The use of technological innovation for increasing the museum heritage accessibility and attractiveness

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THE USE OF TECHNOLOGICAL INNOVATION FOR INCREASING THE MUSEUM HERITAGE ACCESSIBILITY AND ATTRACTIVENESS

Folosirea inovațiilor tehnologice pentru creșterea accesibilității și atractivității patrimoniului muzeal

ABSTRACT

Technological development and changes in consumer desires and preferences are external factors, uncontrollable by a museum, but which have a great influence on its public success. Depending on the attitude and measures taken by a museum, these factors may represent an opportunity or, conversely, a threat, eventually turning into strength or a weakness of the museum. Based on these considerations, the purpose of this article is to highlight some practical ways in which museums can use technological innovation in order to gain a competitive advantage. In the first part, this paper presents a series of modern technologies applied in museums, which allow them to become more attractive and to better fulfill their functions of storage, conservation, research and exploitation of the heritage. The second part presents a study conducted at the County Art Museum «Baia Mare Artistic Centre» regarding the measures taken for heritage digitization and, starting from this, for increasing the public access to the museum's collections.

KEY-WORDS: *innovation, technology, museums, heritage, digitization, distribution, visitors, experience, virtual reality*

Introduction

It has been demonstrated that the use of modern technologies is a viable way to improve performance in cultural organizations.[1] Through technology, museums can better manage their collections, provide memorable visitor experiences and overcome physical boundaries through the use of online distributions and communication channels.[2] In turn, these can lead to higher public satisfaction, which has a positive influence on the rate of visitation and, implicitly, on the

1 Camarero & Garrido (2008), pp. 413-434

2 Parry (2013)

revenues gained by the museum. In other words, museums resort to technological innovations in order to better protect and preserve their heritage, while enhancing the attractiveness of their exhibitions, thus increasing the proceeds they gain directly from beneficiaries, in a situation where subsidies allocated to museums are insufficient compared to current needs.[3]

Statistics show a high number of museum non-visitors in Romania. For example, in 2014, 70% of the Romanians did not visit any heritage objective located outside of their place of domicile.[4] This means that the traditional ways of promoting the museum heritage are not capable enough to capture public attention, which may result in the failure of museums to successfully fulfill their mission to contribute the development of the society[5] by using the their heritage as a driver of cultural, social and economic value.[6] Under these circumstances, museums are required to apply strategies that are designed to increase their market competitiveness. Given that the technological innovation strategy facilitates the achievement by the museums of their functions related to heritage conservation, research and promotion, we believe that studies are needed, to show the practical ways in which museums can successfully use such strategy. The need for these studies lies also in the fact that some museums perceive modern technologies as a threat rather than an opportunity. Thanks to technology, the Internet and the increased remote access to information and products, many museum professionals are concerned that audiences in the future will become more interested in digital images and virtual experience, rather than in the static nature of works of art.[7] This duality, this mixture of advantages and possible disadvantages linked to the use of modern technologies, causes many museums to be reluctant to embracing technological innovation. According to Marchetti & Valente[8], technologies are not broadly adopted, because a clear vision about their role within the troubled process of museum innovation is missing. The authors argue that most museums prefer to stick to low-tech settings, which are perceived as (almost) equally captivating, but less disturbing, cheaper and easier to maintain.

Based on these considerations, the first part of this article summarizes the ways in which technology can be used by museums to increase accessibility and attractiveness of their heritage. The case study included in the second part of this article describes the steps taken by the County Art Museum "The Artistic Center of Baia Mare" to digitize heritage and the strategic directions envisaged for the next period.

