complexity and capabilities of modern technology have a direct impact on the evolution of ILSs within libraries. This signifies that as technology progresses, the features, functionalities, and overall effectiveness of ILSs in libraries are also influenced, reflecting a dynamic and responsive integration of technological innovations within the library landscape, along with the sophisticated technology now available. Libraries no longer just manage physical collections but also digital ones. Groenewegen, in his article entitled "Four Decades of Library Automation," describes the development of library automation in Australia.[20] From the development, Grant introduced a new term to better describe the expanded features of the modern ILS, "library service platform" (LSP).[21] An LSP, in his view, offered much more than the earlier ILS. What he wrote has shown that every ILS is experiencing outstanding development nowadays. Each offers the best to the library that wants to use it. In the same year, Wang and Dawes critically determined the four aspects of the next generation of ILS that libraries need to think of: comprehensive library resource management, a system based on service-oriented architecture, meeting the challenge of the new library workflow, and the next-generation discovery layer.[22] Shivakumaraswmay reviewed the success story of a library automation system.[23] He explored the definition and characteristics of the NewGenLib library management software, outlining the criteria for selecting optimal library management software, discussing their advantages and limitations, and describing the features of the NewGenLib library management software. Xiaohua Li has reviewed the history of the ILS and discussed its limitations. However, ILSs are going to advance over time.[24]

The need for a system that can organize digital library collections today is a must. The current library is not merely limited to working hours but 24-hour library service through its digital services. Therefore, an ILS that also provides such a service is very suitable to the needs of today's society. Upasani, in his study, said that modern libraries need to stay updated with current technological developments.[25] Otherwise, the library will be obsolete, as Mark Smith stated in his article entitled "Top Ten Challenges Facing Public Libraries."[26]

The benefits of ILSs have attracted many libraries to implement. Each ILS, whether it is open-source or commercial, offers advantages. It all depends on the needs of the library that will use it. It is understood, however, that integrating technology into the library demands planning expenditure for hardware, software, additional auxiliary equipment, staff training, and so forth. These issues confront libraries in the developing world like Indonesia where costs and human resources are the main constraints in this context. It is not surprising that many libraries in developing countries took open-source library software to overcome smaller budgets.

METHODS

This survey explored the use of integrated library systems in several libraries in South Sulawesi, Indonesia. For this study, an online survey was administered to any type of library throughout South Sulawesi over the period of 2019 to 2020. The researchers also collected direct data and visited some academic libraries to deeply interview staff on experiences with their ILSs. From the results of in-depth interviews, the data is then displayed, categorized, reduced, and verified for further conclusions to be made in this paper. The questionnaire was designed to find out what kinds of ILS were used and to understand the constraints, challenges, and costs of the systems. In

terms of the qualitative data, the study used a word tool generator provided by https://monkeylearn.com/word-cloud/ to identify and then visually depict the main advantages and disadvantages that the participants experienced during the implementation of the ILS.

RESULTS AND DISCUSSION

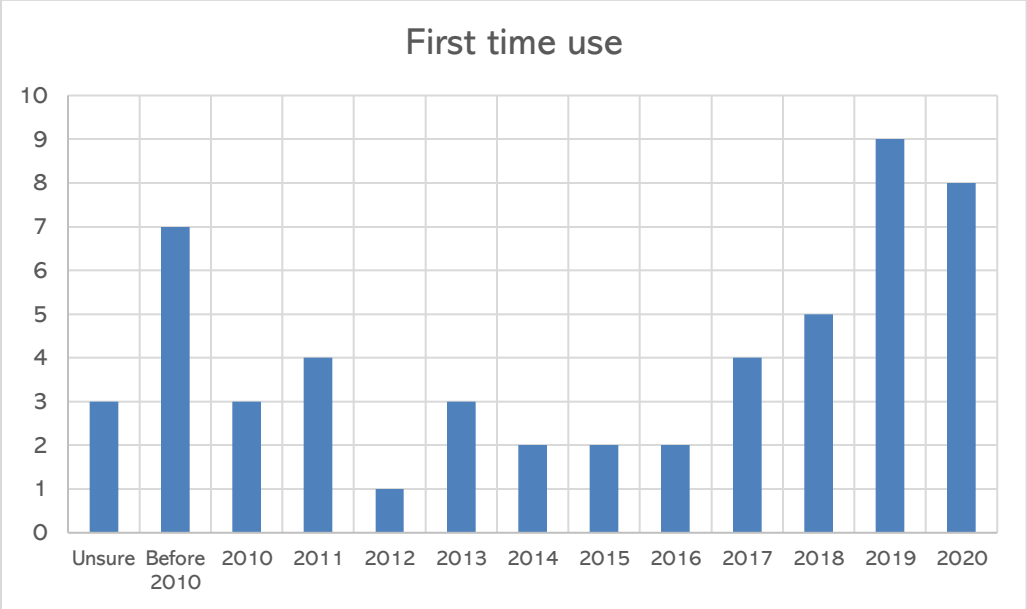
From the online questionnaires distributed, 53 libraries out of 67 participants completed the questionnaires and confirmed that they implemented an ILS, as shown in table 1.

