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e-mail: [\\*kamila\\_81\\_81@mail.ru](mailto:kamila_81_81@mail.ru)**AUTOMATING LIBRARY PROCESSES USING THE OSS**

*Organization of library work is related to such sciences as pedagogy, psychology, sociology, computer science, economics, cybernetics, linguistics. Integration with these scientific processes allows solving a number of problems of library work. Automation of library services and the use of modern software are necessary to increase efficiency and effectiveness. In addition, it is very important for libraries not only to have appropriate software and technologies, but also to be able to use them effectively. Library automation benefits both library staff and users, as it increases staff productivity and improves remote and timely delivery of up-to-date information to users. This article is mainly aimed at determining the relevance of using modern software for library automation. To achieve this goal, the document is divided into sections that highlight the relevance of library automation, and the main issues that should be considered when choosing software for libraries. Recommendations are made on the key factors that should prevail in order to achieve successful automation of library services through software. These recommendations will be useful to the future specialist as a methodological guide for his work on library automation.*

*Keywords: library, software product, method, automation.*

**Introduction**

Today, with the development of new technological solutions, libraries worldwide are stepping out of their standard shells to integrated and networked operations, thus, optimising, updating and making more accessible and reliable their traditional services like library acquisition and cataloguing, classification

and circulation, and others. To be precise, such improvements in the process of handling information have become a must-have for libraries to survive and to deliver their services to their clients promptly and timely. Kazakhstan is not an exception in this movement. In other words, libraries globally are obliged to automate their process since library automation means performing traditional manual tasks in libraries by using the means and solutions of information and communication technologies (IT).

The automation of modern libraries relies on the application of hardware, software and the professional training of library staff. For instance, there are two available library software models: a) Proprietary Software (with a subscription fee) (known as PS) and b) Open-Source Software (known as the OSS) [1].

However, due to the enormous hardware and software costs, together with training library staff and users, only well-funded libraries could afford to automate their processes. Thus, libraries with insufficient funding started relying on the «Open-Source Software Initiative» to access and acquire technological solutions to update, digitalise technical facilities, and manage library processes effectively since it is easy to use and cost-effective [2].

Open-Source Software (OSS) is a publicly available software solution developed by programmers (copyright holders) who grant users the right to use, study, adapt and apply the source codes to their needs, demands and use [3]. Due to the reality of being almost always unfunded, most libraries can acquire this software for free. Thus, we can state that the burst of OSS changed the paradigm of library management by allowing unfunded libraries to be almost as competitive as libraries with decent funds and saving money by concentrating more on staff training and users' needs rather than paying the subscription fees for proprietary software. So, the OSS benefits library automation, whilst library automation improves the delivery of library services to the users efficiently and effectively.

However, there is still a gap in the OSS implementation in the libraries of developing countries compared to those in developed economies. It might be due to the lack of information about the OSS as there is still thinking that software is costly and doubting its effectiveness. Besides, libraries are understaffed again due to budget constraints in hiring and training staff that can adapt the OSS source codes for the necessities of their libraries. So, regarding its effectiveness, such a question emerges: «What characteristics make the OSS an effective software for library automation?». Given the abovementioned, this article pursues to identify the significance of using the OSS for library automation.

### **Materials and methods**

We analysed research articles related to the OSS and library automation topics to understand what we can use to automate libraries in Kazakhstan to provide better

library services. Here, we applied the inductive method to gain more insights. Based on the gathered insights, we synthesised what software products the top-performing higher education institutions use to automate their library processes.

