



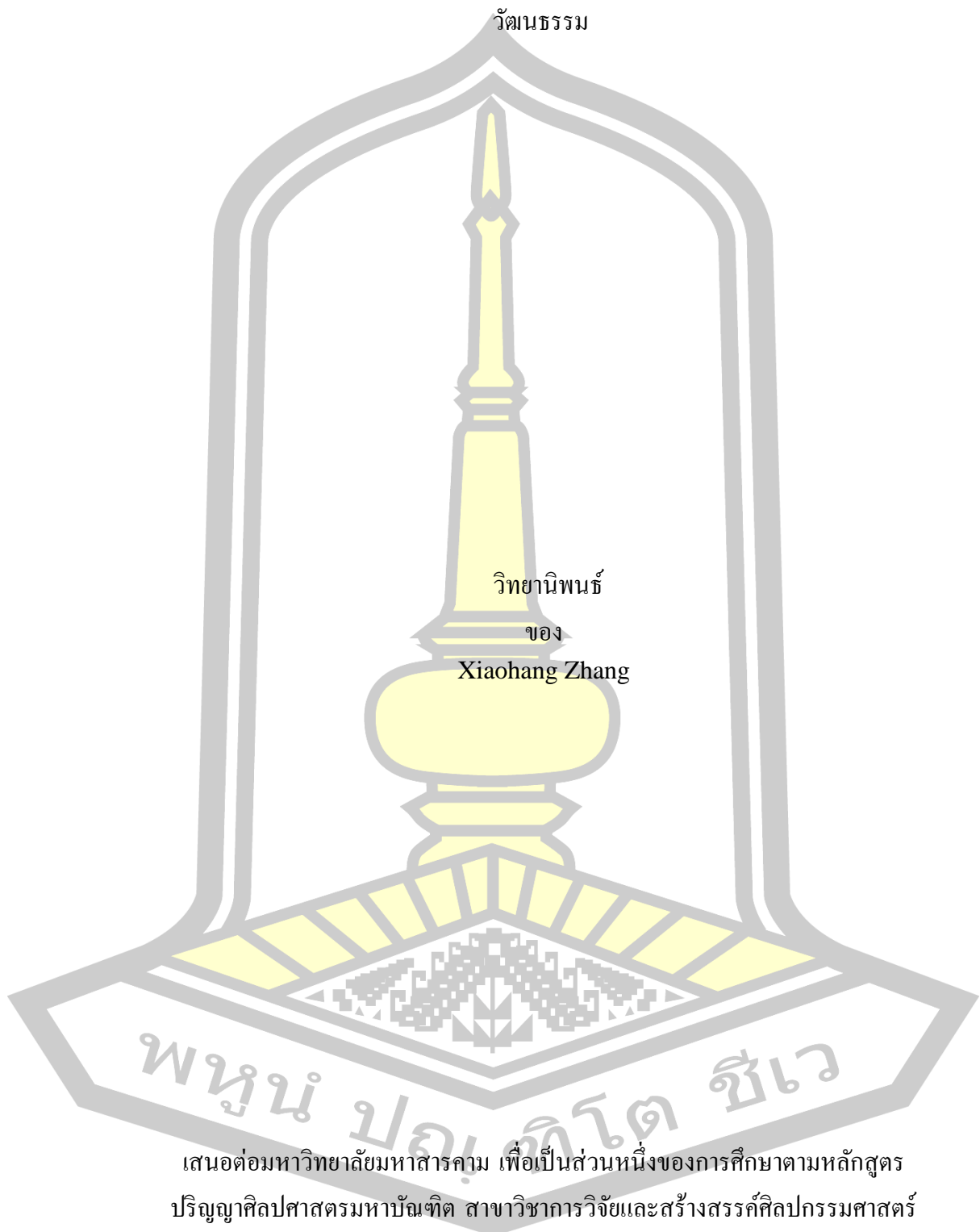
Study on Virtual Expression of Exhibition in Luoyang Digital Exhibition Hall Of
Catering Culture

Xiaohang Zhang

A Thesis Submitted in Partial Fulfillment of Requirements for
degree of Master of Arts in Fine and Applied Arts Research and Creation
December 2023

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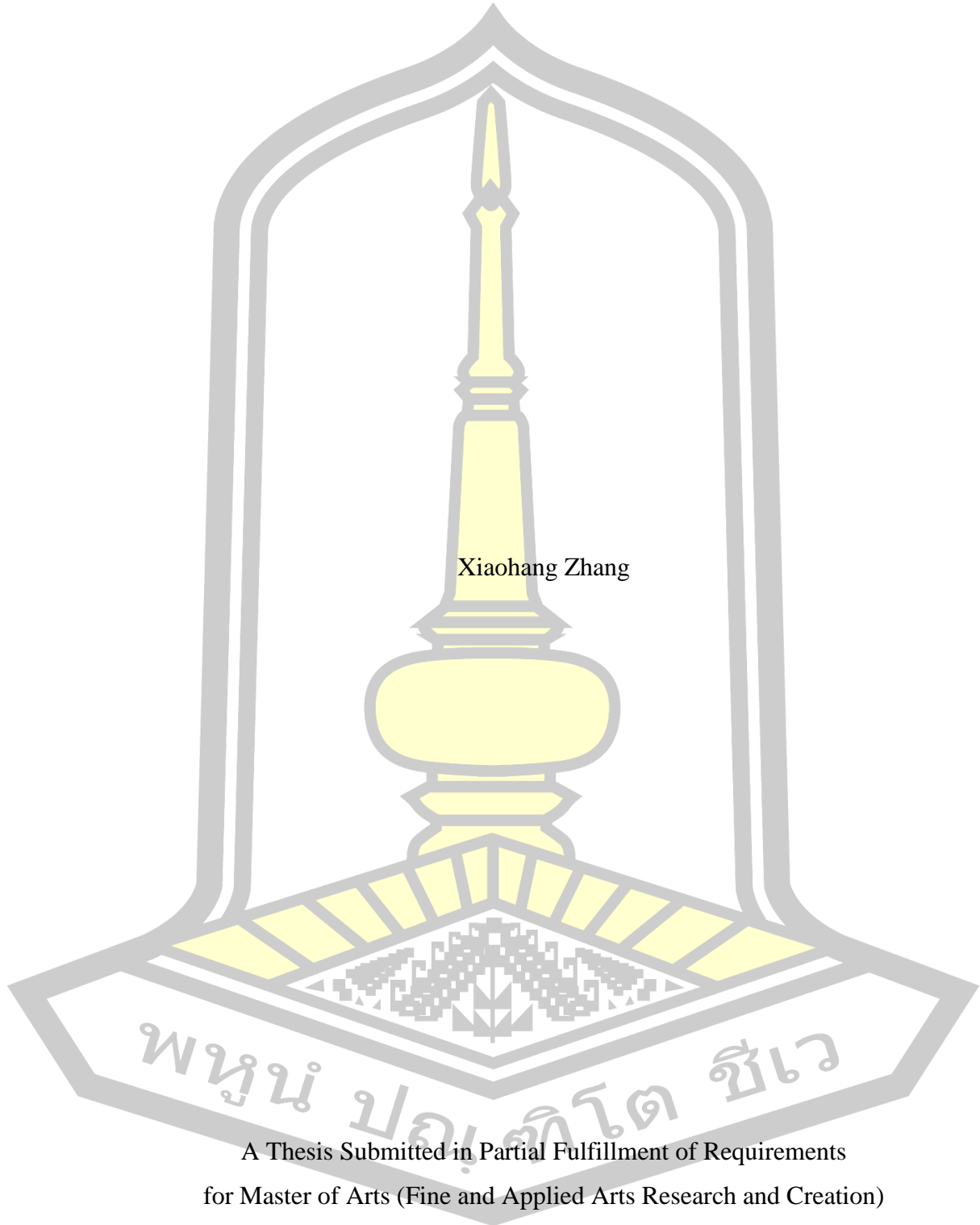
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Study on Virtual Expression of Exhibition in Luoyang Digital Exhibition Hall Of
Catering Culture



Xiaohang Zhang

A Thesis Submitted in Partial Fulfillment of Requirements
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December 2023

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ABSTRACT

The study is a qualitative study that uses concepts from Luoyang food culture and virtual display methods. There are 3 research objectives here: 1) Study the composition and development status of Luoyang's food culture. 2) Study and analyze the current situation, display methods and effects of Luoyang food culture display. 3) Analyze the application status of digital exhibition hall and the design strategy of exhibition expression in Luoyang food culture digital exhibition.

The study found that the changes in Luoyang's food culture are closely related to the historical changes in Luoyang City. According to Luoyang's unique regional conditions and climatic conditions, the basic Luoyang diet composition was formed, and after the renewal of historical dynasties, the preferences, policies and economic development of the rulers at that time made Luoyang food culture further innovate and improve its quality. After the founding of New China, due to the construction of the "First Five-Year Plan" period, a large number of foreigners who supported the construction of Luoyang were poured into Luoyang City, which made Luoyang food once again greatly enriched and updated in modern history.

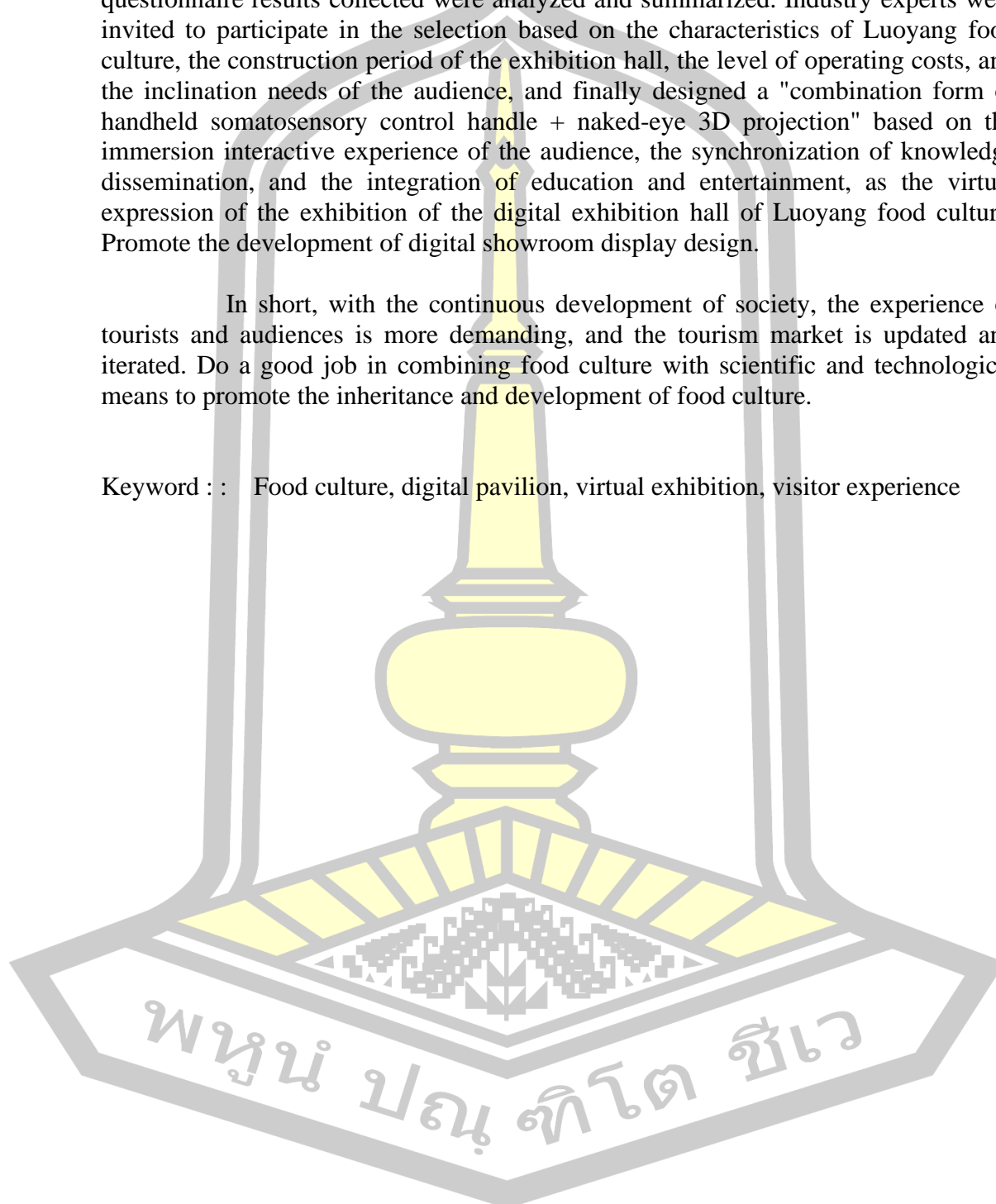
With the development of the tourism market, Luoyang's rich history and culture have been unveiled one after another. Cultural tourism in the ancient capital of Luoyang has pushed into a boom. The development of the tourism market will inevitably lead to the discovery of the catering market, and the development of the catering market will drive the change of food culture. In the study, the share of Luoyang tourism market and the current situation of Luoyang catering industry are analyzed, so that Luoyang catering industry practitioners can update and improve with the help of research results to meet the catering needs of tourists in the new era. At the same time, food culture and cultural tourism are closely related and develop in synergy with each other.