Table 1. Participant libraries that used an ILS

Type of Library	Total	%
Academic	23	43%
Public	6	11%
School	21	40%
Special	3	6%
Total	53	100%

The initial year of use from the 53 participants' libraries was before 2010. The use of ILS in South Sulawesi libraries increased over the past 10 years, as shown in Figure 2. In 2019 and 2020, the numbers increased rapidly.

Figure 2. Year of first-time use on an ILS by total libraries.

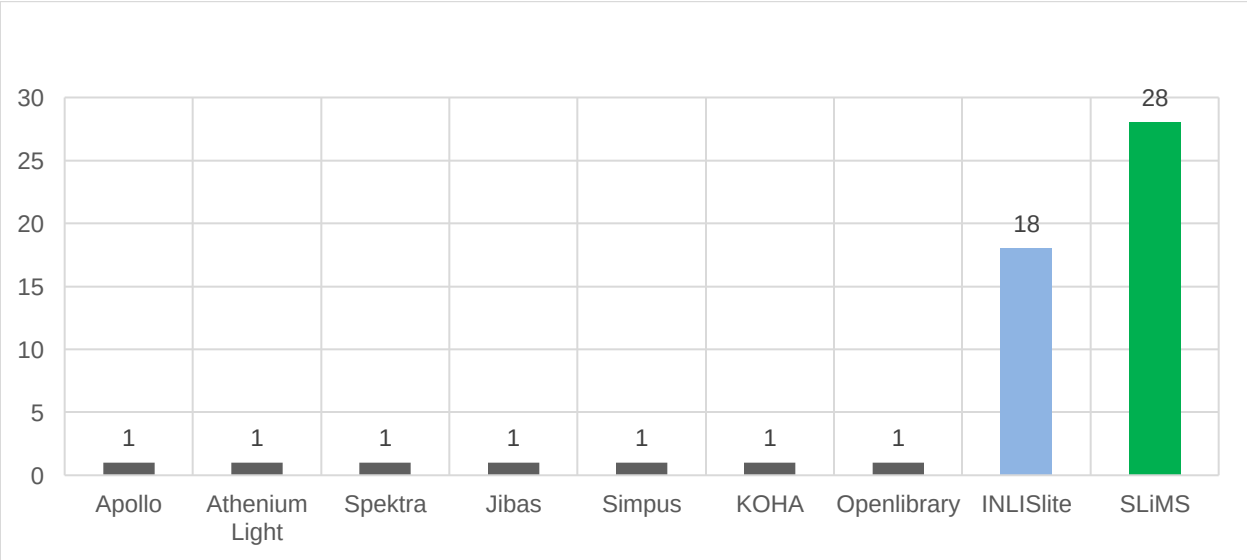


Integrated Library Systems Used

The survey found that nine ILSs have been implemented in the participants' libraries (see fig. 3). Four of the eight ILSs came from abroad, namely KOHA, Openlibrary, Apollo, and Athenium Light,

