The Current Status, Problems and Integration of the Protection and Inheritance of China's World Cultural Heritage in the Context of Digitalization

Mengtian Cao[1], Sichao Zhang[2], Jie Zhao[3] and Yi Hong[4]

[1] a School of Tourism management, South China Normal University, Panyu district, No.378 Waihuan West Road, Guangzhou, 510006, Guangdong, P. R. China, caomt@m.scnu.edu.cn(Cao. M).

Abstract. In the process of the development of human society, there have always been the problems of the protection and inheritance of world cultural heritage, which are the common problems faced by all countries in the world, especially the developing countries. Due to the vulnerability of cultural heritage, with the continuous increasing number and variety of world cultural heritage, how to effectively manage and apply the related technologies to achieve the sustainable development of the protection and inheritance of cultural heritage has become the key point. Firstly, by analysing the development processes of the type and system protection of China's cultural heritage, this paper focuses on revealing the current management status and problems of cultural heritage protection. Meanwhile, it explores the application of the integrated strategies and digital technology of the world's regional network of cultural heritage protection, putting forward some sustainable suggestions.

1. Introduction

Being mostly on the verge of disappearing, world cultural heritage(WCH) has been preserved for a long time, and the living environment has been vulnerable. It is not only damaged by natural disasters, such as volcanoes and earthquakes, but also destroyed by slow natural erosions, such as sunlight exposure, water and wind erosions, the growth of animals, plants and microorganisms, etc. With the rapid development of industry and tourism under the influence of human activities, air pollution and excessive development have become the potential safety hazards of cultural heritage(CH), especially in the developing countries. For example, air pollution has led to the discoloration of Taj Mahal, whereas the excessive tourism development has resulted in the damage to the buildings of Angkor Wat, and Hollywood has also left some damage traces when shooting films in Angkor Wat. In China, the annual visitors to Mogao Grottoes in Dunhuang have had a great impact on the life of the grottoes, and the grottoes have become even worse due to the impact of industrialization, modernization and urbanization[1]. Government-led large-scale project immigration has led to the loss of people's traditional homes and distinctive culture, resulting in the fail in the continuous inheritance of considerable CHs.

Since "Convention Concerning the Protection of the World Cultural and Natural Heritage" adopted by United Nations Educational, Scientific and Cultural Organization)(UNESCO) in 1972 and World Heritage Committee established in 1976, all contracting states have been required to attach great importance to the heritage protection, and CH here is mainly material and cultural heritage (MCH). Thus, the world heritage protection can be more widely and intensively communicated worldwide. In 1987, "The Operational Guidelines for the Implementation of the World Heritage Convention" was

promulgated, defining the purpose, significance and consistent direction of the work of the world heritage protection. In 2003, UNESCO divided CH into MCH and Intangible cultural heritage, so as to expand the range of CH to the spiritual and cultural fields. Besides, UNESCO also issued "The Digital Heritage as a Common Heritage", hoping to protect CH by launching digital preservation projects. At present, world heritage is divided into several categories, namely cultural heritage, natural heritage(NH), cultural and natural dual heritage, cultural landscape heritage and intangible cultural heritage(IH).

With the expansion of the concept and the change of living conditions of CH, the challenges of the protection are increasing. The key research directions of the world heritage protection have been constantly reconstructed as well. Specifically, the protection vision has changed from "European centre" to "global equilibrium"; the extension of the heritage has transformed from "historic monument" to "cultural significance"; the technical guideline has tended to move from "unitary universality" to "multivariate concreteness"[2]. The traditional protection methods include the government's enactment of laws and regulations, the establishment of protection programs and the strengthening of publicity and education. Since the 1990s, information technology has been widely used, and "American Memory", "World Memory" and other projects have been carried out, so the digitization of cultural relics, the digitization of ancient books and the digitalization of archives have become the focus of the research on CH protection. Some disappearing cultures can live on through digital technology, which provides technical support for CH protection. For instance, the digital Dunhuang project has reduced the damage to murals and sculptures caused by tourists visiting the physical caves. Some CHs that have disappeared can be restored by digital technology, such as the digital virtual reconstruction of the Old Summer Palace. "Digitalization" transforms, reproduces and restores CH to a shareable and reproducible digital form, which is interpreted from new perspectives, preserved in new ways and utilized with new demands[3]. At the same time, through the establishment of the structured, modular and standardized CH information database, and through the release on websites, micro-blog, WeChat and other communication platforms, the breadth and efficiency of the information dissemination of CH have been improved, and the difficulty for the public to obtain the relevant information has been reduced as well. However, because of too much emphasis on digitization, the problem of ignoring cultural connotations has been prominent. Therefore, how to combine digital technology with comprehensive management has become a key issue for WCH protection. This paper attempts to find out the sustainable development strategies of the integrated protection from the perspective of the current status and problems of the development of China's WCH.

