

# Digital Documentary Collections of National Cultural Heritage on the Ukrainian Regional State Archives Websites



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**Abstract** The study analyzes the processes of digitization performed by Regional State Archives of Ukraine. These trends have become noticeable since 2016, reaching the highest point in 2019–2020. As of 2020, there are still a small number of articles and scientific papers on the problems of cultural heritage document digitization of Regional State Archives of Ukraine. The monitoring research of Ukraine’s regional state archive websites indicates significant changes in the website organizational structure, their thematic content in comparison with 2016. In 2020, it was established that all Regional State Archives of Ukraine have e-archives compared to 2016. It has been found that e-archives provide up-to-date information. Scientific reference information, namely electronic guides/reference books, metric books, electronic records were discovered. It is emphasized that the development of digital communication has a great impact on the dissemination and promotion of cultural heritage through social networks, blogs, and tags. There is a significant lag between development of cultural heritage documents in Ukraine and foreign archival institutions. These concerns resulted from the long-term absence of document digitization policy, which appeared in spontaneous selection of archival documents and their amounts. In recent research studies, a significant emphasis is placed on observing the need of website organizational structure optimization and storage of digital document copies to improve content management efficiency allowing users to quickly access a document. The importance of thematic diversification of digital cultural heritage collections is emphasized.

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## 1 Introduction

Recently Ukraine has confidently embarked on a path of digital transformational change in various spheres of public life. This process accelerated in 2017–2021, when digital public services were not only developed but implemented. Archival institutions did not stand aside from these innovations. If at the beginning of the XXI century the issue was to create sites of state archives and their interaction [1], in the second decade of the XXI century—to create electronic/digital archives, developing an integrated online community of information services consumers and filling sites with digital document collections and reference material. As of December 2016, there was no digital archive at all, and electronic archives were just beginning to be developed. This is evidenced by the results of the research conducted during 2013–2016 by a Kyiv group of scholars in the framework of the international project “InterPARES Trust” [2].

Active digitization of documents and the creation of digital archives began in 2019. The slowdown in the process of digitization of archival documents can be explained not only by insufficient funding of the archival industry, but also by old approaches to the organization of archives. Mostly documentary funds were considered by the archival community as their property and storage of documents. This approach was decisive in the Law of Ukraine “On the National Archive Fund and Archives”, adopted on December 13, 1993. Even the latest changes made on January 14, 2020 did not drastically affect the situation [3]. However, archives don’t only preserve the documentary memory of the nation, society, community, but also represent, promote and disseminate its cultural heritage, being transparent and open to society and man.

The digital age impresses with its advantages, but also causes challenges for both new technological changes and new thinking. That is why in Ukraine during the first decade of the XXI century there were no significant changes in the organization of archival institutions. This led to the fact of slowing down the process of digitization in the archival field. Only in November 2014, the Ministry of Justice of Ukraine approved the “list of formats for electronic documents of permanent and long-term (over 10 years) storage”, that determines creating and applying electronic documents, photo-electronic documents formats for audiovisual electronic documents, capable of encapsulating audiovisual data of electronic documents [4]. Unfortunately, there are no clarifications and specifications for the document storage in digital formats in the “Regulations on storage conditions of documents of National Archive Fund”, approved by the Ministry of Justice of Ukraine on March 2, 2015. Requirements for the storage of documents in electronic form, described in Section IV are more of a recommendatory nature [5]. It should be noted that even at the terminological level there was confusion in the interpretation of such concepts as “digital archive” and

“electronic archive” [6]. Therefore, it was important for Ukraine to develop a strategy of archival affairs, taking into account full-fledged digital space with its unlimited remote access to archival information resources, which are part of the national cultural heritage as “a set of unique cultural values, cultural heritage sites with exceptional historical significance” [7]. The order of the State Archival Service of Ukraine “On approval and implementation of Methodical recommendations “The Digital Fund for the Use of Documents of the National Archival Fund: Creation, Storage and Access” (16.04.2020) began another important stage for legal regulation of digital documents in Archival Institutions. The document identified the advantages of creating a fund for the use of digital copies of documents, namely: reducing wear and tear on original documents, the possibility of multiple copies, restoration of digital copies without loss of quality, providing fast remote access to the digital copy fund. The importance of methodical recommendations was determined by the use of a unified system of work with digital copies of different types of documents, their recording on an electronic medium, technical and digitization parameters etc. [8]. Accumulation of digital copies of documents and political will contributed to the fact that the State Archival Service of Ukraine had made its first priority “digitization of all processes of archival affairs, records management and state insurance documentation fund” [9] that reflected the project of archival affairs development strategy in Ukraine for the period up to 2025, represented by the State Archival Service [10].

This approach gave first results. The State Archival Service of Ukraine have accelerated the creating and refunding of archives and databases. Information about new digitized copies of documents has determined the development of organizational structure of sites and their thematic rubrication, promoted collections of document digital copies in different formats. However, this process did not fully affect all Regional State Archives of Ukraine.

