What are the Economic Aspects of Digitization in Museums?

-- A Case Study of the Economic Benefits of Digital Museums

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Abstract

With the development of the times, more and more regions are trying to establish digital museums. Digital museums, integrating computer, electronic information and simulation technology, have opened up a new way of visual experience for people. This article will describe the development and application of museum digitization. In addition, it will then evaluate the advantages and disadvantages of this innovation.

Keywords

Digital Museum; AR Experience Technology; 3D Printing; Digital Application Products.

1. Introduction

Since the end of the 20th century, information technology and network technology have been used to support the development of museums (Schweibenz, 1998). Museums have the important mission of collecting, researching, displaying, educating and inheriting history and cultures (Newsom & Silver, 1978). More specifically, the significance of contemporary museums lies in the collection and placement and exhibition of works of art, and importantly in the interests of digital museums which are built at great cost. This article will describe the development and application of museum digitization and assess its economic contributions and deficiencies.

2. Literature Review

Museum digitization refers to a museum that uses virtual reality technology, three-dimensional graphic and image technology, computer network technology, and special visual effect technology to present the existing physical museums in a three-dimensional way on the network (Parry, 2013). The traditional working mode of digital museums is mainly manpower, but this mode will be gradually replaced by computers, such as the museum's digital archive management, digital display and exhibition, digital publicity. Large, monotonous and repetitive tasks will be done more quickly and efficiently with the help of computers (Marty, 2008).

Throughout the world, the beginning of the widespread use of digital technology in the cultural industry can be traced back to the 1990s (Patel, et al., 2005). In 1990, the Library of Congress opened the digital library era in the United States successfully. The "Memory of the World" project initiated by UNESCO in 1992 brought digital technology into the protection of global cultural heritage. In 1995, a number of European and American museums, including the United States Museum and the Louvre in France, began to carry out digital storage projects, making the application of digital technology more extensive (Usaka, Yura, Fujimori, Mori, & Sakamuram, 1998). Today, there are three common applications of digital museums, which are AR experience technology, 3D printing and digital application products.

3. Cases Study

AR experience technology, also known as augmented reality technology, uses computers and other technologies to simulate the physical information that is difficult to experience in a certain time and space of the real world (Nayyar, Mahapatra, & Suseendran, 2018). In addition, AR experience technology could superimpose and apply virtual information in the real world, which is perceived by human senses. In this way, people could achieve sensory experience beyond reality. The combination of AR technology and museums has a broad prospect. AR technology has been exploringly applied to virtual explanation, "restoration" of exhibits, "resurrection" of exhibition objects and interaction with them, display of temporarily not exhibited collections, creation of AR games in museums, navigation in AR museums and other aspects of the business (Han, Jung, & Gibson, 2013). The San Francisco Museum of Modern Art is the first museum dedicated to modern art on the West Coast of the United States (Woodman, Keller, Blessing, & Bryan-Wilson, 2011). Moreover, the San Francisco Museum of Modern Art will present works by Lenny Magritte. Lenny Magritte was Belgium's greatest surrealist painter of the 20th century, creating fantastic and imaginative paintings that evoke our imagination in riddles (Woodman, Keller, Blessing, & Bryan-Wilson, 2011). The AR exhibition aims to deepen people's understanding of Magritte's works and to help people feel the Magritte's artistic spirit. At the same time, the exhibitors are also expected to immerse themselves in the scene naturally.

The rapid development of prototyping technology, 3D printing effectively solves the problem of the touring exhibition of precious or fragile artworks (Valeonti, Hudson-Smith, Terras, & Zarkali, 2018). The Peabody Essex Museum (PEM), on a tour of the country, used 3D printing to reproduce Thomas Hart Benton's art, a clay model, to allow viewers to touch it for a different experience (Lewis & Jacobson, 2002). Jacobson (2003) mentions that for male visitors, weapons, especially ancient wartime knives and guns, were coveted objects that could be touched. In 2015, game developer Niels Andersson used 3D printing to recreate a sword from Europe's Great Migrations at the National Museum of Art in Norway. Visitors could touch the sword for themselves, rather than just see the real thing preserved in a glass counter.

