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REGULATORY AND LEGAL FRAMEWORK, RESEARCH, AND PROSPECTS FOR ARTIFICIAL INTELLIGENCE IMPLEMENTATION IN ARCHIVAL AND LIBRARY AFFAIRS IN UKRAINE: AN ANALYTICAL REVIEW

Introduction. *Archives and libraries represent the world's largest repositories of historical and cultural documents, which have been increasingly digitized. This transformation has turned them into large-scale data centers that, on one hand, require advanced software tools for efficient processing and, on the other, hold potential as powerful knowledge sources for artificial intelligence (AI) applications.*

Problem Statement. *In Ukraine, the implementation of AI in archival and library affairs has only recently entered the stage of active discussion. A key challenge has been to analyze international experience and to determine strategic approaches for further AI development in this domain — whether through the creation of specialized archival and library neural networks, individual artificial neurons or software tools, or through the adaptation of existing AI systems.*

Purpose. *This study has aimed to assess the state of AI use in archives and libraries globally and in Ukraine, and to identify directions for further AI development in these areas.*

Materials and Methods. *The research has employed methods of systems analysis, synthesis, and comparative review of documentary sources and scholarly works in the field of AI.*

Results. *The analysis has confirmed that a general legal framework for AI implementation has been established. A review of scientific research on AI use in leading archives and libraries worldwide has shown that Ukraine remains at an early stage of adoption. Addressing this gap requires either developing specialized AI solutions for the archival and library sectors or adapting general-purpose AI systems. The study has examined the experience of leading archives and libraries internationally and in Ukraine, as well as AI-related projects of international organizations — such as the UN Library Network and EU national libraries — in which the Vernadskyi National*

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Library of Ukraine has participated. These cases have demonstrated promising prospects for addressing current challenges through pilot projects.

Conclusions. *International experience and existing research have indicated that the archival and library sectors require the development of specialized artificial neural networks, a task achievable only through the active initiatives of librarians and archivists.*

Keywords: artificial intelligence, archival and library affairs, AI development strategies, AI implementation in Ukraine, intelligent agents, artificial neural networks.

The task of "the need to develop a coherent state policy to regulate the field of artificial intelligence and eliminate Ukraine's backlog in the relevant field" is set out in paragraph 54 of the Government's Priority Action Plan for 2020 (Order No. 1133-p of 09.09.2020). To fulfil this task, at the end of 2020, the Government of Ukraine approved the Concept of Artificial Intelligence Development in Ukraine (hereinafter — AI Development Concept). This legal act mentions only archives in the context of defining the form of data storage, along with other common forms (state registers, cadasters, databases). This approach is preserved in the second current version of the Concept, approved in 2021 [1].

2023 saw the presentation in Ukraine some documents that defined the information basis for the further development of AI in general and certain areas of activity, as well as its regulatory support. An important result of scientific research was the monograph *Strategy for the Development of Artificial Intelligence in Ukraine* [2] published by the Institute of Artificial Intelligence Problems (hereinafter — IAIP) of the Ministry of Education and Science of Ukraine and the National Academy of Sciences of Ukraine (hereinafter — the NAS of Ukraine). According to the head of this research project, A. I. Shevchenko, this is a long-term work that was done "by trial and error" [2, p. 21], which only increases its value. In the same year, the Ministry of Digital Transformation of Ukraine (hereinafter — the Ministry of DT) presented its own roadmap for AI regulation in Ukraine. Its gradual implementation continues to this day.

Both documents have become fundamental for the further development of AI in Ukraine. While the roadmap of the Ministry of DT pragmatically defines the stages of AI development, mainly its regulatory component, the Strategy for AI Development in Ukraine provided a fairly broad and thorough definition of the goals and objectives for AI development in Ukraine and had a positive impact on the concepts and strategies approved by the Cabinet of Ministers of Ukraine in 2024—2025, and sometimes directly continued in them, as formulated in the Strategy. An important component of this Strategy, as a summary work at a certain stage of the development of AI in Ukraine, is the theoretical achievement and identification of further directions of theoretical and practical research. From the point of view of historical science, this is one of the first works that briefly presents the chronology of the formation of Ukrainian AI science, starting from the end of the 20th century. It should be noted that since 1995, Ukraine has been publishing a professional periodical *Artificial Intelligence* (https://www.jai.in.ua), which publishes the main results of AI research in the field of physical, mathematical and technical sciences. In addition, since 2000, IAIP has been holding annual international scientific conferences in these fields (https://www.ipai.net.ua/uk/aiis-archive).

LEGAL AND REGULATORY FRAMEWORK OF THE AI IN UKRAINE

A number of documents (strategies, plans and programs) issued by the Cabinet of Ministers of Ukraine define specific measures to implement the above Concept of AI Development and, importantly, "define the directions and tasks of the development of artificial intelligence technologies and the introduction of state support mechanisms aimed at creating favorable conditions for the de-

velopment of innovative technologies using artificial intelligence technologies," which is the goal of the Concept of the State Targeted Scientific and Technical Program for the Use of Artificial Intelligence Technologies in Priority Sectors for the Period Until 2026, approved by Government Resolution No. 320-r dated April 13, 2024.