Technological innovations in the museum sector

Innovativeness in business refers to the degree to which a firm creates new products and services using accumulated knowledge from consumers, competitors, and technology.[9] Applying this definition to museums, we may say that museum innovation is "*the new or enhanced processes, products, or business models by which museums can effectively achieve their social and cultural mission.*"[10] In other words, the development of new products, services and processes or the improving of the existing ones through the implementation of new technologies[11] is one of the main ways in which museums can show their innovativeness. To improve their performance, the museums may resort to technological innovations in management, to organizational innovations and, last but not least, to innovations aimed at improving visitation experience.[12]

As visitors are an important criterion by which museums are evaluated and funded, specialists have constantly sought for new ways to provide attractive visitor experiences through the use of technology. In

3 Camarero & Garrido (2011), pp. 39-58.
4 Becuț (2015), p. 116.
5 Pop & Borza (2016).
6 Centrul de Cercetare și Consultanță în Domeniul Culturii (2013).
7 Anderson (1999), pp. 129-162.
8 Marchetti & Valente (2012), pp. 131-143.
9 Camarero & Garrido (2011), pp. 39-58.
10 Eid (2016), p. 2.
11 Camarero & Garrido (2011), pp. 39-58.
12 Vicente, Camarero & Garrido (2012), pp. 649-679.

this regard, it was found that visitors want to spend a nice going out and socializing, while also discovering new things and broaden their horizons. For this reason, many museums have developed participative content, which combines learning with relaxation, conversation, social interaction, participation and collaboration.[13] The main types of technologies that are used in museum exhibitions for an improved visitation experience are:[14]

- *Audiovisual media used for passive presentation in an appealing way*. This generally consists of video presentations on simple monitors or wall projections.
- Guided presentation with the help of audio guides, video projections and other means to accompany visitors throughout their tour, offered as alternatives to tours given by museum staff.
- Interactive browsing stations, with information on museum collections and educational programs (usually, in the form of touch screens and user-friendly interfaces).
- *Environments that provide opportunities for direct creation* or production, take-away experiences and interactive experiences.

Thus, the multimedia employed in exhibitions perform multiple functions, such as provide explanations; display exhibits that the museum cannot actually show, either because of lack of space or because of their fragility and special handling requirements; induce visitors a certain emotional state and facilitate their involvement and interaction with the exhibits in the museum.[15]

To enhance their attractiveness, in recent years more and more museums have been focusing on creating exhibitions that allow visitors to interact in different ways with the content of the exhibition, and not to just passively receive information. For this reason, museums resort to: exhibits offering visitors the opportunity to learn different things while interacting with them, simulation environments, interactive movies, 3D graphics and, last but not least, a virtual reality, allowing visitors "to travel through space and time without stepping out of the museum building"[16].

Museums can also use the new technologies to develop edutainment (education through entertainment) content and to improve the quality of their services. In this regard, Lepouras & Vassilakis[17] propose the use of 3D game technologies for the purpose of developing affordable, easy to use and pleasing virtual environments. For example, the Museum of Science in Boston has been experimenting with a variety of public engagement approaches designed to help visitors think and talk about the societal implications of nanotechnology. These approaches are generally interactive and two-way, allowing for the collection of data about what people think, in addition to simply disseminating information about technology to them.[18] In another case, an immersive virtual museum provides a virtual environment that lets students assume the persona of an adolescent gorilla and interact as part of a gorilla family unit.[19]

Even if such technologies were first used in science museums, Gül & Akmehmet[20] argue that, at global level, there are more and more art museums, which are equipped with interactive spaces and objects. This shows that museums, regardless of their type, can indeed use modern technology to offer their visitors an unforgettable experience.

Therefore, the advantage of virtual reality technologies is that they provide a vivid, enjoyable and realistic experience to museum guests. Also, virtual reality technologies are very useful because they allow visualization and simulation of environments, structures or objects that no longer exist or are difficult to visit.[21] Despite these advantages, the successful implementation of virtual reality environments requires is effort and time consuming. On the other hand, though, we cannot speak of interactive exhibitions as long as the museum heritage is not digitized. This is precisely why digitization of heritage museums is a step that all museums should go through, if they want to move forward and provide interactive exhibitions.