2. Development of world cultural heritage in China

2.1. Types and Development of world heritage in China

China acceded to "Convention Concerning the Protection of the World Cultural and Natural Heritage" on December 12, 1985. In December 1987, four WCHs, namely Peking Man Site at Zhoukoudian (famous for the relatively complete unearthed Peking man fossils in the 1920s), Mogao Grottoes in Dunhuang (the largest and best preserved Buddhist art treasury in the world, known as "the oriental art pearl"), the Great Wall (the greatest architectural project in the history of human civilization) and Mausoleum of the First Qin Emperor (the first largest imperial tomb in Chinese history),were successfully declared to UNESCO by China for the first time. As of July 2017, there were 1,073 world heritages in total in the world, including 814 CHs, 224 NHs and 36 natural and cultural dual heritages (covering 167 countries) as well as 399 WIHs. As can be seen from Figure 1, there were 12 NHs, 36 MCHs and 4 dual heritages (DHs) in China, and 40 IHs were divided into 32 human IH representative directories and 8 IH directories that need urgent protection.

China is one of the countries with the most complete categories of world heritage and the largest number of DH in the world. From Figure 2, it can be seen that China's world material and cultural heritages are mainly located in the eastern and central regions, gradually decreasing from east to west;

MCHs are primarily distributed in Beijing, Hebei, Henan, Shanxi and other provinces, gradually increasing from south to north; there are more world NHs, which are mostly located in the mid-western and southern regions; DHs are the fewest and are mainly distributed in the eastern region.
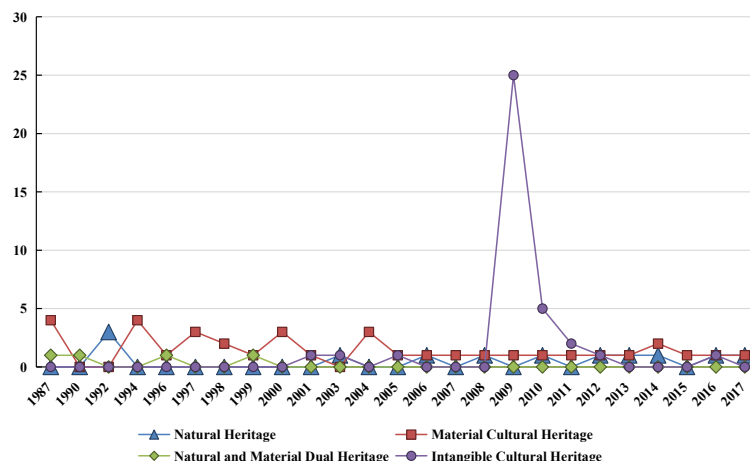

Figure1. Historical annual development of world cultural heritage in China (by the end of 2017)