## ***1.1 Research Goals***

The changes that have taken place in the process of digitization of cultural heritage documents have determined the purpose of the study, which is to determine the state of digitization of archival documents and their exhaustibility on the websites of the State Archives of Ukraine.

## ***1.2 Digital Documentary Fund of Archival Institutions: Scientific Literature Review***

The development of the information society and its impact on archival institutions has been reflected in numerous publications by Ukrainian scholars. Therefore, we selected researches related to this topic reflected the state of informatization of

archives and the tasks they solved at different stages of development of the archival system access on the Internet. Thus, the appearance of websites has also led to much publicity on this topic, important for understanding changes that took place in the information archive space of Ukraine during 2000–2020. G. Boriaka has analyzed the importance of websites as vehicles for information dissemination and typological composition of archival resources on the Internet [11]. A. Kyselova considered a set of problems related to the role of the State Committee of Archives website and the sites of Regional State Archives of Ukraine (now—the State Archival Service of Ukraine) in information resources [12]; determined the location of archival institutions on the archival portal of Ukraine, their structure and content [13]. L. Klimchuk analyzed of the main Website Menus of Podillya State Archives. The author described the content of publications published on the sites, suggesting ways of their modernization [14].

The research of Regional State Archives of Ukraine on the basis of expert assessment of preservation, access and use of digital historical and cultural heritage was held by a group of scholars from the National Aviation University within the international project InerPARES Trust [15]. During the implementation period of the project (2013–2016) all the results were published. I. Tiurmenko developed the methodology of the expert assessment based on the principles of transparency, efficiency, accessibility, reactivity, and means of access, availability of archives, feedback, and digitized collection of material, their content and language [16]. The issues of strategy, policy and state of preservation of historical and cultural heritage, archival services and resources of Regional State Archives of Ukraine were covered by Tiurmenko [17] and Bozhuk [18]. These studies have shown that Regional State Archives of Ukraine are on their way to master the digital space. In effect, it was an exception that the Central State CinePhotoPhono Archives of Ukraine named after H. Pshenychnyi as of 2016 accumulated in archiving audiovisual documents on the basis of the developing regulatory and technological base [19].

Two Ukrainian-Lithuanian seminars “Digital Space and Archives” (2016) and “Digital Transformations and Institutions of Social Memory” (2018) hosted by Department of History and Ukrainian Studies of the National Aviation University became an international platform for exchanging experience and discussion problems of archival digital space development. The seminars included theoretical and practical issues of standards and data exchange; protection of personal data; work with big data; peculiarities of archives and digital collections management in the digital age etc. [20, 21]. The full-text search of documents from archival funds was indicated in the applied scientific research by A. Barantsev, N. Klymenko and I. Shevchenko. Particularly, these scientists developed an objective model and software data organization for accounting and displaying digital documents of archival institutions on electronic networks by analyzing the experience of Germany [22].

The usage of information technology “Topaz” for the implementation of an integrated search engine for object-based storage and transport of archival documents based on two-dimensional QR-codes were covered in the publications by M. Balyshiev, A. Alekseenko, T. Naumenko and Yu. Chernyahovska. The authors described the operation of the system successfully used in the Central State Scientific and Technical Archives of Ukraine [23].

The publication by T. Kruchinin and Y. Chernyatynska about theoretical and methodological principles of archiving websites carried out by the Central State Electronic Archive of Ukraine developed a better understanding of the methods of national cultural heritage digital collection development by archival institutions of Ukraine. In particular, the authors pointed out the importance of the combination of traditional and special methods. Thus, the analyses of web resources value should be supplemented by such parameters as “user-friendliness of the interface; full-text information; availability and quality of graphic design, images, multimedia; hypertext and hyperlinks” [24].

L. Prykhodko has analyzed the contradictions between copyright on intellectual property and public access to cultural heritage, which substantiates the need to work in accordance with European legislation regulations for digitization of cultural heritage by archival institutions of Ukraine and presentation of national heritage in world information resources [25].

I. Tiurmenko, L. Bozhuk, Y. Smolnikova and Y. Serova have figured digital communications in the archival sphere. In particular, their publication based on the study of the practices of the State Archives of Ukraine defines that the digital ecosystem of archival institutions uses both digital media (devices, tools, systems) and digital communication tools for exchanging information through social networks, blogs, portals, sites, etc. [26].

A. Khromov analysed the promotion of digital copies of Ukraine’s cultural heritage on the Archive Portal of Europe. The scientist pointed that the high-priority task is to include the collections “Trident—a symbol of the Ukrainian Revolution of 1917–1921” of the State Archives of the Security Service of Ukraine and collections “Unique documents of the National Archives” on the portals “Europeana.eu” and “Archivesportaleurope.net” [27].