The development and progress of science and technology have incubated the high-tech multimedia digital museum. By studying the development status of the digital exhibition hall, using the questionnaire survey method and analytic hierarchy method, a survey based on the collection of basic information of tourists, the

experience of tourists in the current exhibition mode, and the tendency of tourists to virtual exhibition method was designed and distributed, and the results of the exhibition method questions expected by tourists were collected, and the questionnaire results collected were analyzed and summarized. Industry experts were invited to participate in the selection based on the characteristics of Luoyang food culture, the construction period of the exhibition hall, the level of operating costs, and the inclination needs of the audience, and finally designed a "combination form of handheld somatosensory control handle + naked-eye 3D projection" based on the immersion interactive experience of the audience, the synchronization of knowledge dissemination, and the integration of education and entertainment, as the virtual expression of the exhibition of the digital exhibition hall of Luoyang food culture. Promote the development of digital showroom display design.

In short, with the continuous development of society, the experience of tourists and audiences is more demanding, and the tourism market is updated and iterated. Do a good job in combining food culture with scientific and technological means to promote the inheritance and development of food culture.

Keyword : : Food culture, digital pavilion, virtual exhibition, visitor experience



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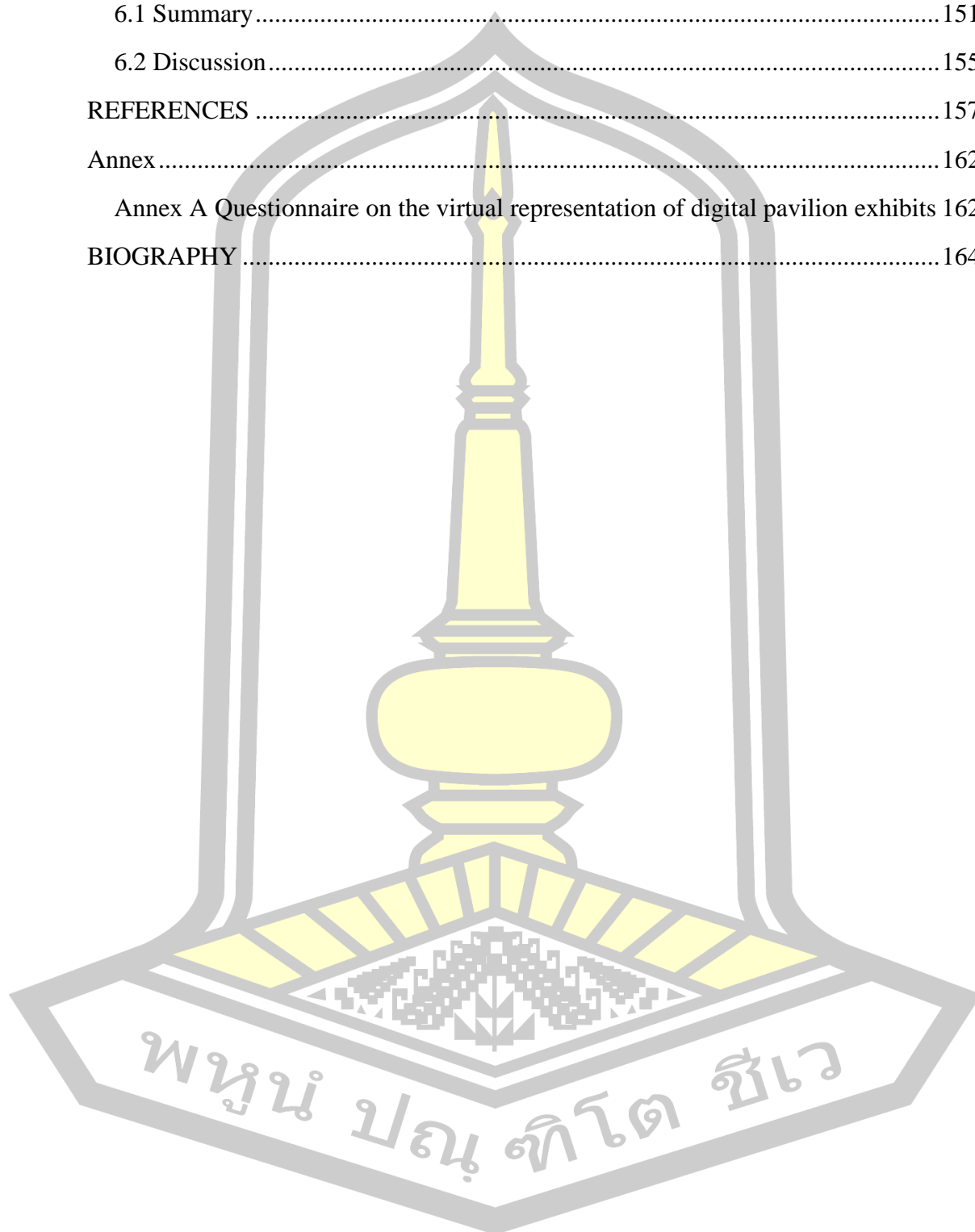
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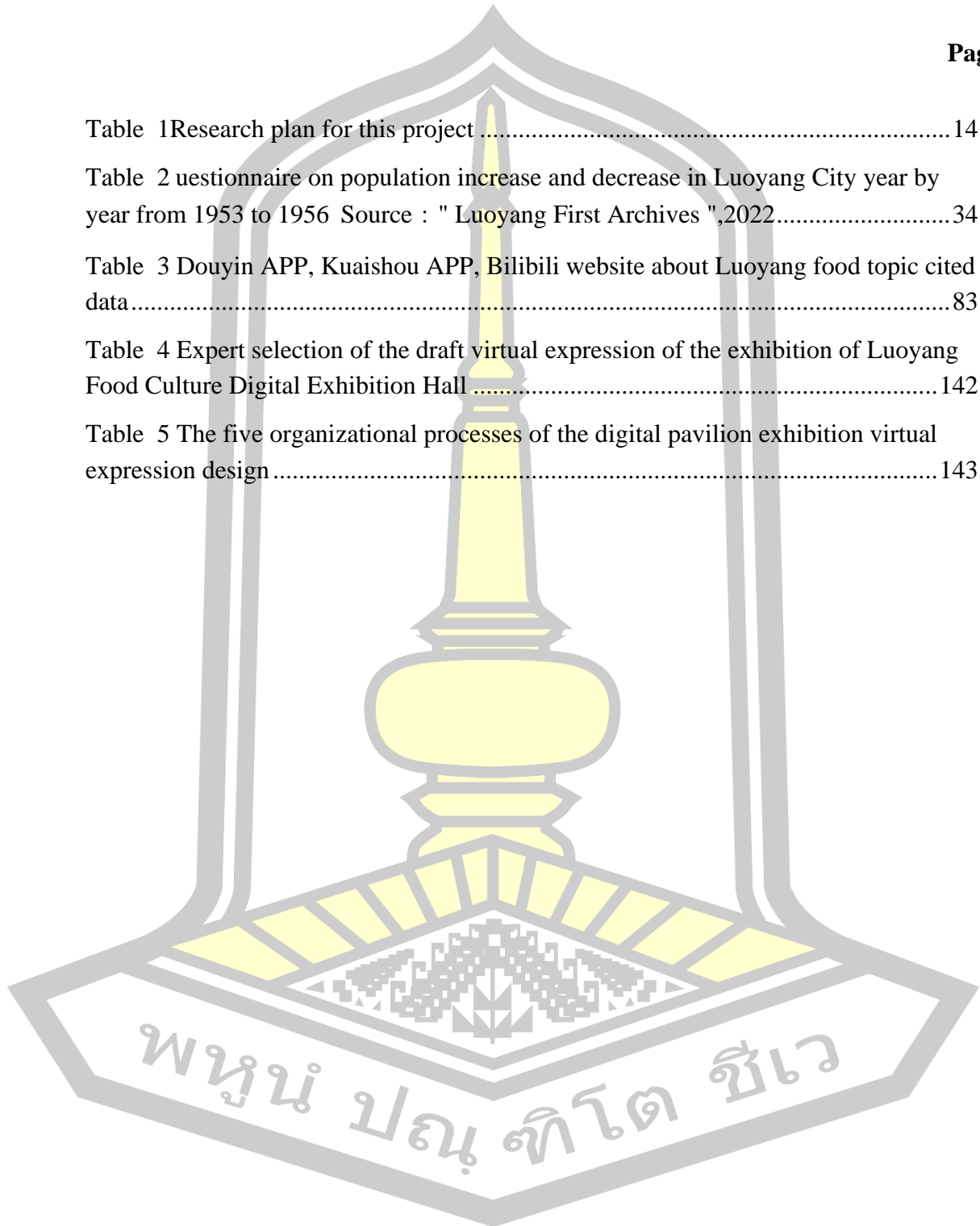
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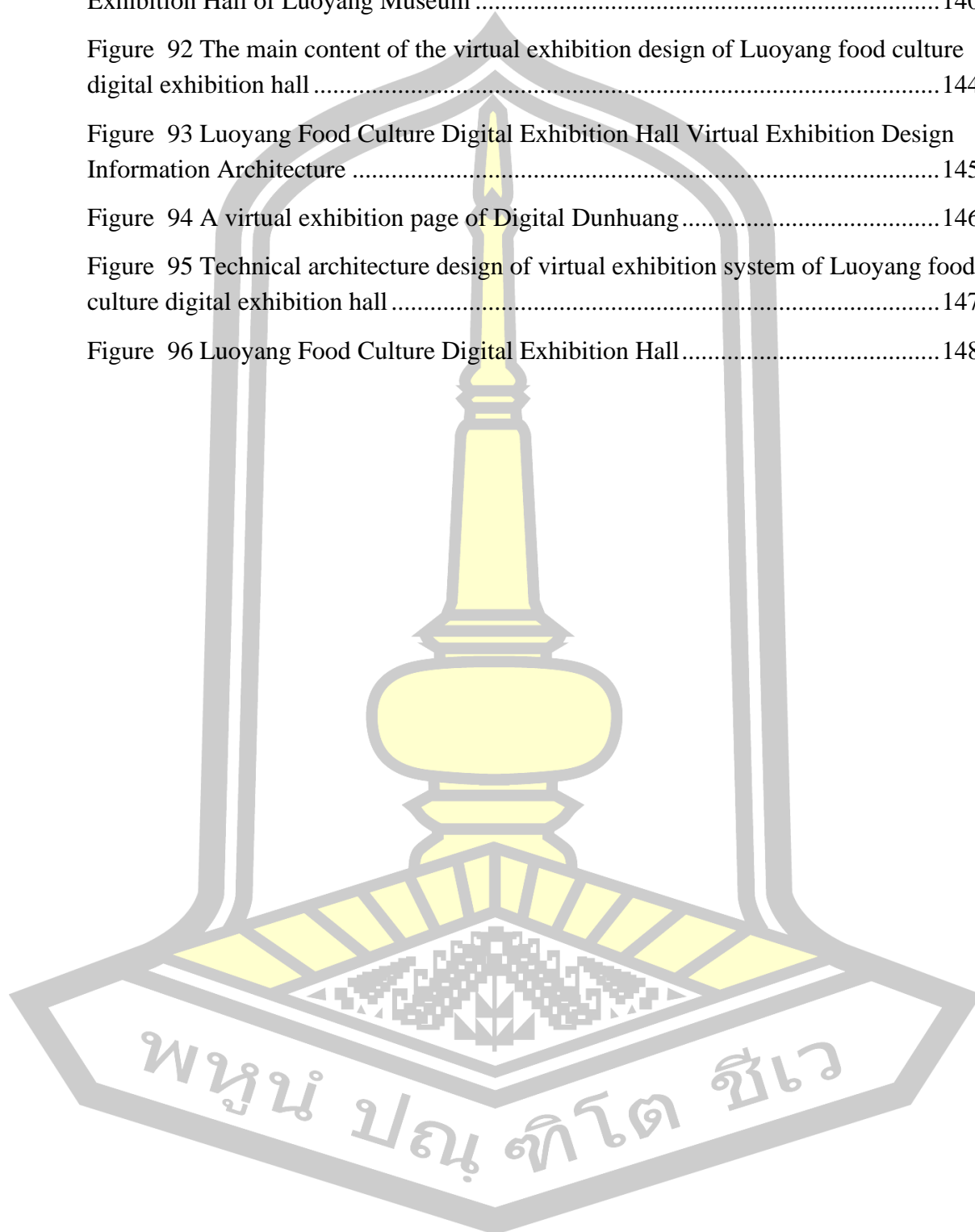
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Chapter I