13 Black & Skinner (2016), p. 3.
14 Roussou & Efraimoglou (1999), pp. 59-62.
15 Mamrayeva & Aikambetova (2014), pp. 33-35.
16 Roussou & Efraimoglou (1999), pp. 59-62.
17 Lepouras & Vassilakis (2004), pp. 96-106.
18 Bell (2008), pp. 386-398.
19 Lepouras & Vassilakis (2004), pp. 96-106.
20 Gül & Akmehmet (2015), pp. 141-155.
21 Lepouras & Vassilakis (2004), pp. 96-106.

The advantages of museum heritage digitizing, i.e. converting heritage objects to digital format, consist of proper heritage conservation, collection management and enhanced public access to museum collections. Museum heritage digitization can be accomplished in many ways, such as photography, scanning, and panoramic display or by saving the 3D coordinates of the art object.[22] Besides being the starting point of many forms of interactivity that can be provided in exhibitions, the transposition of the heritage in digital format and its organization within databases makes it easier to manage, collect, store and generate reports on: (1) movement of objects inside and outside the museum, (2) the exposures of each object and (3) any restoration procedures performed on an object. In turn, this information simplifies the research of museum collections.[23] Also, the development of digital images in 3D format is particularly useful for the conservation, research and restoration of heritage objects.[24] As Pieraccini et al. argue, the scientific community's attention to the 3D heritage digitizing techniques is driven by the multiple benefits they offer, as for example:[25]

- digital archives of three-dimensional models are durable and unalterable, and thus can be used as reference for degradation monitoring and restoration of works;
- 3D images allow the construction of high resolution models of valuable artworks;
- 3D digital images allow for remote fruition and digital restoration of the cultural heritage.

Once their entire heritage is digitized, museums can use the Internet to facilitate public access to images and information about their collections. From this point of view, many museums are reluctant to going online, for the following two reasons: firstly, because online access is unlimited and free and, secondly, because of the impossibility to control how virtual visitors use further the images of the museum heritage items. A possible solution to this problem is that online access to the museum database be subjected to online registration/ subscription. In other words, following their digitization, museums could develop databases, either individually or centralized at national level. The advantages of creating a national database are manifold: (1) all museums will be included in the database, even if they lack the resources (human, material etc.) required to set up and manage such databases; (2) from the users' point of view, the value provided is much higher, which is an important factor for the market success of the project; (3) museums will not have to individually manage their revenues, as these will be the task of team that manages the database, following that, every year, each museum should receive a share of the revenues, commensurate with to number of accesses to /visualizations of objects from its collection.

In turn, each museum can use the Internet as a distribution channel, to increase access to museum heritage and to the scientific resources resulting from the research thereof.[26] This can be achieved by allowing virtual visits to the museum and its collections[27] and by distributing images (e.g. via Instagram), video content (YouTube), podcasts (Soundcloud, iTunes or TuneIn), short messages (Twitter) and by publication of documentary material on blogs and / or social networks (Facebook, Google Plus, etc.).[28]

Based on these theoretical considerations, below is a description of the steps taken by County Art Museum "The Artistic Center of Baia Mare" towards digitizing and promoting its heritage through methods and products designed to broaden indirect accessibility of the audience to the museum collections.

22 Cakir & Karahoca (2015), pp. 101-106.
23 Mamrayeva & Aikambetova (2014), pp. 33-35.
24 Guidi, Beraldin & Atzeni (2004), pp. 370-380.
25 Pieraccini, Guidi & Atzeni (2001), pp. 63-70.
26 Lagrosen (2003), p. 132.
27 Marinescu (2015), pp. 17-25.
28 Lewis (2012), pp. 8-11.

