



Innovative ways to develop electronic document management in library processes

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Abstract. The relevance of the research is determined by the intensification of digital transformations in higher education, the increase in the volume of electronic information, and the need to optimise library processes through the implementation of electronic document management to ensure continuous access to services. The purpose of the article was to analyse innovative trends in the development of electronic document management in library processes and to evaluate the effectiveness of its implementation in the automation of higher education library activities. The study used methods of analysis and synthesis to generalise theoretical approaches to the organisation of electronic document management, a comparative method to compare modern technological solutions, as well as empirical methods of questionnaire surveys to identify the features of the practical use of automated library and information systems by users. The results of the study showed that the development of electronic document management in library processes is based on the integration of cloud technologies, electronic signature tools, distributed data storage technologies, and automated text recognition tools. It was found that automated library and information systems are mainly used to work with electronic catalogues and order literature, providing quick access to information resources and reducing the time spent searching for documents. At the same time, a number of problematic aspects have been identified, in particular, the insufficient convenience and clarity of user interfaces, limited possibilities for downloading electronic documents, as well as the need for a partial update of information content in accordance with educational programmes. The empirical data obtained confirm the need to strengthen information support for users and improve the functionality of electronic library systems. The practical value of the work lies in the development of recommendations for improving the efficiency of electronic document management in higher education libraries by optimising automated systems, regularly updating electronic resources, and developing users' digital competencies

Keywords: digital transformation of libraries; document information management; automation of information processes; cloud technologies; automated library and information systems; information needs of users

Introduction

The digital transformation of the library sector is one of the key areas of development of the information infrastructure of higher education institutions in the context of globalisation and the intensification of electron-

ic communications. As noted by N. Mosha (2025) and S.R. Somipam *et al.* (2025), in global scientific discourse, libraries are increasingly seen not only as repositories of knowledge, but as multifunctional information centres

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integrated into the digital educational and scientific environment. Under such conditions, the introduction of electronic document management as a tool for optimising library processes, ensuring prompt access to resources, and improving the quality of information services for users becomes particularly relevant. V. Dobrovolska & L. Cherednyk (2023) noted that the development of electronic document management in libraries is influenced by innovative technologies, in particular automated library information systems, cloud services, and digital document information management platforms. A similar position is held by O. Ivashkevych (2021), who emphasised that the automation of library processes contributes to reducing time costs, increasing the accuracy of data processing, and forming a unified digital information space. At the same time, P. Ngulube & N.F. Vincent Moshia (2024), as well as M. Isabella (2025), emphasised that the effectiveness of such solutions largely depends on the level of integration of technologies into the daily practice of libraries and the digital competence of users.

A. Gbadebo (2024) emphasised that the integration of artificial intelligence and machine learning into academic libraries enhances cataloguing accuracy, optimises information retrieval, and improves decision-making processes in resource management. The author argues that AI-driven solutions contribute to the automation and modernisation of library operations, creating technological preconditions for the innovative development of electronic document management within contemporary digital library environments. In the international and national context, considerable attention is paid to the use of cloud technologies and distributed data storage technologies. O. Brui (2021) emphasised that the use of cloud services ensures the scalability of library systems, increases the resilience of information infrastructure, and allows libraries to avoid typical mistakes associated with unsystematic digitisation processes. Similar conclusions are presented in the materials V.G. Sprinskyan (2025), which highlight the growing role of remote access to electronic resources.

The latest scientific publications also focus on the integration of artificial intelligence and optical character recognition technologies into the digitisation of library collections, as noted by S.A. Muslim (2024) and G.O. Adigun *et al.* (2024). A.S. Gbotosho & J.K. Opele (2025) emphasised the importance of regularly updating content to meet educational needs and maintain a high level of information literacy among users. In general, Jyoti & P. Kumar (2024) explored that the integration of AI and optical character recognition (OCR) into library systems ensures the inclusiveness and universality of digital resources, while D. Yoliadi *et al.* (2023) noted the need for technical modernisation and improvement of the interface of automated library information systems. Despite a significant number of scientific publications, contemporary research does not pay sufficient attention to a comprehensive assessment of the effectiveness of

implementing electronic document management in the automation of library processes, taking into account real user experience. The issue of aligning the technological capabilities of automated systems with the needs of different categories of users in the context of the educational process remains particularly relevant.