Introduction

1.1 Background of Research

The Chinese nation has a glorious history of nearly 5,000 years, which has created a brilliant Chinese culture, and the brilliant Chinese culture has closely maintained the extension and development of the Chinese nation. Food culture is a very complex collection of phenomena of human production, life and activities, which are related to almost all other areas of human culture to varying degrees. It is no exaggeration to say that the culture of any country and a nation is to some extent and in a sense subordinate to their respective food culture. Dr. Sun Yat-sen, the forerunner of the modern revolution, once said in his book "The Strategy for the Founding of the People's Republic": "After the evolution of China's modern civilization, everything has fallen behind people, but the progress of food and drink is still beyond the reach of all countries." In fact, China's food culture also refers to the food lifestyle of Chinese people. For Chinese, "eating" is not only a simple meal to quench thirst and hunger, but also often contains the thoughts and philosophies of Chinese people when they know and understand things. Chinese this culture of "eating" has gone beyond the matter of "eating" itself, and it has been given a richer and deeper social meaning. (Hu Mengnan, 2014: 2)

As an important part of social life, food culture also continues to develop with social changes, and varies with local lifestyles and customs. In the long process of social life development, each place has gradually formed a food culture with the characteristics of each local region.

Luoyang is one of the eight ancient capitals of China, which has experienced 5,000 years of civilization history, 4,000 years of city building history, and 1,500 years of capital building history, and 105 emperors have successively settled in Kyushu, which is the birthplace of Heluo culture and Chinese culture. (Baidu Encyclopedia Luoyang, 2022: Online) Luoyang has a long history in China, once the political, economic and cultural center of China, as well as a transportation hub with easy access to roads. In the early Western Zhou Dynasty, the first large highway network was established in China, and Luoyang was its center, and the road was as straight as a target, and it could not reach far away; On the Sui-Tang Grand Canal, the Jia and Tang Dynasties are connected, and the sails and shadows are linked, from Luoyang to the sea in the east, Guanlong in the west, Suzhou and Hangzhou in the south, and Youyan in the north. (Wisdom Encyclopedia Luoyang History, 2022: Online)

The origin of Luoyang's food culture can be traced back to before the Xia Dynasty, which can be found in the Yangshao culture and Erlitou culture around Luoyang. From the Xia Dynasty to the Eastern Zhou Dynasty, cooking utensils were greatly improved, and the state began to pay attention to cooking institutions. During the Eastern Han Dynasty, the Silk Road was opened, and cooking methods were improved on the basis of introduction and blending. During the Wei and Jin dynasties, the great integration of ethnic groups brought about the integration of Luoyang food culture, and new famous foods and dishes appeared. After Emperor Wei Xiaowen

moved the capital to Luoyang, he vigorously promoted the Sinicization reform, and Luoyang's food culture was gradually influenced by "Hu food", and local residents began to eat beef and mutton while eating more pork. During this period, Buddhist temples prospered, and the prosperity of vegetarian food in Buddhist temples added new content to Luoyang's food culture, and vegetarian meat was the prototype of Luoyang water mats. (Ma Huanhuan, 2016:1-2)

The policy guidance and promotion of the rulers and the eating habits of the upper echelons became the direct factors that promoted the spread of dietary fashion. Vigorously promote the reform of sinicization, and the consumption of beef and mutton is widespread. Before that, the Han people ate pork. The increase in the variety of meat has greatly helped people to improve their diet and innovate their dishes. From the Northern Wei Dynasty to the Tang Dynasty, there were many temples in the Luoyang area. In order to gain the support of the upper class, monks and nuns devoted themselves to the study of fasting in order to please the dignitaries. They choose common folk vegetables as the main ingredient and use more soups. The soup with seasonings such as "pepper" formed a later small bowl of soup, which was not turned over. The nobles who were tired of eating the delicacies of the mountains and the sea tasted these fasting meals and praised them, and these dishes were brought into the court by the princes and nobles, and were constantly improved in the court. Later, it was brought to the farmhouse table by some wealthy people, which was the prototype of Luoyang water mat. The development and inheritance of any kind of diet is not always smooth sailing. The Central Plains was a place where soldiers of all generations had to fight, and the operation of Luoyang water mats also flourished and declined with the war. After the founding of the People's Republic of China, the government attached great importance to the inheritance of local culinary traditions and culture, and organized Cui Xueli, Fan Chunfang and other water mat chefs and Luoyang celebrity chef Zhou You and others to restore the supply of Luoyang water mats at Luoyang "Really Different" restaurant. Constantly developed dishes, innovated dishes and banquet procedures, and discovered and restored court water seats and Wuhuang water seats. It is precisely because of the strong support of the government that the development of traditional food culture can be guaranteed. This is also an important historical and political reason for the formation of Luoyang food culture.

Luoyang is located in the belly of the Central Plains and has a reputation among the world. The good geographical location makes the Luoyang area rich in products, so the soup in the Luoyang area is rich in ingredients. Take tofu soup as an example, tofu soup pays attention to a variety of colors, in addition to white tofu and fried tofu, colorful colors need to be decorated with vegetables. People choose to add fresh vegetables, usually shredded and stewed with the main ingredient tofu. The choice of vegetables varies according to the seasons, and you can always find the right one throughout the year. Luoyang water mat has the characteristics of vegetarian meat and a wide selection of materials. For example, the main ingredient of the famous peony swallow dish is shredded radish, while Luoyang sea cucumber is made of Ruzhou vermicelli. It is worth mentioning that Luoyang is located in the Central Plains and has a high wheat yield, which makes it a perfect match when drinking soup - flapjacks. Or shred the cake, or break the cake into large pieces and put it in the soup, so that an ordinary bowl of soup can become a staple food to meet people's food and

clothing needs. The dry and cold climate has made people choose sour and spicy flavors and soups, which are easy to resist the cold, to supplement the body's needs. Drought has always been the most important natural disaster in Luoyang, and there is a saying of "nine droughts in ten years". Although the Yi River, Luo River, Yi River and Jian River together with the Yellow River nourish the land of Heluo, due to the impact of population density and economic development, drought in western Yu region, especially Luoyang area, is very harmful. Therefore, in modern history, the Luoyang area has been affected by drought, grain production is low, people are suffering from hunger, often do not have enough to eat, can only drink thin soup to fill their stomachs. The syrup noodles and confused noodles that are prevalent in the Luoyang area today have been greatly developed during this period. These natural factors are intertwined and play a decisive role in people's dietary choices: product resources determine the type of ingredients, and climatic factors such as temperature and precipitation affect the taste of food, so natural factors often affect the initial production of diet. (Shang Yue, 2015:1-2)

In addition to the conditions suitable for its own growth and the needs of society for the flourishing of things, it must also have advantages over other things. The development of Luoyang soup culture is inseparable from its own characteristics. First, Luoyang's soup has the characteristics of being economical, delicious and not expensive. The soup uses noodles, radish, cabbage, tofu, which are local vegetables with high production and low price, and the production cost is low, and ordinary people can enjoy it, and the audience is wide, and naturally there are more followers. Second, even the soup water is easy to digest and absorb, which meets the needs of health preservation. Stewing various materials in water not only tastes delicious, but also dissolves proteins, inorganic salts, vitamins and other nutrients in water, which is more conducive to absorption. Therefore, if the development of new things wants to reach a state of longevity, it must have advantages over other things in order to win a place in the process of survival of the fittest. (Shang Yue, 2015:2-3)

Therefore, through the above content, it can be seen that the formation of Luoyang food culture is formed under the comprehensive influence of many factors, with strong local characteristics and regional customs and habits of Heluo. Under the decisiveness of natural factors and the promotion of human factors, the advantages and characteristics of diet itself affect the formation of food culture in different regions. With the continuous development of society, people's requirements for diet are also constantly improving, and regional diet is still developing and improving, that is, developing in the direction of more reasonable, healthier and more satisfying current eating habits.

