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The Vernadsky National Library of Ukraine in Times of Independence and Martial Law: Development Strategy, Preservation, and International Co-operation

Abstract: This article explores the operational realities faced by the major national libraries in Ukraine during the period of independence and martial law, including shifts in priorities and the development and preservation of digital resources with research and historical-cultural significance at the Vernadsky National Library of Ukraine. It also examines the increased involvement in European open science projects and underscores the critical role of European partnerships in safeguarding national and global cultural heritage, particularly against potential loss during wartime conflicts.

Keywords: The Vernadsky National Library of Ukraine; digitization of cultural heritage; open science; electronic library resources; international library co-operation; humanitarian support to libraries

Die Vernadskyj-Nationalbibliothek der Ukraine in Zeiten der Unabhängigkeit und des Krieges: Entwicklungsstrategien, Bestandserhaltung und internationale Kooperation

Zusammenfassung: Dargestellt werden die Arbeitssituation der größeren Bibliotheken der Ukraine in Zeiten der Unabhängigkeit und des Krieges sowie der Wandel der Arbeitsprioritäten und die Entwicklung und die Bestandserhaltung digitaler Ressourcen von besonderer wissenschaftlicher und kulturhistorischer Bedeutung an der V. I. Vernadskyj-Nationalbibliothek der Ukraine. Die europäische Partnerschaft bei Open-Science-Projekten und vor allem zur Sicherung des nationalen und globalen kulturellen Erbes in Anbetracht der Gefahr ihres Verlustes in Kriegszeiten sind von entscheidender Bedeutung.

Schlüsselwörter: Vernadskyj-Nationalbibliothek der Ukraine; Digitalisierung des Kulturerbes; Open Science; elektronische Bibliotheksressourcen; internationale Bibliothekskooperation; humanitäre Unterstützung für Bibliotheken

1 Introduction

The dissolution of the Soviet Union and Ukraine's declaration of independence in 1991 marked a historic event that fundamentally revived the national status of Ukraine, significantly impacting the development of libraries and their functions. One of the first significant events was the restoration of national library status to the Central V. I. Vernadskyi Scientific Library (VNLU), which was originally established in 1918 as the National Library of the Ukrainian State by the national government of Hetman Pavlo Skoropadskyi, and is now the Vernadsky National Library of Ukraine, serving both research and public library functions. During the Soviet era, the Library underwent significant transformation, evolving from an academic library into a public library and a library for the Academy of Sciences. This act of "justice revival" cannot be underestimated, as according to its charter, the Library was designated to become the country's main library and play a key role in preserving historical cultural heritage. It assumed the functions of the main repository, as over several years it brought together all the national collections previously belonging to institutions dissolved during the Tsarist era and private individuals who left Ukraine during the Revolution of 1917 to 1921. Work began on organizing the cataloguing and storage of the national collection of manuscripts and printed materials, including legal deposit, in order to enable the maximum access to the collections for the population, and to manage the country's libraries. The establishment of Soviet power diminished the national functions of libraries, and until

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the 1990s, no Ukrainian library held the status of a national library.

Although the Soviet authorities announced a policy of opening a large number of public libraries for the education of the people, the collections of these libraries began to be supplemented with political and ideological literature. This literature was aimed at strengthening the new government and shaping mass consciousness based on Bolshevik ideology. The historical and cultural collections that showcased the long and fruitful path of the Ukrainian people, encompassing science, culture, and education, were either destroyed or retained within archives dedicated to literature. The history of libraries in Ukraine and their new functions have been documented by Ukrainian scholars L. A. Dubrovina and O. S. Onyshchenko.[1] The national intellectual elite faced repression in the 1920s and 1930s, and the literature collections were subjected to censorship and were heavily biased towards socio-political literature. Thus, gaining independence in 1991 opened a new path for both large and small libraries towards self-development and fulfilling the functions of libraries in a democratic society. Starting in the 1990s, several leading libraries were granted national status, including the National Parliamentary Library (now The Yaroslav Mudryi National Library of Ukraine (The "Yaroslav the Wise" National Library of Ukraine)); the National Historical Library; the National Library of Ukraine for Children; the Vasyl Stefanyk Lviv National Library; and the Odesa National Scientific Library, and a number of research libraries for the research centres of the sectoral Academies of Sciences (medicine, education, agriculture).