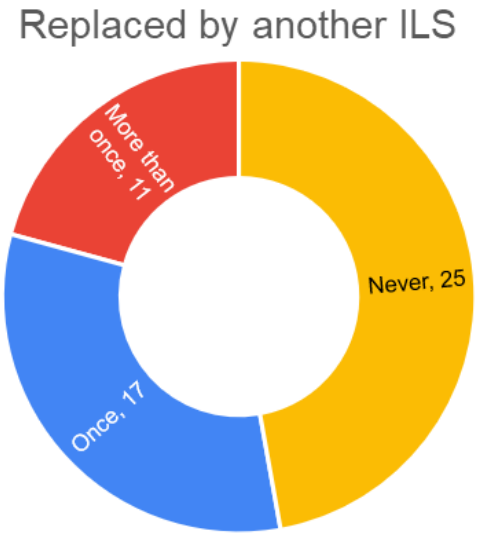
while the other four were developed in Indonesia: INLISlite (Integrated Library System Lite), SLiMS (Senayan Library Management System), Spektra, and Jibas SIMTAKA (*Sistem Informasi Manajemen Perpustakaan* or Library Information Management System). The latter is basically provided for school libraries. INLISlite and SLiMS are two ILSs that are commonly used in any type of libraries in Indonesia. INLISlite is owned and developed by the National Library of the Republic of Indonesia. Meanwhile, SLiMS is an ILS established by the library of the Ministry of Higher Institution of the Republic of Indonesia. Even now, this system continues to be developed by the SLiMS community throughout the country. Due to this community, the appearance and additional features of this ILS are more robust.

Figure 1. Kinds of ILSs used in South Sulawesi libraries.



The survey indicates that the most common library management system is Senayan Library Management System (SLiMS), followed by INLISlite. These two systems are in fact the most often used ILSs in Indonesia, as previously assumed, and the current study further supports this. The Ministry of National Education's Center for Information and Public Relations established SLiMS, initially made available to the public in 2007 (Wicaksono, 2022).[27] The Library of the Ministry of National Education of the Republic of Indonesia opted to integrate the SLiMS system, a decision that followed a prior engagement involving a technological challenge with the Alice system. This strategic adoption of SLiMS reflects the library's commitment to staying abreast of modern information management tools and addressing specific needs that emerged during its interaction with the Alice application.[28] SLiMS has been present in Indonesia for 17 years and functionality continues to develop. This has made the system the most used in various libraries in Indonesia, from school to university libraries. In South Sulawesi itself, this system is also the most widely used. Some libraries have been using it for more than a decade. This system has been updated several times. The first version was SLiMS 3.14 (*Seulanga*), established in 2007, and the latest version was released in 2021, SLiMS 9 Bulian version.[29] In 2009, the SLiMS application was awarded the INAICTA (Indonesia ICT Award), held by the Ministry of Communication and Information of the Republic of Indonesia, for the open-source software category.

Figure 4. ILS replacement in libraries participating in the study.