In 2024, to achieve strategic objective 16 of the Strategy for Digital Development of Innovation Activity of Ukraine until 2030, the Ministry of DT prepared a White Paper on AI regulation in Ukraine as a position paper on Ukraine's approach to the implementation of AI regulation. In the White Paper, the Ministry of DT proposes an approach to AI regulation in Ukraine based on moving from tools and initiatives over the next few years to the adoption of a special AI law in two stages: preparatory and implementation of a law analogous to the EU AI Regulation. The approach aims to support business competitiveness, protect human rights, and promote European integration. It identifies three main stakeholders who should be able to use AI tools and reap all the benefits of their application: citizens, businesses, and the state. The documents mentioned here (the Strategy and the White Paper) have some differences in terms of when they were issued. In fact, the White Paper was prepared and presented in June 2024, with a note on the title — "Version for consultation," and the Strategy was approved in December 2024 [3]. Thus, one of the strategic goals and measure 70 of the operational action plan for the implementation of this strategy were defined much later. Until now, the Ministry of DT has been presenting this version of the White Paper for consultation.

A pilot project has been launched to organize a sandbox study of high-tech tools "using artificial intelligence and blockchain for their full use in various fields, including safety, compliance with legislation, standards, as well as patent purity, intellectual property rights, and market demand." The relevant Procedure was approved by the Resolution of the Cabinet of Ministers of Ukraine No. 1238 dated 29.10.2024 [4].

It is difficult to overstate the importance of the conclusion presented in the *Strategy for the Digital Development of Innovation Activities of Ukraine until 2030*: "Years of underfunding of Ukraine's scientific and cultural development, along with non-compliance with legally established support levels, have resulted in distorted incentives and the low popularity of science and innovation in Ukraine. These unfavorable conditions have triggered an outflow of human capital from the country... Any efforts to support innovation shall begin with creating decent living and working conditions for scientists and other members of the innovation ecosystem."

Despite this, unfortunately, none of the above documents defines any conceptual, strategic, programmatic or planned short-term measures for the introduction of AI in the activities of archives and libraries, the cultural sector as a whole, even in the creative industry, which is often defined as a new priority sector of the economy, given its significant potential for the creation and sale of new innovative products, which generates high added value and creates new jobs, as well as is flexible and adaptable to socio-economic changes and structural restructuring of the economy. At the end of 2024, the Ministry of DT published the Voluntary Code of Conduct for the Ethical and Responsible Use of Artificial Intelligence, which was planned to be defined in the 2023 roadmap of the Ministry of DT. This will help businesses to increase the trust of investors and partners, while citizens will be able to use innovative products without the risks of the development companies that have voluntarily agreed to comply with this code. At the presentation of the Code on 16.12.2024, 14 Ukrainian companies signed it.

We share the opinion of S. K. Ramazanov, who has identified the following problems hindering the development of AI in Ukraine: the lack of domestic infrastructure for its operation and poor business awareness of fundamental scientific developments in the field of AI, insufficient level of digitalization of companies for the implementation of AI, the lack of high-level data manage-

ment, as well as misunderstanding by the management of certain aspects of implementation of AI in the company [2, p. 266]. In our opinion, solving these problems is the main task that is formulated in various forms in the current conceptual and strategic documents of Ukraine.

Unfortunately, the problem of AI development in culture, in particular its use in archives and libraries, is not defined in *the Strategy for the Development of Culture in Ukraine until 2030* and the operational plan of measures for its implementation in 2025—2027, approved by the Cabinet of Ministers of Ukraine Resolution No. 293-r on 28.03.2025. These documents address the problems of innovative technologies only in terms of their application in the creative industry.

In April 2025, the Regulations of the Ministry of DT were amended to ensure the formation and implementation of state policy in the field of AI development and related tasks.

THE SPREAD OF AI IN THE WORLD

In October 2019, Ukraine joined the Organization for Economic Cooperation and Development's AI principles. Ukraine is also a member of the Council of Europe's AI Committee among 11 non-member states. On 17 May 2024, the Committee adopted the draft of the world's first Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law. This Convention was approved at the Council of Europe meeting on 05.09.2024 [5].

The fundamental principles of the Convention are as follows: human dignity and individual autonomy; equality and non-discrimination; respect for privacy and protection of personal data; transparency and oversight; accountability and responsibility; reliability; and safe innovation.

In May 2025, the Cabinet of Ministers of Ukraine approved the Action Plan for the Implementation of the Concept of Artificial Intelligence Development in Ukraine for 2025—2026, which includes nine measures, none of which are aimed at the activities of archives and libraries and culture in general. At the same time, this Plan provides for the "development of ... a draft law on legal regulation in the field of artificial intelligence development" by the end of 2026, in particular, for compliance with the first law in the world on AI, a regulation issued by the EU on 13.06.2024. It is worth noting that this Regulation mentions culture as a field of activity only once in the general context of gaining competitive advantages from the use of AI [6].

Given that, in the short term, AI will affect most areas of activity and everyday life around the world, many developed countries have begun to develop AI strategies that define their own goals and key areas of activity in response to relevant political and social events and challenges.