The creation of such a number of national libraries was the result of a deliberate state policy aimed not only at creating specialist libraries but also at decentralizing the collections and functions of the general national state library, particularly when the term "national" was removed from the Soviet lexicon. At the onset of the revival of the national functions of libraries, there were up to 40 000 libraries of all kinds.[2] Although the 1990s saw Ukraine attempt to build its economic independence, the financial situation regarding library support faced significant challenges. The network of small public libraries began to shrink, and there was a noticeable lack of resources, staff training on restoring hidden collections, and adequate equipment, including computers. Despite these difficulties, the sense of freedom and the remarkably active effort to fill historical and cultural gaps, the initiation of a national bibliography, and the integration of the true spiritual values of the native culture

and historical knowledge into the building of a new society became the most important motivation for librarians and library scholars. A colossal amount of work was undertaken to reintegrate the printed heritage and the names of "forgotten" figures into open research and cultural circulation, enabling the formation of a new generation of citizens free from the ideological constraints of the previous mentality. This aspect of library activity became pivotal and was largely driven by the personal enthusiasm of librarians. Today, the collective holdings of Ukraine's national libraries represent a shared asset not only for Ukraine but for global culture as well.

This period of free development and expansion of libraries continued until the early 2020s. Libraries were enriched with new publications from both commercial and state-funded publishing houses, including the Ukrainian Book programme, which facilitated the revival of the Ukrainian language and enabled the study of the authentic history of the Ukrainian people and other world cultures. The libraries themselves published numerous historical works, reports on their activities, bibliographies, and catalogues. A significant achievement was the creation of electronic resources, which substantially broadened access to library collections.

The onset of Russian aggression plunged libraries once again into a state of destruction and suffering. As a result of the ongoing armed conflict in Ukraine since 24 February 2022, 113 museums and galleries had been damaged by 25 January 2024. In total, 1938 cultural infrastructure objects have suffered damage or destruction due to Russian aggression.[3] As of 22 February 2024, 131 libraries have been destroyed and an additional 746 libraries have sustained various degrees of damage and require extensive repairs. A total of 134 public libraries have lost their collections, and the total losses to library collections exceed 1.5 million volumes.[4] Unfortunately, the situation continues to deteriorate, and the associated statistics to escalate.[5]

Libraries have begun to address a new challenge, preserving their cultural heritage, but their resolution is hindered by a lack of the necessary computer equipment and scanners to permit the digital preservation of resources in case of destruction from bombing, fire, floods, and other consequences of military action. The example of the Vernadsky National Library of Ukraine (VNLU) deserves special attention. Since the early 1990s, coinciding with Ukraine's period of independence, VNLU has significantly advanced in developing electronic resources, accumulating extensive

1 Dubrovina and Onyshchenko (1998–2008).
2 Dubrovina and Onyshchenko (2009) 530.

3 MCIP (2024).
4 Bobyr (2024).
5 Yaroslav Mudryi National Library of Ukraine (2024).

experience in resource creation, professional staff training, and the formation of databases containing cultural heritage of national significance. These developments have opened new possibilities for further enhancing these activities. As a research institution affiliated with the National Academy of Sciences, VNLU has contributed to the development of research resources that have supported the advancement of scientific and academic education in Ukraine. However, in recent years, VNLU has faced declining material and technological capabilities for creating and supporting such resources, due to ageing equipment, outdated software, and reduced funding. The ongoing war has further exacerbated the material and staffing challenges for VNLU, which houses the largest collections of manuscripts, archives, and printed research heritage in Ukraine. The Library holds approximately 17 million items of Ukrainian and world literature and maintains the only integrated system in Ukraine for creating research resources. The holdings of VNLU are designated by the state as a research and cultural asset, constituting a national treasure, with a significant portion of its special collections recognized as part of global research and cultural heritage.

2 The Library during the War: Problems and Tasks

The war has created challenging conditions for major research libraries, which are tasked with preserving the national memory and world knowledge resources. Significant reductions in library funding have led to major problems in maintaining the Library's human resources, which have suffered considerable losses: the relocation of qualified specialists abroad; the loss of young staff receiving only half of their salaries; the bombing of buildings and critical infrastructure; the inability to fully repair damaged roofs and facilities; the periodic lack of electricity and heating; transportation issues; and a deterioration in people's everyday life, requiring positive psychological support for staff.

