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Problems of Cultural Heritage Preservation in the Context of the Armed Conflict Growth

Yuliia Trach, Maryna Tolmach, Olena Chaikovska, Tetiana Gumeniuk

Kyiv National University of Culture and Arts, Kyiv 01601, Ukraine
kn.knukim@gmail.com

Abstract. Attention is paid to the need to preserve cultural heritage in areas of armed conflict and the particular legal protection of its objects. The experience of digitization of cultural heritage in Ukraine through implementation of state and public initiatives is presented.

Keywords: cultural heritage, armed conflicts, digitalization.

1 Preservation of Cultural Heritage in the Area of Armed Conflict

1.1 Cultural heritage as an integral part of the modernization and development strategy

Cultural heritage is in fact the main way of existence of the culture. What is not included in cultural heritage ceases to be a culture and ultimately ceases to exist. For his life, man manages to master only a small share of cultural heritage. What remains after him for other generations becomes a common property of all people, all of humanity. However, it can only be so if it is preserved. The social progress of humankind depends on the solution of the problem of preservation of cultural heritage. The main function of cultural heritage at the present stage is the orientation to the socio-cultural result, which allows solving the problems of the development of the socio-cultural sphere in conditions of reforms, to ensure the integrity of the socio-cultural space, to increase the complex effectiveness of cultural activities.

Recently, worldviews on the concept of heritage have undergone significant evolutionary changes.

In particular, globalization processes that have taken place in the world have led to the need to consider heritage in the local-global coordinate system. Being a synergistic resource by nature, heritage is in many ways a "thing in itself", it will not be used, remaining at the level of physical cultural resources, unless it is involved in the life of the local community. Tangible cultural heritage always has a clear localization in one or another locality, always "inscribed" in a specific local community, creating physically tangible landmarks in space and time, a base for local ideology and identity, presenting resources for the implementation of educational programs, tourism development and related sectors of the economy. Thus, based on the use of cultural heritage,

the local community can build effective social strategies aimed at poverty alleviation and sustainable development. At the same time, undoubtedly, trends in globalization have clearly manifested themselves in the field of cultural heritage.

The potential for the development of cultural heritage holds a special place in the creative economy, which integrates culture, economics, science and education. Firstly, heritage provides cultural continuity in addition to identifying and strengthening individual and collective identity, respect for other cultures and diversity of cultural expressions, as well as affirmation of spiritual, educational, social, economic and other values. Secondly, cultural heritage can be the basis for the development of a creative society and means of promoting local economic development. However, the modern world creates a whole system of threats and challenges to cultural heritage. In a dynamic and increasingly accelerating development, physical cultural resources are at risk of total or partial destruction if they are not included in these processes. Even such a positive trend as tourism development, in the absence of proper control by the authorities, can cause significant damage to heritage sites. Threats to the heritage are also hidden as a result of economic development, industrial development of new territories, new urban development programs, during which entire neighborhoods, environmental pollution, and military conflicts are reconstructed or reconstructed. In many countries of the world, heritage preservation programs suffer from lack of financial, administrative and technical resources due to not enough of attention from government agencies.

1.2 Armed conflicts as a special kind of social emergency

The intensification of the interconnection and interdependence of all states and peoples, marked at the turn of the 21st century, quite eloquently indicates that the world society processes of becoming economically and politically wholesome are increasing. In these circumstances, any peripheral or other changes in the system of interstate relations affect the state of international cooperation as a whole. Factors destabilizing this interaction are military conflicts, not only killing millions of lives and undermining the lifeblood of entire nations, but also being a significant complement to those root causes, the action of which greatly exacerbates the entire complex of global problems that already threaten humanity today.

In modern conditions the tendency of quantity of military conflicts and local wars to increase has been marked: in the XVIII century 68 wars occurred, in the XIX the number became 205, in the period of 1900-1990 it was 234 [11, p.92]. Military clashes between states continue to exist today, posing a serious threat from the point of view of their escalation into a world war, as they occur at a time when the issue of war and peace has not only become an area of global concern, but has also become one of the most serious, affecting the very foundations of the existence of human civilization. Armed conflicts, as very dangerous policy instruments, are bloody and protracted, and human and material casualties in them are incomparable to the results achieved.

