Digital Preservation of Cultural Heritage and Opportunities Created by the Pandemic Crisis for Bringing New Life to Historical and Cultural Artefacts

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Abstract. The article describes possible strategies for saving the cultural heritage and accelerated digitization of cultural artefacts and items of national historical significance. Emphasis is placed on the specific opportunities posed by the pandemic crisis and the labor market fluctuations to introduce ICT innovations in museums, libraries, and other cultural institutions.

Keywords: Internet of Things, Digital Cultural Heritage, RFID, Mobile Technology, 3D Scanning

1   Introduction

The penetration of globalization in everyday life at first glance refocuses the interests of society from the spheres of spirituality and culture to more economy and market related activities, but on the other hand, due to the accompanying progress in information and communication technology (ICT), it provides new serious tools for culturologists and historical heritage researchers to preserve and develop the culture in newer, digital dimensions. It is also worth noting that the preservation of cultural heritage is an important task, especially having in mind the various scenarios that can lead to destruction or loss of a valuable object of great archaeological, historical or cultural value. In this aspect, the digitalization opens new horizons for scientists and gives new meaning to the concept of culture in the new knowledge-based economy.

Literally any object of cultural and historical significance can be digitized - from musical fragments and works that can be preserved for generations on laser or optical discs, through archaeological finds that can be stored as spatial images through 3D scanning, and even manuscripts and antique books, which can be processed with specialized library scanners, thus remaining forever in digital archives, even though the originals (usually on paper or other perishable matter) are already irretrievably lost.

However, the digitalization process is by no means cheap and, in addition to specialized equipment, often requires serious human effort and expert work. We are talking about digitalization on different levels:

- We can use digital technologies to mark, protect or classify the respective object or item. This is achieved, for example, by placing RFID stickers on the object to signal when its location changes (for example, someone is trying to take an exhibit out of a museum) or QR codes (Kaposi, et al., 2013) nearby for fast mapping and linking with the appropriate catalogue base. Such scenarios could be easily synchronized with larger nationwide information systems, through which we know at any time the location of any important cultural object (the so-called Internet of things).

- We can expand the cultural and informational significance of the respective object by adding further information to the site-related database - such as history, significance, chemical composition, owner, restorer, related artifacts, epoch details, and more.

- We can also make a realistic digital copy of the object, which, although not primarily able to replicate all the characteristics of the original, is a reasonable way to preserve and store it in some form for the generations, no matter whether it is photograph, painting, icon (Paneva-Marinova, Goynov, & Luchev, 2017) or statue.

Of course, each of the listed operations requires certain resources, and in this article we will consider the possibility of using the state of emergency and the crisis related to the global pandemic situation in order to find a rational solution to this issue.

2   Opportunities for Accelerated Digitalization of Culture During a Pandemic Crisis

The Covid-19 crisis definitely shocked the whole world. Hundreds of productions and activities were blocked, social life practically came to a standstill, and the sphere of culture was particularly damaged, as long as theatres, cinemas, concert halls, museums and galleries closed their doors for visitors. Millions of people locked themselves in their homes, looking for ways to secure only their lifesaving needs such as food and medicine. Cultural life has virtually died out, and it is only thanks to TV programs and multimedia platforms such as NetFlix and YouTube that people kept up their ties with the world around them, and the Internet has become the natural social environment, raising the reasonable question of whether our digital perspective is not the new reality.

The medical crisis soon escalated into an economic one. Apart from the fact that hundreds of thousands of people lost their lives (mostly from the older population), millions of people around the world in working age lost their jobs without the prospect of finding new soon. Thousands of businesses have gone bankrupt, and many more will suffer the effects of the pandemic for years, even if the world manages to get rid of and recover from it in the foreseeable future. Different sectors of economic life were affected to varying degrees, but cultural professions were among those most affected as their audiences literally disappeared, and their sources of income dried up. And although, within a month or two, some artists and performers searched for and found suitable innovative forms of performance - e.g. streaming live concerts (including through the collaboration of artists all around the world) or video broadcasts of theatrical productions from empty halls, it is crystal clear that the world will never be the same again and survival of the culture is facing a serious challenge.