The Library is reorienting its activities towards the most crucial tasks: preserving its collections and electronic resources, digitizing the most valuable parts of its collections, assessing its preparedness for adverse emergency conditions, and ensuring access to information, and organizing the archiving and proper storage of the Library's collections. The Library has to support the development of research infrastructures and digital science communication, the activities of scholars and research institutions, and serving different users with networked abstract and full text research resources. Implementing effective infor-

mation services for accessing cultural and research sources of information in line with international standards is under way. Key tasks have included developing integrated digital resources in VNLU; organizing access to international research resources, including digital libraries; facilitating the entry of Ukrainian scientists' research into European open science; integration into the European and global research infrastructure; and accelerating communications.[6] This is the new VNLU strategy for the period of the war.[7]

During the period of martial law, developing strategies for international library communication, as well as the expansion and maintenance of fruitful international relations with the global library community, have become increasingly relevant. In the demanding context of war, the roles of international library diplomacy and the development of global relations assume an unprecedented level of importance. These efforts are pivotal not just for the preservation of cultural heritage but also for ensuring the continuity of library services and fostering global solidarity. These activities bring attention to the impacts of conflict on cultural institutions and advocate for the protection of libraries and cultural heritage sites in conflict zones.[8] The international co-operation of national libraries with professional global library and information societies, international professional organizations, and foreign libraries is particularly crucial, as these are the main partners in joint efforts to preserve cultural heritage and to support and develop Ukraine's libraries.

In this context, from January to March 2023, the Conference of European National Librarians (CENL) conducted a "Survey on European National Libraries' Support for Ukrainian Libraries and Ukrainian Cultural Heritage". This survey aimed to provide a comprehensive overview of the support measures implemented by European national libraries to aid Ukraine, its libraries, and its cultural heritage. It sought to deliver a complete picture of the support provided for Ukrainian libraries and Ukrainian cultural heritage by CENL members. Additionally, the survey facilitated effective coordination of these efforts in response to the current needs of Ukrainian libraries and librarians. The survey included questions on topics such as basic information on offers of support, scholarship programmes, the protection of Ukrainian heritage assets, communications, and further support for librarians and libraries in Ukraine.[9] The substantial work done by CENL highlights the significant support for Ukraine's library sector from its members

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6 Dubrovina (2023) 82 f.

7 V. I. Vernadskyi National Library of Ukraine (2023).

8 Demianiuk (2023b) 74.

9 CENL (2023) 3–6.

and underscores the importance of effective international collaboration, especially in times of crisis. Such collective action not only highlights the critical role libraries play in the preservation of cultural heritage but also illustrates the effectiveness of international co-operation in protecting valuable cultural resources against the threats posed by conflicts and other disruptive events.[10]

3 Partnership-Based Humanitarian Aid

The Library's priority is to accelerate the digitization of collections in order to preserve information and provide access to users. This effort has been greatly assisted by the organizational efforts and support of CENL and several individual European national libraries, which have helped in obtaining funding and equipment. We are immensely grateful to the German National Library; Berlin State Library; National Library of Poland; National Library of Sweden and the Swedish Academy; National Library of France; National Library of Finland and University Association, and many others, whose support enabled our Library to acquire powerful scanners and servers, computers, and other essential equipment.[11] In addition, the "Saving Ukrainian Cultural Heritage Online" (SUCHO.org) initiative has emerged as a significant project. By the end of 2022, over 1 500 volunteers from 38 countries had copied the websites of more than 5 000 Ukrainian cultural institutions, creating backups on servers abroad.[12]

Through collaborative efforts with the British Library and Berlin State Library, significant strides were made in the preservation of the collections, ensuring the availability of equipment for all aspects of caring for collections and for conservation. These provisions revitalized the activities of our conservation department, facilitating the restoration of damaged manuscripts, early prints, archival documents, newspapers, maps, and other artifacts. Furthermore, the British Library played a pivotal role in mobilizing numerous donors through the material, technical, and financial backing of the International Alliance for the Protection of Heritage in Conflict Areas (ALIPH), the Institute of Conservation (ICON) and the International Council of Museums (ICOM). These organizations coordinated the delivery of conservation materials to Ukraine in July 2022, thereby enhancing our capacity to manage and restore damaged items in our collections.