According to a study by the German platform for AI implementation [7], 23 countries have their own strategies today: Australia, Belgium, Canada, China, Denmark, Finland, France, Germany, India, Japan, the Netherlands, Norway, South Korea, Poland, Portugal, Russia, Singapore, Spain, Sweden, Turkey, the United Kingdom, the United States, and the European Union. It should be noted that this is not an exhaustive list. For example, the African Union, New Zealand, Ukraine, etc. also have their own strategies. It is noteworthy that most countries approved their strategies during 2023—2024. However, the US strategy, created in 2016, has already been revised three times (2019, 2023 and 2024).

When studying these strategies, one should also pay attention to the documents that determine the practical implementation of these strategies. Thus, since 2018, Germany has spent five billion euros on the implementation of its AI strategy.

A review of the regulatory frameworks of the information-driven world over the past five years shows that the problem of introducing AI into the activities of archives and libraries remains outside the scope of these documents. There are few references to the cultural sphere in general and the cultural heritage in particular — for example, in the African Union strategy. However, many of them recognize the interdisciplinary nature of AI

and the need for a scientific component in the creation of new intelligent technologies and their implementation in various fields of activity.

UNESCO's research confirms that since 2016 more than 30 countries have adopted laws that explicitly mention AI, and in 2024, discussions of AI-related bills in legislatures have increased worldwide. To better understand the current AI governance environment, UNESCO has mapped different regulatory approaches to AI, namely: *Consultation Paper on AI Regulation: Emerging Approaches Across the World*, which was developed through a review of sources on AI regulation in different parts of the world; discussions with parliamentarians from around the world at the Inter-Parliamentary Union Assembly on the *Impact of Artificial Intelligence on Democracy, Human Rights and the Rule of Law*, held in Geneva on 23—27.03.2024; discussions with members of parliament at the Regional Summit of Parliamentarians on AI in Latin America, held in Buenos Aires (Argentina) on 13—14.06.2024.

The issues of AI development have been the subject of discussion and relevant UN decisions. In March 2024, the UN General Assembly adopted the Resolution *Harnessing the Power of Safe, Secure and Trustworthy AI Systems for Sustainable Development*, which contains 13 important basic points that became the basis for further steps, primarily for member states around the world. In connection with the adoption of this Resolution, US Ambassador to the UN L. Thomas-Greenfield expressed one of the concerns of modern people about AI: "Today, all 193 members of the UN General Assembly have spoken with one voice and decided together to govern artificial intelligence, not let it govern us" [8].

In May 2024, the UN system issued a White Paper on AI Governance, which, in particular, identifies risks, challenges and considerations for global AI governance, namely: "given the horizontal, transversal and cross-sectoral nature of AI, it has the potential to impact all aspects of humanity" [9].

The desire to keep AI under control in order to obtain safe technologies that not only provide high efficiency in solving a variety of problems but also are used as a trusted service led to the agreement in 2024 by the UN and the EU on new rules for AI and other digital technologies. This agreement became the basis for the signing of a bilateral agreement on AI between the United Kingdom and the United States to accelerate work across the entire spectrum of technologies, in particular to address risks associated with national security and societal issues, which guarantees the security of AI tools and the Large Language Models (LLMs) that use them.

The US Department of State's Global AI Research Agenda (GAIRA) of 12.09.2024 contains important conclusions for us: "there is no international consensus on guidelines for AI research, reflecting the state of the AI research community, which is still evolving. Given this lack of consensus, this agenda will be guided by three recommended principles for AI research: 1) inclusion and equity; 2) responsible research; and 3) partnership and collaboration" [10].

These principles emphasize the importance of building AI systems that "benefit people and society, while adhering to the highest standards of autonomy, dignity, and privacy."

ACTIVITIES OF INTERNATIONAL PROFESSIONAL ORGANISATIONS ON THE IMPLEMENTATION OF AI IN THE OPERATION OF ARCHIVES AND LIBRARIES

Given the current state of AI development both globally and in Ukraine, the leadership of archives and libraries worldwide has quickly recognized the need for dedicated AI strategies. Such strategies have already begun to emerge in leading institutions as well as in international, non-governmental, non-profit, global and regional, open-ended professional organizations.

As of the end of 2024, according to the members of the AI in Libraries network group of the Conference of European National Librarians (CENL): "the current understanding of the potential of AI for libraries seems to be still low" [11].

Therefore, today the main task for organizations such as UNESCO, IFLA (International Federation of Library Associations and Institutions), ICA (International Council on Archives), and CENL is to discuss the problems of implementing AI in the activities of archives and libraries, primarily in the form of a survey and organizing events of various levels: webinars, seminars, round tables, conferences, forums, and symposia dedicated to various aspects of AI development and application. To effectively solve these tasks, a so-called AI network group was created at each organization, which develops materials for discussion and proposes drafts of summary documents.