It should be noted from the outset that the argumentative scenario presented in the first part of the article is, in our view, the projection of an ideal casuistry. We mean a utopian, and not an ideal casuistry, because the international trend in this field is clearly advocating the updating of existing museums through a process of "transfiguration" of their look and their professional activism, which is expected to shape the identity traits of the museums of tomorrow. Placed in this context, the reality depicted by the Romanian museums today is extremely diverse and, to some extent, lacks consistency and homogeneity, being no doubt positioned somewhere in the early stage of the change process. Moreover, it would not be far-fetched to say that our today's museums are presented with a list of urgent issues, that is in stark contrast with that of the museums from the Western European countries, in particular - where emergencies like conservation and restoration, primary records and secondary records (databases), coherent collection-specific definition and the like were solved a long time ago. However, given the extremely fast pace at which international museology has evolved in last two decades, the Romanian museum sector is faced with the "mandatory task" to "burn some stages", which means that their "updating" is a challenge they must take in parallel and simultaneously with the task of "catching up".

If we were to accept the logic of such a dualist journey, a formula we are advocating for in the case of the County Art Museum "Baia Mare Arts Center" (MJACABM), we believe we should also accept the fact that the "growth rates" of the "updating" efforts may be moderate, yet sustained and continuous. This would mean that it would be desirable to avoid joining radical programs at the moment - such as, for example, transferring digitization initiatives to "open source" projects through a massive dissemination of heritage digitization formats before all the databases have been researched and introduced in the public domain, even if only by specific primary tools (catalogs, directories, studies, etc.).

Seen from this perspective, the situation of the County Art Museum "Baia Mare Arts Center comes to prove the aforementioned positioning (quantitative and qualitative) somewhere in the early half of the "updating" process. We substantiate this assertion by the statistics that follow.

The County Art Museum "Baia Mare Arts Center" (MJACABM) was established on 1 October 2006 as an independent institution, subordinated to the Maramures County Council, by the MCC Decision no. 82 / 19.09.2006, following the reorganization of the Maramures County Museum.

The heritage of County Art Museum "Baia Mare Arts Center" is structured into two main categories: *fine arts & visual arts,* and *documentary fund*. In turn, the fine art and visual art section comprises collections from various domains: painting, sculpture, easel and reproduction graphic art, decorative art and art photography. According to heritage inventories, as at 31.12.2015 the museum's collections are structured as follows:

Table 1. *Structure of the museum moveable cultural heritage goods as at 31.12.2015*

Collection	Painting	Graphic art	Sculpture	Decorative art	Art photography	Documentary fund	Total
No. of items	1.366	2.508	149	56	33	2.269	**6.381**
Share	21,41%	39,30%	2,34%	0,88%	0,52%	35,56%	**100%**

Source: heritage inventory registers as at 31.12.2015

Graphic works hold the largest share of the museum collections, i.e. 39.3%, followed by documentary fund collections, accounting for 35.56% of total collections, and by easel paintings, representing 21.41% of the museum's cultural heritage