All of this is to say that in today's context, the search for effective ways and means of resolving and preventing military conflicts is a pressing need of humanity. Moreover, the right of armed conflicts, applied in the period of armed conflicts, in particular, in

non-international ones, lacks modern legal requirements and methods of their humanization and settlement, the necessary control mechanisms, and the nature of the efforts made by international organizations for the implementation of the policy of conflict prevention. In these circumstances, the preservation of cultural heritage is one of the foundations for the preservation of cultural diversity and a powerful tool for cultural dialogue. There is a serious problem requiring international control and responsibility for observing humanitarian law on the protection of cultural property, especially in the event of an armed conflict of international or international conflict.

1.3 Legal protection of cultural heritage in the event of armed conflict

For a long time, objects of cultural heritage, in particular, works of art were the main object of conquest, and it was not until the middle of the 19th century that, thanks to the widespread restitution of cultural values captured by Napoleon in the course of his military campaigns, a customary rule was imposed in Europe, prohibiting it. From that moment, the world community begins to recognize the special legal status behind the objects of cultural heritage, the need to protect them from the adverse effects of the war. However, up to the present day the problem of their protection has not been finally resolved.

In many countries of the world, laws were adopted and special systems for the protection of cultural heritage developed. International charters and agreements provide for provisions that claim that heritage belongs to all people, and therefore require collective responsibility for the protection of cultural heritage, consisting of individuals, their communities, as well as governments at local, regional and international levels. In particular, the role of international organizations (UNESCO, ICOMOS, ICOM, ICCROM, etc.) in the protection of cultural heritage in the armed zones has been limited. In 1945, UNESCO in The Hague published the first protocol on the protection of cultural priority in the event of armed conflict, the second was published in 1999 [15].

It should be noted that The Hague Convention of 1954 and its two additional protocols became the most recognised of legal instruments for the protection of cultural property during armed conflicts. However, compared with the other UNESCO conventions for the protection of cultural heritage and property (especially in relation to the 1970 Illicit Traffic Convention and the 1972 World Heritage Convention), the 1954 Hague convention with its both additional protocols gained less state parties endorsement (Figure 1).

Since 1970, the UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property has been a major instrument of international protection for cultural heritage. In 1999, the UN Security Council adopted Resolution No.2347, condemning the unlawful destruction of cultural heritage. At a meeting at the UN headquarters in 2017, the relationship between the destruction of cultural heritage and terrorism and mass violence was announced [14].

The International Committee of the Blue Shield, in conjunction with the Association of its National Committees (in Ukraine this committee exists since 2014), should directly engage in the official protection of cultural heritage in the event of armed conflict

on the basis and in accordance with the mandate under the conventions of international humanitarian law. However, despite its mission of strategic dialogue with decision-makers and major international organizations in order to prevent and respond quickly to armed conflicts, the International Committee of the Blue Shield has not achieved the greatest success in this area, as one might expect, and to save the objects of culture after natural disasters.

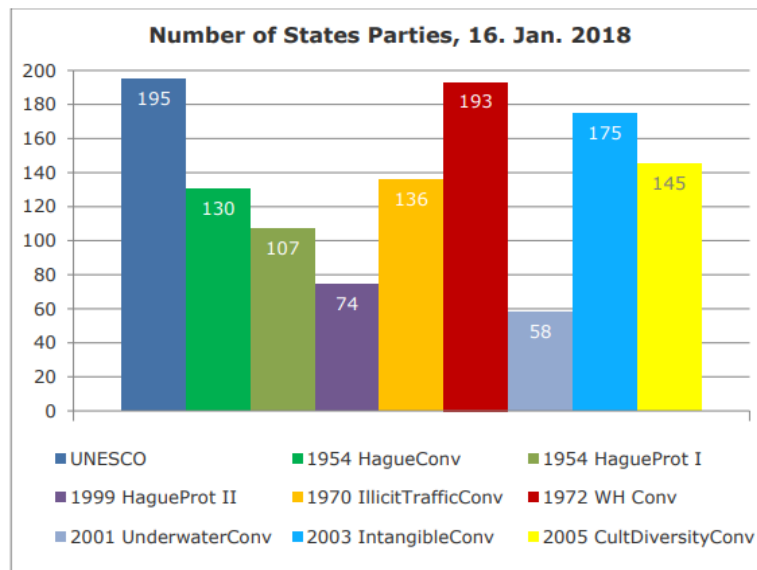


Fig. 1. Number of State Parties to the different UNESCO-Conventions for the protection of cultural heritage