English colleagues from the University of Sheffield have prepared a draft strategic response of libraries to AI [12], which was published for discussion on the official IFLA website (2023) as a methodological note for libraries to implement AI. The document is based on an analysis of the responses of the surveyed libraries that planned to use AI: library chatbot; support for text and data analysis (providing initial metadata); automation of systematic reviews (e.g., filtering results); discovery of knowledge about collections; promotion of AI (and data) literacy among users; prediction of library user behaviour, etc. The information obtained was applied to SWOT analysis (Strengths, Weaknesses, Opportunities, Threats), which allowed us to develop a new strategic planning for library development and identify strengths and weaknesses in the activities of libraries, mainly university libraries in England, identify existing opportunities based on real examples of technology application and possible threats — obstacles to further implementation of AI projects.

The problem of attitudes towards AI, from euphoric but often without a deep understanding, to denial, rejection, due to fear of losing jobs and even subjugation of humanity to AI, which is born out of ignorance and replaced by false information, remains important. Such a barrier is mentioned in the study "Artificial Intelligence and Documentary Heritage" by the Subcommittee on Education and Research of the UNESCO Memory of the World Program, edited by L. Duranty and C. Rogers, which has been distributed as a newsletter since May 2024 [13]. The issues addressed in this study are: enhancing archive-focused LLMs with augmented search generation; data archives for privacy protection; the balance between AI, privacy, and accessibility in archives; the role of AI in identifying or recreating archival digital record collections and enriching metadata schemas, including methods for enriching the metadata of UNESCO's audio archives with AI; appearance-based archival science; and the crucial role of paradata in AI governance; a hybrid real-time approach that uses paradata to hold AI systems accountable in traditional archives and beyond; modelling the digitization of documentary heritage materials using AI; AI-enabled annotation of digitized archival materials; AI culture and images; African-European gaps in AI rules for records management; AI literacy as a prerequisite for records management and archival professionals.

Typical for most libraries is the history of digitalization development provided by the National Library of France — from mass digitization of collections to the creation of an AI roadmap (2004—2024), presented by in a report at the webinar of the CENL AI in Libraries network group in October 2024 [14]. The experience of French colleagues confirms a simple approach: without awareness of new opportunities, their application is impossible or ineffective. Thus, research and theory are needed first, and for practitioners, the study of existing scientific achievements and available technological capabilities is essential. This is in line with the purpose of the group, which is aligned with the priorities of the CENL Strategy 2018—2022: to make effective use of AI through better understanding and application; to promote the exchange, collaboration and standardization of AI between institutions; and to identify areas of AI of particular relevance to libraries. The group is creating a network of national libraries that are already involved in the use of AI in their activities or wish to do so, thus creating a dynamic of exchange and sharing of experience that will be

useful and accelerate the deployment of new technologies in more libraries. At the end of 2024, the group consisted of 18 members representing 14 national libraries in Europe.

In November 2024, the University of Maribor (Slovenia) hosted a session on "How Libraries Can Prepare for Artificial Intelligence" as part of the third winter seminar of the Association of European Research Libraries LIBER. The participants of the event started with a discussion of the following questions: what is AI? Is AI a friend or an enemy? Is AI really new knowledge?

The latest large-scale IFLA event in the form of a symposium on "Artificial Intelligence and the Future of Libraries and Librarianship" took place on 26—27 February 2025 at the Library of Northwest Qatar.

The main topic for discussion at the CENL Annual Meeting on 15—17 June 2025 was "Artificial Intelligence meets Cultural Heritage."

Large-scale work on researching the problem of AI implementation in the activities of archival institutions is carried out by the ICA, under the auspices of which a number of webinars have been held over the past five years (https://www.youtube.com/@ICArchives/search?query=Artificial Intelligence) on the following topics: *Artificial Intelligence and Archives* (2020); *Artificial Intelligence and Diversity: A Turning Point in Archival Practice* (2021); *Artificial Intelligence for Evaluation and Selection in Archives* (three-day), organized in cooperation with the Hub for Artificial Intelligence Research in Archives (HAIRA) (2022). The result was the Recommendations on the use of artificial intelligence in the evaluation and selection of archival materials in 2022 [15]; *Artificial Intelligence Innovations in Small Audiovisual Archives: Challenges and Opportunities*, organized in cooperation with the Photographic and Audiovisual Archives Working Group (PAAG): (2024); *AI and Archives: Developing Interaction with Archives*, organized together with the Expert Group on Research Services and Outreach (EGRSO): (2024). The last significant achievement as of April 2025 was the Online Guide to Artificial Intelligence and Archival Practice in the form of an educational resource [16] developed as part of the Archives and Artificial Intelligence project funded by ICA PCOM 2024 [17].

The international initiative Artificial Intelligence for Libraries, Archives & Museums (AI4LAM) [18] is dedicated to promoting the use of AI in, for, and by libraries, archives, and museums. For this purpose, since 2018, various national libraries around the world have been holding *Fantastic Future* annual conferences on AI issues: National Library of Norway (2018), Stanford University Library (2019), The National Library of France (2021), British Library (2022, virtually), Internet Archive in Vancouver (Canada, 2023), National Film and Sound Archive of Australia (2024), British Library (3—5 December, 2025).