The British Library has provided significant information and psychological support to Ukrainian libraries.[13] During the International Conference on "Library. Science. Communication. Current Issues in the Preservation and Innovative Development of Scientific Libraries", hosted by VNLU in October 2023, Sir Roly Keating, Chief Executive of the British Library, underscored the vital role of national libraries in the collective global effort to collect, preserve, and make accessible the cultural heritage of nations. He emphasized the critical importance of these activities for researchers both now and in the future. He stated: "Never can I remember a time when the role that national libraries have to play as a common global shared endeavour in collecting, preserving, and making accessible the heritage of nations for researchers now and into posterity has been so important".[14]

It is crucial to highlight the significant role of CENL, led by Frank Scholze, in preserving cultural heritage, as notably seen in the collections of VNLU. CENL has actively engaged in initiatives such as the "Kulturgutschutz Ukraine", a major project based in Germany aimed at safeguarding Ukrainian cultural assets during the ongoing crisis. Frank Scholze, his deputies Ute Schwens, and Michael Fernau, and in collaboration with Professor Achim Bonte, Director-General of Berlin State Library (a Prussian Cultural Heritage Foundation since 2020) have mobilized extensive resources and expertise to support these preservation efforts. This initiative is further strengthened by the involvement of colleagues from the German National Library in Leipzig, including Director Stephanie Preuss and Tina Bode, who leads the conservation department in Leipzig. A key supporter of our Library has been Olaf Hamann, Head of the Eastern European Literature Department at the State Library in Berlin, along with members of "Kulturgutschutz Ukraine". In March 2022, the Federal Government's Commissioner for Culture and Media launched the "Ukrainian Network for the Protection of Cultural Values". This network gathers and coordinates information about the cultural situation and those involved on the ground, as well as about existing needs and offers of assistance.[15]

Addressing the annual conference at VNLU, Olaf Hamann underscored the significant importance of the Conference and highlighted that in Germany and many other Western countries, volunteers have united to support efforts to preserve Ukrainian identity and the cultural her-

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10 Demianiuk (2023a) 103–110.
11 Dubrovina and Kovtaniuk (2024) 38 ff.
12 Ibid. 38.

13 Strishenets (2023) 114 f.
14 http://www.nbuv.gov.ua/node/6282.
15 https://www.dnb.de/DE/Ueber-uns/Ukraine/ukraine_node.htm.

itage of Ukraine. He stated: "In Germany and many other Western countries, volunteers came together to support your efforts to preserve Ukrainian identity and safeguard your country's cultural heritage".[16]

It is important to acknowledge the considerable support from Sweden. Special appreciation is extended to the leadership of the Royal Library (National Library of Sweden), particularly to its former Director Karin Grönvall, Deputy Director Lars Ilshammar, and to Andreas Segerberg, Research Coordinator in the Department of Psychology, University of Gothenburg. A vital role was played by Lars Ilshammar, a Swedish historian, Doctor of Philosophy, and Deputy Director of the National Library of Sweden (until 2023), who also volunteered for "Saving Ukrainian Cultural Heritage Online (SUCHO)" and served on the IFLA Working Group "Cultural Heritage for Ukraine". His energetic participation was instrumental in acquiring essential computer equipment for Ukraine from SUCHO, including laptops, all-in-one PCs, monitors, printers, and external drives. He has said that "Damage to the cultural heritage of a people, regardless of the country to which it belongs, is equivalent to damage to the cultural heritage of all humanity, because every nation contributes to the culture of the world".[17]

Building on this foundation, Lars Ilshammar has also undertaken significant efforts in providing practical and emotional support and humanitarian assistance to Ukraine, including our Library. Collaborating closely with the Swedish Royal Academy[18], which funded the purchase of two powerful scanners, this initiative was further supported by Mats Ulrik Malm, who has been Permanent Secretary and spokesman for the Swedish Academy since 26 April 2019. This aid was prominently featured in the Swedish Academy's annual report for 2023.[19]

Following these substantial contributions, significant support was provided by the National Library of Poland, which supplied critical firefighting equipment, including necessary fire extinguishers and other specialized tools. This support was crucial for enabling our participation in IFLA activities in 2022 and other international events. Additionally, many national libraries, along with the Consortium of European Research Libraries (CERL), have organized summer schools, online training for staff, and offered projects, grants, webinars, and more. These educational initiatives are designed to enhance the capabilities of library professionals and foster international collaboration within the library sector.