### **Results and discussion**

Today, libraries require automation since they face various challenges. For example, these challenges are the abundance of information flow that grows exponentially, having fewer library spaces, information behaviour changes of library users, diversity of instruments to organise the overflow of information, cost fluctuations for hard-copy and printed materials, growth Internet resources, and the necessity to share information and develop inter-library loans. Thus, promoting library automation among libraries in the republic to deliver better services becomes even more vital since they need to overcome these challenges and be ready for future challenges. This way, traditional approaches to library management become ineffective, while using the OSS become a new conventional approach. It is because library automation may increase the library staff's speed, efficiency, competence and productivity. It also helps library staff to manage their timing efficiently since most routine clerical work like recording, sorting, duplicating, categorising, and other services will be automated, allowing library staff to devote more time to professional growth. Overall, library automation can lead to the following [4]:

- the enhancement of the quality, efficiency and speed of the provided service;
- the access of remote users to library services distantly, especially relevant to rural areas;
- the better and more extensive dissemination of library services and technological solutions that help other remote libraries adopt new solutions for their library management;
- the adequate sharing of resources and development of inter-loan processes that will allow users to be more effective;
- successful networking through professional network communities;
- better human resource management and accountability in terms of financial resources;
- the generation of reports to help make better decisions and manage the library processes effectively.

It is challenging for any library to select the right software product since they all dream of increasing library productivity, solving operational challenges, becoming more competitive and reducing costs for overall library management. Libraries may fail to achieve these mentioned aims if they select improper software. The wrong choice may result in the growth of more unnecessary expenditures to maintain the operability of the software, loss of time to train library staff and lack

of time to pilot the software with users to define its advantages and disadvantages, which are must-follow steps to automate library fully and successfully. For instance, we suggest relying on the 10 criteria indicated by FedSolutions (2012), highlighting the importance of carefully selecting the software [5]:

First, it is necessary to be more specific about *why the library needs the software*. For example, if that is a university library, it should count the needs of various users like students, academic and teaching staff and researchers. So, you need to apply the OSS that satisfies all users' needs and allows accessing authentic resources to study, prepare reports, conduct research and perform other tasks that ensure the higher education institution's success [6].

Second, libraries should clearly define their *priorities*. It is essential to examine whether the software product can benefit the organisation. So, if the university installs software managed centrally but wants to let distance learners or researchers on field trips access the data, then the software should have the functions to export, input, edit and save data in various forms. So, it is crucial to prioritise all the needs to select the right software.

Third, evaluating whether the library needs the software to *satisfy the organisation's overall mission or enhance the business perspectives* is vital. For example, errors may lead to substantial financial losses if the software is critical for the business. As for university libraries, they require both, especially research-oriented or entrepreneurial universities, since any failure might collapse the educational process that harms students and all other users.

Fourth, it is crucial to check *the suppliers' credibility and the longevity and quality of maintenance* they provide. So, university libraries must choose reliable suppliers who can provide long-term care since any failure to deliver quality, and in-time services might affect the quality of the provided education or conducted research. Thus, evaluating and analysing the clients' satisfaction ratings or consulting other libraries from partner universities are necessary to avoid any unpredictable pitfalls.

Fifth, it is essential to check *software reliability*. For example, before installing the software, it is necessary to understand how long it might take to solve technical glitches if any, and how fast the issues can be resolved so they do not hinder the library's activities and users. Thus, it is worth reading on forums and consulting with other users to receive decent feedback.

Sixth, ensuring *that software integrates with the organisation's operational day-to-day needs* is also necessary. For example, the universities should check «whether software fits their current needs and trends and helps streamline operational library processes» and «who, when, how and where will use the software precisely». They need to develop a decent strategic plan with outcomes,

visions, and workable solutions in case of failure. However, if there is a technical failure, they should also ensure they can fix the issues remotely.

Seventh is more about the **support model**. So, it is necessary to clarify how well the technical support team provide consultation and support in case of any issues, how they provide such support (using phone, emails and other means of Internet communication), how long they take to reply and start considering the clients' requests or complaints, how well the documents and other informational guidelines are developed, and what they charge for (what if there any hidden fees?).

Eighth, it is vital to understand the **growth scalability**. In other words, universities should evaluate whether software products can still be beneficial in the long run if universities expand and change their operational activities. When the issue is about growing the scale, another question emerges, how much will the cost change and will there be additional fees? Such questioning will help in being careful when signing the agreement since even a minor pitfall may result in not being able to add even a single additional user.

The ninth step is checking the **pricing**, especially, as mentioned above, if the organisation needs to add users or update any services. The pricing should include technical support, staff training, and maintenance.