PILOT PROJECTS ON THE USE OF AI IN NARA

The practical achievements of the US government agency National Archives and Records Administration (NARA), which have been or are being implemented in the form of pilot projects and whose results or information about their status are published online in 2023—2024 [19], are noteworthy:

- an AI pilot project for verification and marking of personally identifiable information in digitized archival records, aimed at using AI to identify personal data subject to protection under applicable law in digital copies of archival documents and to remove it when providing access to these materials. Personal data is identified and edited using a special AI-based module of the AWS platform (Amazon Web Services). At the same time, personal data is detected by the Google Cloud Platform web service. The final decision on data editing is made by AI based on the results of a comparative analysis of both options;
- a pilot project on AI-assisted disclosure under the Freedom of Information Act, based on Natural Language Processing (NLP), a field of AI research that focuses on computer understanding, analysis and generation of human language

at the word, phrase and syntax level. This NARA pilot project is aimed at improving the fulfilment of requests in accordance with the requirements of the above-mentioned Act. The developed AI tools allow searching for the required documents and automatically removing restricted information from them, which makes the process faster and more accurate;

- automatic document description (metadata creation) for NARA digital archives using AI. This saves archivists' time, facilitates record search, and helps the public better understand the information in the National Archives catalogue. The technology is based on machine learning to analyze the content of documents and existing metadata and create descriptive fields similar to authority records;
- AI-based semantic search for the National Archival Catalogue, which uses AI to understand not only search phrases, but also the meaning of the search query, its semantics, and find hidden links between archival documents. This makes user research faster, easier, and more insightful. To implement this project, NARA decided to use Google Vertex AI software for the Gemini big language model, which they believe will provide better semantic search functionality on as opposed to the tested AWS Titan generative AI model.

This list of NARA pilot projects on the use of AI is not exhaustive. The peculiarity of these projects is the involvement of users in the final stages of testing ready-made solutions. The online resource created by American archivists certainly provides archives and libraries around the world with invaluable information that will make the implementation of AI more efficient.

From the above, it is clear that the development of AI in the world as a whole and in certain areas of activity has accelerated over the past five years. In our opinion, this is due not only to certain theoretical developments, practical experience, the first infrastructures and regulatory frameworks, but also to changes in approaches to the technological development of AI itself. For a long time, experts have been trying to create a universal AI, which did not lead to the desired breakthrough results. It seemed that in order to create an artificial likeness of any original, its creators should know this original well. Is this really the case? We think not. This is confirmed by the attempts to solve the problem of defining the concept of intelligence, its essence, as well as such concepts as "computational intelligence," "electronic intelligence" and the very concept of "artificial intelligence" in the AI theory at the present stage [20]. This idea leads us to a more pragmatic problem, which can be expressed by the following question: how many universal people have we seen in our lives? Those who are able to solve any problem in practice? Obviously, having just mental abilities is not enough. That's why children eventually move from general education to studying in the area where they can achieve the best results for various reasons: the exact sciences, music, literature, sports, crafts, etc. The general movement of AI development proves that the results improved as soon as researchers started developing AI in separate areas or combining only a few of them, as, for example, the above experience of NARA proves.

ACTIVITIES OF UKRAINIAN ARCHIVES AND LIBRARIES IN IMPLEMENTING OF AI

Ukrainian archives and libraries, on the one hand, are in a state where foreign researchers and institutions have already obtained significant results of AI implementation, which are available for review, and on the other hand, have not yet approached the problem even at the conceptual level, despite the existence of individual applications of solutions to specific problems in the library and archival spheres, which proves the unsystematic nature of the approach in the cultural sector as a whole. This is also evidenced by a review of scientific texts of the Ukrainian segment, which are mostly found in the materials of events of various levels in the form of abstracts or presentations, which are devoted to certain aspects based on foreign experience. There are also a few articles.

Most of these materials are devoted to the implementation of AI in libraries, and less to archives. The existing scientific heritage can be generally described as a statement of the possibility of using AI to improve certain areas of activity, provided that there is appropriate support. Ukrainian humanities scholars are waiting for cooperation with AI specialists. In our opinion, archives and libraries should be prepared for such interdisciplinary interaction, first of all, in order to be able to formulate their needs for information technology specialists as a response to the challenges faced by cultural institutions.

The most active events of various forms, which discussed the problems of introducing AI into the activities of archives and libraries, were held in 2024—2025. In our opinion, the most thorough in the library sector of Ukraine today are public speeches by L. M. Demianiuk (2022) [21], T. O. Yaroshenko (2023) [22] and Yu. S. Kovtaniuk, O. Yu. Kuznetsov (2024) [23].

In March 2024, L. M. Guba, Yu. O. Basova and V. O. Barabash considered the problem of using AI in intellectual property in their speech at the IX All-Ukrainian Scientific and Practical Internet Conference of Poltava State Agrarian University.

An interesting topic is the comparison of the electronic library and ChatGPT, proposed by O. V. Markovets and A. V. Hrynovets for discussion at the IX International Scientific and Practical Conference "Information and Society," held in Vinnytsia, 07 June 2024 [24].