To determine the level of digitization of cultural heritage documents in Ukraine foreign researchers were analyzed. First of all, we have selected publications important for organization and development of digital archives in Ukraine. These articles, particularly by foreign authors, not only describe the accumulated experience, but analyze contradictory and outdated practices, offer effective selecting methods for long-term preservation of document collections. In particular, T. Hauswedell, J. Nyhan and M. Beals analyzed the internal and external factors that influence the selection of newspapers keeping for a longer period archiving purposes in the public interest [28].

C. Dallas proved the method of umbrella supervision of digital storage and management of digital records based on a pragmatic approach. The scholars proposed to rethink the traditional model of broad-based management and proved that the need for research practices and digital infrastructures that aim to ensure continuous supervision of the digital environment [29].

The problem of digital archival copies was raised in a scientific article by P. Conway. Among others, the author substantiated the provision on the importance of digitized archival document life cycle to ensure long-term remote access to collections. These collections are called “surrogates”, as a result of re-copying of the original data actual replacement [30].

Thus, a comparative analysis of Ukrainian and foreign scientific publications showed that the digital archives are in the early stages of development that caused the insignificant publishing activity on this issue. These factors entailed the monitoring research that would show the qualitative and quantitative changes occurred in the digitization process in Regional State Archives of Ukraine from 2016 to 2021.

### ***1.3 Methodology***

The study of the process of the development of cultural heritage digital collections was considered as an applied monitoring research to record changes in the digital space of Regional State Archives of Ukraine from 2016 to 2021. Such chronological boundaries appeared due to the fact that the last extensive monitoring was conducted during 2013–2016, as it was mentioned above. Therefore, 2016 is the starting point for the development of document digitization by Regional State Archives of Ukraine up to 2021.

The websites of 24 Regional State Archives of Ukraine (except State Archives of the Republic of Crimea) were selected for research. It is interesting to analyse the network of state archives as it gives an opportunity to obtain an indicator of digitized documents at the regional level and to provide a more truthful overview of digitization at different regional locations. The website is a component of information resources. Taking into consideration its navigation organization, structure, thematic rubrication and content, we can define the audience of site users with how popular they are for society and people. Thus, the research used a method of comparative analysis that allowed determining the situation with the digitalization of cultural heritage in 2021 compared to 2016 and impact of website content on its popularity.

Thus, the analyses of digital collections of cultural heritage contained on the websites of Regional State Archives of Ukraine caused solving the following tasks:

- Establish the availability of e-archives and their content.
- Analyze the digital collections themes and headings.
- Define digital/electronic document storage formats.
- Fix changes in the structure and thematic rubrication of websites from 2016 to 2021.

## **2 Websites of Regional State Archives of Ukraine as a Component of Digital Information Resources of Cultural Heritage**

Preservation and cultural heritage actualization has been and remains one of the priorities of state policy of all developed countries. In Ukraine, great attention is paid to the cultural heritage preservation that focused mainly on socialization of the individual,

the formation of national self-awareness and the widest possible representation of its publicity and integration into the international cultural space through representation of national cultural values on the global information network. A significant part of the information resources contributed the national cultural heritage is represented by archival institution documents.

The challenges of the modern information society require from the archives of Ukraine, as institutions of social memory, new approaches for providing equal opportunities and universal access to archival information, being an important component of national information resources, national cultural heritage. Currently, electronic archives information resources by means of digitized documents are the most effective form of involvement in the scientific circulation of huge arrays of documents contained in the state archives of Ukraine, providing the general public with socially significant retrospective documentary information, an important tool for quality remote customer service. The strategic directions of the open access to archival information organization include the following: digitization of archival documents, digitization of reference apparatus providing access to them through the Internet. Access to archival information for users through the websites of relevant institutions would facilitate the functioning of the centralized electronic fund for the use of documents of the National Archival Fund (NAF), approved by the order of the Cabinet of Ministers of Ukraine “On approval of Electronic Governance Policy in Ukraine” on August 22, 2018 № 617 [31].

Ukrainian scholars who study the problems of archival materials digitization give strong arguments (saving money for the development, protection and maintenance of one information and communication system instead of many others archival institutions of Ukraine; simplification of training work of employees and users in the system; efficient information searching on the web and as a consequence—acceleration of archival services, etc.) in developing a centralized electronic fund for the use of NAF documents as a single search engine that will perform the functions of a centralized front office and provide around the clock access to all archival information in electronic/digital “single window” format [32].