The purpose of this article was to analyse innovative technologies for electronic document management and evaluate the effectiveness of their implementation in the automation of library processes in higher education institutions. To achieve this goal, the following tasks were set: to analyse modern technological solutions and the functional capabilities of automated library information systems used in electronic document management in libraries; to evaluate the effectiveness of electronic document management and the quality of library information services based on empirical data; to formulate practical recommendations for improving and further developing electronic document management in library processes. The scientific novelty of the work lies in combining theoretical analysis of innovative electronic document management technologies with empirical assessment of their effectiveness in real-life conditions of higher education libraries, which allows identifying key problems and promising areas for further development of library processes in the digital environment.

Materials and Methods

The study was based on a mixed methodological approach that combined elements of qualitative and quantitative analysis to comprehensively examine the effectiveness of implementing innovative electronic document management technologies in automating library processes at higher education institutions. The empirical study was conducted among first-year students of two higher education institutions: the National University of Ostroh Academy, which uses the automated library information system Koha, and Khmelnytskyi National University, which uses the automated library information system UFD/Library. The total number of respondents was 14 students, with seven participants from each institution. The methodological strategy of the study was focused on the integration of technological, organisational, and user aspects of the digital transformation of libraries.

At the theoretical level, methods of analysis, synthesis, induction, and deduction were used to process scientific publications and regulatory documents governing the functioning of electronic document management and digital services in the library sector. In particular, the research analysed the Law of Ukraine No. 851-IV (2003), which regulates the legal status and circulation of electronic documents. Theoretical base of the study was formed by relevant contemporary scholarly publications T. Granchak (2019), T. Mali & R. Deshmukh (2021) addressing the digital transformation of libraries, user-oriented design of automated library systems, and the

application of artificial intelligence technologies in library practice. These sources were selected through a targeted review of peer-reviewed academic literature to ensure conceptual validity and methodological relevance.

The empirical part of the study was implemented using a quantitative questionnaire survey method. The research tools were developed taking into account a preliminary analysis of scientific approaches to evaluating the effectiveness of digital library services and the principles of user-oriented design of information systems. The questionnaire consisted of thematic blocks aimed at: identifying the frequency and nature of the use of electronic library resources; assessing the functional capabilities of automated library and information systems; analysing the convenience of access, navigation, and speed of information processing; determining the level of user satisfaction with the quality of electronic information services. The survey was conducted in accordance with established ethical standards for research involving human participants. Participation was voluntary and anonymous, informed consent was obtained from respondents, and the confidentiality of personal data was ensured throughout all stages of data collection and processing. The ethical framework of the study was aligned with the principles set out in the ICC/ESOMAR International Code on Market, Opinion and Social Research and Data Analytics (2025), and the European Commission's Guidelines on Ethics and Data Protection (2021), which regulate responsible research practices, data protection, and respect for participants' rights.

To increase the validity of the instrument, the questions were standardised and the response scales were constructed according to the principle of ordered categories, which ensured the possibility of further statistical processing of the results. The research sample was formed on the basis of targeted selection and included first-year full-time bachelor's degree students from two higher education institutions: the National University of Ostroh Academy and Khmelnytskyi National University. The total number of respondents was 14. This approach made it possible to obtain primary empirical data on user experience of interacting with electronic library systems at the initial stage of study at a higher education institution. Data collection was carried out remotely through an online survey. Participation was voluntary and anonymous, which minimised the risk of biased responses and contributed to the reliability of the results. Empirical data was processed using descriptive statistics methods, in particular calculating percentage indicators and frequency distribution of responses. To interpret the results, a comparative analysis method was used, which allowed comparing user assessments of various aspects of electronic document management. The generalisation method was used to form conclusions and practical recommendations aimed at improving the efficiency of library process automation and the quality of electronic information services.

Results and Discussion

An analysis of the development of innovative electronic document management technologies in library institutions demonstrates their importance as a tool for improving the efficiency of information services and optimising internal processes. Among the key technologies that form the prerequisites for the implementation of electronic document management are cloud services, blockchain technologies, qualified electronic signatures, as well as artificial intelligence and OCR tools. A separate area of scientific research is related to the implementation of automated library information systems as the basis for electronic document management. In Ukrainian library encyclopaedia (2014), it is stated that such systems provide centralised management of electronic catalogues, collections, and remote user services. An analysis of review materials on open library systems, presented in the publication V.I. Vernadsky National Library of Ukraine (2014), indicates the growing role of open-source software, which expands the possibilities for adapting information systems to the needs of specific institutions and different user groups. It should be noted separately that regulatory and legal studies, in particular the document of the Order of the Cabinet of Ministers of Ukraine No. 219-r (2016), emphasise the importance of electronic signatures for ensuring the legal significance of electronic documents in library and management activities. The materials PDF24 Tools (n.d.) indicate that the use of such tools increases the accessibility of information resources and contributes to the unification of the presentation of electronic documents.