At the end of October 2024, the issue was widely discussed at the II All-Ukrainian Scientific and Practical Conference with International Participation "Studies in Information Science, Social Communications and Philology in the Modern World" held at Mariupol State University (Kyiv) [25]. The participants of the event touched upon the following topics in their speeches: the use of AI in: knowledge management in the university library (B. Myroshnyk); library services (M. Vorontsova, K. Savik); big data processing (B. Protsenko); preservation of archives and libraries in times of war (M. Bella); the process of formation and storage of archives and libraries in the conditions of war (M. Bella); the process of forming and storing documentary collections (O. Krygina); the use of Internet resources in the activities of libraries (L. Cherednyk); automation of analytical and synthetic processing (E. Molchanov); creative industries in compliance with copyright (N. Dumansky).

In November 2024, M. Chirkova made a presentation on the use of AI in the archival field at the IX International Scientific and Practical Conference *Documentary and Information Communications in the Context of Globalization: State, Problems and Prospects* held at *Yuri Kondratyuk Poltava Polytechnic* National University [26].

In May 2025, the Eighth International Scientific Conference *Information, Communication and Knowledge Management in a Globalized World* was held at the Kyiv National University of Culture and Arts [27]. The participants of the event touched upon the following topics in their speeches: the use of AI in: the activities of libraries of higher education institutions (A. O. Gaiwan); communicative competencies in the professional activities of specialists in information, library and archival affairs (A. M. Sheremeta); reference services in public libraries (M. M. Maranchak); interaction of library science, education and practice (O. Z. Klymenko); informatization of archival affairs (O. M. Artemenkova, A. M. Kryklyva); digital transformation of bibliographic resources (O. Y. Antoniuk) and libraries of higher education institutions (Yu. I. Horban), as well as perception of AI by libraries of the world in 2024 (D. O. Honcharov).

Many other participants of the above and other events addressed the problem of the development and use of AI in various areas of activity in general, not only archives and libraries.

Among the studies presented in the form of scientific articles in professional journals, the following should be mentioned: L. Demianiuk's study of the strategies of the world library community for integrating AI into the library industry [28]; N. Maranchak's review of foreign experience in

using AI in digital marketing of the library industry of Ukraine and the prospects for its application by Ukrainian libraries [29]; O. Ivashkevych's presentation of the results of AI application in Ukrainian libraries [30]; K. Kotsiubivska, O. Tymoshenko and V. Vasilevskyi's study of the use of AI tools for the preservation and promotion of cultural heritage in general [31]; a model of legal protection of works (texts, music, images) created by AI proposed by Y. Kapitsa [32]; a discussion of the legal status of AI-generated documents in law enforcement initiated by D. Kaliuzhnyi, in which the author concludes that appropriate changes to current legislation are needed [33]. Employees of the V. I. Vernadskyi National Library of Ukraine (VNLU) S. Maslovska, N. Bilinets, and L. Rudytska compiled a bibliographic index of recent works, speeches, and events on AI, which is available online [34].

As for the practical experience, it is divided into two approaches: the use of off-the-shelf solutions by training them to perform specific tasks or the creation of custom archives and libraries. Thus, Ukrainian institutions in these fields of activity have taken the following first steps in this direction.

The State Archives of Lviv Oblast (2022) introduced software that helps archival staff identify and correct errors in the compilation of documents. The tool was developed by the Department of Artificial Intelligence Systems of Lviv Polytechnic within the framework of the *Digital Lviv Region* Regional Informatization Program of the Lviv Regional State Administration [35].

H. I. Denysenko Scientific and Technical Library of the *Igor Sikorsky Kyiv Polytechnic Institute* National Technical University of Ukraine (STL of KPI) created a library Telegram chatbot (2023), which allows answering all questions about the operation of the library, its services and information resources, and address more complex requests to the specialized departments of the institution.

Online resources such as those offered by the STL of KPI on its official website in the section "Using AI for Academic Activities" [36], which provides information on AI-based online services in various categories.

Under the guidance of film director I. Kanivets (2024), AI was used to digitally restore the film about the 1918 revolution *Ukrainian Movement* from the funds of the Central State Audiovisual and Electronic Archive [37].

To help archives and libraries staff to master the available AI technologies, they began to organize thematic seminars (webinars). For example, at the end of February 2025, the National Scientific Agricultural Library of the National Academy of Agrarian Sciences of Ukraine hosted a webinar "Application of Artificial Intelligence in the Professional Activity of a Librarian," conducted by Yu. Lukianchuk. Despite the high appreciation given by the participants of the event, who got a general idea of the available free AI technologies, in the end Yurii Lukianchuk received the following question: so, how to apply AI in the activities of libraries? The lecturer gave a decent answer about the possible use of these technologies. However, he noted that they are not yet able to solve all the problems in librarianship, including replacing librarians in the cataloguing process.

Other events include workshops, which offer the opportunity to complete AI implementation tasks independently under the supervision of a master class leader. One such event was attended by Ukrainian archivists in June 2025 in Oslo (Norway), where such opportunities were explored. According to the participants, the value of the workshop increased due to the possibility of using their own datasets, which makes the experience gained as relevant as possible for its future implementation in Ukraine.