In the context of these tasks the Ministry of Culture of Ukraine (now—the Ministry of Culture and Information Policy of Ukraine) developed a concept of electronic information resource of cultural heritage and cultural values in order to preserve and represent in the global information network of Ukrainian cultural heritage in 2019. It is a portal with unique (most valuable) cultural heritage of the Museum, State Library, and National Archival Funds of Ukraine. The project is based on the idea of preserving and promoting the cultural heritage of Ukraine by collecting and accumulating information in electronic form, the adaptation of electronic national cultural heritage accounting, digitization of their images, and cultural heritage information exchange processes [33]. Nowadays, important for Ukraine state project was not implemented due to a number of objective reasons, including insufficient funding in 2021 with a low level of readiness of archival, museum, library fields (insignificant number of documents and reference apparatus in electronic (digital) form).

Digital advances prioritized Ukrainian archival institutions in optimizing the work of all archival processes, developing a full digital space offering unlimited possibilities of remote online access to archival information resources, and improving the customer service quality of retrospective (historical) information sources. Thus, the state archives digitized only about 6.4% of issues at the beginning of 2016 [34], while in 2017 this figure increased to 42,908 units of NAF storage and accounting documents [35]. In 2019, the figure that was up to 83,052, proved a growing trend of digital content of archives information resources. Also in 2019, 7204 issues were digitized and transmitted into electronic format by archival institutions. Among digitalization drivers of NAF documents are Vinnytsia, Volyn, Kyiv, Luhansk, and Khmelnytskyi Regional State Archives [36].

Direct presentation of digitized/electronic archival information resources is carried out through the websites of archives, which are part of electronic information resources—a comprehensive electronic operation manual. The development and operation of online information resources namely: the archival institutions websites forced the initial stage of transformation of Ukrainian archives through forming a single search engine for free equal access to archival information resources and e-services. Digitization in the field of archives contributes to the updating and filling-up websites of archival institutions with information. New Internet-technologies enable wide-ranging open access to their databases. The analysis of the electronic information resources of 24 Regional State Archive websites together with digital cultural heritage showed the qualitative changes that took place during 2016–2021.

First of all, the information supply of most sections of Regional State Archive websites were updated, the representation of archival institutions in social media spaces was expanded. In the context of communication virtualization, archives focus on the presentation and distribution of archival information resources, their exchange, and development of integrated resources on the Internet, organization of online access to socially significant information that is part of the global information space [26]. We have chosen social networks Facebook, Twitter and YouTube to analyze these criteria.

In 2016, 18% of archival institutions had a Facebook page (Dnipropetrovsk, Odessa, Rivne and Ternopil Regional State Archives) and only Kharkiv Regional State Archive used all the social networks (4%). Nowadays, all Regional State Archives of Ukraine (except Ivano-Frankivsk Regional State Archive) actively use social network pages for active communication with users popularizing digital cultural heritage in the network society. Compared to 2016 the average indicator of information archival resources presence in social networks has significantly increased in 2021, namely 24 Archival Institutions (100%) use Facebook; Zhytomyr Regional State Archive uses Twitter and Facebook (4%) [37]; all other social network (16,6%) are used by Kyiv, Poltava, Kharkiv and Kherson Regional State Archives; 9 Regional State Archives (37.5%) are presented on Facebook and YouTube. Word clouds are presented on the websites of Sumy and Kharkiv Regional State Archives, which is 8.3% of all archival institutions. Archives has started using different Internet resources (forums, blogs, tags) in order to expand thematic communication with



users on archival information. Vinnytsia Regional State Archive uses Blogging—4%. Social networks of Regional State Archives of Ukraine in social networks are presented in Table 1.

Now, you can see 24 Ukraine Regional State Archives have their own pages on Facebook that is the most popular social network among Ukrainian users. However, it should be noted that there is no reference for Facebook pages on some archive websites, particularly Zakarpattia, Ivano-Frankivsk, Chernivtsi and Chernihiv regions. That profoundly and negatively affected the number of Internet users and popularization of the Ukraine Regional State Archive pages in social network. Thus, it is not contributed to increase the number of Regional State Archive pages in social network.

With regard to other social networks, there were only 13 of them on YouTube and 5 Archives on Twitter. Blogging is almost non-existent in the information area.

**Table 1** The presence of Regional State Archives of Ukraine in social networks

Regional archives	Social networks (Facebook, Twitter, YouTube)	Forums, tags, blogs
Vinnytsia	Facebook	Blog
Volyn	Facebook	–
Dnipropetrovsk	Facebook	–
Donetsk	Facebook	–
Zhytomyr	Facebook, Twitter	–
Zakarpattia	Facebook	–
Zaporizhzhia	Facebook	–
Ivano-Frankivsk	Facebook	–
Kyiv	Facebook, YouTube, Twitter	–
Kirovohrad	Facebook, YouTube	–
Luhansk	Facebook	–
Lviv	Facebook, YouTube	–
Mykolayiv	Facebook, YouTube	–
Odesa	Facebook, YouTube	–
Poltava	Facebook, Twitter, YouTube	–
Rivne	Facebook, YouTube	–
Sumy	Facebook	Tag
Ternopil	Facebook, YouTube	–
Kharkiv	Facebook, Twitter, YouTube	Tag
Kherson	Facebook, Twitter, YouTube	–
Khmelnyskyi i	Facebook, YouTube	–
Cherkasy	Facebook, YouTube	–
Chernivtsi	Facebook	–
Chernihiv	Facebook, YouTube	–

Instagram (excluding Donetsk, Luhansk and Odesa Regional State Archives) and TikTok, which are particularly popular with young people, are almost never used. Thus, for the community involvement in cultural heritage, Regional State Archives should be largely represented in social networks to address the concerns of different categories of citizens on the basis of age, education, social status, ethnicity, scientific interests, etc.