International organizations have tried to protect the world's cultural heritage, but in many cases, their role in protection has been limited due to the lack of adherence to cultural conventions by some countries, the inability to take measures to protect them through legislation, etc. In addition, among the reasons for the inefficient protection of cultural heritage in areas of armed conflict are the lack of effective coordination between international organizations and national institutions working in the field of cultural heritage protection in the area of armed conflict, the limited financial resources, their insufficiency to reach their respective goals and their organizations, repeated attacks on cultural heritage sites and insufficient awareness of the importance of its preservation.

In this context, it is necessary to intensify the development of social partnership mechanisms, new decision-making mechanisms relevant to local communities, between national and regional authorities, public institutions responsible for socio-cultural development, third sector organizations and business entities to integrate cultural heritage into development programs on different levels as well as new decision-making mechanisms significant to local communities. For this purpose, in 2018, the European Commission conducted a wide study and presented a comprehensive review of existing

knowledge on the protection of cultural heritage from the effects of natural disasters and threats caused by human activities, in particular military conflicts - "Safeguarding Cultural Heritage from Natural and Man -Made Disasters at the European and international levels. A comparative analysis of risk management in the EU" (Luxembourg, 2018) [5]. This document reflects existing strategies and tools for disaster risk management in 28 Member States, and provides evidence-based recommendations to support European cooperation and better integrate cultural heritage into national platforms for disaster risk reduction.

In the context of the need to prevent the consequences of armed conflict, these recommendations are presented in several blocks: recommendations to the European authorities (in particular, the development of long-term concepts and strategies is necessary); national (in particular, it is necessary to establish or develop civil-military cooperation); regional and local authorities (in particular, information on the need for civil-military cooperation in the field of the protection of cultural property should be initiated at the local level in schools); as well as owners of cultural property (in particular, they must provide adequate records of their property rights and their assets, preferably certified and digitized). Thus, the European Commission pays special attention not only to the study of adaptation strategies, methodologies and other corrective tools in relation to the preservation of cultural heritage, but to the digitization of its objects as one of the inevitable and useful options for preserving the cultural heritage.

2 Digitalization of Cultural Heritage: Ukraine's Experience in The Context of World Trends

2.1 Digitalization as a fundamentally new manifestation of globalization processes in the field of cultural heritage

Digitalization is a global trend followed by all countries aiming at developing a competitive economy and improving the quality of life of the population. Digitalization is characterized by three leading characteristics: all types of content move from analogue, physical and static to digital, at the same time they become mobile and personal; the transition to simple communication technologies (technology becomes a communication tool), the leading characteristic of the device and technology is controllability; communications become heterogeneous: vertical, hierarchical communication loses relevance, and there is a transition to a network structure of communication [17]. Digitization plays a special role in the field of culture, where multimedia technologies have changed the technological essence of the function of cultural heritage creation and its promotion. In modern conditions, the creation of a collective memory is already real, which will allow us to formulate new models of the global history of culture, to reveal common traditions, to get acquainted with the unique works of large and low-prevalent culture.

In a society where information, technology of acquiring and disseminating knowledge becomes the main value, the legacy with its clearly expressed information essence begins to acquire new traits, as a result of which its value is increased. Among

other things, it is the isolation from the legacy of its information component, which begins to live its separate life in international networks - its "virtualization". Another phenomenon is the emergence of new, devoid of one particular type of one-tier non-hierarchical relationships outside the political and administrative frameworks and boundaries, the formation of communities built around certain aspects of heritage activities or policies without unified management or coordination centers operating primarily on the basis of new information technologies.

In the face of such global change, in the face of the threat of cultural unification, the need for efforts to maintain the diversity of cultural heritage as one of the sustainable development resources is increasing. The cultural heritage of different civilizations can and should become the basis for intercultural communication and world progress, a nourishing basis for creativity. For the EU member states, 2018 has become a year of cultural heritage. Much attention was paid to expanding funding and reconstruction of cultural preservation programs. In 2018, the EU approved 10 long-term initiatives in the field of cultural preservation and development, including three programs for the dissemination of cultural knowledge, cultural tourism, combating illicit trafficking in cultural heritage items, as well as improving the skills of creative professionals, involving the society in decision-making on objects cultures and innovative approaches to the preservation and multiplication of cultures of European peoples [1]. Thus, technological and digital innovations have unique potential because they facilitate access to world heritage in a way that has never been achieved in all of human history. At present, digitization of services and the creation of an information space in the cultural environment is one of the most pressing issues in the field of cultural reform. These changes will entail the mass dissemination of cultural values, the convenience of their use, and the involvement of a large audience in the country's historical context.