Among the main technological solutions, the following can be highlighted and characterised: cloud technologies that ensure the availability and continuity of document exchange regardless of physical location, provided there is an internet connection. Since data is stored in the "cloud" rather than on a local device storage, this saves space on the hard drive, minimising the need to reboot the device and search for additional memory sources. Therefore, the process of digitising library resources such as books, magazines, and others requires a large amount of memory, which is successfully implemented thanks to cloud technologies. Among them, Google Drive, OneDrive, and Dropbox (Fig. 1) should be highlighted. At the same time, thanks to their functional capabilities, they provide both convenient storage and access to digital documents. Blockchain technologies ensure transparency in document management and the recording of all changes, which increases the level of trust in stored data. Features of blockchain implementation in library systems include differentiated access, which ensures the secure use of unique resources with restricted access. A qualified electronic signature guarantees the legal validity of electronic documents in accordance with the current legislation of Ukraine (Law of Ukraine No. 851-IV, 2003). Its use allows for remote

signing and approval of documents, which is particularly relevant in the context of remote work or remote

departments. The list of accredited key certification centres is provided in Table 1.

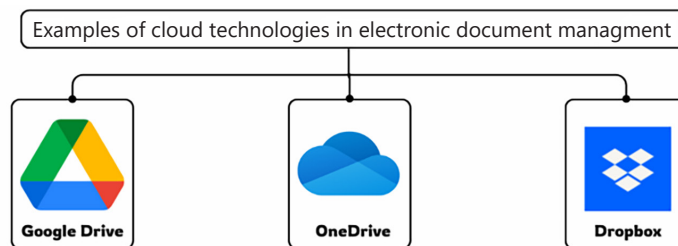


Figure 1. An example of cloud technologies in electronic document management

Source: provided by the author

Table 1. List of accredited key certification centres

No.	Logo	Name of the accredited key certification centre
1		Joint Stock Company Commercial Bank PrivatBank
2		State-owned enterprise "DIA"
3		National Bank of Ukraine
4		Limited Liability Company "Key Certification Centre "Ukraine"

Source: provided by the author

The use of qualified electronic signatures in electronic document management ensures secure document exchange, particularly between institutions, which not only significantly simplifies and speeds up approval and signing procedures, but also minimises the likelihood of unauthorised document modification, guaranteeing the authenticity of the signatory. In this context, it should be noted that in conditions of martial law, remote employment, or business trips, when there is an urgent need to sign or, as mentioned above, approve documents, the QES is an effective tool that enables the legitimate certification of the legal force of a document regardless of the user's geographical location. To perform this operation, it is sufficient to have access to the appropriate technical means and to possess the identification data established during the issuance of the QES certificate or other information determined by the specifics of its receipt. Within the scope of the problem under study, it can be stated that the QES is one of the key technical tools for the development and further provision of remote library services, which include the issuance of reader tickets, ordering electronic copies of documents, and other services that require official certification of the parties.

The integration of artificial intelligence and OCR technologies significantly improves the efficiency of library resource digitisation processes. The use of specialised tools, such as PDF24 Tools, OnlineOCR, Smallpdf

OCR, and Sider (Fig. 2), provides automated recognition of text information, tables, and graphic elements, as well as conversion of documents into editable formats. This, in turn, contributes to increasing the accessibility of information resources for a wide range of users, including people with disabilities (Granchak, 2019).

In particular, PDF24 Tools (n.d.) is a multifunctional platform for working with PDF documents, providing conversion, compression, merging, splitting, and basic text recognition. Its advantages include free access, an intuitive interface, and no need for complex software, which lowers the barriers to entry for users with varying levels of digital literacy. This expands the possibilities for independent document processing and increases the speed of access to electronic resources. OnlineOCR (n.d.) and Smallpdf (n.d.) implement OCR technology, which allows scanned images and PDF files to be converted into editable text formats. Their key advantage is that they support many languages, preserve the structure of the document, and allow for subsequent text searches. In a library environment, this significantly improves the indexability and full-text accessibility of digitised collections, facilitates the integration of documents into electronic catalogues and repositories, and ensures the accessibility of materials for users with special educational needs (in particular through the use of screen reading software).