As for the popularity of archives in a network society, an important factor to be taken into consideration is amount of reposts, likes, comments and subscribers on the social networks. Kyiv, Kirovohrad, Lviv, Cherkasy, and Dnipropetrovsk State Archives became the most subscribed in Facebook. The increased amount of subscribers is due mainly to the considerable information that composed of a broad spectrum of archive activities, messages informing about reception of latest items to go on-line, exhibitions, collections, digitization process and expansion of digital archives to include digital copies of documents, etc.

Updating and actualization of archive information resources at national and international levels contribute to possibility of presenting Ukraine Regional State Archives on free online encyclopedia "Wikipedia". It is, in a sense, a specific manifestation of storage, distribution, and use of knowledge about Ukrainian national identity in the global information space. Wikipedia also plays important information, education and communication role in today's globalized world. In early July 2021, the Ukrainian Wikipedia has crossed the halfway mark of 1,100,000 articles, peaking at number 17 in all languages in which it has a version. Wikipedia articles relating to Ukraine Regional State Archives are pretty informative and include sections on archive history, available funds, sources, images, location, working hours and access to the web site.

That is why, possibility of access to the Ukraine Regional State Archive information content from any place in the world, any device, 24 h a day with the free online encyclopedia Wikipedia provides representation of the national cultural heritage, encourages the popularization and makes archives accessible to the public at large.

Internet-based technology of the network society has fundamentally altered the communication model of archival institutions with users of their retrospective information resources. This has contributed to enhancing the use of Ukraine Regional State Archive websites not only for official hospitality (inform users about historical background, the institutional and legal framework for the creation and operations of Regional State Archives, structure and staff members), but also has become the starting point for communication of archive community members. It is also, of course, a powerful marketing tool for promoting archive information products and services both across and between target audiences and general public. Site attendance is the most important indicator that emphasizes the effectiveness of this particular communication channel. According to web traffic on Regional State Archives websites, it can be stated that attendance rate exists, mostly on the front pages of Volyn, Zhytomyr, Ivano-Frankivsk, Kirovohrad, Luhansk and Odessa Regional State Archives, which represents about 25% of the total number of archives.

Site attendance can be an indication of the presence of Ukraine Regional State Archive in media space reflecting as institution of social memory the effectiveness

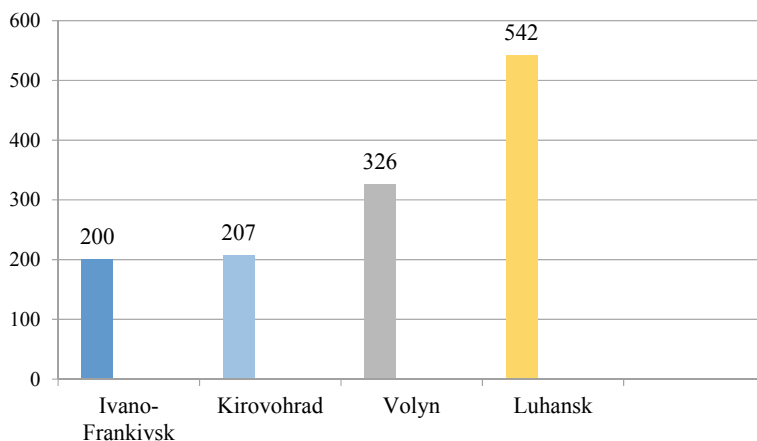
of solution of the basic types of information, education and communication tasks. Visits to the site provide insights into the number of users. It is also an essential characteristic of the effectiveness of web resources. So the more people visit the site, the larger possibility of their participation on the page. As a rule, the website traffic of Regional State Archive website is measured by the amount of visitors per day, week, month and year. Unfortunately, this indicator were subsequently located on Volyn, Ivano-Frankivsk, Kirovohrad, Luhansk and Odessa Regional State Archive websites, which represents about 20,8% of the total number of archival institutions.

Luhansk and Kirovohrad Regional State Archive websites categorized according to total number of visitors per today, yesterday, thirty days, one year and country of origin have the best statistics of the site visits.