2.2 The benefits of digitalization of cultural heritage

Thanks to the modern achievements in the information sphere, the world community is observing a mosaic of unique, unique, unique cultures. The mobile information-landscape matrices of each invariant cultural environment will make constant changes to the general structure of world culture; will be able to ensure the joint movement of cultures of small peoples towards each other. The purpose of such projects is to create a regional segment of cultural heritage networks through the creation and development of collections of information resources. Creating a collection allows you to increase access to information resources; to ensure the development of sufficient and protected resources to maintain the vitality and viability of the region, its sustainable functioning and development; to protect regional cultural values.

Today, the creation of collections is not a technical problem, but a cultural one, since it is necessary to develop a methodology and technology for their creation and development. First, when forming a regional segment in cultural heritage networks, it is advisable to develop a concept, define meaningful boundaries, work out the criteria by which it is created and justify them. Secondly, only on this basis it is possible to develop technological and methodological solutions: determination of the content composition, sources of formation, principles of systematization, ensuring completeness. Thirdly, it

is necessary to choose information technologies for creation, support and use of the collection. The leading role is given to the creators who order the technical solution, based on conceptual provisions.

Collections created on this approach will be able to perform many functions in cultural heritage networks. For example informational (the accumulation, systematization and transmission of local history information), epistemological (acquisition of knowledge about the surrounding life, facts from the history of the region), transformative (the transformation of local lore knowledge into spiritual and practical values (conducting local lore, publishing books, discs, creating films, etc.)), function of scientific research (organization and conducting of local lore scientific researches in the field of culture, history, natural science), axiological (rendering assistance to the individual in the realization of significance for oneself, for the society of certain events, phenomena, etc. from the life of the region, participation in the formation of personal relation to these or other regional cultural values; this function is expressed in the choice of thinking behavior), educational (formation of self-consciousness of the person), practical (assistance in solving socio-economic, cultural and other problems in the region), function of security (protection of monuments of history and culture of the region on the basis of conscious action and in accordance with values), integrative (orientation to interdisciplinary regional studies, to the formation of fundamental concepts), regulatory (the establishment of traditional rules and regulations that regulate behavior, passing on local knowledge from generation to generation), cultural (participation in the expansion of horizons, education, self-education, development of culture). Consequently, collections are inherently multifunctional, which means they will be able to solve the global challenges facing culture as a whole.

2.3 Ukraine's experience in digitizing cultural heritage

In Ukraine, despite the general development of the IT sphere and strong creative ideas, the dialogue between culture and technology is just beginning. The country has adopted the Concept of Development of the Digital Economy and Society of Ukraine for 2018-2020 [13], according to which digitalization is the saturation of the physical world with electronic-digital devices, tools, systems and the establishment of electronic-communication exchange between them, which in fact makes it possible to integrate the interaction of the virtual and the physical, that is, creates cyberphysical space. Also approved is the "List of cultural heritage objects of national importance, which are entered in the State Register of immovable monuments of Ukraine" [8]. However, despite recognizing the decisive role of cultural heritage as the most powerful component of shaping Ukrainian identity along with language, territory, economic life and communion of historical fate, which becomes a factor of national consolidation, awareness of Ukrainians as a single nation, promotion of social issues and promotion of social development. and the preservation of national cultural heritage has been greatly exacerbated. The main reason for the existing shortcomings and problems is the total non-compliance with the current legislation on the protection of cultural heritage as a whole, and individual laws concerning its different types and types.