Building on this extensive international collaboration, VNLU received material assistance from the University of the Arts Helsinki network, which includes the Academy of Fine Arts, the Sibelius Academy, and the Theatre Academy.[20] Thanks to the efforts of the libraries of these art academies, VNLU was able to acquire antivirus software. We are deeply grateful to the Director, Tommi Harju, and his staff for providing timely support that significantly aids us in maintaining our resources.

4 The Digitization of Historical-Cultural Collections and the Creation of Digital Resources for Ukraine's National Memory

Accelerating the digitization of Ukraine's historical-cultural collections has become a key priority, aimed at preserving unique historical information related to the development of science, culture, education, and information systems, and providing this information in open access based on guidelines that establish the criteria for selecting significant book treasures for digitization,[21] with these criteria being continuously refined during periods of military conflict.

There has been extensive discussion in Ukraine about the digitization of cultural heritage preserved in libraries, archives, and museums.[22] The intensive process of digitizing documents involves determining which documents to digitize first, ensuring the high quality of the digital copies created, and providing their reliable storage. It is understood that the appraisal of value is a subjective process and always depends on various factors at the time, including the training and knowledge of the experts involved. The Library has over the years brought together a group of official experts who work in conjunction with the Ministry of Culture and Information Policy (MCIP) of Ukraine, ensuring the quality of appraisals and advancing the creation of digital resources. The experience of VNLU highlights the importance of conducting meticulous inspections of the condition of unique and rare items before digitization. It is advisable to digitize not only extremely valuable documents but also those in satisfactory condition and of manageable size, both in terms of format and spine dimensions. This strategy enables the preparation of essential copies at the initial phase of digitization. During martial law, prior-

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16 http://www.nbuv.gov.ua/node/6282.

17 Lars Ilshammar.

18 https://www.kva.se/.

19 SDG Academy (2023).

20 https://docs.lib.purdue.edu/iatul/2021/thursday/5/.

21 Kovalchuk (2010) 142–147.

22 Kovtaniuk (2023).

itizing the creation of master copies is crucial. Nonetheless, the tasks of creating metadata, developing a user catalogue, and OCR-ing can be postponed and completed by specialists once digital copies are available and a dedicated backup resource has been created. There are also legal issues that require new legislative solutions. It is important to note that Ukrainian law does not currently define the conditions under which a master copy of an item in any sector of activity (archive, library, or museum) could attain the status of the original in the event of irreversible damage or loss of the original. However, in our opinion, this should not hinder the increasing pace of digitizing collections.

An important factor in ensuring high quality digitization results, especially during the time of active military conflict in Ukraine, has been the charitable support from our European colleagues in many renowned institutions. Libraries have begun receiving professional digitization equipment and large capacity data storage systems. This has made possible the creation of high-quality master copies, typically at a resolution of 600 dpi, with optimal speed given the size of such digital copies. The VNLU uses Zeutschel OS C2 scanners, A2+ format, which were provided by European donors and allow for faster operator work due to the automation of most processes, including both mechanical and software features equipped in the device.

Thus, today it is impossible not to positively assess the growth in the volume of digitized manuscripts, books, newspapers, and archival documents. In just the last six months, over 160 000 items have been digitized, compared to only 12 000 in previous years. Although the proper processing of these is not yet complete, ongoing efforts are being made to make these documents publicly available.

Perspectives on ensuring the reliable storage of master copies are evolving, necessitating storage solutions of significant strategic capacity. Historically, during peacetime, this involved merely duplicating the data from the primary storage to a remote location and creating a third, isolated storage on reliable media within the same institution, disconnected from any networks. This approach was governed by Ukraine's legal framework for information protection. The primary objective was to ensure the secure storage of data and its recovery in the event of damage or loss.