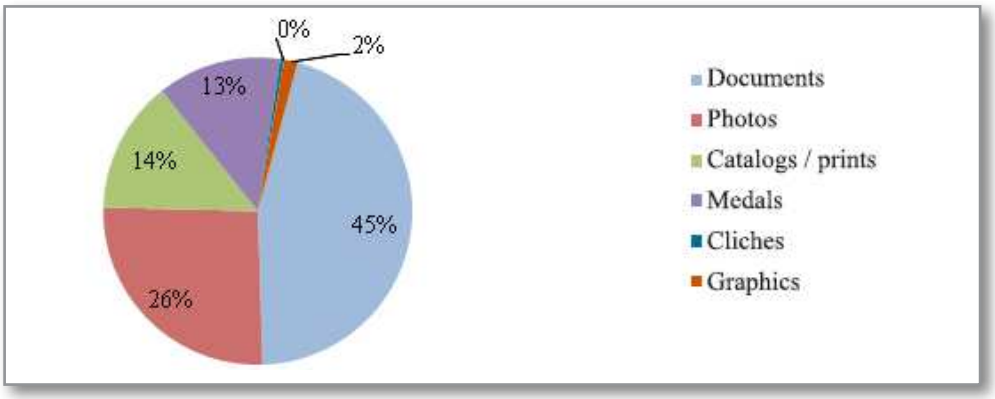

Figure 1. *The structure of the Documentary Fund as at 31.12.2015.*

3.1. Digitization of the *Documentary Fund*

The documentary section of the museum contains a total of 2,269 items and is structured as follows: 1,953 objects in the public domain (pieces acquired by purchase) and 316 objects in the private domain (items acquired by donations and by accessioning). The most important collections of the *documentary fund* are: Zoltán Bitay , József Balla, Louis Slevensky and Elijah Cămărăşan Archives. The documentary fund also includes vintage documents and photographs, personal correspondence, memorabilia, catalogs, exhibition publications, clichés and medals that belonged or are related to the life and the work of artists who worked over the time with the Baia Mare Arts Center, starting from 1896. The structure of documentary fund by types of objects is shown in Figure 1.

Given that some of the documents are more than 100 years' old, their frequent handling for research purposes may damage their physical integrity and conservation state. As such, to allow access to the information contained by these documents without exerting a negative impact on their physical condition, the museum proceeded to their conversion into digital format through scanning. Thus, from the total of 2,269 objects of the Documentary Fund, 1,244 have been scanned so far, i.e. 54.83%.

Scanning was performed in the order of importance of the documents and taking account of their level of exposure to the risk of damage, starting with the oldest documents, continuing with the photographs and ending with exhibition leaflets and catalogs. The database resulting from the scanning – the *Documentary Fund Digiteque* - was transferred to an external hard drive, to be accessed whenever the need to view these museum items arises. At the same time, the museum is gradually proceeding to transposing the color print scans on medium density cardboard (160-200 g/ m^2), thus creating the Documentary Fund Faximiloteque – a collection of documentary copies, which will duplicate all the collections of original documents and will eventually be available for primary access and research. Besides the fact that digitization will, thanks to the by-products it generates, have a beneficial effect on the conservation state of the original objects, which will thus be protected against damage caused by direct and frequent use, the scanning of the Documentary Fund is expected to:

- speed up access of museum professionals to documents and their content, thereby contributing to increased work efficiency and productivity;
- facilitate access of potential users of the documentation resources of the museum;
- provide the opportunity to enhance the cultural harnessing of the collections by online dissemination of the collection items.

The scanning of the Documentary Fund lasted from December 2011 until June 2012 and was carried out under a partnership agreement between the museum and the *Team for Youth Association*, with the latter providing project volunteers from Serbia, Macedonia, Poland, Italy, Germany, Turkey, Spain, Estonia and France, who worked for a total of 800 hours on this project. In addition to the scanning of the museum documentary fund, a task handled by Predrag Radivojevic (volunteer from Serbia), the international volunteers carried out tasks such as: (1) translation of the presentation brochure of the Baia Mare Arts Center in their native languages and posting it on the Center's webpage[29], fact that facilitated the dissemination of information about the Baia Mare Arts Center and the worldwide