The digitalization of museums, galleries and libraries is a logical process (Kouzov, 2018), which has been going on for many years, but so far most of these institutions have not completed it, and there are still many who have not actually started it. In any case, the Covid crisis has made it clear that the vast majority of the cultural institutions have not been prepared for situations like this and certainly have no prospect of digitizing quickly and make their collections available online. In order to fully digitize a substantial part of their cultural inventory, serious preparation, planning, funding, expertise and labour are required, and most of these resources were not available, so in most countries the only thing that saved those, working in such organizations from losing their jobs, was the fact that much of their funding is public and the respective states continue to subsidize the culture in various forms (Denchev & Vassileva, 2010). However, in order to radically address the issue of the digitalization of the cultural heritage, a key change in thinking is needed and indeed serious financial resources must be set aside over a short period of time, in which a large volume of concrete innovative activities should be carried out. The fact that during a crisis, such as the current pandemic, a large part of the museum and the library workers have time, free from visitors, is a chance to launch such a large-scale effort, and governments with a vision could make good use of this opportunity.

All countries around the world are currently trying to find optimal ways to revive businesses economically through appropriate financial injections, so if their governments are really concerned about preserving the culture and its development in a business perspective, they could easily focus some of the incentives on the support of the digitization of their cultural values. In practice, most cultural institutions have probably prepared projects for digitization of their archives, and those who have not, could easily use standard know-how as long as the approach to different collections would not be different if it comes to the same type of artifacts, no matter whether we envision sculptures, paintings or something else. Most projects certainly include the provision of appropriate technological tools (e.g. 3D scanners) and software platforms for storing digital copies, training the staff in their use and, of course, the digitalization itself. Depending on the objects, subject to the digitization, the technologies, equipment, skills and processing time vary, but their common and ultimate goal is to combine the latest and advanced technologies with the most intimate niche of the human development - the realm of the spiritual. And this symbiosis should best support the development of new type of thinking and awareness of citizens in the knowledge-based economy - the ability to think in a digital perspective. Obviously, a huge part of the social and economic activities can be transferred to digital dimensions, and if we can properly transpose the spiritual charge that the cultural objects and historical artifacts carry in this new reality (Kouzov, 2019), it will definitely give us the self-confidence of people ready for adequate participation in the life of the new century. The rapidly developing technology changes the way of life and affects every aspect of the surrounding environment including culture and the ways we reach and perceive it, so various new forms of culture and art related to the digitization are likely to appear in the nearest future. This in no way belittles the existing cultural objects and historical landmarks, but rather helps us rediscover them in their new, innovative perspective.

3   Smart Digitization Strategy - Stages and Stakeholders

The strategy, that we consider optimal in connection with the initiation of a large-scale campaign for digitalization of the cultural heritage in the conditions of a pandemic crisis, has several stages:

- Identification of the cultural institutions whose collections will be digitized. Initially, it is recommended to pick organizations that have a clear vision, project or action plan and a critical mass of experts to launch the initiative;

- Provision of an adequate budget for support of the activities from the respective public funds in the field of culture for dealing with the Covid crisis;

- Carrying out the tender procedures for purchasing the necessary equipment and software related to the entire digitalization process;

- Hiring additional staff (if needed) in order to start and complete the major bulk of digitalization activities in a relatively short period – having in mind the unfolding unemployment related to the crisis, it should not be a problem to provide suitable candidates, incl. temporary employment;