Tenth, the OSS used for library automation is an investment of an organisation. Thus, universities should understand how to measure the monetary value, known as **the Return on Investment (ROI)**. This step should be ongoing but needs to be addressed before signing the agreement with the software supplier.

Thus, since the success of library automation and entire library management directly depends on selecting the right software, following the criteria mentioned above is primordial. If the organisation is not planning to install from scratch, others should consider whether the new software product is compatible with the existing equipment to reduce the costs implied by purchasing new technical solutions. But no matter what, organisations should critically analyse workstations, patrons' access points, and the variety of available software before installation.

Furthermore, we present the characteristics of the OSS that qualify whether the selected software can be used to automate the library that differ distinctively from proprietary software [7]. These characteristics are described below.

The first characteristic is **source code**. The OSS come with the source code, which is publicly available and can be downloaded from the Internet at no cost.

The second characteristic is **derived works**. The provided source code allows programmers to modify and enhance the program. The redistribution and code modifications can lead to rapid evolutions in this sphere.

The third characteristic is **free distribution but following licencing**. The OSS licence permits the right to use or redistribute the code to apply from scratch or to

incorporate the code in other projects. Based on the selected open-source licence, the universities may obtain permission to modify the «original source code» to tailor and fix to solve particular issues and challenges. The licensing of the OSS makes it different from other public domain or shareware sources.

The fourth characteristic is the principle of ***no discrimination against people and groups and their fields of endeavour***. For example, programmers should be able to work with people of any nationality or physical state by encouraging the involvement of diverse people.

The fifth characteristic is that ***licensing should not restrict the distribution of other software products*** and demand that they all should only be open-source software.

The sixth characteristic is that ***licensing should be technology-neutral***, not discriminating against any individual technology and interface style.

Moreover, apart from these listed essential characteristics, there are specific practical benefits of applying the OSS, ranging from philosophical, theoretical, hands-on and even ethical reasons. So, below we summarise the five main practical benefits.

The first is the ***reliability*** of the OSS. Being publicly available, various program developers often scrutinise these source codes for bugs like data loss, sudden system collapse, and other failures. We do not treat the OSS as free of any issues, but we can assertively state that they can be addressed in time and use the available codes as a reference.

The second benefit is ***stability***. Compared to Proprietary Software, the OSS does not cheat by claiming to withdraw licensing since it stops supporting or checking for the bugs in older versions. The OSS even allows using older original source codes, providing more flexibility and choice for its users.

The third benefit is being ***under audit control (auditability)***. Since copyright holders make their source codes available, they ensure that their claims about security, flexibility, reliability and other benefits are true-to-life and coincide with their claims.

The fourth is about the ***cost*** of the OSS. It is because the source codes do not require any royalties and fees. If there are any operating costs, they are usually minimal and affordable compared to Proprietary Software. Besides, the OSS users may even exclude the costs for virus-checking software since these source codes almost have no vulnerability to viruses.

The fifth benefit is the ***flexibility and freedom*** provided by using the OSS. The OSS licensing allows users to apply and purchase other software products freely and choose the OSS that satisfies all their necessities.



Below, we review several open-source software that assists library automation and management.

**KOHA Software** has derived its title from a Maori term meaning a «gift» or «donation.» This software emerged from the initiative of rural librarians in New Zealand who found Proprietary Software to be too costly and inefficient due to the absence of some specific features to address their challenges. It was developed by Katipo Communications for the Horowhenua Library Trust back in 1999 in New Zealand and was launched for the first time in 2000, and in 2017 became the most used Open-Source Integrated Library System (ILS) worldwide. The design of this ILS allows working with minimum hardware resources. Thus, it can run on the Linux Operating System with the Apache Web Server, apply MySQL open-source database management system, and is written in JavaScript, Perl and HTML. Users can run this ILS even in Windows operating system by running some additional modules [8].