Figure 2. Distribution of world heritage in China

2.2. Main cultural heritage protection regulations and related planning in China
The Chinese government has played a leading role in the protection of CH. From Table 1, it is indicated that in 1961, "Provisional Regulations on the Protection and Management of Cultural Relics" was promulgated to guide the protection of CH, and "Outline of the Protection Laws of Cultural Relics" was formulated. Subsequently, China acceded to the international conventions and formulated the protection laws of cultural relics, and CH protection extended from cultural relics and historic sites to the relationship with the surrounding environment and the overall protection of historical blocks. Meanwhile, based on geographical and humanistic characteristics, China adopted the effective protection strategies according to local conditions, emphasizing the use of words, sound recordings, videos, digital multimedia and other methods to conduct the real, systematic and comprehensive records of IH, so as to establish archives and databases. Moreover, China formulated the relevant laws of the protection of world IH, and the protection objects were expanded to ancient villages, industrial heritages, cultural routes and other new types. Besides, in the relevant planning, China put forward using the information monitoring and network communication technology to enhance the monitoring, early warning and security prevention capabilities of CH protection and establish "the dynamic

monitoring platform for the information of CH protection", so as to inherit and carry forward the excellent traditional culture of the Chinese nation, promote the construction of socialist spiritual civilization and strengthen the protection and preservation of IH.

Table 1. The main rules and planning of China's cultural heritage protection

Year	Name	Content
1961	Provisional regulations on the protection and management of cultural relics	To guide the protection of cultural heritage and establish an outline for the protection of cultural relic.
1972	Convention Concerning the Protection of the World Cultural and Natural Heritage	Define the guiding concept of "common heritage of mankind" and further expand the content of protection.
1982	Cultural Relics Protection Law	The protection of cultural heritage extends from cultural relics and monuments to the relationship with the surrounding environment and the overall protection of historical blocks.
2005	Protection regulations for famous historical and cultural cities	According to the geographical and cultural characteristics, according to local conditions for effective protection strategy.
2005	Opinions on strengthening the protection of China's intangible cultural heritage	The intangible cultural heritage should be recorded in a real, systematic and comprehensive way by various means, such as writing, recording, video recording and digital multimedia, so as to establish archives and databases.
2006	Provisional measures for the protection and management of national intangible cultural heritage	The protection object will be extended to ancient villages, industrial heritage, cultural routes and other new types.
2006	The 11th five-year plan for the development of information technology for cultural relics	Using the information monitoring and network communication technology to enhance the monitoring, early warning and security prevention capabilities of cultural heritage protection and establish "the dynamic monitoring platform for the information of cultural heritage protection".
2011	Law of the People's Republic of China on intangible cultural heritage	Inherit and carry forward the excellent traditional culture of the Chinese nation, promote the construction of socialist spiritual civilization and strengthen the protection and preservation of intangible cultural heritage.

3. Problems in the protection of Chinese cultural heritage

3.1. The geographical boundary of the belonging area is unknown
In recent years, IH protection in various regions has been put on the agenda, but there has been the strong utilitarian. The belongingness of CH is not clear, and the regional boundaries are chaotic, so that several provinces, cities or regions have competed for a certain IH. For example, the Story of the Cowherd and the Weaving Maid, the Legend of Butterfly Love and other IHs have all been contended. Moreover, scholars have mostly put together the clues of IH from the written documents and the official historical records, rarely using the detailed interviews to understand the historical and cultural significance of IH from the local people's perspectives, so as to easily lead to the misinterpretation of the locality of IH. In addition, in the design of the digital classification system, scholars have mostly had more preconceived opinions on the classification of IH, rarely considering the inheritors' and the owners' understanding of the locality of the category belongingness of IH, and after the media communication, it is very likely to mislead the local people's perception of IH.

3.2. Unclear property rights and disorderly management
Firstly, the ownership and management rights of China's CH are not divided, so as to affect the interest distribution among the subjects of property rights; secondly, there is no clear power boundary among management subjects. China's CH protection management institutions are divided into three categories, which are administrative management institutions, public management institutions and enterprise management institutions. Among them, public management institutions play the leading role, which means the management rights of CH belong to the State Administration of Cultural Heritage. However, in the specific operations, the local governments and the related units are involved, resulting in the chaotic management and the difficulty in evaluating the comprehensive value of CH, including social value, cultural value, historical value and economic value. Hence, it is difficult to calculate the costs of CH, and the protection risks are increased.