The current strategy has undergone three significant changes: the application of reliable, small-sized network storage units that are easy to operate, do not require server rooms, do not need much time to shut down their operations, and most importantly, can be easily moved in case of real danger; isolated, untouched storage on reliable media in protected locations, such as safe rooms that are highly likely to remain intact in the event of direct explosive hits to the building and can withstand high temperatures; and

remote cloud storage outside Ukraine. These strategic modifications enhance the resilience and accessibility of critical data under a variety of challenging conditions.

Already in March 2022, amendments were made to Ukraine's regulatory acts on technical information protection. These changes enabled archives, libraries, and museums to begin actively copying data to cloud storage located outside the country. This development allowed the rapid organization of free and reliable data storage in European clouds, notably Amazon Web Services.[23] Currently, hundreds of terabytes of information are securely stored in this cloud. However, the period of free storage will end six months after the cessation of martial law.

At this time, digital "socio-humanitarian" projects[24] are also being developed at VNLU, which are showcased in the "Digital Heritage" section[25] of the ResearchUA digital platform for researchers. The processes of digitization and the presentation of historical and cultural heritage objects in a digital environment form an important segment in the development of the current knowledge infrastructure, which includes education, science, and culture. Today, national and research libraries are treasuries of cultural achievements, not just for the Ukrainian people but also as custodians of the collective memory of all humanity and global spiritual values. The unique universal collection of the Vernadsky National Library of Ukraine – "The Collection of Manuscripts, Old Prints, Rare Books, Historical Collections, Archival Collection, and Depository", was officially included in the State Register of Research Objects that constitute the national heritage by the Cabinet of Ministers of Ukraine under Resolution No. 1709, dated 19 December 2001.

The collections of VNLU serve both as a reflection and a substantive record of the development of the Ukrainian state and society as a whole. They also serve as objects of "socio-humanitarian" research, aimed at integrating information sources into the scientific, educational, and cultural discourse. In response to digitization requirements, the VNLU is now actively developing a new direction in digital humanities. This includes establishing specialized databases; developing digital collections and archives; constructing and performing source-critical analysis of text corpora; producing multimedia research publications; and engaging in data visualization, statistical, and bibliometric analyses. Additionally, the initiative involves creating com-

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23 Demianiuk (2023a) 106.

24 The collections of the Vernadsky National Library of Ukraine serve as a mirror and a seminal reflection of the development of Ukrainian state and society as a whole. These collections are the subject of socio-humanitarian studies aimed at introducing information sources into research and cultural circulation.

25 http://research.nbuv.gov.ua/heritage.

prehensive databases and knowledge bases, as well as electronic reference resources. In the "Digital Heritage" section, information is presented about VNLU's digital projects such as the National Bibliography, Manuscript and Archival Collections, Book Treasures and Collections, Ukrainica (e-library), Digital Library of Historical-Cultural Heritage, and the Ukrainian National Biographical Archive.

5 The Formation of Digital Heritage Research and Electronic Resources

Another shift in priorities is the opportunity to integrate into the European research infrastructure, which has been identified as a priority direction. Since 2016, the EU has been actively developing the European Research e-Infrastructure, envisioned as an integrated ecosystem of digital tools that support research and innovation. Concurrently, in 2016, VNLU launched an information portal project "Science of Ukraine: Access to Knowledge". The portal provides integrated access to VNLU's electronic research resources through searchable profiles of research institutions and researchers and facilitates the popularization and increased visibility and accessibility for Ukrainian scientific achievements. The main open access resources available on the portal include the electronic archive of Ukrainian scientific periodicals, which features more than 1.6 million full text articles from 2 800 scientific journals; profiles of 156 000 Ukrainian scientists; and a database of abstracts. This constitutes the largest integrated research resource in Ukraine.

VNLU's resources are also incorporated into the National Repository of Academic Texts (NRAT), established by Ukraine's Ministry of Science and Education. The VNLU repository, along with the sites of four scientific journals that offer open-access content, features in the pan-European OpenAIRE repository.[26] Furthermore, VNLU is developing a library portal for Ukraine's National Academy of Sciences (NAS) and a Data Repository, with an emphasis on integration into international and European digital communication networks, encompassing 184 research institutions across 110 fields of knowledge within the NAS.[27]