**Evergreen Software** is another open-source ILS; the development started in 2004 with the initiative of a librarian, Lamar Veatch, who motioned that they needed to find better solutions to solve their challenges. Its basic features are circulation, cataloguing, self-service, serialisation, OPAC (Online Public Access Catalogue) through the web browser, SIP 2.0 (Standard Interchange Protocol) to interact with other products and Search/Retrieval using the servers like URL and Z39.50. Besides, this ILS scales on an OpenSRF architecture, which allows even beginner programmers to develop unique applications for Evergreen. This ILS also supports the packages of Debian and Ubuntu.

As for **ABCD Software (Library and Documentation Centers Automation)**, we can state that it is another efficient, accessible, open-source integrated package to automate library processes launched in 2009. Its purpose was not only to enhance library automation but also to facilitate all the documentation procedures. It is also a joint product of BIREME (Brazil), collaborating closely with The Flemish Inter-University Council (Belgium), using UNESCO's ISIS (Integrated Set of Information Systems) software. This software product is flexible and multipurpose since it provides various features [9].

Regarding **WinISIS** (known initially as CD/ISIS), we can highlight that it is a Windows operation system-based software package for library automation. Since UNESCO developed WinISIS, it has managed and distributed its rights freely for non-commercial purposes. It rapidly became a solution to automate libraries in developing countries since it can run on a single computer and operate on a local area network, thus allowing diversity of access.

Given that developing countries use **NewGenLib** as the primary integrated package for library automation and management, we can define it as a well-

supported, well-tested, free and open-source ILS. Developed by Verus Solutions Pvt Ltd (India) in 2005, Kesavan Institute of Information and Knowledge Management (India) is responsible for providing the expertise. It has been released stably, and its latest version is 3.1.2 (published in 2015). Being written in Java, it can operate on Linux and Windows.

As for **EMILDA**, it is yet another publicly available Perl and PHP-based ILS. Unfortunately, today, this project has stagnated and announced to stop its releases. It is compatible with the Z39.50 protocol and 100% with MARC, achieved using Zebra with MySQL.

**PMB** is another fully functional ILS with all the basic library automation and management features. Developed in France and supporting seven languages, including English, its 4.1 version was downloaded 38 000 times. Written in PHP, it operates on Linux, Windows and Mac OS.

The last is **WEBLIS**. It is a free-of-charge ILS for library automation developed by the Institute for Computer and Information Engineering (ICIE) in Poland and based on CDS/ISIS. Behind the launch of WEBLIS was a vast strategic plan to internationalise this ILS. Thus, UNESCO has managed and distributed it at no cost since 2004 [10].

Analysing the information presented above, we further prepared a comparative analysis of various OSS solutions (See Table 1).

Table 1 – The comparative analysis of various OSS solutions

Title of the OSS	Advantages	Disadvantages
Koha	Library staff can start working with this software with little training since it is easy to navigate and learn without following complicated manuals, supports simple features to scan new books, and even create barcode labels	The high annual cost, lack of decent support and training, weak indexing, and hard-to-deal glitches
Evergreen Software	Easy to customise and learn, cost-effective, robust and has excellent functionality, especially for cataloguing	Loading takes a long time, can freeze accidentally, and poor documentation
ABCD	It has decent functions to automate and manage the library centrally	Hard to save and monitor the changes of errors that occur when automated centrally
WinISIS	Free of charge and compatible with other software products	Printing functions are complicated; freezes when working with an extensive database; hard to install, and unstable when working on LAN

NewGenLib	Easy to adapt to the needs of users, easy to add users, cost-effective	Lack of decent support and training, Low scalability and speed level
EMILDA	Cost-effective	The speed is low and stopped the releasing the new versions
PMB	The variety of functional modules	The speed is low, although it states to focus on improving the speed
WEBLIS	Full library automation features	Unstable when working on LAN

Overall, despite the named disadvantages of the OSS products, their primary benefit is that they are free for any libraries seeking to automate their processes. Therefore, the OSS applied for library automation will always be in demand and scrutinised by many users, increasing its reliability.