Based on the above, the implementation of AI in the activities of archives and libraries relies solely on specialists archival and librarianship. They can choose two ways to solve this problem. The first is to use off-the-shelf solutions (systems, neural networks) for which machine learning should be performed in order to make their own datasets available to AI and take into account the specifics of a particular institution. At the initial stage, people often try to get by with solutions that are classified as free software. However, the best ones

are usually proprietary. The second way is to create your own tools (artificial neurons), systems, and artificial neural networks. It is clear that the second way is more costly, given that it involves hiring not only AI implementation specialists but also software product developers. Based on the above experience, the first way is more common in the world. However, both approaches require the involvement of IT specialists specializing in AI. The implementation of neural network platforms in the Ukrainian information space is an important step forward.

The strategic importance of developing this area is emphasized by the decision of the Ministry of DT, which was determined in April 2025, that a Ukrainian big language model [38] will be developed by the end of this year, which is already being developed at the AI Development Center for the public sector, opened by the Ministry of DT in early 2025. In July 2025 we and 52 other institutions (ministries, other central executive authorities, research institutions, in particular in various fields of linguistics, universities, broadcasting companies, libraries, archives, museums) received a questionnaire from the Ministry of DT "On the assessment of available data for the development of the Ukrainian big language model" (incoming letter of 25.07.2025 No. 1/04-5-11036).

The Presidium of the National Academy of Sciences of Ukraine issued Order No. 236 dated 16.07.2025, by which it approved the "Fundamentals of the Strategy for the Development and Application of Artificial Intelligence in the National Academy of Sciences of Ukraine" and recommended that "the Coordination Council of the National Academy of Sciences of Ukraine on the Development of Artificial Intelligence by the end of the third quarter of 2025 develop a draft operational plan and scientific support for the implementation of the Strategy with clear goals, stages, performance indicators and monitoring mechanisms." It should be noted that the document does not mention libraries. However, among the identified main areas of research in the field of AI are the digitalization of archives in the area of "Ukrainian-language natural language processing systems" and "digitization of archives, texts, visual sources, artifacts", as well as "stylistic, semantic and contextual analysis" in the area of "Digital humanities and cultural heritage." Given that the activities of the VNLU and the V. Stefanyk Lviv National Scientific Library of Ukraine are universal in nature and are also guided by regulations in the archival field, the identified strategic directions for the development and application of AI in the National Academy of Sciences of Ukraine in the field of digital humanities and cultural heritage are a solid basis for further development and application of AI in the national libraries of Ukraine.

What is the role of archivists and librarians in this interdisciplinary interaction? They should be able to formulate terms of reference for AI specialists. To do this, they should learn and apply the methods available in Ukraine today. In fact, we are talking about one of the areas of development of digital humanities. An analysis of AI research proves the difficulty of its perception by the humanities, given that these scientific texts cover research in the physical, mathematical, and technical fields of knowledge with the teaching of complex mathematical apparatus. However, Ukrainian AI researchers have already prepared methods that take into account the practical interdisciplinary nature of AI use in various fields and can be mastered by humanities scholars. From this perspective, among others, in our opinion, the textbook by N. V. Shapoval (2022) [39] deserves attention, which may allow for the development of digital humanities based on the proposed methodology for identifying the so-called intelligent agents to solve specific problems of archives and libraries. The use of such techniques encourages a preliminary audit of the activities of a particular institution to determine the processes to which AI can be applied in the presence of so-called sensors with which the agent will perceive information and, based on the available internal and/or externally accessible knowledge arrays and embedded acts of perception, will make appropriate decisions. Such a methodology can provide humanities scholars

with the opportunity to conduct their own assessment of AI capabilities and will lead to a systematic vision of its use based on the inductive method, which will lead to a qualitatively new level of interaction with information technology specialists in the field of AI. Obviously, this approach will allow obtaining a much better result, given the ability of archivists and librarians to formulate technical specifications for the implementation of AI, taking into account professional knowledge in their field of activity.

In view of the above, in 2026, the VNLU will launch a research project *Theoretical Aspects and Applied Principles of Artificial Intelligence in Library Activities*, which involves not only obtaining practical results and methods, but also researching theoretical aspects, including the preparation of a conceptual vision of librarians for the further development of AI in librarianship.

Over the past five years, there has been a growing interest in AI in general and in the theoretical achievements and positive experience gained by mankind over the past 25 years as a significant basis for the transition from universal AI to solving specific problems and creating systems that combine some of the areas of AI application.

Most developed countries have created their own AI development strategies. Various research centers are constantly assessing the readiness for AI implementation and the level of AI implementation in various fields of activity, with rating reports among these countries.

Ukraine has also begun the process of introducing AI, created specialized institutions, primarily the IAIP, a number of specialized departments in various universities on AI issues; defended PhD and doctoral dissertations; prepared textbooks, monographs, published many articles in professional journals; published specialized professional periodicals on AI issues, such as Artificial Intelligence (since 1995); thematic events (conferences, round tables, seminars, webinars, etc.) are held on a regular basis; the IAIP has proposed a Strategic Vision for the further development of AI, which has become the scientific basis for creating a regulatory framework for the development of AI.