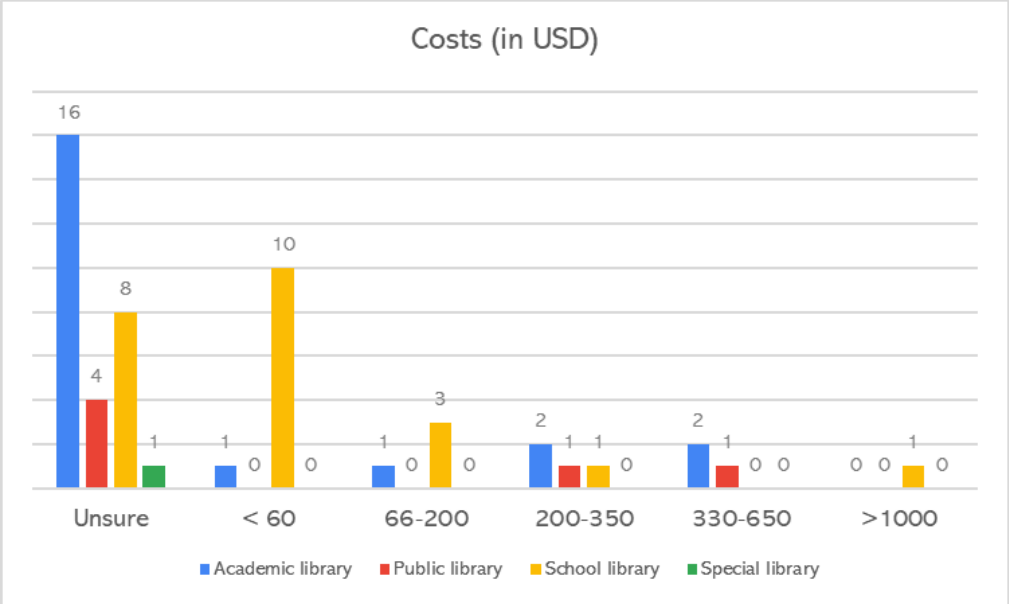


Half of the libraries in our sample had replaced a previous system at least once (see fig. 4). However, this study did not further question the causes of the changes, which could include a number of factors: the old ILS became outdated and no longer matched the library's needs, hardware stopped functioning, cost, lack of vendor support, poor user experience, etc. As noted by Richard M. Jost in his book about ILS implementation, libraries need to know what things must be prepared before choosing and implementing an ILS. Choosing the wrong ILS can lead to operational inefficiencies, user dissatisfaction, data integrity concerns, staff frustration, financial implications, scalability issues, integration challenges, and limited support and upgrades, impacting the overall functionality and success of the library. Yeh and Walter stated critical success factors for implementing an ILS or migrating to a new ILS, e.g., top management involvement, vendor support, project team competence, project management and tracking, and staff user education and training.[30] Case studies by Joshua M. Avery and Hupe et al. also highlight that vendor hosting and support are important factors in terms of ILS practices.[31] For instance, vendor hosting and support influence the success of the implementation of ILS in libraries. Migration or transition from the old system to the new one is normal for libraries that keep up with the times, although it is recognized that these migrations can require a lot of energy and cost if not planned properly.

The cost of implementing an ILS can vary widely depending on several factors, such as the size of the library, the scope of the project, the level of customization required, and the vendor selected. The costs allocated to provide ILS are varied according to the survey, as seen in figure 5.

Small libraries, especially in rural areas, may face budget constraints that make it difficult for them to afford the upfront costs of an ILS. In addition, smaller libraries may also have limited staff and technical expertise to manage implementation, which can make the process more challenging. Meanwhile, larger libraries may have more resources to apply, but staff training often becomes an obstacle in developing countries.[32] In other words, despite having the financial and infrastructure resources, large-scale libraries in developing countries may encounter difficulties in providing adequate training for their staff. The new technology means staff must learn new skill sets, so appropriate training is needed, as stated by Dzurinko.[33]

Figure 5. Costs for implementing ILS



Overall, the cost of implementing an ILS will depend on the specific requirements of the library, regardless of its size. It is important for libraries to carefully evaluate their needs and budget, and to work with their vendor to develop a comprehensive implementation plan that includes all costs. The decision to buy or replace an ILS is undoubtedly significant for the library. It entails spending a sizeable sum of money, devoting staff time and effort, and organizing and making the library's materials accessible. But more importantly, according to Diane R. Tebbets, it will significantly influence the library services to their users.[34]

Advantages and Disadvantages

Each ILS has its advantages and disadvantages. A good system is one that meets the library's requirements. This survey also asked about the experience and the benefits of the library using ILS.

Advantages

This study used a word cloud generator to visualize the advantages gathered from the survey (see fig. 6). The most frequently perceived advantage of implementing an ILS is in the library management process. According to the survey, using an ILS for management and service delivery makes a library's operations simpler than using conventional ways. The impact of ILS on various library operations, including circulation, cataloging, and acquisitions, is significant and influences the efficiency and effectiveness of these processes. Meanwhile, the service provided to library patrons is quicker and more efficient. With the use of computer technology, processing library materials becomes undoubtedly more effective, as discussed by Ukachi et al.[35]

Additionally, libraries benefit from faster turnaround and a shorter queue for users to receive circulation services during peak times. By operating in this way, librarians can manage and serve library patrons more effectively. The same effectiveness is seen from the users' perspective. Patrons can quickly identify library materials using the OPAC without having to consult a staff member. The information about the items in a library's collection is providing patrons with comprehensive details such as availability, location, and additional resources related to their search queries. The management of data may be more structured, accurate, and reliable.

Figure 6. A word cloud showing the advantages of ILS implementation.