Digital application products often exist in the form of mobile phone apps (Rizvic, Pletinckx, & Okanovi, 2015). Schweibenz (1998) mentions that the Metropolitan Museum of Art in New York, the American Museum of Natural History, the Louvre in France, the British Museum and other world-famous museums have launched practical apps after entering the Internet era. The effective operation of these apps has narrowed the distance between museums and ordinary visitors, and people can communicate with museum staff in a more relaxing way. These apps also can regularly update articles and HD pictures to introduce various collections (Rizvic, Pletinckx, & Okanovi, 2015). Jang and Lien (2014) state that these advantages make the museum a good platform to communicate with the audience, and also provide new ideas for the audience to appreciate collections and understand the stories behind the collections. For example, in 2019, the National Science Museum in Japan was closed due to the COVID-19 outbreak, but the official website took high-resolution photos of the museum and displayed them for free on mobile apps and official websites (https://www.kahaku.go.jp/#). The application of this technology compensates for the fact that visitors cannot reach the site in time due to the interference of time, distance or other external factors (Chatzidimitris, Kavakli, Economou, & Gavalas, 2013).

4. Evaluation

Museum digitization applications are very common and diversified. They bring people different perceptions and experiences, but there are still some problems. The following part will discuss the economic contribution and limitation of museum digitization technology.

First of all, the use of digital applications in museums can attract a large number of visitors and generate revenue for museums. At present, with the continuous deepening of the digital construction of museums, the influence and popularity of museums are increasingly recognized by society. Rizvic, Pletinckx and Okanovi (2015) illustrate that a large number of tourists come with a curious mindset. Even if they have to pay, visitors are willing to experience the new electronic products brought by the museum, because these technologies can enrich their knowledge and have fun in the museum. In this way, museums can also get rich economic benefits from it (Lepouras & Vassilakis, 2004). Besides, under the promotion and adjustment of the market, museums have also improved the quality and service level of digital products, which will attract more visitors and promote museums' influence, thus creating huge profits for museums.

Secondly, the push and promotion of the museum's digital application products can stimulate consumers' shopping desire. Lv (2011) states that the digital application products of museums should constantly explore the connotation of the collections. Furthermore, these products need to be combined with cultural creativity and tourism to constantly develop museum souvenirs. In this way, tourists can not only buy the products they like but also meet their spiritual and cultural needs. More importantly, it can also form a new model of museum creative industry research and development (Shaw & MacLeod, 2000). With science and technology as the guide, museums have a more stable source of funding.

Thirdly, the use of the digital application of museums can save the museum's labor costs. Museums introduce modern digital technology into the collection, storage, research, display, dissemination and other work of the museum. The purpose of this introduction is to improve the efficiency and level of the work of museums (Schweibenz, 2004). For visitors, museums' digital applications allow them to explore virtual museums at will for in-depth immersive experiences and more convenient access to electronic information about various collections, which can alleviate the task of museum guides (Parry, 2013). Through this series of operations, the unnecessary labor costs and expenses of the museum are gradually reduced.

However, some digital applications of museums also have homogenization. Lindqvist (2012) states that there are"queue views" and "deserted corners" in museums. It is not difficult to find that many people have little interest in staying in similar exhibition areas after experiencing similar products, similar displays and similar environments. As a result, the museum has invested heavily in the construction of museums. It turns out to have low utilization efficiency and few tourists, which cannot generate a stable capital chain to make profits for the museum (Stylianou-Lambert, Boukas, & Christodoulou-Yerali, 2014).

5. Conclusion

To sum up, the common applications of museum digitization are AR experience technology, 3D printing and digital application products. Through the development of digitization, museums allow visitors to use various senses to experience works and relics in museums and understand the history and culture behind them. In addition, the digital construction of the museum can attract a large number of visitors to bring revenue to the museum. Secondly, the promotion of digital products in museums can stimulate consumers' desire to buy. Finally, the digital application of the museum can save the labor cost of the museum. Although museum digitization still has some drawbacks, in the future, when technicians improve the problems in the digitization system and give innovations, the economic aspects of digitization in museums will be improved (Kosmopoulos & Styliaras, 2018).

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