29 http://www.muzartbm.ro/centrul-artistic-baia-mare-1896-2007/

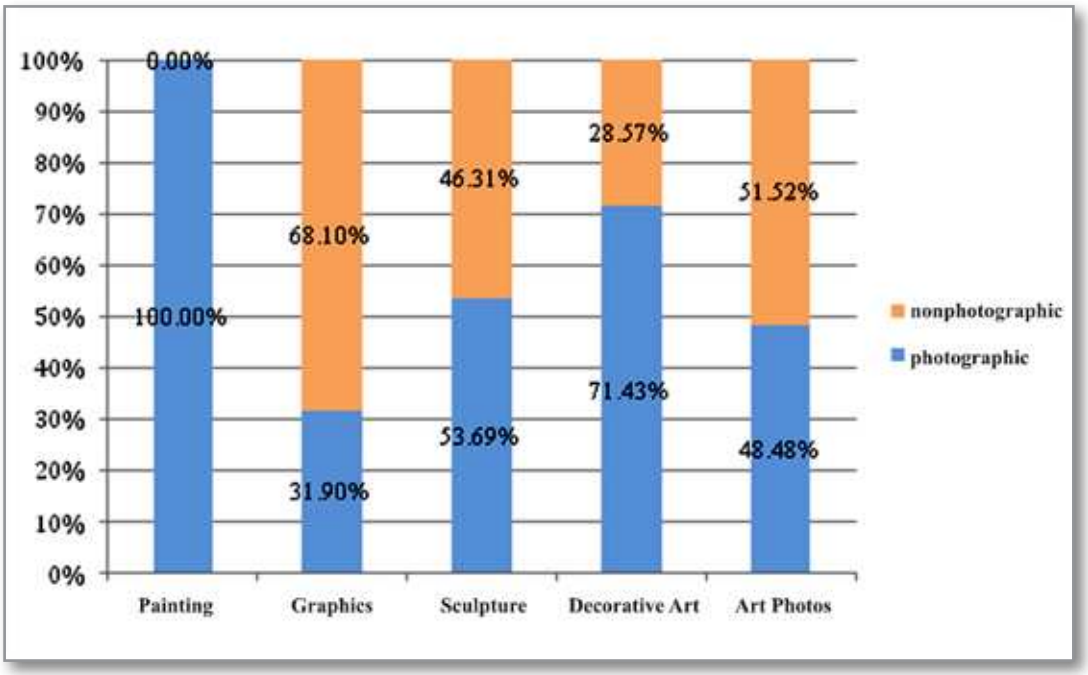

Figure 2. *Level of artwork digitization*

promotion of local cultural values; (2) organization of the temporary exhibition "*Forms of Beauty: Beauty from the Outside, Beauty From Within"*[30]; (3) organization of a series of events under the name of "International Evenings at the Museum".

Digitization of the museum's fine arts and visual arts heritage

As for the museum's easel paintings, easel and reproduction graphics, decorative art, sculpture and artistic photography collections, some of them were digitally processed by photographing. Out of the total of 4,112 artworks, 2,302 were digitized, i.e. 55.98%, and a total of 3982 record cards were entered in the DOCPAT record application (for 96.84% of the artworks – some of them without photographic documentation). The level of digitization by collections of is shown in Figure 2.

Measures taken to enhance public access to the museum's heritage

In carrying out further heritage digitization and, hence, the preservation, processing, internal research and public exploitation of its heritage, the museum must find additional ways and tools to broaden the dissemination to the public of the museum heritage in traditional formats (catalogs, repertoires, postcards, posters, invitations etc.), in electronic formats (online databases, publications on virtual environments - website, blog, Facebook, Youtube etc.) and in intermediate formats that use digitization to produce "artisan-like" items to be sold to the public (transposition on canvas, ceramic and metallic support: e.g. reproductions of paintings, jugs, plates, bags, cloths, jewelry boxes, mirrors, bookmarks, visiting card boxes, fridge magnets etc.).

Implementing a genuine promotion and dissemination policy, focused on the basic rules of contemporary marketing, has been the strategic objective of the MJACABM since 2009. Until early 2011, the presence on the Internet of our museum had not been a major target, and had therefore been rather sporadic and unsystematic. In 2011, the museum decided to embark itself on a set of actions aimed at progressively increasing its visibility in the virtual environment. As such, in the summer of 2011, the museum started its blog on the WordPress platform, containing both raw data and information on the programs conducted by the institution. By linking its blog to Facebook and Twitter accounts, the museum was able to exploit the blog both as a free-of-charge online promotion channel, and as a substitute for the museum's webpage. Likewise, the museum carries out most of its public relations activities via the Internet. Most often than not, the museum's press releases are sent via email and are taken up by the media either directly or from the museum's blog or Facebook page.

