

Original Paper

Literature Review on the Digital Museum in a Chinese Context

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Abstract

Parry (2007) claims that “it would be an exaggeration to suggest that the computer has been the cause of the recent ‘reimagining’, ‘rethinking’, ‘reshaping’ and ‘reframing’ of the museum” (p. 140). Technological innovation creates new possibilities for the development of the museum, and the digital museum as one of its products plays a key role in the preservation and communication of cultural heritage. However, research on the digital museum is lacking in China. Therefore, this article is an attempt to determine the extent to which factors influence the construction of digital museums. In order to answer the research question, a systematic review has been utilized in order to comb the available literature in the Chinese context. As a result, 1829 articles have been retrieved and 205 articles have been accessed, and finally, 41 studies have been selected and reviewed. The results indicate that the development of the digital museum is influenced by technology, human resources, and funding. Then, suggestions and implications are put forward for further research.

Keywords

digital museum, human resources, technology and funding

1. Introduction and Problem Statement

1.1 Introduction

In the twenty-first century, technology has already brought about great breakthroughs in our society, which is self-evident in that technology is ubiquitous (Maleuvre, 1999; Chang, 2012). Museums have been transformed by their social context and the proliferation of information technology. The history of automation of museums might have begun in 1963 in Washington, D. C. (Cui, 2015). Since then, technology has changed the way museums interact and communicate with others. For example, in 2001, the Palace Museum’s website was open to the public, indicating Chinese museums’ first step into the

digital era (Zhao, 2013). By the end of May 2016, the Baidu Encyclopedia Digital Museum Project had 1,609 museum websites, including 56 3D panoramic digital museums (Note 1). Nowadays, as Bearman and Geber (2008) state, a museum without a collections database and a web presence is hardly considered professional. Therefore, the museum finally might achieve the goal of being wall-less, which corresponds with André Malraux's famous idea regarding the *imaginary museum without walls* presented in 1947. In China, confronted with this new situation, the state has formulated a series of policies to support museums to embrace technology, such as the State's 11th Five-Year (2006-2010) Plan regarding Cultural Relics Undertakings; the State's 11th Five-Year Plan of Cultural Development; the State's 11th Five-Year (2011-2015) Plan regarding Cultural Relics Undertakings; the Ministry of Culture on 12th Five-Year Plan for the Development of Culture and Technology and Science; Outline of Museums Medium and Long-Term Development Plan (2011-2020). Therefore, museums in China have devoted themselves to the facilitation of the digitalization of the museum. However, in the current literature, research concerning the extent to which factors influence the concept of the digital museum is lacking.

1.2 Problem Statement

In Chinese-language literature, research on the relationship between new technology and museums mainly emphasize the following aspects: First, an emphasis on the application of new technology for museums (Zhang et al., 2003; He et al., 2008; Lu, 2012). Second, an emphasis on communications channels for digital museums (Jin, 2010; Chang, 2010; Ren, 2015). Third, a discussion on the educational function museums would have in a virtual environment (Guan, 2006; Liu, 2009). However, little research has been conducted to explore the extent to which factors influence the development of the digital museum.

Therefore, the research question of "which factors affect the development of the digital museum in China?" has been proposed. More specifically, the objective of this study is twofold: (1) how is the digital museum conceptualized in previous studies in the Chinese context? (2) Which factors affect the development of the digital museum in China? There are two main research purposes to this study: one aims to provide theoretical insight for the better understanding of the digital museum; the other is to provide some managerial implications for museum practitioners.

2. Method

In order to answer the research question, a systematic review has been undertaken in order to gather data concerning which factors influence the development of digital museums. Petticrew and Roberts (2006) define that "systematic reviews are literature reviews that adhere closely to a set of scientific methods that explicitly aim to limit systematic error (bias), mainly by attempting to identify, appraise and synthesize all relevant studies (of whatever design) in order to answer a particular question (or set

of questions)” (p. 9). It can scientifically and comprehensively analyze the related resources and display the corresponding fair results. In the systematic review, all of the studies related to the topic have been identified, appraised and synthesized, aiming to guarantee that the research results are more credible and valid (Petticrew & Roberts, 2006). This study has selected the literature based on Petticrew and Robert’s (2006) pre-defined procedure which is presented as follows: 1) Formulate the research question of an appropriate scope; 2) Study and screen the related resources on the basis of the inclusion or exclusion criteria; 3) Describe the study characteristics, sample appraisal, and synthesis.