The situation with the protection of cultural heritage is also exacerbated by the occupation and annexation of the Autonomous Republic of Crimea, parts of Donetsk and Luhansk regions by the Russian Federation in 2014, since those territories have a significant number of cultural heritage sites. According to the published data of the Ministry of Culture of Ukraine, as of 2013, there were 34 museums of different types operating on the territory of the Autonomous Republic of Crimea. In Crimea there were 917.477 objects of the state part of the Museum Fund of Ukraine. There were 5 museum institutions in Sevastopol, 320.163 museum objects of the state part of the Museum Fund of Ukraine were stored. According to the statistics of the Autonomous Republic of Crimea, more than 300 public and departmental museums were also located in the territory of the Autonomy [7, p.31]. The Russian occupying power poses a direct threat to these prominent cultural heritage sites, for example, on November 16-17, 2015, a tower and a wall fragment of the symbol of the city - the ancient Genoese fortress, which was nominated in two nominations of the Preliminary World Heritage List, collapsed in Sudak. There is documented evidence that Russia is exporting significant cultural values from the occupied Crimea, for example almost all paintings of the famous Aivazovsky Gallery in Feodosia were taken out [7, p. 34].

The use of massive artillery shelling of settlements and industrial sites in the Donetsk and Luhansk regions by Russian military and mercenary groups, as well as by separatist units they support, causes damage and destruction of cultural heritage sites and cultural heritage sites. As of 2013 on the territory of Donetsk oblast, in the sovereign region, 4144 cultural monuments were transferred. Including archeology - 1956, history - 2008, monumental mystery - 32, city architecture and architecture - 148. In the Lugansk region, on the sovereign oblast, 6317 Blvd. Including archeology - 5014, history - 919, monumental mystery - 38, architecture and public garden - 338, garden and park mystery - 8. However, it is difficult to say today how many industrial architectural monuments in these regions have been affected - their identification and accounting have been practically not carried out by local cultural heritage agencies due to either the reluctance of admission of professionals by business owners or due to the regime nature of many industrial sites. of objects [7, p.36]. In addition, it should be noted that until 2014, there were 59 state museums operating in the Donetsk region, of which only 30 (together with branches) and the historical and cultural reserve in the town of Svyatogirsk are in the controlled territory. There are 34 state museums in the Luhansk region, of which only 14 are in the controlled territory. The fate of outstanding cultural assets in uncontrolled territories remains unknown.

Unfortunately, international legal regulation of the protection and return of cultural property has proved to be ineffective for the protection of cultural property in the occupied Crimea and in the area of armed conflict in certain areas of Donetsk and Luhansk regions. Nevertheless, Ukraine and the world community are taking decisive steps not only to preserve and restore illegally exported cultural property, but also to hold those responsible for the deliberate damage to cultural heritage. Under these conditions, it is clearly necessary not only to develop a register of cultural objects to be digitized, but also to make specific projects for the digitization of cultural objects. In addition, the

regulatory framework in the field of cultural heritage requires immediate revision, taking into account the use of information technologies not only in accounting for its objects, but also in their digitization.

The first steps are already being made. For example, since 2016, the Ministry of Culture of Ukraine has approved standards for the electronic description of museum objects, while emphasizing the importance of complying with them so that they do not then depend on a particular manufacturer or software. This will allow museums that generate information to freely exchange data and submit them to the state register [6]. This possible improvement of cultural property safety would contribute to the renewal of cultural property passports with indication of GPS coordinates and entering cultural property to electronic databases. Creating mirror electronic copies of registers of cultural property of Ukrainian museums, in its turn, would allow to track and find stolen for museums cultural property [20].

This year, on the initiative of the Ministry of Culture of Ukraine, the Ukrainian Center for Cultural Research and other sectoral public organizations, a project was launched - an online platform for digitizing the register of cultural heritage of Ukraine. The project emerged as a response to current cultural realities: paper records are still being kept in paper form. Currently, ministry staff spend about 4 hours working to respond to a request for a particular cultural property [12].

In June 2019 the Ministry of Culture launched a pilot project which will be implemented on the basis of the Vinnytsia region with the purpose of practical elaboration of the necessary and important aspects of filling and functioning of the electronic platform with its subsequent implementation at the national level. The implementation of this pilot project is another important step towards not only the preservation and enhancement of cultural heritage, but also the widespread presentation of it at a modern information level [2]. Creating an electronic register of cultural heritage will help to collect, process, analyze and optimize the process of moving 14+ million objects of the museum fund and 130+ thousand objects of tangible and intangible cultural heritage. In doing so, the resource will contribute to the implementation of the Association Agreement with the EU in the context of the preservation and evaluation of cultural and historical heritage. The team also strives to help solve the problem of the return of cultural property from temporarily occupied territories. And the global dream of resource initiators is to promote the self-identification of Ukrainians through the preservation and promotion of cultural heritage.