3.3. Lack of unified planning, imperfect laws and regulations
The value of CH has been recognized by more and more people, and the consciousness of the comprehensive protection of CH has become stronger, while the protection types are diverse. However, the excessive development of CH resources has led to the high loss of CH. The conflicts between economic construction development and CH protection have been a longstanding problem, and there are still blind spots in the protection of CH at the legal and institutional levels. When the local residents and the tourists destroy CH, there is no corresponding legal system for clear management and definition. At the same time, the government lacks the relevant supporting funds to support CH protection. Furthermore, due to the lack of the scientific analytic demonstration and the overall planning scheme, in order to increase the tourism income of the heritage sites, many protection departments have newly built, disorderly built and expanded many places of food, accommodation, entertainment and shopping that are inconsistent with the heritage environment, which has violated the authenticity principle of "Convention Concerning the Protection of the World Cultural and Natural Heritage" and lowered the tourism quality of tourists[4-6]

3.4. Excessive use of technology is evident
Digital protection and inheritance provide a new way for the protection and inheritance of CH, gradually becoming a development trend of the cultural protection and the cultural industry. The advantages of digital CH protection not only make it possible to carry out the cross-region multi-space-time cultural transmission and communication but also promote the cultural, educational and economic development of the region where CH is located[7]. At the same time, with the phenomenon of "valuing technology and neglecting culture", digital protection is also faced with the problems of ignoring the local characteristics of CH, the difficulty in demonstrating the role of cultural radiation and transmission, valuing forms and neglecting connotations, etc.[8].At present, most of

China's heritage site administrators are lack of understanding what problems digitalization can solve for heritage protection and how digitalization can help the local CH protection. They usually follow the trend to carry out the digital work and excessively pursue and rely on new technologies and new methods, pinning their hopes on digital devices that are constantly being upgraded, so that the manpower, material resources and financial resources invested in the digital work become a constructive waste. For example, the lack of discussion on appropriate technologies and methods has led to the complete copy of numerous records, and the three-dimensional laser scanning of cultural relic buildings has preserved massive data information, but there is no subsequent research and utilization, resulting in substantial data accumulation[9]. Relevant personnel are not very efficient in testing the digital results and using the results, and the auxiliary research or management system mostly stays at the database level and is not easy to be analysed and used.

4. Integration and digital of cultural heritage in China

4.1. Establish a legal mechanism for the risk protection of cultural heritage
In the safeguard mechanism for protection laws and regulations of CH, the risk protection system should be established according to local conditions. The risk protection of CH can be designed from two perspectives, namely pre-protection and post-protection. The so-called pre-protection refers to the system designed by the law before the specific infringement of CH, whereas the so-called post-protection means the accountability system designed in the legislation for the infringers who have already destroyed CH.

4.2. Participatory digital protection
Through database construction, digital application and big data analysis, digital technology has provided the strong technical support for WCH protection. In view of the problem of "valuing technology and neglecting culture" in digital protection, it is necessary to advocate the concept of "participatory digital protection" and give the inheritors and owners of CH the right to participate in digital protection. When they are involved, it will be possible for digital protection to accomplish the historical mission of the protection and inheritance of intangible heritage and gradually integrate into the daily life of the people. Therefore, digital protection should pay more attention to the exploration and innovation of the excellent spiritual connotations of IH at the cultural level, the in-depth exploration of the socio-economic value and cultural significance of CH and the improvement at the technical level. Meanwhile, there is a need to use the information monitoring and network communication technology to enhance the monitoring, early warning and security prevention capabilities of CH protection and establish "the dynamic monitoring platform for the information of CH protection", which mainly implements the dynamic monitoring of natural environment data, natural disaster data, man-made damage data and protection management information of CH. Moreover, it is necessary to establish the dynamic information management and crisis warning mechanism for CH, so as to provide the accurate and scientific decision-making basis for the administrative units of cultural relics at all levels to strengthen the comprehensive protection and effective management of CH and provide the spatial information technology guarantee for promoting the comprehensive development of CH and the utilization of resources.