The most representative of Luoyang food culture is Luoyang water mat. Luoyang water banquet is a characteristic traditional banquet in Luoyang, Henan, which belongs to the Yu cuisine. The name of Luoyang Water Seat has two meanings: first, the dish has soup and water; The second is to withdraw one after the dish is eaten, like flowing clouds and water. Luoyang water mat has four characteristics: first, there are meat and vegetarian, cold and hot; Second, there is soup and water, and the soup water is added; Third, there are strict regulations on the order of serving; Fourth, vegetarian meat is made, and it is difficult to distinguish between true and false. As the saying goes, "the cavity of singing, the soup of the chef". (Wang Qionshan & Liu Lixia, 2013: 2)

In recent years, with the vigorous development of tourism, tourism catering as one of the six elements of tourism has an increasing impact on the tourism development of destinations. According to a report released by the World Tourism Organization, more than one-third of global tourists spend more than one-third on food and beverages, and food and drink in tourist destinations is an important aspect of determining the quality of the travel experience. France, Mexico, Japan and other countries play the gastronomic economy brand and attract the world's attention by applying for gastronomic heritage. China's cities such as Chengdu, Yangzhou and Macau have been designated as Creative Cities of Gastronomy by UNESCO, which not only enhances the city's popularity, but also enhances the city's attractiveness. (Phoenix.com, 2022: Online)

The quality of tourism catering not only affects the economic benefits of tourism in tourist places, but also directly affects the overall impression of tourists on tourist destinations. In recent years, with the vigorous development of Luoyang's tourism industry, Luoyang's tourism catering industry has developed well. However, due to various reasons, there are still a series of problems in the development of tourism catering in Luoyang. Therefore, in the face of the current situation, how to fully develop the advantageous conditions and take measures to promote the rapid development of Luoyang's tourism catering industry has become an urgent issue that needs to be solved in the tourism development of Luoyang City.

Luoyang food culture absorbs the respective characteristics of the north and south in terms of food customs, gathers the flavors of the four directions, and forms the characteristics of Luoyang food culture that emphasize practicality, do not emphasize patterns, vegetarian oil and low salt, seasoning is consistent, sweet and delicious, rational and harmonious, and beneficial to the elderly. The unique food culture of Luoyang has also laid a good foundation for the development of Luoyang's tourism industry. (Zhu Xiaoxiang, 2010:2-3)

As one of the first batch of national-level historical and cultural cities and a famous tourist city at home and abroad, Luoyang also needs to work hard to enhance the popularity of special food, strive to create a taste journey combining food and tourism, and constantly open up new growth points in the tourism industry. (Phoenix.com, 2022: Online)

With the profound influence of food culture and the support of relevant departments, a number of tourism catering enterprises with Luoyang that can show Luoyang food culture have emerged, such as Luoyang Zhenji Hotel, Luoyang Restaurant, Old Luoyang Noodle Restaurant, etc., these enterprises have considerable scale and market competitiveness. Founded in 1895, Luoyang Zhenji Hotel is a time-honored Chinese brand, a famous Chinese restaurant, an international restaurant, and the main reception "window" of Luoyang City. There is a saying among the people that "if you don't enter the real difference, you haven't arrived in Luoyang City". At the end of 2009, Luoyang Water Seat became the "First Banquet in China" recognized by the Ministry of Commerce and the China Hotel Association.

Luoyang tourism catering source market is broad. Luoyang's superior tourism resources and location conditions make Luoyang the preferred tourist destination for many tourists at home and abroad, and tourism has become a pillar industry of Luoyang City. According to the statistics of Luoyang Tourism Bureau, Luoyang received 45.67 million tourist arrivals in 2008, including more than 200,000 inbound

tourists, and the vast source market has laid a good foundation for the development of Luoyang tourism catering.

In the "14th Five-Year Plan for the Integrated Development of Cultural Tourism in Luoyang City" released on June 17, 2022: Since the 13th Five-Year Plan, the whole city has earnestly studied and implemented General Secretary Xi Jinping's important expositions on cultural tourism, centered on the work of the provincial party committee and the provincial government, actively implemented the cultural tourism work deployment of the municipal party committee and municipal government, and actively promoted the protection and inheritance of the Yellow River culture in accordance with the principle of "suitable integration is integration, can be fully integrated, cultural and plastic tourism, and tourism highlights culture", and with the goal of the construction of the national Heluo Cultural and Ecological Reserve. The canal culture is protected, inherited, and utilized, and an innovative system for the inheritance and innovation of Chinese civilization is built, and efforts are made to build an international cultural tourism city with "ancient and modern brilliance, poetry and distance". And during the "Thirteenth Five-Year Plan" period, Luoyang City has successfully established a national public cultural service system demonstration area, a national cultural tourism consumption pilot city, a national leisure agriculture and rural tourism demonstration city, and a national Heluo cultural and ecological protection experimental zone. With the goal of building an international cultural tourism city, we will focus on promoting the construction of the Yellow River Eco-cultural Tourism Belt, Funiu Mountain All-Area Tourism and Chinese Civilization Inheritance and Innovation Demonstration Zone, promote "all-region tourism", sing well the "Four Seasons Song", and promote Luoyang's transformation from a tourist city to urban tourism, and a ticket economy to an industrial economy. Strive to build the Sui and Tang Luoyang City National Historical and Cultural Park, the Erlitou Summer Capital Site Museum, and the Oriental Museum Capital "New Three Articles", and the Sui and Tang Luoyang City Heavenly Ming Hall, Yingtianmen and Jiuzhou Pond have become new cultural landmarks of the ancient capital. It plans to build a number of cultural tourism projects such as the Sui-Tang Luoyang City National Historical and Cultural Park, the Sui-Tang Grand Canal National Cultural Park, the Yellow River Basin Intangible Cultural Heritage Protection and Exhibition Center, and the Hakka Town of Daguguan, so as to build the main landmark city of the Yellow River history and culture. Luanchuan Laojun Mountain View Area has entered the camp of scenic spots with domestic main business income exceeding 100 million yuan, and Baiyun Mountain View Area in Songxian County has successfully created a provincial tourist resort. Vigorously develop rural tourism to help alleviate poverty and rural revitalization. Successfully established a national pilot city for cultural and tourism consumption, launched the "Enjoy Luoyang" cultural tourism consumption platform, and explored the Luoyang model of "promoting consumption with economy". Launched a series of consumption activities of "Ancient Capital at 8 o'clock at night, meet Luoyang City" and "New life in the ancient capital, fashion Luoyang City". (Sohu.com, 2022: Online)

At the same time, Luoyang was included in the list of key tourism cities in the "14th Five-Year Plan" for tourism development issued by the State Council of China. The Sui and Tang Luoyang City National Archaeological Site Park project was selected as a national cultural and tourism investment and financing project and

invested 50 billion yuan, building Luoyang into a "special cultural zone". (NetEase, 2022: Online)

With the take-off of Luoyang's economy and the rapid development of tourism, the catering market in Luoyang City has also developed rapidly. At present, the turnover of Luoyang tourism catering industry has also maintained double-digit rapid growth for many consecutive years, reaching more than 5 billion yuan in 2006, and a number of diversified comprehensive enterprises integrating catering, culture and tourism have emerged. However, compared with other cities with developed tourism and catering, there are still some shortcomings in the development of tourism catering industry in Luoyang. The main manifestation is: the small scale of the tourism catering market. In countries and regions with developed tourism, the income of tourism catering accounts for about 30% of the total tourism revenue. Compared with these areas, the scale of Luoyang's catering market is significantly smaller. At present, Luoyang's tourism catering revenue only accounts for about 20% of Luoyang's tourism revenue. Tourism catering income is significantly lower than the level of tourism-developed areas. Although there are some physical museums with food culture themes in Luoyang City, food culture has not been fully excavated and publicity is not in place. With the improvement of people's consumption level, tourists increasingly want to experience the unique food culture of tourist places. However, in the process of the development of Luoyang catering, some catering enterprises have neglected the excavation and development of local specialties and deliciousness, and lacked the excavation and refinement of the connotation of Luoyang food culture. This inevitably makes it difficult to improve the level of tourism consumption of tourists, and it is difficult to have a deep understanding of Luoyang food culture. In addition, Luoyang tourism publicity has not yet regarded tourism catering products as the basic components of the overall tourism products, and the publicity of Luoyang food culture is small, which affects the comprehensive economic benefits of Luoyang tourism. (Zhu Xiaoxiang, 2010:2-3)

The rich food culture of Luoyang precipitates the traditional living characteristics of Luoyang people and is an important element of Luoyang's urban culture. In modern society, food culture display has become a kind of tourism resource display window, attracting tourists' taste buds. Luoyang's ancient capital culture is dazzling, but there are few ways to display food culture that accompanies the growth of ancient capital culture. At present, there are still relatively few theme pavilions about Luoyang food culture, and the digital exhibition hall of food culture is even more blank.

Luoyang is an ancient and young city, and is promoting the integration of immersive culture and tourism into a new realm through endless innovative ideas and means. Fully explore and utilize Luoyang's rich historical and cultural resources, with cultural plastic tourism, tourism and culture, to create a cultural tourism industry with outstanding characteristics, people-oriented, diversified benefits, and build Luoyang into an important immersive cultural tourism industry innovation highland in China, with the official establishment of Luoyang Cultural Tourism Investment Group Co., Ltd. and the symbol of Henan Cultural Tourism Investment Group stationed in Luoyang, more and more immersive cultural tourism industry in Luoyang has risen, which has provided a strong policy guarantee and market guarantee for the development of food culture digital exhibition halls.

The museum is a hall for mankind to collect historical memory certificates and forge new cultures, and shoulders the important functions of protecting, researching and displaying human and human environmental heritage, and promoting the development of human civilization. The development trend of world museums shows that modern museums are no longer simple cultural relics specimen collection, display and research institutions, but should become cultural education institutions and information consulting institutions oriented to the society and serving the public. Museums have changed from a passive service to a new stage of active service to society, and today's society has regarded the degree of development and utilization of museums as an important indicator of the development of a region or even a country's civilization. In 2001, ICOM adopted the current definition of a museum, which reads: "A museum is a non-profit, permanent (fixed) institution that collects, protects, researches, disseminates and exhibits material evidence of human beings and the human environment for the purpose of research, education and appreciation, and serves society and its development, and is open to the public". Since its emergence in the 90s of the 20th century, the digital museum has been considered to be a museum that digitally expresses the functions of general museums, such as collection, display, research, education, and entertainment. The basic definition of digital museum is: an information service organization that processes, processes, reorganizes, and disseminates knowledge related to natural or cultural heritage to the public with digital technology, form and unified digital resource standards. (Gong Huaping, Wang Ying, Hu Chunjian, & Liu Chunnian, 2015:1-2)

Compared with traditional physical museums, digital museums realize the digitization of collections. The collections in the digital museum are presented with digital sound, text and image information, which solves the harsh requirements of traditional physical collections for storage sites and can be preserved permanently. Expanded the collection display channels.