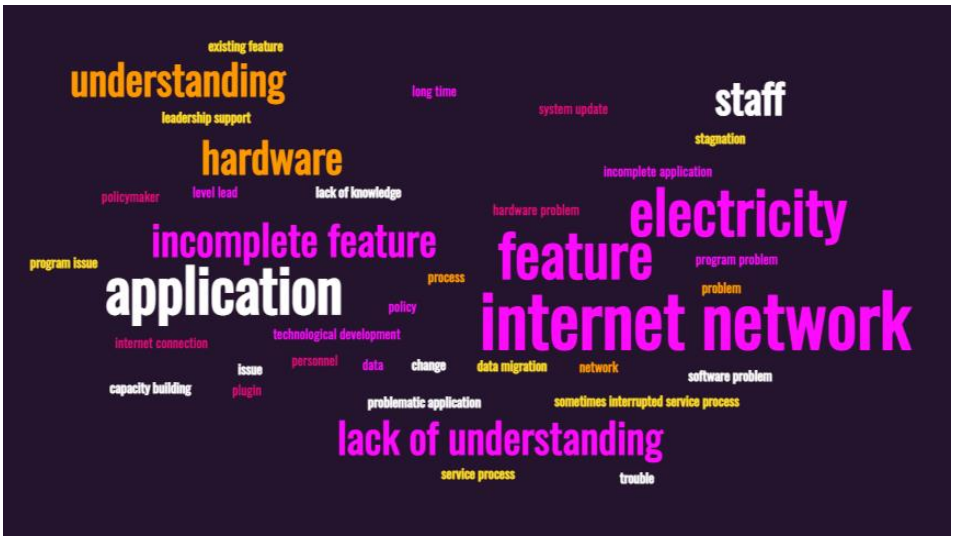
Overall, an ILS can help libraries improve their operations, enhance the patron experience, and achieve greater efficiency and cost savings. By implementing an ILS, libraries can better manage their collections, provide better access to resources, and deliver more effective services to patrons.

Disadvantages

Behind the convenience offered by ILSs, there are also disadvantages faced by participants libraries in this survey. The survey also visualized these shortcomings (see fig. 7). It is recognized that reliable internet connections and electricity are not available to all libraries. Some libraries are located far from the city where internet infrastructure is still very limited. A slow or unreliable internet connection can have a significant impact on the performance of an ILS, leading to slower load times, failed transactions, or even system crashes. This can affect the overall efficiency and effectiveness of library operations, as well as the user experience for library patrons. To address these challenges, libraries may need to invest in upgrading their internet networks, such as increasing bandwidth or upgrading to more reliable service providers. They may also need to consider alternative solutions, such as implementing a local ILS or partnering with other libraries to share resources and infrastructure.

The level of understanding of the ILS by librarians is also limited. Some respondents even admitted that this is a new technology and very difficult to operate. Today's librarians should have a deeper understanding of these systems because it is compulsory to living and working in the digital age. For this reason, librarians must be ready to accept challenges in every technological development to face competition in this digital era (Safitri, 2017).[36] Modern librarians need to be comfortable and conversant with technology as the current library workplace is engaged with technology (Schwartz, 2013).[37] Maceli and Burke (2016) in their survey on technology skills for information professionals provided a broad view into the technologies that LIS practitioners currently use and desire to learn. The LIS practitioners surveyed have interested patrons, see technology as part of their mission, and are not satisfied with the current state of affairs, but they seem to lack money, time, skills, and a willing library administration.[38] Therefore, libraries in today's era need competent staff in IT and this lack of human resources, from this survey, is another disadvantage experienced by some libraries.

Figure 7. A word cloud showing the disadvantages of ILS implementation



Furthermore, other barriers include the lack of hardware, incomplete system features, technical issues, and range of support and policies provided by the system's management, which can affect the sustainability and overall use of the system. Therefore, it is not surprising that some libraries, as mentioned before, switch to other systems that meet the library's current requirements.

The cost of operating an integrated library system (ILS) can be a significant barrier for some libraries, especially small libraries, including rural libraries. However, there are several strategies that libraries can use to overcome the associated cost barriers, including the consideration of open-source software, as many participant libraries relied on. The open-source ILS requires no usage fee due to its community base. So, when technical problems occur, these issues can be solved by the greater usage community together and even developed further. However, libraries that select an open-source ILS must be prepared for possible obstacles that might occur in the future, as stated by Suyanto (2012).[39] The two open-source ILSs named above, SLiMS and INLISlite, are primary choices for many libraries in Indonesia today, as is the case with the South Sulawesi libraries. For some libraries in developing countries, an open-source ILS is a probable choice in the face of budget constraints.

CONCLUSION

The application of ILSs in the South Sulawesi region has been used for almost two decades. Likewise, we can see the development of the use of ILSs from year to year in various types of libraries. SLiMS and INLISlite remain the most widely used systems among the nine other systems identified and implemented within the region. Cost and open-source are common considerations among these libraries. Of all the systems used, the costs incurred range from an approximate minimum of 60 USD to over 1,000 USD. While an ILS provides significant management and library services advantages, its implementation and maintenance is met with challenges faced by libraries, especially in locations where technology infrastructure is still very limited. Given the economic and technological similarities, these findings may be generalized to libraries in other countries facing comparable conditions, providing a basis for strategic planning and collaborative efforts to improve library services globally.

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