To that end, the Library became part of a special working group in Ukraine's National Academy of Sciences, which undertook the development of the concept and principles for joining the European Open Science Cloud (EOSC),

implementing international standards, and integrating into the European research information infrastructure. The implementation of the LibNAS project will undoubtedly contribute to creating a positive image of the research institutions and researchers of Ukraine's NAS in digital communication research and will occupy a worthy place in global and national research resources.[28]

VNLU agreed to participate in the CENL Research Infrastructure Initiatives programme, which promotes European integration processes for Ukraine. From 2021 to 2023, VNLU developed its information architecture and a test version of the digital platform ResearchUA[29], with the aim of a multi-faceted development of Ukraine's electronic research infrastructure and the creation of a nationwide digital research space. The library services of the "ResearchUA" digital platform are designed to actively support scientific research in Ukraine: promoting the development of new forms and models of digital communication research; consolidating and improving access to national research electronic library and information resources; and integrating heritage digital resources into research circulation. The digital platform contains consolidated reference and methodological information about digital communication research, international and national information resources, and research information services. Among the main digital research resources and services at a national level are: "Scientific Periodicals of Ukraine" (over 1.5 million full text articles in open access); the abstracts database "Ukrainica naukova" (an annotated resource of publications from Ukrainian scientific periodicals since 1998); the e-library of dissertation abstracts (over 100 000 dissertation abstracts defended in Ukraine since 1998); the information portal "Science of Ukraine: Access to Knowledge" (representing over 150 000 search profiles of Ukrainian scientists linked to VNLU information resources); and "Bibliometrics of Ukrainian Science" (a national scientometric information-analytical service presenting bibliometric profiles of scientists and institutions in Ukraine). For the ResearchUA digital platform, a section of the website titled "Open Science"[30] has been developed. It presents the open access scientific resources of the Vernadsky National Library of Ukraine, including "Scientific Periodicals of Ukraine"; the "Library Portal of the National Academy of Sciences of Ukraine (LibNAS)"; and the "VNLU Repository EVerLib". The section provides information on international online catalogues related to open access research resources, i. e., DOAJ (Directory of Open Access Journals), an international multidisciplinary cata-

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26 Lobuzina (2023) 90.
27 Lobuzina (2021) 21.

28 Lobuzina (2023) 94.
29 http://research.nbuv.gov.ua.
30 http://research.nbuv.gov.ua/open-science.

logue of open access journals, and OpenDOAR (Directory of Open Access Repositories), an international catalogue of open access repositories. An article on "Institutional Repositories", which directly embody the open science concept, has also been developed.[31] The conceptual foundations of the information architecture for library services supporting scientific research have been outlined in the collective monograph *Digital Library and Information Resources in the Development of the Scientific Segment of the National Information Space.*[32]

6 Conclusions

Libraries in Ukraine are continuously exposed to severe threats due to the ongoing military conflict, which significantly jeopardizes their structural integrity and disrupts their normal operational capabilities. The role of libraries in preserving and safeguarding collections, creating digital resources, including research and cultural heritage items during wartime, is extremely high due to the potential loss of these resources. Libraries are tasked with digitization, developing electronic resources, and protecting cultural and research assets under crisis conditions. Thanks to an active involvement in the European library community, humanitarian aid from European partners, the international organization CENL, and other donors, coupled with the existing experience of VNLU in digitization and the formation of digital resources of cultural book heritage, new opportunities have emerged.

Providing open access to the resources of scientific knowledge and participating in European open science projects during the war helps to fulfil the role of the national research library in preserving national memory, significantly expanding access to research knowledge, and developing services, thereby contributing to mental resilience against aggression. Under the conditions of martial law in Ukraine, such projects facilitate access to research information regardless of a scientist's location, an important factor in the survival of Ukrainian science and education, especially as a significant part of the leading researchers have relocated to various regions of Ukraine or abroad.

In 2022 to 2023, VNLU markedly intensified its collaboration with CENL, focusing on initiatives aimed at promoting global information accessibility and the dissemination of knowledge. CENL has been instrumental in advancing Ukraine's electronic research infrastructure and elevating

it to a European level, particularly in the context of the ongoing conflict. This support has significantly strengthened Ukraine's capacity to preserve and disseminate its rich research and cultural heritage. Additionally, it has facilitated the integration of Ukrainian library electronic resources into the broader European research data space, enhancing their accessibility and utility.

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