Advantages of digital museums: the dissemination of information is more accurate and diverse. Different from physical museums, digital museums have the characteristics of virtualization, networking and intelligence, in which information entity virtualization plays a major role, after digitizing the digital museum exhibits, they can be converted into digital language for retention and storage, which can reproduce physical museums in a virtual way, making the transmission of information more diversified and accurate, which is an extension of the function of traditional physical museums; Optimized the information display effect. The digital museum can interact with the audience in real time, which is not available in traditional museums, and the setting of virtual tour and virtual tour guide functions makes the display of digital museum content more attractive. In this mode, the audience is no longer a single visitor, has the initiative, can become an information researcher, and then with the help of WeChat public account, Weibo and other platforms, the audience can exchange opinions and ideas in time, interact and communicate with managers in real time, and improve the quality and effect of information display; It is not limited by space-time factors. The digital museum allows the audience to have a broader information browsing space, will not be limited by time and space factors, using the information retrieval key, the audience can obtain the collection information in time, and extend, understand the principle, structure, use and historical changes of the collection, achieve multi-sensory participation, and more resonate with the audience.

Realize the development and sharing of resources. Digital museums eliminate the development differences caused by regional economic levels, and equal digital museum resources can be obtained from economically developed regions or underdeveloped regions. After the construction of the digital museum, the sharing and exchange of information has become easier, and the exchange, transmission and communication of information can be quickly completed in a short period of time by using the network. (Wu Yinghong, 2018:1)

Therefore, the construction of Luoyang food culture digital exhibition hall can not only help tourism food culture researchers fully explore Luoyang food culture, but also more comprehensive, multi-channel and in-depth display and dissemination of Luoyang food culture to tourists.

However, for the current development status of China's digital museums, it can be seen that in the past ten years, China's digital museums have developed rapidly, after unremitting efforts, in large and medium-sized cities have achieved initial results, however, under the influence of a variety of factors, the current development of China's digital museums is not balanced, the technical level is uneven: the lag of concepts in China's digital museum construction work is widespread, due to insufficient theoretical preparation, resulting in the construction of China's digital museum lagging behind the level of developed countries, in the early stage of construction, It is more casual, blind, and lacks long-term planning. From the perspective of the mainstream model, the current construction of digital museums is mainly in the form of a single museum, which can only start from a single library, resulting in inconsistent standards, the problem of separate administration, and the difficulty of sharing information. Different regions and different levels of museums have different wooden conditions, and there are significant differences in development, and the level of museums in developed regions is significantly higher than that of economically backward areas. The data shows that the total number of digital museums in China is about 3,000, of which the proportion of digital museums is not high, and it cannot meet the construction needs of digital museums. (Wu Yinghong, 2018:1)

With the combination of 5G networks and mobile terminals and virtual reality (VR) devices, it is a high-tech integration that has emerged in the graphics field in recent years. With the support of the current new digital technology information technology, museums have applied virtual reality technology to exhibition design, used virtual reality technology to construct scenarios, and displayed exhibit information through three-dimensional images. Compared with traditional methods, the interface built by virtual reality technology is more three-dimensional, which can not only enrich the audience's audio-visual experience, but also fully display the detailed information of the exhibits. Especially with 5G technology, high-speed information transmission can bring a smoother aesthetic experience to the audience, and to a large extent, the audience's concept of time and space when viewing the exhibition in the traditional way. At the same time, the change of aesthetic methods also makes the audience's experience of the exhibits more profound. However, it should be noted that in order to ensure the real-time interaction of virtual reality technology in the application of museum exhibitions, the following conditions need to be met in the latter time: the constructed virtual three-dimensional space has a sense of realism; The virtual environment and the real environment need to be kept in the

same spatial location; In order to ensure the consistency of the virtual space, the color and lighting conditions in the real environment cannot be changed. Therefore, the application of virtual reality technology to digital museum exhibitions can change the traditional interaction between the audience and the museum, making the interaction simpler, more interactive, and more interactive. The application of virtual reality technology to museum exhibitions can continuously enhance the interaction between the audience and museum exhibits, and more effectively improve the artistic effect of museum exhibitions. (Pulu, 2022:1)

Therefore, studying the virtual expression of Luoyang food culture digital exhibition hall is a new theme, which can provide richer exhibition virtual expression methods for the later construction of Luoyang food culture digital exhibition hall and even other digital exhibition halls.

1.2.Purpose of theResearch

2.1 To Study the composition and development status of Luoyang's food culture

2.2 To Study and analysis of the current situation, display methods and effects of Luoyang food culture display

2.3 To Investigate and analyze the application status of digital exhibition hall exhibition and the audience's evaluation and tendency of digital exhibition hall exhibition, and design the virtual expression scheme of Luoyang food culture digital exhibition hall

1.3 ResearchQuestions

3.1 The historical origin of Luoyang food culture? What are the factors influencing the formation of food culture? What constitutes food culture? What is the current situation of the development of Luoyang food culture?

3.2 What is the current status of the main publicity and display of Luoyang food culture? How well has it been shown so far? What are the difficulties in communication and promotion?

3.3 What is the current development status of digital pavilions? What are the advantages of building a digital pavilion of food culture in Luoyang? What are the characteristics of the exhibition space of the digital exhibition hall? What is the functional composition? What is the development and current situation of digital display? What should be paid attention to to show Luoyang food culture through the design of the virtual exhibition expression of the digital exhibition hall?

1.4 Definition of Terms

Luoyang food culture: The Luoyang food culture **means** in this study refers to the "soup" culture in the Heluo food culture in the Yellow River basin of the Heluo land. They are influenced by human migration in different periods, dynastic replacement, climate, economic and trade flows and other factors to form the current Luoyang food culture.

Presentation: Presentation: In this study, the way of presentation means that the museum displays the exhibits to visitors. They are more different cultural relics that need to be displayed and used to display and disseminate information by means of physical objects, pictures or videos.

Digital Pavilion: Digital pavilions in this study means It refers to a virtual exhibition hall that extends time and space compared to traditional physical exhibition halls. Since its emergence in the 90s of the 20th century, digital museums have been considered to be museums that digitally express the collection, display, research, education, entertainment and other functions of traditional physical museums.

Virtual exhibition: The virtual exhibition means in this study refers to the exhibition mode in which various exhibits and introductions are scientifically combined in a digital museum according to certain logical rules, with photo boards or models and brief descriptions.

1.5 Scope of Research

1.5.1 Research area: Luoyang City, Henan Province, which has experienced 5,000 years of civilization history, 4,000 years of city building history, 1,500 years of capital building history, and 105 emperors have successively settled in Kyushu, which is the birthplace of Heluo culture and Chinese culture. The origin of Luoyang's food culture can be traced back to before the Xia Dynasty.

1.5.2 Study period: The researchers divided it into the following two periods:

1.5.2.1 Before the Luoyang Peony Flower Festival was upgraded to the China Luoyang Peony Culture Festival (1983-2010). During this period, the Luoyang Municipal Government took the lead in organizing an official flower appreciation festival, so that the peony viewing festival that originated in the Sui Dynasty continued to continue, and since then the Luoyang tourism market has expanded and opened. Luoyang food culture gradually spread to tourists.

1.5.2.2 Luoyang Peony Flower Club after the upgrade to China Luoyang Peony Culture Festival (2010 to present). After the Luoyang Peony Flower Club was upgraded to a national-level festival sponsored by the State Council and the Ministry of Culture, Luoyang's tourism market entered a prosperous period and has become a famous cultural tourism popular city until now. Luoyang food culture has also spread to the whole country. At the same time, during this period, Luoyang also built several digital pavilions.

Which in this research, The researcher will conduct the research. to study the information analyze the application status of digital exhibition hall and the design of virtual expression in Luoyang food culture digital exhibition hall in the period between 2021, 7. - 2023, 2.

1.5.3 Units of analysis in the study : Based on the use of computer technology and museum exhibits to build a digital exhibition hall, the virtual

exhibition mode of the digital exhibition with Luoyang food culture as the theme is studied.

1.6 Research Methodology

This study uses qualitative methods to study the composition and presentation of Luoyang food culture in the past and present. Details of the methodology are as follows:

1.6.1 Population and Sample

1. 6.1.1 Practitioners in Luoyang catering industry

The method of apprenticeship is the mainstream, and although vocational and technical colleges have become popular in recent years, the cuisine learned from students who go to culinary school is more chaotic. Apprenticeship is currently the main inheritance of Luoyang's dietary skills. Most Luoyang food practitioners learn Luoyang food skills by learning from teachers. Some of them are family-handed down skills.

Most of these practitioners are middle-aged people who have been keen on researching, producing and selling Luoyang diet for many years. Therefore, this group of Luoyang catering practitioners occupies a very important position in the development and dissemination of Luoyang food culture, as a group of chefs to develop in line with the premise of consumer taste, in line with the daily diet of contemporary life, but without losing its inherent traditional flavor.

1.6.1.2 Luoyang Museum staff

During the seven days of National Day in 2021, museums in Luoyang City received more than 500,000 visitors. (Data source is Luoyang Cultural Relics Bureau) Luoyang Museum is one of the first national first-class museums, and is a comprehensive museum integrating cultural relics collection, scientific research, exhibition and exhibition, social education and cultural exchange.

Luoyang Museum Heluozhiguang Digital Museum is the earliest digital museum in Luoyang City to use digital virtual exhibitions and interactive experiences. These staff members are the front-line staff who have the most direct contact with the group of tourists visiting the museum, and have the most intuitive effect on the display and dissemination of Luoyang culture. The way visitors to the exhibition hall like to display is also the most authentic feeling.

Old Luoyang Food Culture Museum is a thematic museum established in 2013, the collection of the museum from the Xia, Shang, Zhou to the Republic of China and even the "" period, the number of collections, the historical span, ranking first among similar museums in our province. All the collections are divided into 10 categories: stoneware, bronzeware, pottery, bambooware, porcelain, jade, silverware, ironware, woodware, and lacquerware, basically covering the cooking utensils, containers, measuring utensils, etc. used by the ancestors. These collections, which have gone through vicissitudes, show the wisdom and attention of the ancients in terms of food life, and reflect the long history and breadth and depth of Luoyang's food civilization.

1.6.1.3 Staff engaged in the research and development of virtual exhibition hall technology

The R&D and construction of the virtual exhibition hall is a difficult, long-term, costly, and technically demanding project. These staff members master the

construction technology of the virtual exhibition hall and the latest virtual exhibition design technology.

1.6.1.4 Groups of domestic and foreign tourists.

With the trend and development of tourism in Luoyang City, more and more tourists come to Luoyang for tourism. The food with Luoyang characteristics is also loved by tourists. TV variety shows about Luoyang's food culture have also been loved by domestic and foreign audiences on the Internet.

Domestic and foreign tourists are an important factor affecting the design of the virtual exhibition method of Luoyang Food Culture Exhibition Hall. Only the exhibition method that tourists are satisfied with can help tourists have a deeper understanding of Luoyang food culture and spread Luoyang food culture to the outside world.

For the above four types of population samples, this study mainly used the form of main interviews and random electronic questionnaires to collect and analyze sample information. Two to three representative figures were selected for each type of population interview, and the number of data collected and analyzed on the experience tendencies of digital exhibition halls in the form of random electronic questionnaires for domestic and foreign tourists was estimated to be more than 100.

1.6.2 Instrumentation/Tools

Mainly electronic questionnaires and interview catalogs

1.6.2.1 Questionnaire on the virtual representation of digital pavilion exhibits

1.6.2.2 Outline of interviews with representatives of Luoyang food culture inheritors

1.6.3 Data Collection

1.6.3.1 Field work data collection

Interview: Collect the opinions of Luoyang catering industry practitioners, tourism group operators, museum staff and tourists based on field data. Over the years, Luoyang Food has undergone some changes in terms of publicity methods, production taste, and item display, as well as the audience's feelings about the existing digital exhibition hall exhibition methods and the preferences and preferences of future exhibition methods. A virtual exhibition method that is more easily accepted and liked by tourists is formed to keep up with the development of society.