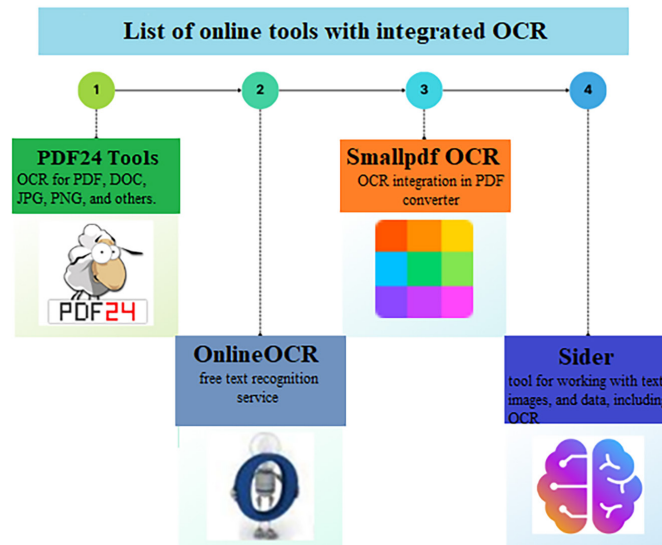


Figure 2. List of online tools with integrated OCR

Source: provided by the author on the basis of T. Granchak (2019)

Sider (n.d.) is also important as an AI-based tool that expands the functionality of working with digital texts through automated summarisation, translation, explanation of complex fragments, and semantic analysis of content. This approach promotes personalised access to information, increases information inclusivity, and

supports users in interpreting large amounts of data. The use of these technologies creates conditions for the comprehensive combination of modern innovative solutions with traditional library work methods, ensuring the integration of electronic document management into all stages of the document life cycle (Fig. 3).

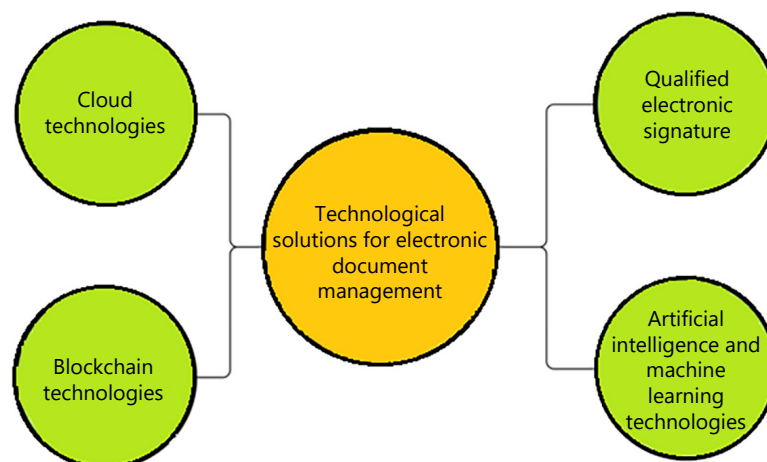


Figure 3. Technological solutions for electronic document management

Source: provided by the author

The implementation of cloud technologies, blockchain solutions, qualified electronic signatures, as well as artificial intelligence and machine learning technologies forms a comprehensive innovative infrastructure that ensures the integration of electronic document management with traditional library processes at all stages of the document life cycle – from creation to archival storage and reuse. At the initial stage, digital documents are generated in a cloud environment, which provides centralised access, version control, and synchronisation between the library's structural units. A qualified electronic

signature guarantees the authenticity, integrity, and legal significance of an electronic document, allowing it to fully replace paper document flow in internal management and inter-institutional processes. At the processing stage, machine learning integration allows for optimising cataloguing and subject indexing processes that were traditionally performed manually. Algorithms analyse text arrays, identify keywords, semantic relationships, and relevance levels, and generate recommendations for categorisation. Cloud services enable multiple specialists to work on documents simultaneously, supporting a model

of collaborative editing and distributed responsibility. Combined with traditional library description standards (classification systems, subject headings), this creates a hybrid model where innovative tools complement the librarian's expert activity rather than replace it.