The counters of website visits available on Kirovohrad State Archive website allow the user to see the computer history on the basis of the above-mentioned characteristics beginning in 2013 and Luhansk State Archive website provides information starting from 2016. An additional indicator of information resource quality is the regular (“unique”) visitor called a host, meaning that repeat visits at regular intervals. The monthly average statistics of site visits of Volyn, Ivano-Frankivsk, Kirovohrad and Luhansk Regional State Archives can be seen in Fig. 1.

So, monitoring and measuring quantitative indicators of site visits, average number of views, visitor country of origin with further analysis permits the objective evaluation of website’s popularity and network traffic.

As shown in Fig. 1, a considerable amount of Regional State Archives could not use an extensive range of quantitative indicators of site visits to improve archive website work environment for maximum productivity. This situation significantly reduces the effectiveness of retrieving and sharing archived information by users.



**Fig. 1** The monthly average statistics of site visits

## ***2.1 The Structure of Digital Cultural Heritage on the Websites of Archival Institutions***

The main priority of archival institutions activities of Ukraine is digitization of NAF documents, namely online access to archival information resources. The one and only opportunity to provide the general public with free and equal access to historical and cultural heritage is the availability of State Regional Archives of Ukraine documents in digital format. Information about new digitized copies of documents that is constantly and systematically updated by archives led to the improvement of the site organizational structure and their thematic rubrication, contributed to the emergence of collections of document digital copies in different formats. It should be noted that State Regional Archive websites developed on the prototype of the web portal of the State Archival Service “Archives of Ukraine” got qualitative transformations in 2019–2021 and is now becoming a kind of “platform with broad user range, adaptive web design and different web applications” [38].

All Ukrainian State Regional Archives have their own web-based information resource that provides online access to the electronic form of scientific reference apparatus, copies of permanent digital storage issues, archival collections and other NAF documents. Due to a number of factors the structure of electronic/digital document selections presented on the websites of the State Regional Archives differs in both quantity and quality. Among them is unsystematic and chaotic digitization. State archival institution select materials for what to digitize based on available technical capabilities and user requests; the speed of digitization differs because state archival institutions are not fully equipped with modern technical equipment sufficient to create digital document copies; shallow archival institution online service makes it impossible to provide remote access to archival resources; absence of archives for storing digital information (except Volyn and Zaporizhzhya State Regional Archives).

The results of the monitoring research show that State Regional Archives of Ukraine do not fully use modern information and communication technologies to organize online access to archival information resources. We have analyzed websites for their digital information content as online access to the scientific reference apparatus is important for quick availability of the necessary documents in the archives websites, namely electronic guides/catalogs, catalogs of metric books, electronic annotating records of funds, electronic describing records, digital copies of issue, digitized issue of funds, collections of digitized documents, digital collections of film and photo documents, etc. During 2016–2021 almost all regional archives updated their websites in terms of full-text information usability, quality graphic design, images, multimedia, quality content and forms of publication of archival information resources and more.

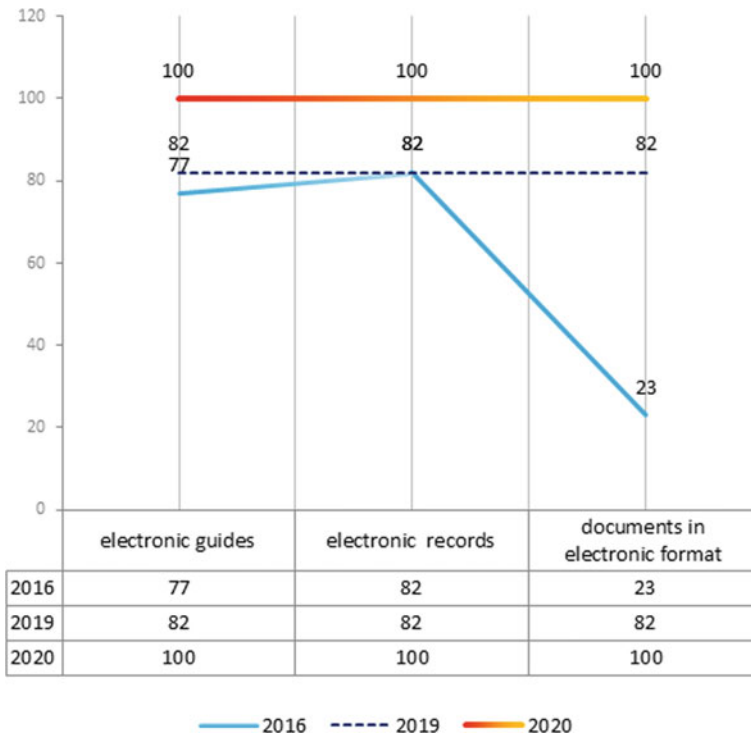
It is worth noting that during 2016–2021, the structure of all State Regional Archive websites underwent significant changes. In addition to the traditional sections—“About the archive”, “News archive”, “Funds”, “Inform the public”, “Access to public information”, “Regulatory framework”, “Portal map/Site map”, “Online documentary exhibitions”, “Declassification of archival documents”, “Publications on the site”, “Contacts”, “Archive in the media”, etc., new thematic issues appeared, namely: “Archives of Repressive Organs of the Communist Totalitarian Regime in 1917–1991” (contains a list of archival funds, revealed the presence of repressive bodies archival information for 1917–1991), “Electronic archive/E-archive/Documents online”, “Electronic reference information publications”, “Electronic services” (Kyiv Regional State Archive includes the possibility of ordering digital copies of archival documents).