1.6.3.2 File Data Collection:

Collect literature and materials in Luoyang Library and online academic platform, refer to textbooks, electronic libraries, personal research and articles about Luoyang food culture and digital exhibition exhibition monetization.

1.6.4 Data Analysis

According to the interview results of interviews with Luoyang catering industry practitioners, digital exhibition hall technology industry experts, etc., as well as the results of the electronic questionnaire data distributed by tourists and visitors on the current virtual exhibition mode and the preference and tendency of the virtual exhibition mode of the digital exhibition hall in the future, the research and analysis were carried out, and the content that needs to be used in this study was summarized.

1.6.5 Research presentation

1.6.5.1 Full text of research paper: written through descriptive analysis and presented with pictures and diagrams.

1.6.5.2 Research Article: Published in an international journal, scope or ISI level.

1.7 Concept, Theory and Conceptual framework

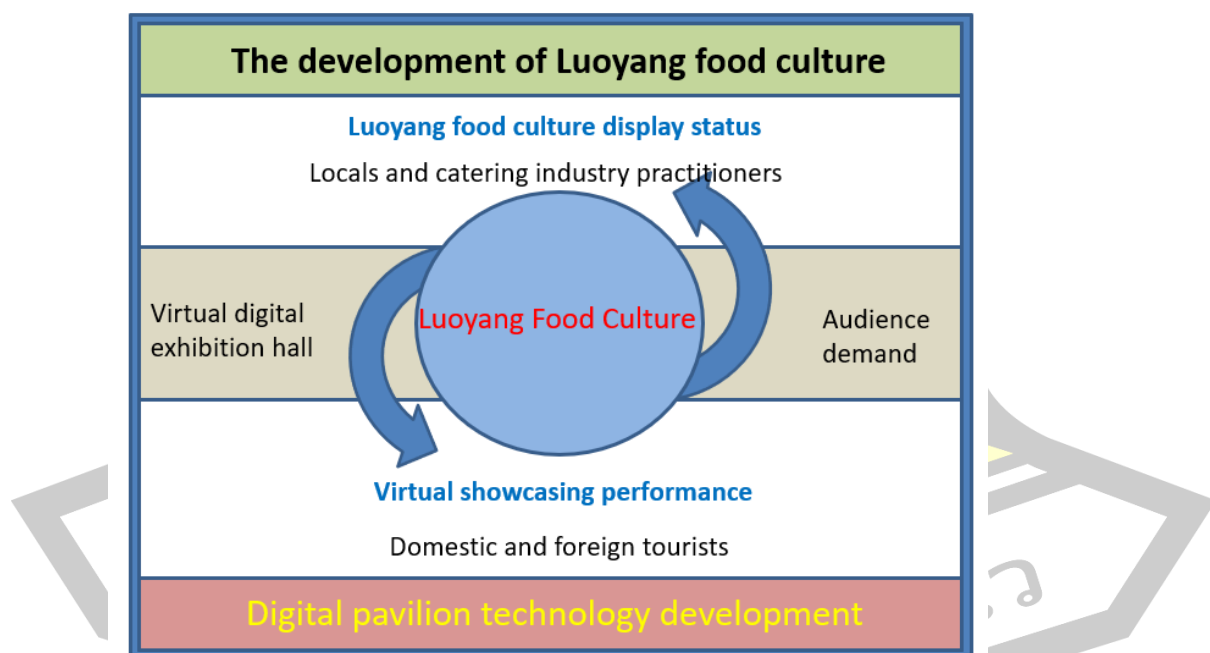
1.7.1 Research Concepts

The two main concepts of instrumentalization are to analyze the current situation of Luoyang food culture display and the virtual exhibition expression.

1.7.1.1 The research concept of analyzing Luoyang food culture comes from "Looking at the Food Culture of Luoyang in Northern Wei from the Jia Lan Ji of Luoyang", Zhao Kai, 2014

1.7.1.2 The research concept of virtual exhibition comes from "VR/AR Technology Empowers Natural Museum Virtual Exhibition Design Application Research" Li Yujing & Yan Jie, 2022.

1.7.1.3 In this study, the current situation of Luoyang food culture display is mainly applied to two aspects of Luoyang food culture. On the one hand, the digital exhibition hall is a carrier of Luoyang food culture dissemination; On the other hand, Luoyang food culture is also an important part of Luoyang culture. From the perspective of communication carriers, the rich food culture of Luoyang can make the content of the digital exhibition hall more substantial; From the perspective of an important part of Luoyang culture, it involves Luoyang's customs, economy, geography, race and other dimensions, and is a branch with distinctive characteristics in Luoyang culture.



Research conceptual framework

Figure 1

1.7.2 Research conceptual framework

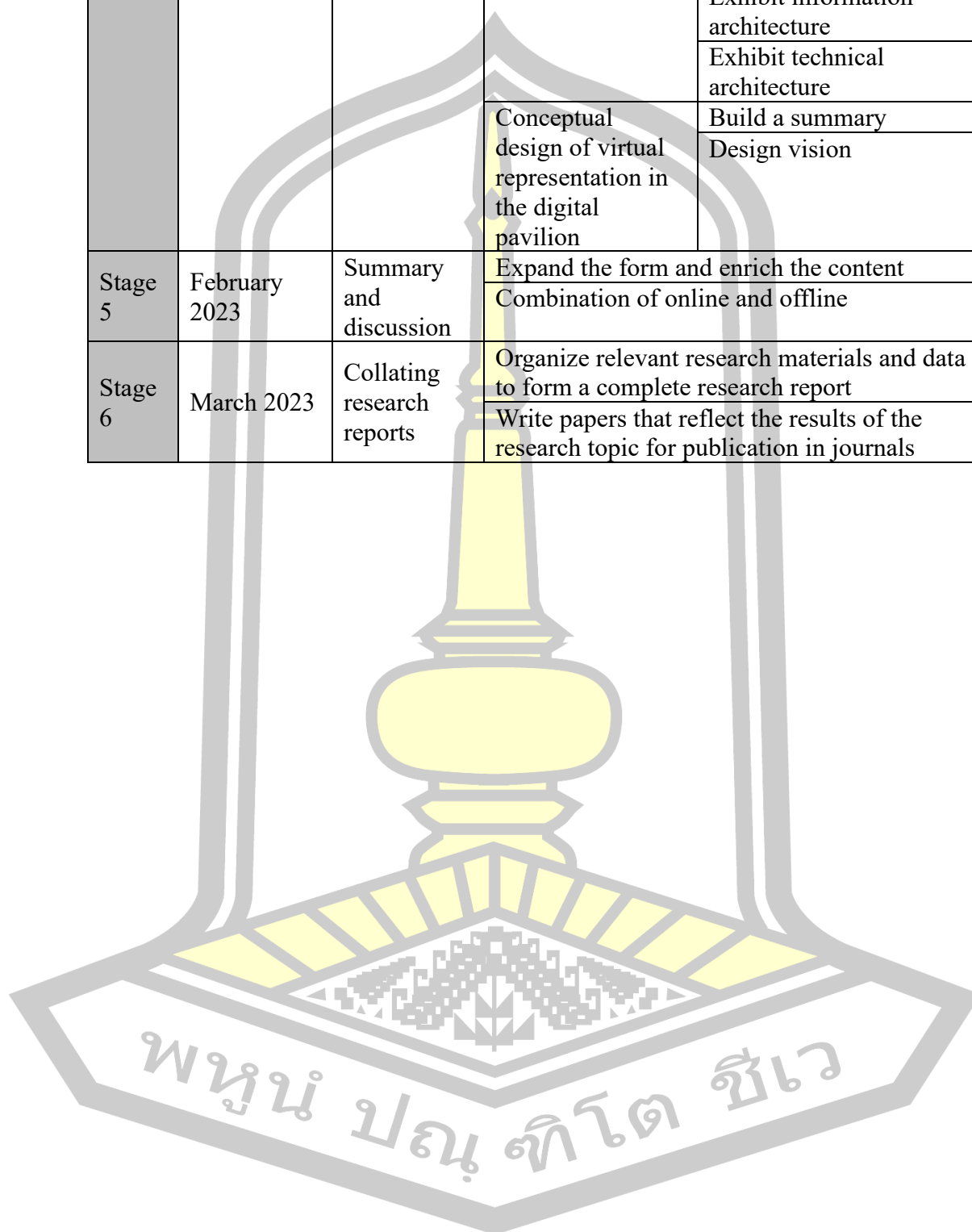
In this research framework, the main object of research is Luoyang food culture. The publicity method and effect of the traditional physical Luoyang Food Culture Museum, through this medium, we link the virtual digital exhibition hall with the development of social needs to study the expression of virtual exhibition.

1.8 Research plan

Table 1 Research plan for this project

stage 1	May-June 2022	Identify research topics	Project context and significance	
Stage 2	July to October 2022	Explore the current state of research	Theoretical research	The composition of Luoyang food culture
				Development status of Luoyang food culture
			Luoyang food culture shows the current situation and effect	
			There is a dilemma in the spread of Luoyang food culture	
Construction of digital pavilions	Current status of foreign development			
	Domestic development status			
Stage 3	November-December 2022	Research Methods and Analysis	Digital exhibition hall construction positioning	
			Development status of virtual exhibition in digital exhibition halls	
			Audience research Surveys	Audience research Surveys
			The current situation of the physical exhibition hall of food culture	
			Audience demand analysis	
			Analysis of typical exhibit information characteristics	Physical exhibits
				Non-physical exhibits
	Inheritors			
Demonstrate technical requirements analysis				
Stage 4	December 2022 to February 2023	Creation & Design	Digital exhibition hall virtual exhibition design positioning	
			Selection of proposals for virtual representation of digital pavilion exhibitions	
			Digital exhibition virtual expression design	Organize the development process
				The main contents of the

			scheme	exhibition
				Exhibit information architecture
				Exhibit technical architecture
			Conceptual design of virtual representation in the digital pavilion	Build a summary
				Design vision
Stage 5	February 2023	Summary and discussion	Expand the form and enrich the content	
			Combination of online and offline	
Stage 6	March 2023	Collating research reports	Organize relevant research materials and data to form a complete research report	
			Write papers that reflect the results of the research topic for publication in journals	



1.9 Benefits of Research

11.1 Benefits for academia: This topic further analyzes the development history, characteristics and development status of Luoyang food culture. Provide more creative development ideas and forms for the innovation of Luoyang food and meet the needs of diners in emerging tourism markets and the dissemination of Luoyang food culture. Research on virtual displays in digital pavilions and questionnaire data on visitors can provide more sample data for subsequent researchers. Infiltrate food culture into various disciplines, and create cross-border cooperation in the fields of catering, art and science and technology..

11.2 Benefits to the society and community of the study site: This project studies the formation factors of Luoyang food culture and the dilemma of food development. The research results can be provided to practitioners in the catering industry to use this research to develop new Luoyang dishes that are more in line with the tastes of current tourism market consumer groups, and can also be used as the historical background, story mining and publicity of dishes, so that Luoyang's cuisine has more cultural background and artistic value. The research on the virtual expression of digital exhibition halls can better meet the needs of audience experience for staff in the digital exhibition design industry in the subsequent construction of digital exhibition halls, so that the audience can experience higher satisfaction during the tour.