### Conclusion

For developing countries like Kazakhstan, automating library processes and digitalising library management using the OSS is a decent solution as it is cost-effective. Considering the growth of information flow and increasing demands for the quality of education, library automation is a must-perform action for all libraries, especially those located in remote and rural areas. The recent Covid-19 pandemic has demonstrated that remote access to library resources has become even more critical. Thus, library automation is a primary task for any library. Automating library processes can benefit the library staff and users. The OSS allows users to work efficiently and access information timely. However, selecting a suitable and compatible OSS requires a detailed analysis from the clients since negligence might lead to the failures of whole operational processes. This article has summarised the essential criteria for selecting the OSS and analysed the advantages and disadvantages of various software products.

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## ОСС КӨМЕГІМЕН КІТАПХАНА ПРОЦЕСТЕРІН АВТОМАТТАНДЫРУ

*Кітапхана жұмысын ұйымдастыру педагогика, психология, әлеуметтану, информатика, экономика, кибернетика, лингвистика сияқты ғылымдармен байланысты. Ал, осы ғылым үрдістерімен интеграция кітапхана жұмысының бірқатар мәселелерін шешуге мүмкіндік береді. Кітапхана қызметін автоматтандыру және заманауи бағдарламалық қамтамасыз етуді пайдалану тиімділік пен нәтижелілікті арттыру үшін қажет. Сонымен қатар, кітапханалар үшін сәйкес бағдарламалық-аппараттық құралдар мен технологиялардың болуы ғана емес, сонымен қатар оларды тиімді пайдалана білуі де өте маңызды. Кітапхананы автоматтандыру кітапхана қызметкерлеріне де, пайдаланушыларға да пайдалы,*

*ойткені бұл қызметкерлердің жұмыс мүмкіндіктерін арттырады және пайдаланушыларға ең соңғы ақпаратты қашықтан және уақтылы беруді жақсартады. Бұл мақала негізінен кітапханаларды автоматтандыру үшін заманауи бағдарламалық жасақтаманы қолданудың өзектілігін анықтауға бағытталған. Осы мақсатқа жету үшін құжат кітапханаларды автоматтандырудың өзектілігін көрсететін бөлімдерге бөлінді, кітапханаларға арналған бағдарламалық жасақтаманы таңдау кезінде ескерілуі керек негізгі мәселелер айтылды. Бағдарламалық жасақтама арқылы кітапхана қызметін сәтті автоматтандыруға қол жеткізу үшін басым болуы керек негізгі факторлар туралы ұсыныстар келтірілген. Бұл ұсыныстар болашақ маманға кітапхана жұмысын автоматтандыру бойынша жұмыстарына әдістемелік нұсқаулық ретінде пайдалы болады.*

*Кілтті сөздер: кітапхана, программалық өнім, әдіс, автоматтандыру.*

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## **АВТОМАТИЗАЦИЯ БИБЛИОТЕЧНЫХ ПРОЦЕССОВ С ИСПОЛЬЗОВАНИЕМ OSS**

*Организация библиотечной работы связана с такими науками, как педагогика, психология, социология, информатика, экономика, кибернетика, лингвистика. Интеграция с этими научными процессами позволяет решить ряд проблем библиотечной работы. Автоматизация библиотечных услуг и использование современного программного обеспечения необходимы для повышения эффективности и результативности. Кроме того, для библиотек очень важно не только иметь соответствующее программное обеспечение и технологии, но и уметь их эффективно использовать. Автоматизация библиотек приносит пользу как библиотечному персоналу, так и пользователям, поскольку повышает производительность труда персонала и улучшает удаленную и своевременную доставку актуальной информации пользователям. Данная статья в основном направлена на определение актуальности использования современного программного обеспечения для автоматизации библиотек. Для достижения этой*

*цели документ разбит на разделы, освещающие актуальность автоматизации библиотек, а также основные вопросы, которые следует учитывать при выборе программного обеспечения для библиотек. Даны рекомендации по ключевым факторам, которые должны преобладать для достижения успешной автоматизации библиотечных услуг с помощью программного обеспечения. Эти рекомендации будут полезны будущему специалисту в качестве методического руководства в его работе по автоматизации библиотек.*

*Ключевые слова: библиотека, программный продукт, метод, автоматизация.*

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