At the stage of access and use, artificial intelligence technologies contribute to the intellectualisation of search mechanisms: semantic search, personalised recommendation systems, automatic referencing, and translation are being implemented. This increases the accessibility of resources for various categories of users, including those with special educational needs. At the storage stage, cloud infrastructure provides storage scalability, backup, and protection against data loss. The use of blockchain technology can guarantee the immutability of records of document creation, modification, or transfer, forming a transparent chain of transactions. This is especially important for preserving digital heritage, electronic archives, and official documentation, where the reliability and security of information is critical.

Analysis of electronic document management effectiveness in library processes revealed that 71.4% of first-year students at the monitored institutions actively use automated library and information systems (Koha and UFD/Library) for electronic catalogue operations. Conversely, 28.6% of respondents reported either rare or no engagement with these systems (Fig. 4).

Do you use an automated library information system to work with electronic library catalogues?

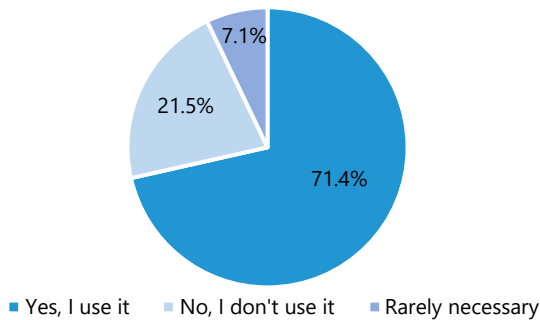


Figure 4. Using automated library information systems to work with the library's electronic catalogue
Source: provided by the author

The interface of the automated library information system was found to be rather inconvenient and unclear for 64.3% of respondents, while 28.6% rated it as convenient, and only 7.1% did not use the system (Fig. 5). This assessment may be related to the interface design, navigation logic, and the level of information literacy of users.

Regarding the relevance of materials posted in electronic libraries, 50% of respondents indicated that they needed partial updating, 28.6% assessed their relevance as partial, and 21.4% considered the materials to be fully relevant to educational needs (Fig. 6). Analysis of these

data reveals the need for regular content updates, taking into account the specifics of educational programmes, and the introduction of a feedback system for users.

How convenient and understandable is the interface of the automated library information system for you?

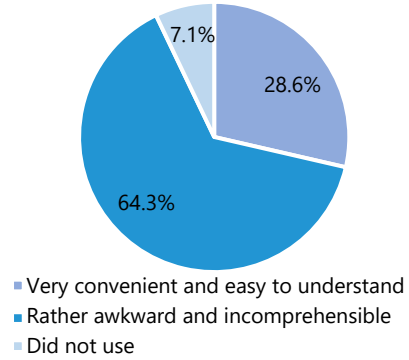


Figure 5. How convenient and understandable is the interface of the automated library information system?
Source: provided by the author

How convenient and understandable is the interface of the automated library information system for you?

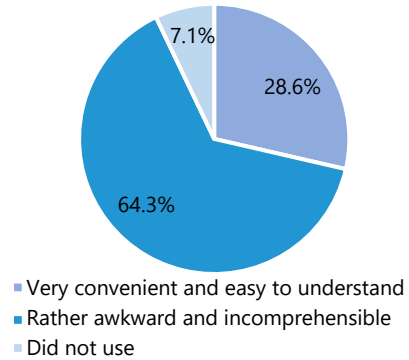


Figure 6. Opinion of respondents who participated in a survey on the relevance of literature available in their university's electronic library
Source: provided by the author

The survey results show that users have mixed perceptions of the speed of searching for literature in the electronic catalogue. In particular, more than half of the respondents 57.1% rated the search process as having an average search speed, which may indicate a generally acceptable but not optimal level of search engine performance. At the same time, 21.4% of respondents said that the search was fast, and another 14.3% said it was very fast, which indicates a positive user experience in certain segments of the audience and the effectiveness of search tools under certain conditions. However, 7.2% of respondents described the search as very slow, which may be an indicator of technical limitations of the system, insufficient interface optimisation, or the influence of external factors such as the quality of the Internet connection or the level of digital competence of users (Fig. 7).