11.3 Benefits of formulating local government policies: The results of the current situation and development dilemma of the spread of Luoyang food culture studied and analyzed in this project can provide more reference materials for local governments to supplement and adjust Luoyang's guidelines and policies in the development of tourism and catering market. Promote the spread of Luoyang food culture and promote the promotion of Luoyang tourism food. It will help Luoyang to upgrade from a scenic tourism city to a famous cultural tourism city.

11.4 Theoretically: The information in the research can support the development of related food and beverage industries and digital pavilion display design industries..



Chapter II

The composition and development status of Luoyang food culture

This chapter briefly elaborates on the origin background of Luoyang food, and introduces the historical development process of Luoyang food culture. regional, economic and political factors in the formation of Luoyang food culture; Through the material and spiritual composition of Luoyang food culture, the soup culture, noodle culture and snack culture of Luoyang were listed, and the Luoyang food categories listed as intangible cultural heritage were briefly introduced. Finally, the development status of Luoyang food culture is explained.

2.1 The origin of Luoyang food culture

Culture is the soul of a country, a region and a nation. The city is an important carrier space of culture, and the unique explicit image or IP image of a city and the spiritual outlook of the city are all derived from the urban culture, developed in the urban culture, and displayed in the urban culture. The Heluo culture nurtured in the Heluo region of the Central Plains of China is an important core and birthplace of the Yellow River civilization, and it is also the mainstream culture of the Chinese nation.

Luoyang, located in the center of Heluo, is one of the eight ancient capitals of China, and it is also the first historical and cultural city announced by the State Council of China. It has experienced 5,000 years of civilization history, 4,000 years of construction history, and 1,500 years of capital building history. For a long time in history, it has been the center of China's political, social, cultural and economic and social development. At the same time, Aunt Luo's road also extends in all directions. At the beginning of the Western Zhou Dynasty, the first large road network was established in China, with Luoyang as the center, and the road was widely accessible in all directions, and all areas were directly accessible. On the top of the Sui-Tang Grand Canal, boats are connected and sails are in pieces. From Luoyang, you can start in any direction of southeast, northwest and southeast. As shown in the figure below, As the eastern starting point of the ancient Silk Road, Luoyang is an important center of people-to-people exchanges in the world, and the world-wide trade exchanges in history and the fruitful culture created in Luoyang in ancient China are witnesses of Luoyang's history.

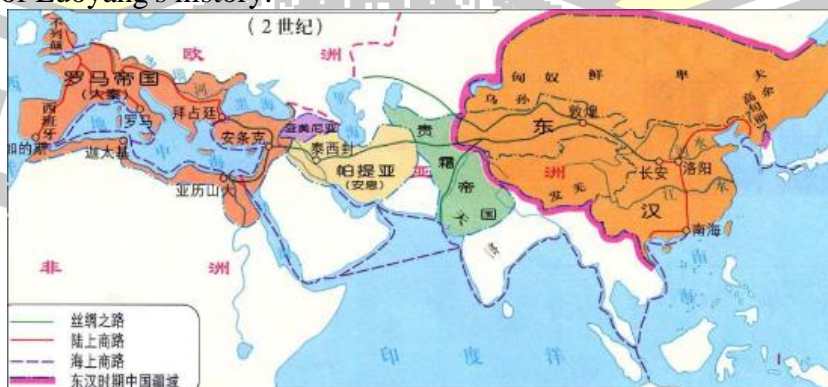


Figure 2 Ancient Chinese "Silk Road" Roadmap

Source : "www.bing.com",2018

The thriving cultural industry is an important medium for promoting international people-to-people exchanges and cooperation. Cultural industries and products are not only an important component of a city's culture, but also an important component of the city's economy and society, and also the embodiment of a city's industrialization and scientific and technological development level.

Food culture has always been an important part of Luoyang's traditional culture, reflecting the lifestyle and customs of Luoyang people. It can be seen from the Yangshao cultural painted pottery ware shown in the figure below and the warehousing pottery of the Luoyang Erlitou Xia Du Site Museum, Luoyang's food culture can be found in the Yangshao culture around Luoyang, Xia capital Erlitou culture and other sites and cooking utensils. It can be seen that Luoyang's food culture can be traced back to the first dynasty in China, the Xia Dynasty or even earlier. According to the current archaeological data, from the Xia Dynasty to the Eastern Zhou Dynasty, the utensils used in cooking were further improved, and the government at that time also began to pay attention to the cooking industry and institutions. Since then, Luoyang food culture has begun to develop rapidly, providing a good beginning for the formation of Luoyang food culture, which is now precipitated with the traditions and life characteristics of Luoyang people. Luoyang food culture is an important component of Luoyang, a city full of cultural charm. In modern society, food culture has become a tourism resource that reflects the unique culture, image, customs and history of a city, attracting the taste buds of tourists from all over the world.



Figure 3 Yangshao Cultural Painted Pottery

Source : "www.bing.com",2021

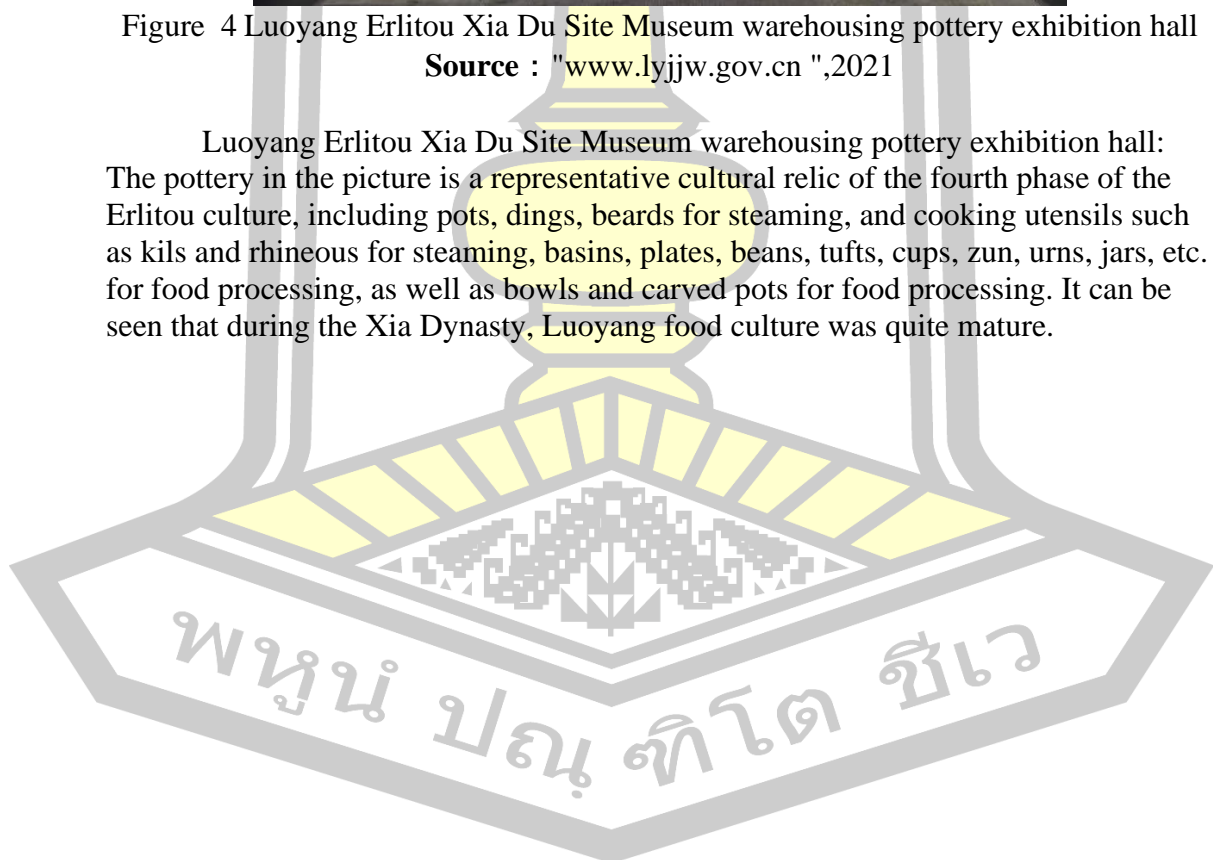
The vessel in the picture is a kind of full-body painted pottery that holds food. It can be seen from the picture that during the Yangshao culture period, the people have begun to pay attention to the design and decoration of tableware, and a clear context of food culture has begun.



Figure 4 Luoyang Erlitou Xia Du Site Museum warehousing pottery exhibition hall

Source : "www.lyjjw.gov.cn ",2021

Luoyang Erlitou Xia Du Site Museum warehousing pottery exhibition hall: The pottery in the picture is a representative cultural relic of the fourth phase of the Erlitou culture, including pots, dings, beards for steaming, and cooking utensils such as kils and rhineous for steaming, basins, plates, beans, tufts, cups, zun, urns, jars, etc. for food processing, as well as bowls and carved pots for food processing. It can be seen that during the Xia Dynasty, Luoyang food culture was quite mature.



Luoyang's food culture is dominated by soup, vegetables and noodles. Diverse and well-made. The formation of such a food culture in Luoyang is closely related to its long history.



Figure 5 Luoyang Museum Prologue Foyer
Source : " The author himself filmed ",2022

The exhibition hall floor in the foyer of the prologue of the Luoyang Museum is a chronological list of Luoyang as the capital of the 13 dynasties of the Xia Dynasty, Shang Dynasty, Western Zhou Dynasty, Eastern Zhou, Eastern Han, Cao Wei, Western Jin, Northern Wei, Sui Dynasty, Tang Dynasty, Later Liang, Later Tang and Later Jin.

From the Xia Dynasty to the Eastern Zhou Dynasty, cooking utensils were further improved, and the state also began to pay attention to cooking institutions. Until the Eastern Han Dynasty, the Silk Road was opened, and cooking methods were further improved and enriched on the basis of introduction and integration. During the Wei and Jin dynasties, China carried out great ethnic integration, not only social and cultural integration, but also food culture, different ethnic groups brought dishes, utensils, seasonings, etc. to enrich and innovate new foods and dishes. After Emperor Xiaowen of Wei moved the capital to Luoyang, with the Sinicization reform vigorously promoted by Emperor Xiaowen, Luoyang's diet was gradually influenced by the food of the Western Regions (Hu food). At that time, Luoyang residents more commonly liked to use pork as raw materials to make meat delicacies, because Western Regions food entered Luoyang City, and other meat foods such as beef and mutton began to be widely consumed in Luoyang City. At that time, Buddhist culture also began to flourish greatly in Luoyang, so non-meat vegetarian food from Buddhist temples also began to flourish, adding new content to Luoyang's food culture, making Luoyang's diet more abundant, and the taste of meat food is the prototype of the current Luoyang halal water mat cuisine. (Ma Huanhuan, 2016:1-2)



Figure 6 Schematic map of Emperor Xiaowen's route to Luoyang
 Source : "www.bing.com ",2021

It can be seen from the picture that Emperor Xiaowen ordered the capital to be moved from Pingcheng to Luoyang. The route map shown in the picture is the move of the capital by Emperor Xiaowen of Northern Wei during the Wei and Jin dynasties, moving people of different nationalities to Luoyang and implementing a policy of sinicization.