By design, the project will work on three levels. Yes, art lovers will be able to find information about any cultural heritage monument through the search engine. Specialists will learn analytics and share themed events. Moreover, in the online office of the resource, it will be possible to get 12 administrative services provided by the Ministry of Culture of Ukraine online. The team has already presented a prototype of the register of cultural heritage of Ukraine. The biggest challenge in the implementation of the project was the search for the optimal combination of theoretical problems and their practical IT solutions. The information from the resource will be able to get directly to the European resource Europeana, which will help to present the Ukrainian cultural heritage to the world. The Ministry of Culture plans to take the resource on its balance sheet

and develop it as a state-of-the-art portal that provides access to comprehensive information in the fields of culture, the arts, history and is focused primarily on the interest of the end consumer, including for receiving administrative services.

Particularly noteworthy is the large-scale project "Authentic Ukraine", implemented by the Ministry of Culture in collaboration with Google Ukraine, with the involvement of many other organizations interested in preserving and presenting unique Ukrainian authenticity[3]. The Authentic Ukraine Project is a unique virtual space containing a collection of authentic audio and visual examples of Ukrainian authenticity. The virtual platform consists of two parts: "Material Cultural Heritage", represented by virtual tours - wooden churches on the UNESCO World Heritage List, open air museums and opera houses of Ukraine, and "Intangible Cultural Heritage", which consists of 5 sections: oral traditions and forms of expression; performing arts; customs, ceremonies, celebrations; knowledge and practices relating to nature and the universe; traditional crafts. This project opens up new opportunities for exploring and learning about Ukraine's cultural heritage, encourages domestic and foreign tourism, and makes Ukraine more interesting to the world. The platform provides links to all digital heritage resources, is modern, easy to navigate and conveys the atmosphere and emotions of these cultural objects. The Authentic Ukraine electronic resource provides an opportunity to add and expand content. Here you can find copyright texts, audio and video, illustrations, 3D images and virtual tours.

An important part of the project is the educational component. At the end of each section there are interactive tests that can be used by educators during the educational process, which makes the platform a convenient tool for educational activities in schools and public institutions. The information is available in Ukrainian and English.

A significant contribution to filling the void in the theory and practice of digitalization the domestic heritage sector and bringing in the latest knowledge and technologies, world leading practices, and consolidating the efforts of experts in the digital preservation of national historical and cultural heritage are The Digitized Heritage: Preservation, Access, Representation (2013-2017) and The Digitized Heritage: Consolidation, Integration, Creativity (from 2018). The Digitized Heritage is a series of information and training events on the subject of digitizing historical, cultural and scientific heritage. The events have been held in Ukraine, in Kyiv and some other cities since 2013. The initiator was The Specialized Center BALL, LTD, a Ukrainian company dealing with ICT in the culture, education, and science sectors [4]. For over than six years there were 20 informational and training events on digitizing of historical, cultural, and scientific heritage stored in archives, museums, libraries, private collections, and other memory organisations, as well as developing digital libraries, archives and museum collections and enabling open access to them.

The events took place in 6 regions of Ukraine, with the participation of about 600 people from 50 cities and towns of Ukraine, speakers from Ukraine, Italy, United Kingdom, Germany, Belgium, Malta, Poland, Russia. The objective of these events was:

- to acquaint heritage specialists with advanced international practices and train them to use technologies for digitizing, development, and integration of digital collections, access and use methods;

- to promote the construction of a platform in Ukraine for technological development and improvement of digital competences for international professional collaboration and integration of national resources with European digital heritage, with EUROPEANA as a first priority;
- to transfer knowledge on digitizing and technology of digital content and metadata integration to global systems like EUROPEANA according European standards and methods

During 6 years of the Digital Heritage events, it has been possible to form a professional community that tries to keep up with the digital technological development in the heritage sector, bring Memory institutions and their digital resources to a dignified level of digital development awareness and foster the development of cross-sectoral and interdisciplinary collaboration and influence on public administration.