2.1 Search Procedures

This research has been conducted in a Chinese context, so therefore we have selected the Chinese database as the retrieval object. We searched through the available literature by utilizing the databases of the China National Knowledge Infrastructure (CNKI), which is one of the most authoritative and largest databases in China). The search was conducted using a combination of the following three sets of key words: 1) Digital media, digital technology, digital exhibition, digital environment, virtual reality; 2) Museum computerization, online museum, digital museum, virtual museum, physical museum; 3) Museum management, museum audience, museum talents, museum funding.

2.2 Inclusion Criteria and Selection Results

Studies that met the following inclusion criteria were selected: (1) the study focused on the concept of the digital museum in a Chinese context; (2) the study focused on management, audiences and the public, and the media and technology related to the development of digital museums in China; (3) the published articles were written in Chinese; (4) the scope of the literature (peer-reviewed journal articles were considered); (5) the journal articles had been published between 2000 and the beginning of 2017. The database search retrieved 1829 articles. First, the list of titles was scanned and 1442 articles were excluded. Then, the abstract of the 387 remaining articles were evaluated and the full texts of 205 of them were retrieved and analyzed in order to make a final selection. Based on the application of those five previously mentioned inclusion criteria, 41 articles were ultimately selected and shown to fulfil the inclusion criteria, and as such were included in this database (see Figure 1). Of the total number of studies included, there were 38 related studies and 3 theoretical studies. Moreover, the articles were excluded if they solely focused on information communication technology and computing science, such as the case if, for example, the study was conducted in order to research the application of a new technology in museums from a computing perspective. The same topic and duplicate studies were not mentioned.

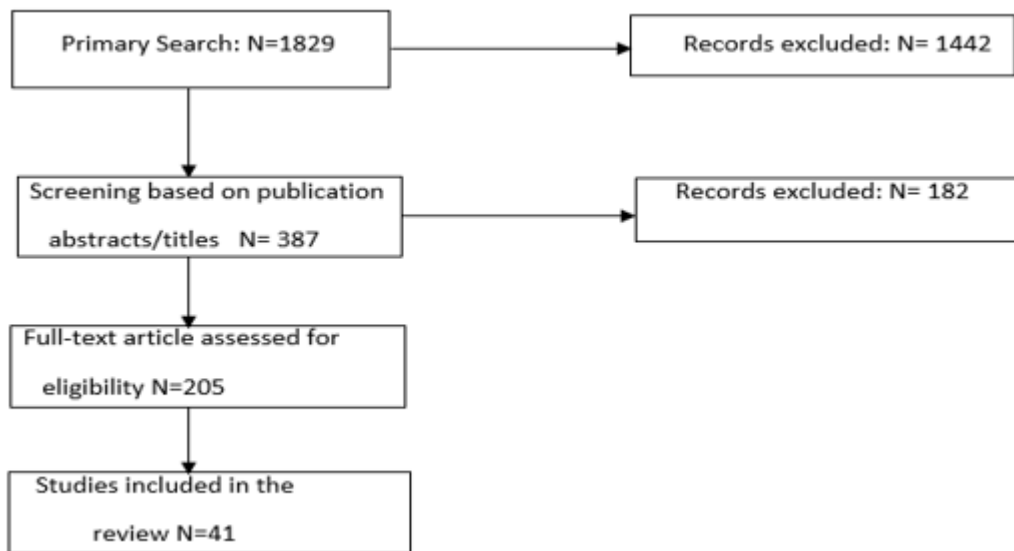


Figure 1. Flow Chart of the Selection Process

2.3 Analysis of Selected Studies

According to the system theory, an organization can be considered an open or closed system and may be affected by internal or external environments (Von, 1986). An open system consists of three significant elements; the first is inputs, which means the resources the organization receives such as equipment, natural and material resources, their staff, etc.; then, the inputs are transformed, which are called throughputs, and then the products and services are yielded, which is called the output (Rice, 2013). Drawing on the system theory, museum management is defined in this study by a distinct ongoing process of allocating inputs (human, economic and material resources) by typical managerial functions (planning, organizing, directing and control) so as to achieve the stated objective (Liu, 2009). Therefore, the development of digital museums is mainly influenced by human, economic, and material resources. Based on the above statement, each study was summarized into a classification scheme and included three central aspects: (1) how the digital museum is defined; (2) how human resources affects its development; (3) how material resources affects its development.

3. Results

3.1 The Digital Museum Defined in the Literature

Remarkably, amongst the 41 articles reviewed, the digital museum was defined in 32 of them. Six of the articles mentioned digital museum without providing a further explanation of what is meant by the concept. A considerable account of different terms was adopted in 32 of the reviewed studies in order to represent “the digital museum” in different stages. These terms included: electronic museum, the

digitalized museum, online museum, museum website, online museum, and the virtual museum. Although these terms might overlap and are used in most contexts, each conception has evolved accompanying the innovation of new technology. Meanwhile it indicates that there is no uniform definition of the digital museum in China, and the concept of the museum on the construction of digitalization is in a mess. The development of the digitalization of the museum experienced three different conditions from “museum digitalization”, “the digitalized museum” to “the digital museum”. Next, three main terms have been discussed; then, the definition of the digital museum is adopted.