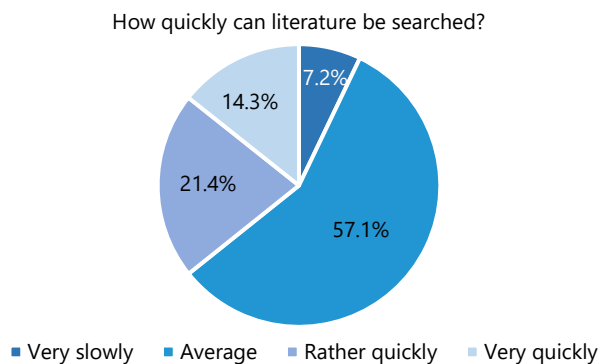


Figure 7. How quickly is the literature search performed
Source: provided by the author

The survey results show that there are significant restrictions on users' access to full-text electronic versions of information resources. In particular, for the vast majority of respondents 85.8%, the ability to download electronic materials is only partially available or depends on the type and conditions of a particular publication, which indicates the fragmented nature of electronic access. At the same time, full and unlimited access to electronic versions of resources is provided to only 14.2% of respondents (Fig. 8), which indicates an insufficient level of development of open access policies and digital infrastructure. This situation potentially hinders the effective use of electronic library resources, limits opportunities for academic mobility, and reduces the level of integration of digital services into the scientific and educational process.

Is it possible to download an electronic version of the literature?

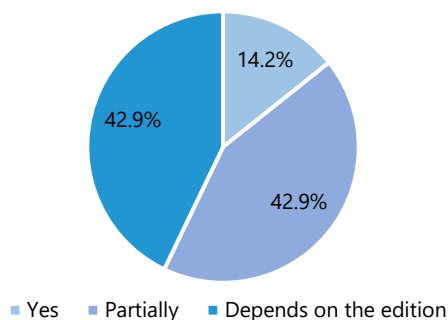


Figure 8. Ability to download electronic versions of literature

Source: provided by the author

The results of empirical research show that the ability to order literature through an automated library information system is implemented unevenly. Thus, for 50% of respondents, this function is fully accessible and provides a full range of operations related to searching, ordering, and reserving library resources. Partial availability of this service was reported by 21.4% of respondents, indicating the existence of certain technical or organisational limitations in the system's operation. At the same time, 28.6% of respondents reported limited or

completely absent functionality of the electronic ordering service, which may negatively affect user satisfaction and the effectiveness of information services in general (Fig. 9). The data obtained underscores the need for further modernisation of automated library and information systems in order to ensure equal access to library resources and improve the quality of digital services.

Is it possible to order literature using the automated library information system?

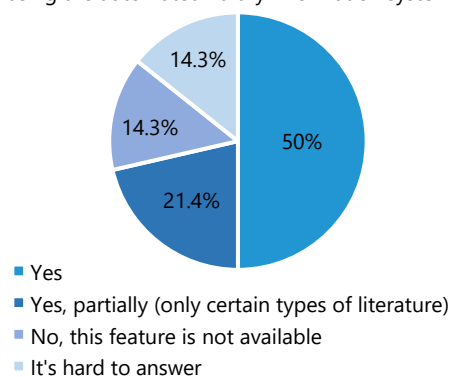


Figure 9. The ability to order literature using an automated library information system
Source: provided by the author

The survey results show that respondents highly value the advantages of implementing electronic document management in library processes. In particular, the vast majority of participants in the study noted significant time savings when searching for and ordering literature 78.6%, which is due to the automation of information search procedures and a reduction in the number of intermediate operations. Another important factor in improving the efficiency of library services is the possibility of remote access to library services 71.4%, which ensures the continuity of information services regardless of spatial and time constraints. Quick access to literature 64.3% contributes to faster educational and scientific decision-making, as well as increased use of electronic collections. In addition, half of the respondents 50% emphasised the reduction in the volume of paper document flow, which not only optimises internal library processes but also complies with the principles of sustainable development and environmental responsibility. The combination of these advantages confirms the feasibility and strategic importance of implementing electronic document management as a key tool for modernising contemporary libraries.

Analysis of the user survey results revealed a number of systemic difficulties in the use of the automated library information system. In particular, respondents noted partial inaccessibility of the website, slow page loading, and outdated information materials, which negatively affects the usability and efficiency of access to digital content. The identified problems indicate an insufficient level of technical optimisation of the electronic

infrastructure and the need for regular updating and upgrading of the automated library information system in accordance with the modern requirements of the digital environment. Based on the empirical data obtained and the results of a comprehensive analysis, a number of scientifically sound recommendations were formulated aimed at improving the efficiency of automated library and information systems and improving electronic document management in higher education institutions. Firstly, in order to raise user awareness of the functional capabilities of automated library and information systems, it is advisable to introduce a system of targeted information and educational activities. This involves organising regular thematic lectures, practical training sessions, and consultations, as well as developing structured information materials, including video tutorials that demonstrate algorithms for searching, navigating, and using electronic resources. This approach will help increase users' digital literacy and ensure fuller use of the systems' functional potential.