Over the past five years, Ukraine has created a general legal framework for AI development, including the Concept of AI Development, and is preparing a draft specialized law. The Ministry of DT has begun building Ukraine's AI infrastructure, including a number of national neural networks, such as, a national large-scale language model. Under the Ministry of DT has established an AI Development Centre for the public sector. The Presidium of the National Academy of Sciences of Ukraine has determined the strategic directions for the development and implementation of AI in the NAS of Ukraine. The preparation of an operational plan and scientific support for the implementation of the AI Strategy in the NAS of Ukraine has begun.

Almost all intergovernmental unions (EU), associations (UN), international organizations (UNESCO), including sectoral (IFLA, ICA) and regional (CENL), and inter-sectoral associations (AI4LAM) have created special groups for the development of AI in a particular field or archives and libraries in general. There is an active discussion of the possibility of formulating conceptual foundations for the further development of AI, disseminating practices of implementing AI in the activities of archives and libraries, sharing experiences, identifying the most successful solutions and ways to improve the results achieved, and drawing up international recommendations.

Many of the world's leading archives and libraries have created their own AI development strategies and started to gradually implement it in their operations. Among others, the results of NARA are noteworthy and deserve to be studied and disseminated among other institutions around the world. Unfortunately, not only have no such sectoral documents been created in Ukraine to provide a conceptual and strategic vision for the further development of AI in archives and libraries, but Ukrainian archivists and librarians are only in the process of raising the issue and discussing certain issues, which has intensified over the past three years.

The humanitarian sphere needs to strengthen interdisciplinary dialogue, delve deeper into the AI problem, and create its own generally accepted vision of the conceptual foundations of AI development in archives and libraries, taking into account the specifics of archives and libraries.

An effective approach to making a final decision on the use of AI in the activities of archives and libraries on the basis of off-the-shelf solutions or the creation of new ones, which may be costly, should be the practice of conducting audits of all processes of their activities and available datasets in institutions, followed by the application of a methodology for assessing the possibility of creating a set of intelligent agents based on the results obtained, as well as drawing up a common system vision and consulting with AI specialists to prepare their own and technical requirements for performing individual tasks. The proposed approach needs to be tested and methodological recommendations for archives and libraries based on integrated solutions should be developed based on its results.

Research on AI in archival and library science will become an important component of the effective development of digital humanities in Ukraine as a whole.

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НОРМАТИВНО-ПРАВОВЕ ЗАБЕЗПЕЧЕННЯ, НАУКОВІ ДОСЛІДЖЕННЯ І ПЕРСПЕКТИВИ ВПРОВАДЖЕННЯ ШІ В АРХІВНІЙ ТА БІБЛІОТЕЧНІЙ СПРАВІ УКРАЇНИ: АНАЛІТИЧНИЙ ОГЛЯД

Вступ. Архіви й бібліотеки є найбільшим у світі історико-культурним масивом документів, що поступово стає цифровим. Це перетворює їх у центри великих даних, які, з одного боку, потребують застосування сучасних програмних інструментів для їхньої ефективної обробки, а з іншого — організації їх як потужного джерела знань штучного інтелекту (ШІ).

Проблематика. Питання впровадження ШІ в галузі архівної та бібліотечної справи в Україні лише обговорюється, виникає проблема аналізу досвіду і вибору концепцій подальшого розвитку ШІ у цій сфері: або створення спеціалізованих архівно-бібліотечних нейромереж, окремих штучних нейронів або програмних інструментів, або ж адаптація наявних нейромереж до архівної та бібліотечної справ.

Мета. Визначити стан використання ШІ в діяльності архівів та бібліотек у світі й Україні, а також напрями подальшого розвитку ШІ в цих сферах.

Матеріали й методи. Застосовано методи системного аналізу, синтезу, порівняння документальних джерел та наукових праць в галузі використання ШІ.

Результати. Показано, що нормативно-правова база використання ШІ в цілому створена. Огляд наукових досліджень сучасного стану впровадження ШІ у провідних архівах і бібліотеках світу показав, що Україна перебуває на початковому його етапі, що потребує розв'язання шляхом вибору або спеціалізованих програмних рішень на основі системи ШІ загального призначення, або розробки нейромереж спеціально для архівів і бібліотек. Досвід застосування ШІ у провідних архівах і бібліотеках світу й України, а також розробка проєктів міжнародних організацій в галузі архівної та бібліотечної справ, до яких долучається НБУВ, зокрема (мережі бібліотек ООН та національних бібліотек ЄС), показав перспективи вирішення цих завдань шляхом розробки пілотних проєктів.

Висновки. Більшість досліджень та досвід міжнародних організацій показує, що архівна та бібліотечна сфери потребують розвитку спеціалізованих штучних нейромереж, що можливо лише за рахунок власних ініціатив бібліотекарів та архівістів.

Ключові слова: штучний інтелект, бібліотечна та архівна справи, концепції розвитку ШІ в архівах і бібліотеках, стратегії впровадження ШІ в Україні, інтелектуальні агенти, штучні нейромережі.