- Training of the existing and the newly hired staff to use the technological means for the digitalization process. We should take into account that there are also relatively low-skilled activities (e.g. placing QR codes or RFID stickers on the exhibits or the surrounding ecosystem, information update through web forms, etc.), which can be started almost immediately, and there are more sophisticated ones, such as creating virtual panoramas or 3D scanning, which require bigger expertise and skills, but are more or less related to human labour and can be successfully used as a measure against the unemployment. Despite the development of technology, the need for expert human intervention in the process of digitalization will not disappear for many years, and even nowadays we often try to find the optimal ratio between more expensive technology and more manual labour (for example, there are specialized robotic systems that scan manuscripts where the scrolling mechanism may be fully automated or supported manually by a human operator), but it is quite clear that over time the automation will take up an increasing share of these activities as technology becomes cheaper and labour costs rise;

- Starting the digitalization itself, and here it is important to mention the opportunity to digitize not only the exhibited collections, but also the whole inventory, which in many cases is much larger than the items presented in the museum or gallery, mainly due to the lack of exhibition space or insufficient information and accompanying metadata about the stored objects (which need to be supplemented in the digitalization process anyway).

One successful project, although not directly supported by public funds, is the ART UK project (Baker, 2019), developed by the eponymous charity foundation, which is actively working to digitize the collections (Figure 1) of the museums in the United Kingdom.

Fig. 1. Queen Mary (1867–1953) digital copy. Kirkleatham Museum, (ART UK, 2016)

To date, the foundation has managed to digitize over 250,000 works of art (sculptors, paintings, photographs, etc.) by over 40,000 authors, an approach, similar to that described above, but the activity is funded mainly by subscriptions from the cultural institutions themselves for the digitizing service, as well as from the joint sale of imprints of the works through the ART UK digital store, the earnings being shared with the participating institutions, and exhibits from over 3,000 collections all across England can now be found in the organization's funds. The advantage of the approach is that most participating institutions do not have the necessary resources and knowledge to digitize their collections themselves, while the professional ART UK team performs this activity for them, constantly upgrading its know-how and capabilities. A similar approach is proposed in our strategy for smart digitalization of the cultural heritage, which was described, with the clarification that countries, that prioritize such projects and create a critical mass of expert teams, could successfully provide and expand such services internationally, while their major effort will remain to conclude the necessary licensing agreements for the use of the artworks, as technology itself is no longer an issue. On the other hand, the grants that countries provide to deal with the crisis, could successfully serve the cultural institutions to pay for their digitization by an expert team or to train their employees to organize the digitization themselves. In both scenarios, in a relatively short period of time, a huge number of objects of cultural and historical significance could be digitized, incl. the opportunity for the potential users to acquire an online access to a much wider range of objects, as the digital collections will also include objects, that are not displayed in the museum, but are still part of its inventory.

Whether the pandemic crisis continues or life soon returns to normal, the opportunity of a larger campaign to digitize the cultural life, associated with the museums and galleries, is an investment in the future and a bridge to preserving the mankind's cultural wealth, thus strengthening our spiritual foundations in a new, highly technological environment. In certain aspects, the digitalisation of the cultural heritage provokes a more holistic approach to literally "reengineer" our cultural perceptions, sometimes leading to qualitatively new forms of representation of traditional cultural values, enriching them with the technologies of the future as well as with new forms of digital art, unknown so far. The pandemic crisis can be devastating for the cultural sphere or a chance for a cultural revival, already in online dimensions, and it only depends on our rational thinking whether we will take advantage of these new, challenging opportunities.

4   Conclusions

We believe that using the crisis, created by Covid-19, to prioritize the digitalization of the cultural heritage brings multifaceted benefits to society because it solves both an economic problem (thus opposing unemployment) and a cultural one (creating conditions for mobilizing financial, human and technological resources, which in short terms will digitize the key art collections in the respective countries). Last but not least, the digital replicas of artworks reach a much wider audience via the Internet, as well as provide much more complete information (catalogue, audio, video, etc.) at a time convenient for the visitor, because visits to museums and the time spent there are usually limited, while on the internet portal of the digital collections, in fact, the art lovers can participate equivalently in 24x7 mode, enjoying the artworks, without being bothered by other visitors.

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