The study of the organization and archive information content makes it possible to identify the main headings published in electronic/digital format, namely: Electronic archive” (Vinnytsia, Volyn, Dnipropetrovsk, Zakarpattia, Kirovohrad, Lviv, Odessa and Kharkiv Regional State Archives) [39–46], “E-archive” (Kyiv and Sumy Regional State Archives) [47, 48], “Electronic reference information publications”, “Scientific reference apparatus” (Zhytomyr, Zaporizhzhya, Rivne and Chernivtsi Regional State Archives) [49–52], “Online funds/Funds” (Donetsk, Luhansk, Kherson and Cherkasy Regional State Archives) [53–56], “Digital archive” (Mykolayiv Regional State Archive) [57], “Electronic archival resources” (Poltava Regional State Archive) [58], “Publications” (Ternopil Regional State Archive) [59], “Archive online” (Khmelnyskyi Regional State Archive) [60], “Digitized descriptions and online issues” (Chernihiv Regional State Archive) [61]. According to our monitoring research, the one and only Ivano-Frankivsk Regional State Archive has not used section “Electronic Archive”. Eleven funds of digital copies of the pre-Soviet period, stored in this archive are located in the section “Reference apparatus” which complicates the search for electronic resources on the website of the institution [62]. Additionally, Zhytomyr, Kyiv, Odesa, Sumy, Kharkiv and Cherkasy Regional State Archives have developed online access to some database structure extent of electronic documents (collections of documents), which is 25% of the total number of Regional State Archives institutions. Mykolayiv Regional State Archive presented online access the database “Repressed” contains information about 9771 persons—victims of Stalinist political repression. Easy-to-use search tools are performed by the columns “surname”, “name”, “middle name” [63].

Currently, the monitoring of archival institutions’ websites in September 2021 showed 100% availability of electronic/digital archives of different information saturation presented in the relevant sections, while in 2016 this figure was only 5% [64, 65]. Thus, we can state that during 2016–2021 there were significant changes in creating and organizing online access to electronic/digital archives [66, 67]. However, unregulated selection for digitization, differences in the organizational structure and content of the archive websites, limited opportunities for users to regulate content, uncomfortable search for necessary resources advance archival institutions to intensify effective communication infrastructure.

Nowadays, all the regional archives (100%) have electronic means of access to funds on their websites, namely scientific reference apparatus (electronic guides/catalogs, catalogs of metric books, electronic annotating records of funds, digital copies of issue, digitized issue of funds, collections of digitized documents, digital collections of film and photo documents), while in 2016 the percentage for electronic guides was 77%, electronic describing records—82% [64, 66–69]. According to the results of monitoring research in September 2021, we have seen positive changes in development of electronic/digital archives, put that in context, all the State Archives of Ukraine (100%) have published documents in electronic format comparing to 23% in 2016 [64, 68]. Archival institutions are actively pursuing the policy of accessibility and openness of archival cultural heritage to the public, providing effective information and services especially important under tightened quarantine restrictions. In the first half of 2020 the digitization of Regional State Archive issues increased by 82% compared to the same period in 2019. Among drivers are Vinnytsia, Rivne, Kherson, Cherkasy, and Chernihiv Regional State Archives [70] (Fig. 2).

As we have already mentioned publication of documents/electronic archives in digital format is not the only opportunity to provide users with access to historical



**Fig. 2** Picture summary of electronic documents based on the digital collections of the State Archives of Ukraine

and cultural heritage stored at Regional State Archives of Ukraine. According to the expert assessment of 2016, Regional State Archives didn't make public digital copies of archival files. Nowadays, all Regional State Archives of Ukraine have digital copies except Vinnytsia, Zaporizhzhya, Ivano-Frankivsk, Chernivtsi, which is 16.6% of the total number. The percentage of unique document publications on the websites has significantly increased—66% in 2020 against 10% in 2016 [64, 67].

The websites of Regional State Archives of Ukraine organize online exhibitions using mainly web-technologies exposition of archival materials conducted remotely through the use of virtual images of selected and systematized documents [71]. The advantages of online exhibitions consist in access exhibition, remote viewing, the possibility of retrospective information updating specific to each presentation theme. The monitoring research in 2021 resulted in 100% online exhibitions of archive websites against 95% in 2016. However, it should be noted that quantitative growth of online exhibitions includes 578 in 2016, and in 2021—795, broad range of topics with corresponding digital expansion, research and reference apparatus improvement.