30 https://muzeuldeartabaiamare.wordpress.com/category/expozitii-temporare/forms-of-beauty/vernisajul-expozitiei-forms-of-beauty/

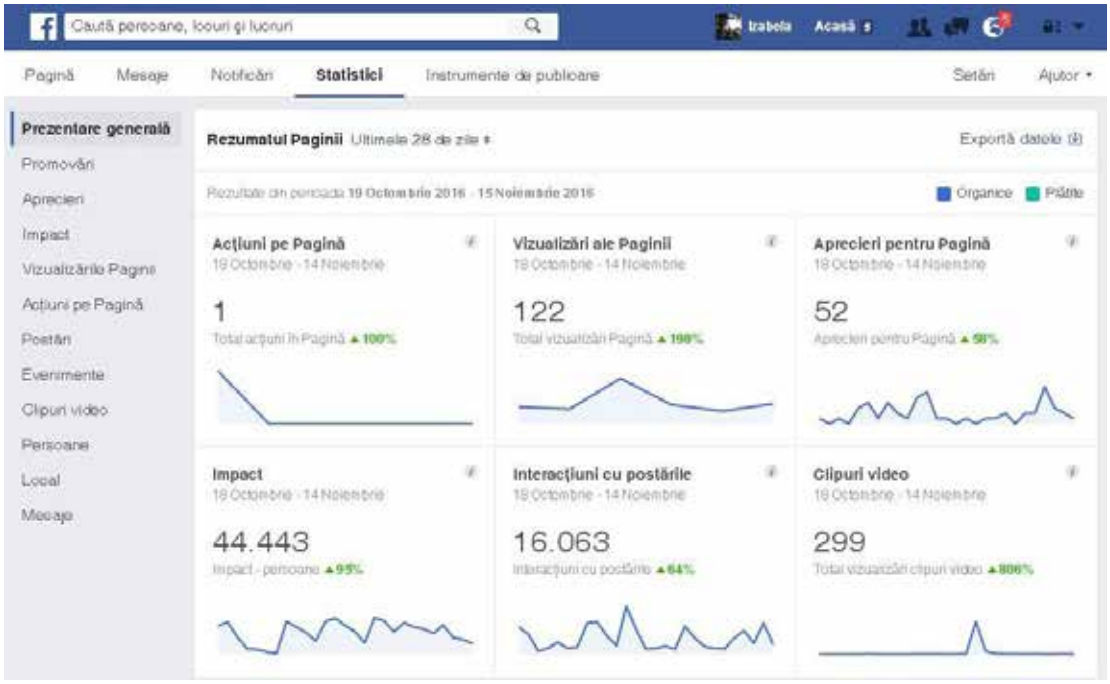

Figure 3. *Extract from the statistics on the museum's presence of Facebook*

The year 2012 brought further improvements in the web-based activities of the museum, owing to the fact that the museum managed to transfer its database from the blog to the www.muzartbm.ro website, thereby allowing access of potential audience to virtual visits to the museum at *http://www.muzartbm.ro/tur-virtual/,* where the museum offers everybody, anytime and anywhere the possibility of a free virtual visualization of its permanent exhibition.

Also, the museum publishes each month on its website the image and an argumentative essay on an artwork, under the project "The work of the Month", initiated in December 2011. Until November 2016, a total of 60 paintings and sculptures were posted on the website, representing the top of the fine art collection of the museum.

Occasionally, the museum posts on its blog or on its website the digitized images of artworks from the various temporary exhibitions organized in or outside the museum. Thus, from the launch of its blog and until November 2016, the museum has published a number of 252 articles, 6 pages and 1,542 digitized image, totaling 1.8 GB, which recorded, by November 6, 2016, a total of 189 725 visualizations.