Secondly, to ensure the relevance, scientific relevance, and compliance of the information content of electronic libraries with educational needs, it is necessary to systematically update digital resources. At the same time, it is important to take into account the specifics of educational programmes, curricula, and disciplines taught at the university, which will ensure a close connection between the content of electronic collections and the educational and scientific activities of students. Thirdly, in order to ensure constant feedback from users and timely identification of problematic aspects of the system's functioning, it is advisable to introduce the practice of regular surveys using digital data collection services (in particular, Google Forms). Systematic monitoring of user experience will enable evidence-based management of electronic document management development, prompt adjustment of system functional parameters, and strengthening of the user-oriented nature of library services.

Thus, the data obtained demonstrate that the introduction of innovative electronic document management technologies in library processes increases the efficiency of library operations, ensures the accessibility and relevance of information resources, contributes to the optimisation of internal processes, and creates conditions for the provision of remote services to a wide range of users. The results of the study demonstrate that the introduction of innovative electronic document management technologies in library processes increases the efficiency of libraries, provides quick access to information resources, and optimises internal document processing. A comparison of the questionnaire survey data with studies by other authors shows similar trends in educational library systems. For example, D.P. Narendra (2025) noted that the use of automated library information systems significantly improves the speed of information retrieval and increases the accessibility of digital resources

for users, which is consistent with the results obtained in this study. Research conducted by S.A. Muslim (2024) shows that the use of digital tools and systems contributes to improving the accuracy and efficiency of access to knowledge, as well as optimising user interaction with electronic information resources.

Despite the positive aspects, there are certain limitations in the use of automated library information systems. Similarly, Z. Liu & B. Shao (2024) point out in their systematic review of library service platforms that the complexity of the architecture and the lack of intuitiveness of the interface remain key barriers to the effective use of modern digital services. An analysis of the relevance of materials in electronic libraries showed that about half of users consider regular content updates to be necessary. This is consistent with the findings of a study by G.O. Adigun *et al.* (2024), which emphasises the importance of systematically updating electronic catalogues and digital resources to maintain their relevance and support a high level of information literacy among users. It is worth noting the role of qualified electronic signatures as a critical tool for ensuring the legal validity of electronic documents in a remote environment. The results obtained confirm the conclusions of recent studies V. Dobrovolska & L. Cherednyk (2023), P. Ngulube & N.F. Vincent Moshia (2024), V.G. Sprinsyan (2025), according to which the use of secure electronic identification mechanisms reduces the risk of unauthorised changes to documents and increases trust in digital academic services, especially in a remote working environment.

The integration of artificial intelligence and OCR technologies into the process of digitising library collections ensures the versatility and scalability of electronic resources. Thus, P. Dragon *et al.* (2025) note that intelligent search engines significantly expand access to electronic catalogues and increase the efficiency of information retrieval. A similar position is held by S. Panda & N. Kaur (2023), who emphasise that modern OCR solutions promote the inclusion of users with special needs and increase the accuracy and speed of digital document processing. The prospects for using augmented reality and intelligent services in the library environment deserve special mention. In particular, a study conducted by A. Hussain (2022) notes that augmented reality technologies expand the functionality of electronic libraries, improve navigation clarity, and increase user engagement with digital resources. At the same time, T. Mali & R. Deshmukh (2021) note that the use of artificial intelligence tools in libraries contributes to the automation of routine operations, the improvement of recommendation systems, and the enhancement of the quality of information services. At the same time, the results of the study show that some users encounter technical limitations related to the speed of the system and the availability of certain functions, which emphasises the need for systematic optimisation of automated library and information systems. This is

consistent with the research by M.N. Islam *et al.* (2025), which analyses that technical barriers and insufficient infrastructure remain significant factors hindering the full implementation of innovative solutions in the library sector. Thus, the results obtained confirm the existence of significant potential for further development of electronic document management in library processes. At the same time, they bring to the fore the discussion on the optimal combination of innovative technologies with traditional methods of work, the identification of priority areas for digitisation, and the formation of effective models for integrating automated library and information systems into the educational process.