The absence of clear policy on digitization and publication of archival documents leads to the fact that archives quite chaotically present documentary material in free access, guided primarily by the interests of archive institutions. We have found out that only 8 Regional State Archives have digital collections of photo documents (Kyiv and Chernihiv Regional State Archives), film and photo documents (Mykolayiv Regional State Archive), maps (Zakarpattia and Kyiv Regional State Archives), newspapers (Poltava Regional State Archive), letters (Khmelnyskyi Regional State Archive), book collections (Kirovohrad and Lviv Regional State Archives). The formats of presentation of digital resources are still important indicators to measure effectiveness of Regional State Archives.

Mostly, archives use DOC and PDF formats to present electronic (digital copies) of static web documents. Vinnytsia, Poltava, Kharkiv and Kherson Regional State Archives store digital materials and make them available on the Internet in JPG, DjVu and ZIP formats. Odessa Regional State Archive supports *the largest number of formats to develop* dynamic web pages, *namely*: DOC, PDF, JPG, DjVu, RAR, ETC. The advantage to using DOC and PDF formats in most Ukrainian archives is automatic download and opening of files. Different formats of digital materials JPG, DjVu, ZIP, RAR, ETC, etc., are viewed by special programs without their installation on archive websites, which makes available resources difficult to access for users.

### 3 Conclusion

According to the monitoring results, a table of the digital cultural heritage species composition of the websites of Ukraine Regional State Archives has been compiled. The following main features are taken as characteristics of site information content: availability of electronic/digital archives; availability and accessibility of databases to archival documents; availability of a digitized scientific reference apparatus, represented by electronic guide-books/catalogs/reference books, electronic annotating records of funds, digital copies of issue, digitized issue of funds); availability of digital copies of metric books, or electronic catalogs of metric books; availability of digital collections of unique documents, collections of maps, postcards, periodicals, photo collections; electronic exhibitions; digital copies of archival documents.

The species composition of the digital cultural heritage is presented in Table 2.

The results of the monitoring research proved that archival institutions do not fully use modern information and communication technologies to organize online access to archival information resources due to lack of digitization and archival resources publication policy. The State Archives of Ukraine *compared to* foreign Archives, which digitalize retrospective information and electronic databases, focused on online exhibitions as an effective tool used for accessing national cultural heritage. At the same time, the monitoring research showed that Regional State Archives of Ukraine puts more stress on cultural heritage but *openness* and high volumes of access to information was related inversely to Foreign Archival Institution Sites.



**Table 2** The species composition of the digital cultural heritage on the websites of the state regional archives of Ukraine

Regional archive	Features									
	E-archive	Databases	Electronic guide-/reference books	Metric books	Unique documents	Collections	Online exhibits	Annotating records of funds	Digital copies of archival documents	
Vinnitsia	+	-	+	-	-	-	19	+	-	
Volyn	+	-	+	-	8	-	17	+	+	
Dnipropetrovsk	+	-	+	+	1	-	30	+	+	
Donetsk	+	-	+	-	-	-	28	+	+	
Zhytomyr	+	+	+	+	3	-	53	+	+	
Zakarpattia	+	-	+	-	3	+	11	+	+	
Zaporizhzhia	+	-	+	+	-	-	93	+	-	
Ivano-Frankivsk	+	-	+	-	-	-	3	+	-	
Kyiv	+	+	+	-	3	+	15	+	+	
Kirovohrad	+	-	+	+	-	+	74	+	+	
Luhansk	+	-	-	-	-	-	38	-	Partially	
Lviv	+	-	+	-	6	+	6	+	Partially	
Mykolayiv	+	+	+	+	2	+	136	+	+	
Odesa	+	+	+	+	3	-	35	+	+	
Poltava	+	-	+	Catalog	3	+	11	+	+	
Rivne	+	-	+	-	-	-	13	-	+	
Sumy	+	+	+	+	2	-	8	+	+	
Ternopil	+	-	+	-	-	-	13	-	Partially	
Kharkiv	+	+	+	+	3	-	32	+	+	

(continued)

Table 2 (continued)

Regional archive	Features									
	E-archive	Databases	Electronic guide-/reference books	Metric books	Unique documents	Collections	Online exhibits	Annotating records of funds	Digital copies of archival documents	
Kherson	+	–	+	–	2	+	39	+	Partially	
Khmelnytskyi	+	–	+	Catalog	3	+	2	+	+	
Cherkasy	+	+	+	–	2	–	17	+	+	
Chernivtsi	+	–	+	Partially	3	–	37	+	–	
Chernihiv	+	–	+	Catalog	10	–	65	+	+	

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