5. Conclusions and Discussions
WCH protection is the common protection of multi-stakeholder groups, including the governments, enterprises, community residents and tourists. At the government level, it is necessary to comply with various protection laws and regulations to implement cultural protection policies as well as shape local characteristics to promote local development; at the enterprise level, CH is the original resource for obtaining profits, and the enterprises should carry out the "imaginary processing" project of the heritage, provide the basic service facilities and consider the maintenance and preservation of heritage landscapes; at the resident level, cultural protection is the basic element for the survival and

development of ethnic groups, and the residents should use practical actions to carry forward the local traditional culture and protect the heritage; at the tourist level, their tourism choices will affect the decision-making subjects of CH protection and development planning, and the gradually lost traditional cultural landscapes and the damaged heritage sites will not become their tourist destinations, which indirectly protects CH.

The spatial distribution of China's WCH is uneven, and it is necessary to scientifically formulate the protection plans for world heritage sites to improve the supervision capacities of CH protection, increase the capital investments in heritage protection and strengthen the publicity, education, training and study of heritage protection. Furthermore, there is a need to establish a wide-ranging united front of CH protection involving different forms, scales and connotations, fully arouse the enthusiasm of all sectors of the society and various departments and especially strengthen the role of non-governmental cooperation organizations. For instance, Beijing CH Protection Centre (CHP), China CH Foundation, etc. have played a key role in awakening people's awareness and responsibility for CH protection, cooperating with the government to mobilize the civilian power to repair and protect Chinese culture and historical sites and promoting the social development and economic construction.

In the information age, the combination of digital technology and comprehensive management can promote the harmonious symbiosis between heritage protection and heritage tourism in the study, protection, management, display and a series of links of CH. Firstly, the dynamic information database of WCH management should be established to provide the recording archives of the dynamic information system and the early warning system of WCH as well as the system-supported data foundation, and the construction mode of the distributed database should be adopted to gradually form the unified dynamic information database of WCH management. Meanwhile, the real-time database technology should be used to deal with the constantly updated data, and the WCH network monitoring system should be established. Moreover, it is necessary to establish the network architecture including monitoring data centres and CH site monitoring stations at all levels, which covers all WCH monitoring systems in China, and there is a need to establish the early warning system of WCH. In addition, based on the WCH network monitoring system, the unified early warning indicator systems and rules and regulations should be adopted, and the corresponding early warning indicators should be set according to the conditions of different CH sites, so as to comprehensively provide the decision-making information services for the national macro-management, provide the scientific research information services for the researchers and provide the tourism and education information services for the masses.

Reference
[1] Li R. (2011) Current State, Problems and Countermeasures of the World Heritage Protection in China, Heritage Protection.38-44.
[2] Tang Y. (2015) Inspiration of International Transformation and Reconstruction of Cultural Heritage Protection, Conservation and Renewal of History.47-55.
[3] Wang Y. (2009) National cultural heritage digitization. Beijing: People's Publishing House press, Beijing.
[4] Shan C. (2016) Comparative Study on the Feature of the World Cultural Heritages in Beijing and Rome, Beijing University of Civil Engineering And Architecture, Beijing.
[5] Ruan Y, Xiao J. (2000) Seeking a "win-win" way of heritage protection and tourism development, Urban Planning. 86-89.

[6] Wang D. (2013) Chinese Cultural Heritage Protection And Development Of Dialectical Thinking. Sichuan Normal University.

[7] Zhao F, Ye Y, Wang C. (2017) The practical significance and current situation of digitalized protection of Chu Culture Heritage. Art Education Research (20). 28-29.

[8] Song J, Wang M. (2015) An Analysis of the Current Situation and Problems of the Digital Protection of Chinese Intangible Cultural Heritage. Cultural Heritage Journal (06). 1-9+157.

[9] He Y, Ma Y. (2016) Research on "Digital Legacy" Theory and Innovation Practice, Chinese cultural heritage (2).