■ Conclusions

The results of the study show that the development of innovative electronic document management technologies creates new opportunities for improving the efficiency of library processes in higher education institutions. Modern technologies, in particular cloud services, blockchain, qualified electronic signatures, and artificial intelligence tools with OCR functionality, enable comprehensive automation of document processes by integrating electronic document management with traditional library activities. As the analysis has shown, the introduction of electronic document management facilitates rapid access to information resources, reduces paper document flow, saves time when searching for and ordering literature, and provides the possibility of remote use of library services regardless of the geographical location of users.

An empirical study conducted among first-year students at two higher education institutions: the National University of Ostroh Academy (automated library information system Koha) and Khmelnytsky National University (automated library information system UFD/ Library) automated library and information system, confirmed that most respondents actively use automated library and information systems to work with electronic catalogues. At the same time, it was found that the interface and functionality of automated library and information systems are mostly rated as rather inconvenient and in need of improvement. In addition, some users noted the need to update electronic resources, reflecting the need to adapt information content to the requirements of educational programmes and real user experience.

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The study also showed that the use of qualified electronic signatures is critical for the legitimate certification of the legal validity of electronic documents in library processes. This ensures secure information exchange, particularly when working remotely, under martial law, or on business trips, and increases user confidence in electronic document management. Based on the data obtained, the following recommendations were developed to improve the effectiveness of implementing automated library information systems in higher education institutions: organising targeted training events and developing training materials to raise user awareness of the functional capabilities of automated library information systems; ensuring regular updates of electronic resources in accordance with curricula and disciplines; introducing a systematic feedback mechanism with users, including questionnaires, for the timely identification of shortcomings and optimisation of the system.

Thus, the introduction of innovative technologies in the field of electronic document management contributes not only to the modernisation of internal library processes, but also to the expansion of the range of available services, ensuring the openness and accessibility of information resources for various categories of users, including people with special needs and those in remote regions. As a result, the library as a modern information centre gains increased functionality and the ability to adapt to a dynamic information environment. Prospects for further research lie in an in-depth study of the relationship between the technological capabilities of automated library and information systems and the level of digital competence of users, as well as in the development of comprehensive models for optimising electronic document management that take into account the individual needs of different user groups and the sociocultural context of the application of digital solutions in the library sphere.

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■ Conflict of Interest

None.

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Інноваційні шляхи розвитку електронного документообігу в бібліотечних процесах

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Анотація. Актуальність дослідження обумовлена інтенсифікацією цифрових трансформацій у вищій освіті, зростанням обсягів електронної інформації та необхідністю оптимізації бібліотечних процесів через впровадження електронного документообігу для забезпечення безперервного доступу до послуг. Метою статті був аналіз інноваційних напрямів розвитку електронного документообігу в бібліотечних процесах та оцінка ефективності його впровадження в автоматизації діяльності бібліотек закладів вищої освіти. У дослідженні було застосовано методи аналізу й синтезу для узагальнення теоретичних підходів до організації електронного документообігу, порівняльний метод для зіставлення сучасних технологічних рішень, а також емпіричні методи анкетного опитування з метою виявлення особливостей практичного використання автоматизованих бібліотечно-інформаційних систем користувачами. Результати дослідження засвідчили, що розвиток електронного документообігу в бібліотечних процесах ґрунтується на інтеграції хмарних технологій, засобів електронного підпису, технологій розподіленого зберігання даних та інструментів автоматизованого розпізнавання текстової інформації. Встановлено, що автоматизовані бібліотечно-інформаційні системи переважно використовуються для роботи з електронними каталогами та замовлення літератури, забезпечуючи оперативний доступ до інформаційних ресурсів і скорочення часу на пошук документів. Водночас було виявлено низку проблемних аспектів, зокрема недостатню зручність і зрозумілість користувацьких інтерфейсів, обмежені можливості завантаження електронних документів, а також потребу в частковому оновленні інформаційного наповнення відповідно до освітніх програм. Отримані емпіричні дані підтвердили необхідність посилення інформаційної підтримки користувачів і вдосконалення функціональних можливостей електронних бібліотечних систем. Практична цінність роботи полягає у розробленні рекомендацій щодо підвищення ефективності електронного документообігу в бібліотеках закладів вищої освіти шляхом оптимізації автоматизованих систем, регулярного оновлення електронних ресурсів і розвитку цифрових компетентностей користувачів

Ключові слова: цифрова трансформація бібліотек; управління документною інформацією; автоматизація інформаційних процесів; хмарні технології; автоматизовані бібліотечно-інформаційні системи; інформаційні потреби користувачів