Noteworthy is the experience of the BALI specialized center (<http://scbali.com>), whose activity is focused on a wide range of scientific and practical works in the field of information and communication technologies in the scientific, educational and cultural sectors, in particular in the field of digitized cultural heritage and digital integration of resources. BALI Center is the developer of the information system «Digitized Content Visualizator» [19] - a new generation tool for the formation of various online digital collections, the creation of a digital museum, with solutions for their integration with the website and other resources, national and world digital heritage systems.

Purpose of the information system "Digitized Content Visualizator":

- creation of databases of metadata, multi-format digital analogues of objects of historical and cultural funds,
- formation of digital collections, funds management;
- multi-format and multifunctional representation and use of digitized objects and digital collections online,
- providing a variety of digital content information services for different categories of users;
- integration into a single digital content system provided in various media formats, its functioning in accordance with standards, practices and trends of development of digital and informational technologies and information services in the web environment.

DS-Visu version 3.0: "Digitized Heritage" is focused on creating digital representations of objects of historical and cultural heritage, forming and managing digital collections formed from funds of memory institutions (libraries, museums, archives), private and other collections, in accordance with existing national, European and world standards in museum, archival, librarian business and leading practices of representations of digitized museum collections in a web-based environment, presenting them in integrated national and global information systems.

DC-Visu operates in a PHP environment optimized for current Javascript enabled browsers. It does not require local installation by the user, provides quick access to digital documents of any size and allows to work with them online.

DC-Visu consists of several modules:

1. administration system (basic functional; access control module; multilingual interface module; statistics);
2. content formation and management system (collection management module; object management module; content generation module);
3. visualization system (web presentation modules for collections; modules for visualization of digitized documents);
4. full-text search system (module of automatic recognition of texts on the basis of system ABBY FineReader Engine; editor-marker of texts; verification and crowdsourcing module);
5. content conversion system (metadata converter; image converter).

The basic functions are:

- formation of online digital resources: digitized objects and digital collections;
- dynamic creation of lists of digital collections and digitized objects;
- dynamic representation of metadata for digitized objects and digital collections;
- presentation of icons of collections and objects, photos of objects of collections, digitized documents;
- viewing digitized documents page by page and spreadsheets, scaling, rotating page drags;
- navigation by content, composition or kit, pointers, image icons, document page numbers;
- searching for description, content, and index items providing standardized descriptions of the original and the digital copy as an electronic resource,
- forming a bibliographic link / quotation on structural parts of documents, saving images (separate, all) to the file and printing, descriptions and references / quotes and content textual data, integration of electronic analogues of objects in various file formats (text, graphics, multimedia, 3D) and related Internet resources;
- accessing to existing analogues;
- connection of objects with accounting files, related objects from the fund, site, Internet;
- automatic generation of URL addresses of resources and QR-codes of access to these resources through mobile devices;
- exporting metadata to XML source structures.

Within the framework of the Europeana project, one of the European Union's Digital Service Infrastructures for cultural heritage [10], the Bali Center supported the initiative to connect national content to the Europeana collections of digitized cultural heritage in the following thematic areas: Ukrainian science and culture in personalities and facts; World history in documentary funds of Ukraine; Lifetime editions of great authors; Anniversary dates: landmark cities and events. Thanks to the activities of the Bali Center, collections of scientific libraries of the National Dragomanov National Pedagogical University, Taras Shevchenko National University of Kyiv, V. N. Karazin Kharkiv National University, KPI National Technical University, V.O. Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine are presented today in Europeana.

These are only the first steps in the path of digitalization, but now Ukraine has the task of creating a body responsible for interagency cooperation on digitalization. The government should create a mechanism for establishing cooperation between existing institutions, determine the structures (government departments or institutions) that are most suitable for managing large-scale digital transformation projects. In addition, public funding should give impetus to the digitalization of cultural heritage, to begin with in a specific sector or area. A clear vision of the essential elements of digitalization must be ensured by national strategies. Underlying and consistent ICT goals and national broadband infrastructure also remain a prerequisite. Education and awareness raising are critical to implementing digitalization policies. Along with social events and campaigns aimed at disseminating electronic skills and raising the level of digital literacy in society, it is important that the government provide targeted initiatives to meet cultural heritage needs. Countries with an initial digitalization level, including Ukraine, to accelerate the pace of the digitalization process should focus on the development of a constructive policy and regulatory framework, as well as relevant actions by the state, which matured will accelerate digitalization [18].

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