Regarding the other communication channels, the greatest impact was achieved by the museum through the Facebook platform. The official website of the museum was visited by over 8,000 people and the material posted by the museums were accessed in just one month (18 October-14 November 2016) by 44 443 visitors (Fig. 3).

On Twitter, the museum has a number of 293 subscribers, a significant proportion of who are represented by other cultural organizations and media.

Museum's Youtube channel[31] is totaling 6083 views and 12 subscribers, given that, from its launch (July 2011) and up until now the museum uploaded 31 videos on Youtube. We believe it is worth mentioning that 21 of the videos were made by the museum staff, under the promotional program "B*aia Mare Art Center. European Benchmarks between Traditions and Innovations*". The implementation and promotion of this program is, until now, one of the main objectives undertaken and achieved by the young and very active staff of the Department of Programs, Marketing and Museum Cultural Products Promotion – a new and innovative function of our museum, established in 2008.

In summary, we believe that, during its ten years of independent operation (2006-2016), the County Art Museum "Baia Mare Art Center" has endeavored to adopt various measures to enhance public access to its collections, exhibitions and information, for

31 https://www.youtube.com/user/MuzeulDeArtaBM

educational and promotion purposes, put at the disposal of the public in electronic format through a variety of virtual environment channels, fully free of charge.

However, further improvement of these distribution and public communication tools is recommendable. In the medium and long term, the museum may consider the possibility of selling online its promotional products, including the creation of a publicly accessible database containing digitized artworks from the museum's heritage. Thereafter, the museum should start transferring its database to a national database, along with dissemination thereof at a transnational scale, subject, of course, to compliance with the intellectual property rights and related rights of the legal administrator - County Museum "Baia Mare Art Center."

Conclusions

We may say that, across the Romanian museum sector, there is a wide range of attitudes and opinions as to the use of modern technological solutions and the need for museum upgrading. Some museums choose to disregard the use of new technologies almost completely (nearly half of the museums listed in the database of museums and public collections in Romania, managed by CIMEC, do not even have an e-mail address), while other museums use almost exclusively the information dissemination technology, while ignoring modern technologies, design to provide and enhance interaction of the museum with its visitors.

At the opposite end, we see museums (usually, national museums) that are nearing completion of their heritage digitizing processes and are on the verge of making it accessible to the audience, while developing practices designed to adapt the exhibition content in such a way as to improve the visitation experience in line with the most advanced international standards.

The reasons that have led to the adoption of the measures described above are related not only to the financial, but also to the socio-cultural sustainability of the museum. From the economic point of view, implementation by the museum of a technological innovation strategy requires substantial investments, i.e. higher costs, but it also yields higher revenues for the museum, thanks to an increased number of visitors. In terms of the socio-cultural dimension, the impact is 100% positive, given the fact that the making available of scientific information in an attractive and interesting way to the public at large will help them understand it much easier. In addition, the use of new technologies is likely to contribute in the future to stimulating the desire and interest of the community members to get involved in the activities of the museum. Last but not least, modern technological solutions are particularly useful for the conservation, management and research of museum cultural heritage. Besides, as technological innovation is also used for communicating educational content in use-friendly manner, the innovation strategy can contribute even to the improvement of the environmental sustainability of the museum, there where exhibits include materials / content focusing on natural environment protection.

Of course, before all these positive effects can occur, museums should first of all solve the problems related to their heritage digitizing. If the main reason for the reluctance of museums to employing ultramodern technologies in organizing their exhibition is and will remain for quite some time the high investment costs such technologies are involving, the development of digital databases is an affordable and feasible objective even under the current conditions, even if for now its achievement is hindered, especially in the case of small and medium museums, by the shortage of skilled professionals with competencies in this field and, not to a lesser extent, by the huge volume of museum objects still awaiting to enter the primary documentary processing stage and then the digitization process as such.

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