First, the term “museum digitalization” had begun to circulate in the 1970s due to the application of computers in the field of museums and continues to be widely used today. Based on the content analysis of the definition of museum digitalization, in brief, it is a dynamic process including digitalizing every aspect of the museum (Zhu, 2010; Peng, 2011; Liang, 2013). Scholars have indicated museum digitalization includes three main components: (1) it refers to the utilization of digital technology (such as computer technology, Database Technology (DBT), multimedia technology, network technology, communication mechanisms and automatic control technology); (2) to digitize the museum entity, which is a dynamic process that contains the establishment of websites, digital management of collections, virtual displays, building automation, network construction, etc. (Li, 2008; Gao, 2013; Ran & Li, 2016); (3) Its purpose is to effectively achieve a sharing, utilization, and management of information resources in museums (Zhao, 2012). This analysis also implies that a digitalized museum is one of the results of museum digitalization.

Second, the term “the digitalized museum” was traced back to the 1990s, with its associated integration of museums and the internet. Zhen (1999) first defined the digitalized museum as “the digital museum is a museum that the functions of collection, research, entertainment, display, and education is presented to the public in a digital way” (p. 14). According to the content analysis of the concept of the digitalized museum, it is understood in two different ways. 1) the digitalized museum refers to an important application of modern information technology centered on computers at cultural institutions, which aims to combine internal information collection management with external information queries (Zhen, 1999; Chen, 2000; Tian & Zhu, 2009; Zhao, 2013), and its development has resulted in a radical revolution in museum management. The digitalized museum is divided into four different aspects (Chen, 2000): 1) a local area network of collection data management. Workers utilized the LAN to register, classify and manage the collection; 2) Touchscreens and computer facilities are used to retrieve information. These facilities serve the visitor, and the visitor may use them to obtain further information regarding cultural relics and cultural knowledge; 3) The museum website provides the latest information for the audience no matter where you are and who you are; 4) The computer is used to manage routine work. 5) the digitized museum refers to an application of digital technology to store and process the information of collection, exhibition, the management of museums, and depends on

LAN and the Internet to communicate with others (Zhang & Ning, 2000; Zheng et al., 2004; Li & Pan, 2005; Yang, 2006). In essence, it is a comprehensive information service system combining computer technology with communication technology, similar to the concept of the digital museum (Gu, 2006; Chen, 2007). It provides a comprehensive, efficient and convenient service for their audience or other users of the network. It is a new development trend for traditional museums, although traditional museums cannot be replaced by it. They complement each other and provide services to meet the different requirements of the audience. Its essential characteristics include digital storage, network transmission, resource sharing, and management computerization (Li, 2008; Li, 2016). It aims to realize the resource sharing. The two different understandings both emphasize the application this new technology has to the field museums. The first understanding considers that the digitalized museum utilizes modern computer technology in order to transform the traditional museum by aiming to realize the digitalization of its collection and management. The second understanding stresses that the digitalized museum has completed digital processing and is also the result of museum digitalization. Third, the term “the digital museum” first emerged in the twenty-first century, in addition to the Palace Museum’s website which was opened to the public in 2001, marking Chinese museums’ first entry into the digital era. It is a new thing accompanying the digital library and one part of the digitalized museum (Cui, 2015; Zhou & Yang, 2016). Its three basic characteristics are the digitization of cultural relics and specimens, a network for information dissemination and liberalization of data retrieval (Lu, 2012; Liang, 2013). According to an understanding of the digitalized museum, it refers to an information service system and database, which takes information on cultural relics as kernel content and uses modern information technology (including computer technology, virtual reality technology, multimedia technology, internet and database, etc.) to gather, arrange and manage the information on the cultural relics in order to provide the public with the rich cultural resources through the internet. Although these terms have differences, they do possess some dimensions of overlap. Moreover, the three terms “represent the development of the digitalization of the museum in the different conditions, and their relationship is shown in Figure 2. Museum digitalization refers to digitalizing the traditional museum and the process for finally realizing the concept of digital museum and is the foundation for constructing it. The digitalized museum is a concrete and existing museum which has already achieved the museum digitalization and is a prerequisite for the existence of a digital museum. Therefore, in this study, we agree that the digital museum, in essence, is an information system and database and includes the online museum, virtual museum, web museum, and internet museum.



Figure 2. The Relationship of the Three Terms

3.2 The Factors Affecting the Development of the Digital Museum in China

31 out of 41 of the studies mentions the extent to which factors influence the development of the digital museums. Based on the analysis of the reviewed studies, three main factors have been identified affect the development of digital museums, i.e., human resources, technology and funding.

3.2.1 Technology

Thirteen articles mention that technology is the decisive factor concerning the construction of the digital museum, in a total of 31 studies. Technology, such as internet technology, virtual technology, and digital technology, provides the possibility for museums to endow a new life to cultural relics and enlarges channels of communication for the museum (Jin, 2013). Concerning the influence of technology on the digital museum, two aspects mainly are emphasized: data standardization and intellectual property rights.

With respect to data standardization, it is mentioned among eleven different articles, which influences the dissemination and sharing of culture resources in museums. Data standardization is the basic work of establishing a digital museum and is the prerequisite for accomplishing interconnection and interworking, resource sharing, safe business collaboration, and reliability. Data standardization is the basic issue in terms of the construction of the information system, such as the resource classification standard, data exchange standard, application service standard, and so on. Data standardization could aid the digital museum “actively created and constructed-in-practice” (Harbers, 2005, p. 268). However, the fact is that there is a lack of a uniform data standard concerning the construction of digital museums in China, means this concept in the country still has a long way to go to build and improve.

In terms of intellectual property rights, eleven of the reviewed studies involved the issue of intellectual property rights. Intellectual property rights are an important part of museums’ assets, and their protection and utilization are also a significant part of the management of museums. Huang (2018) states that it mainly contains “copyright, trade and mark right, patent right, realm name right and the right of the name” (p. 14). Digital museums spreads their information through the internet, and as a result, almost anyone is able to access the digital resources the museum provides, causing a potential

information security hazard. Therefore, more attention should be paid to defending the security of intellectual property rights.

3.2.2 Human Resources

Ten of the articles demonstrated that professional talents are an important factor for developing digital museums. A lack of inter-disciplinary talents and a brain drain are two key issues digital museums face. As the digital museum is a newborn thing, its development and growth cannot work without the guidance of new ideas. Moreover, the construction of the digital museum has been a growing requirement for inter-disciplinary talent who possess a rich knowledge on management and business, as well as the late-model professional who masters modern information technology and has a better understanding of museum work.

3.2.3 Funding

Nine of the articles state that it is expensive to introduce new technology and buy new equipment to create digital museums. In China, state-owned museums are public welfare cultural institutions and are not-for-profit. Their financial allocation from the government is the main source of their money. However, this allocation cannot satisfy the requirements of the development of museums. Seven of the articles mentions that the imbalance of this resource allocation results in an unbalanced development of digital museums. As China is a huge country, and the development level of museums is different across the different regions. For instance, in the more developed areas, such as Shanghai and Beijing, more resources can be obtained to facilitate the museum's development; however, in the more developing regions, such as Anhui and Gansu, fewer resources are allocated to the development of digital museums.

4. Discussion and Conclusion

To conclude, two problems have been tackled in this study: 1) the concept of the digital museum has been identified; 2) the factors affecting the development of the digital museum are illustrated in China. In essence, the digital museum is an information system and database and includes an online museum and uses the internet to disseminate its digital resources. The concept and connotation of the digital museum has experienced four stages: representation which emphasizes the protection of digital collections and online displays; reconstruction which recovers the disappeared and evolved cultural heritage; replacement which utilizes information technology to restore historical appearances; and recollection, which integrates the collection through the internet. The development of the digital museum has been influenced by these factors: technology, data standardization, intellectual property rights, information management, human resources, funds, and allocation of resources.

According to the results, managerial implications are proposed for policymakers and museum managers. First, findings can be considered when policymakers make plans for facilitating the

development of a digital museum. For example, measures should be taken to standardize the data and protect intellectual property rights. Plans should be taken to manage the human and material capital to ensure and facilitate the development of the digital museum. Second, museum managers should have a better understanding of digital museums and make plans to introduce comprehensive talents and new technology. Moreover, in order to obtain more funding to support the development of digital museums, marketing should be employed to make further profits, creative products should be developed, and the cooperation between museums and the tourism sector should be enhanced.

5. Limitations and Future Research

There are several limitations. Firstly, this study is an analysis of secondary sources and lacks first-hand data. Second, the results cannot be generalized for museums due to the limited sample size. In the future, semi-structured interviews concerning which factors influence the digitalization of museums will be conducted in order to gather first-hand source to deeply probe into this topic.

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Note

Note 1. <https://baike.baidu.com/museum/>