Figure 7 Timemap of the Northern Wei Xiaowen Emperor Rite Buddha in the Longmen Grottoes (currently in the Metropolitan Museum of Art)
 Source : "www.bjwmb.gov.cn ",2022

The content of the stone carvings of the Buddha rites of Emperor Xiaowen of Northern Wei shows that after Emperor Xiaowen promoted Sinicization, the ritual system, clothing, and decorative ornaments were all changed to Han style..

The Sui and Tang dynasties were a prosperous period for Luoyang's food culture. As shown in the figure below, during this period, agriculture and handicrafts vigorously promoted the development, connecting the Tonghui River, North Canal, South Canal, Tongji Canal, Yongji Canal, Huitong River, Huaiyang Canal, Jiangnan Canal, Zhejiang East Canal and other rivers from Beijing in the north, Ningbo in the south and Hangzhou to form the Sui-Tang Grand Canal in the center of Luoyang, and cross-regional commercial exchanges were close, which laid the material foundation for the prosperity and development of Luoyang's catering industry at that time. As the number of merchants from various countries increased, it became more common to use beef and lamb to make delicious food. The prosperous economy and culture of the Sui and Tang Dynasties greatly promoted the development of Luoyang's food culture, especially after the female emperor of the Tang Dynasty, Wu Zetian, set the capital of the capital in Luoyang, and the trend and progress of Luoyang's catering industry development were unprecedented in previous periods. The prosperity of Luoyang Capital City has made more practitioners with excellent cooking skills gather in Luoyang City. Wealthy businessmen and officials have higher requirements for dietary standards, which has also largely prompted practitioners in the catering industry in Luoyang City to continuously improve the types and tastes of dishes and innovative dishes, while new dishes are constantly appearing on the table. The water mat cuisine in Luoyang's food culture was formed during the prosperity of the Sui and Tang dynasties. (Yang Li, 2014:1-2)



Figure 8 Luoyang Sui-Tang Grand Canal Roadmap

Source : "zh.wikipedia.org ",2022

Through the road map of the Sui-Tang Grand Canal, it can be seen that the living materials and food of Luoyang City in the Sui and Tang Dynasties could be transported to Luoyang from afar through the Grand Canal. It provides a rich ingredient base and dish research and development foundation for the prosperity of Luoyang food culture.

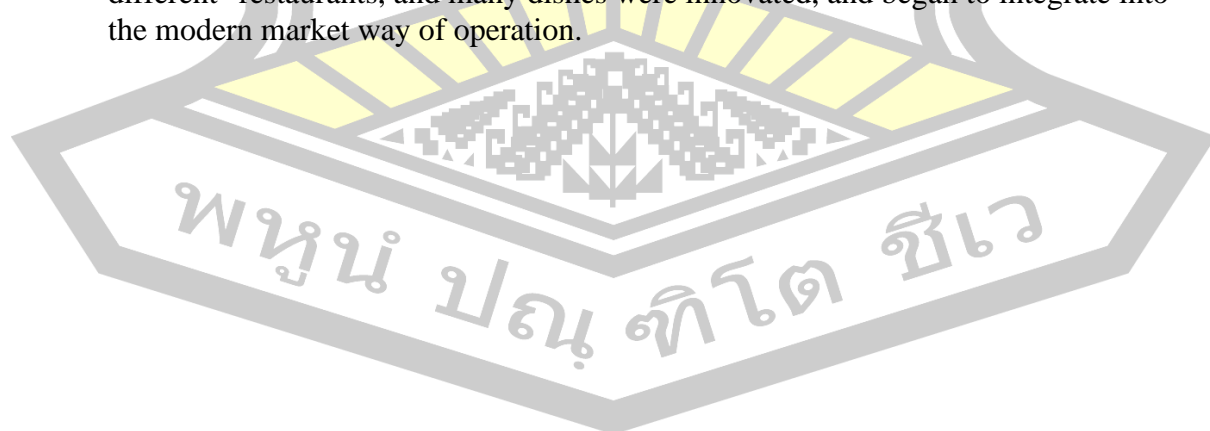


Figure 9 Schematic relief of the Sui-Tang Grand Canal Cultural Museum in Luoyang China

Source : " The author himself filmed ",2022

After the Tang Dynasty and the Song Dynasty, Luoyang will gradually lose its status as the political, economic and cultural center of the country, and the development speed of Luoyang's catering industry will begin to slow down, and Luoyang's food culture will no longer be in the leading position of Chinese food culture at that time.

In the 20th century, after the founding of New China, the country began to attach importance to the inheritance of traditional cooking culture and craftsmanship, Luoyang food culture was further developed, wheat flour made of food, special snacks were innovated, traditional water mats were also restored to supply in "really different" restaurants, and many dishes were innovated, and began to integrate into the modern market way of operation.



2.3 Factors in the formation of the current Luoyang food culture

2.3.1 Regional factors for the formation of Luoyang food culture

Food culture has regional characteristics, different environments form a variety of rich food culture, Luoyang's food culture is Luoyang people according to Luoyang's regional climate and geographical conditions to create a very rich Luoyang characteristics of food culture.

Luoyang's geographical location is in the central area of the Central Plains, with a reputation among the world, and the geographical location is very superior. Luoyang is located in a temperate monsoon climate, with obvious changes in scenery and temperature throughout the year, and a mild climate. As shown in the figure below, to the north of Luoyang there are Mt. Huangshan, the Yellow River and the Yellow River Plain; To the south, there are the Funiu Mountain Range (Xiong'er Mountain, Waifang Mountain, Song Mountain); To the west there is Crest Mountain; The Luoyang River, Yi River, Yi River, and Jian River meet in Luoyang City; The land in the suburbs is even more fertile. Superior climatic conditions and geographical environment make Luoyang area rich in grains, fruits and vegetables. With abundant food raw materials, Luoyang's catering industry and food culture provide unique natural conditions for the formation and development of food culture.

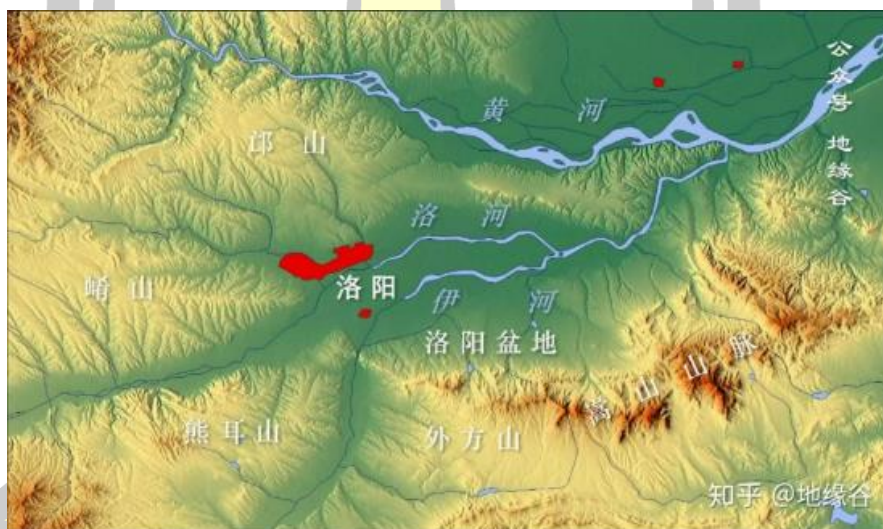


Figure 10 Geographical orientation and topographic map of Luoyang China

Source : "www.bing.com",2021

The good geographical location and unique climate make Luoyang area also very rich in ingredients. Take one of Luoyang's special delicacies - tofu soup as an example, tofu soup pays attention to a variety of colors, in addition to white tofu and fried tofu, colorful colors need more vegetables to decorate. Catering practitioners in Luoyang City add fresh vegetables to the soup, usually shredded vegetables and other side dishes and stewed with tofu. The choice of vegetables is not static, and seasonal vegetables are used for each season.

The large wheat production in Luoyang makes the use of wheat flour to make food in Luoyang more abundant, and the soup is also created to be eaten together. Luoyang is located in a semi-arid and semi-humid region and has a temperate monsoon climate. Far from the sea, the monsoon climate is characterized by significant characteristics: windy spring, arid climate; Winters are dry and cold, with less rain and snow. The precipitation in Luoyang is relatively small compared to the same latitude, which has a lot to do with the topography. The terrain of Luoyang City is high in the west and low in the east, with mountains and hills in the territory, and the terrain is complex. There are four mountain ranges: Funiu, Waifang, Bear's Ear and Xianshan. Funiu Mountain runs from the southwest to the south, the outer mountain is the southeast barrier, the Bears Ear Mountain extends from the southwest diagonally through the middle to the northeast, and the Xian Mountain is located in the west. The main rivers in Luoyang City are the Yellow River, Luo River, Yi River, Jian River and Ru River. Especially after the Song Dynasty, the western region of China has been continuously reclaimed, soil erosion has intensified, and the climate has been continuously dry. Every early spring, Luoyang has frequent winds. Therefore, in order to resist the severe cold of the defense temperature and replenish water, Luoyang people have developed the habit of drinking soup, and the sour and spicy taste in the soup water is also to achieve the purpose of driving away the cold.



Figure 11 Distribution map of China's geographical boundary area and geographical orientation of Luoyang

Source : "www.bing.com ",2022

At the same time, in terms of food customs, it has absorbed the respective characteristics of the north and south, gathered the flavors of the four directions, and formed the characteristics of Luoyang food culture that emphasizes practicality, does not emphasize patterns, vegetarian oil and low salt, moderate seasoning, sweet and salty, rational and harmonious, and nourishing and beneficial. Therefore, regional conditions are an important factor affecting the formation of Luoyang food culture.

2.3.2 Economic factors for the formation of Luoyang food culture

In China's 5,000-year history, the Tang Dynasty undoubtedly presented the most glorious era. The development of Luoyang commerce during the Sui and Tang dynasties arose with the construction of the eastern capital by the Sui Emperor. In October of the fourth year of the Sui Emperor, he ordered the construction of the new capital of Luoyang, and after the construction of the new capital of Luoyang, all the residents of the original Luoyang City were moved into the new Luoyang City, and tens of thousands of wealthy merchants and families from all over the country gathered in Luoyang City. It also gathered more than 3,000 skilled craftsmen from various prefectures and counties in Hebei to Luoyang City. This laid a stable foundation for the restoration of Luoyang's commercial economy as soon as possible.

Layout plan of Luoyang City in the Sui and Tang Dynasties: Luoyang City in the Sui and Tang Dynasties was built in the Sui Dynasty and was used until the end of the Northern Song Dynasty, lasting more than 530 years. As a famous capital city in ancient China, Luoyang City of Sui and Tang Dynasty has witnessed the most glorious history of Chinese feudal society, contains rich cultural connotations, is a valuable material for studying the establishment of ancient China's capital, urban layout, social life, etc., and has an important position in the history of the development of ancient China's capital, and its plan layout and architectural shape have a far-reaching impact on future generations, and even affect East Asian countries. It can be seen from the figure that the urban framework of Luoyang in the Sui and Tang Dynasties was very large, and the population was also larger. It provides space for a large number of people to migrate to Luoyang City. The variety of population migration also determines the richness of Luoyang's food culture.

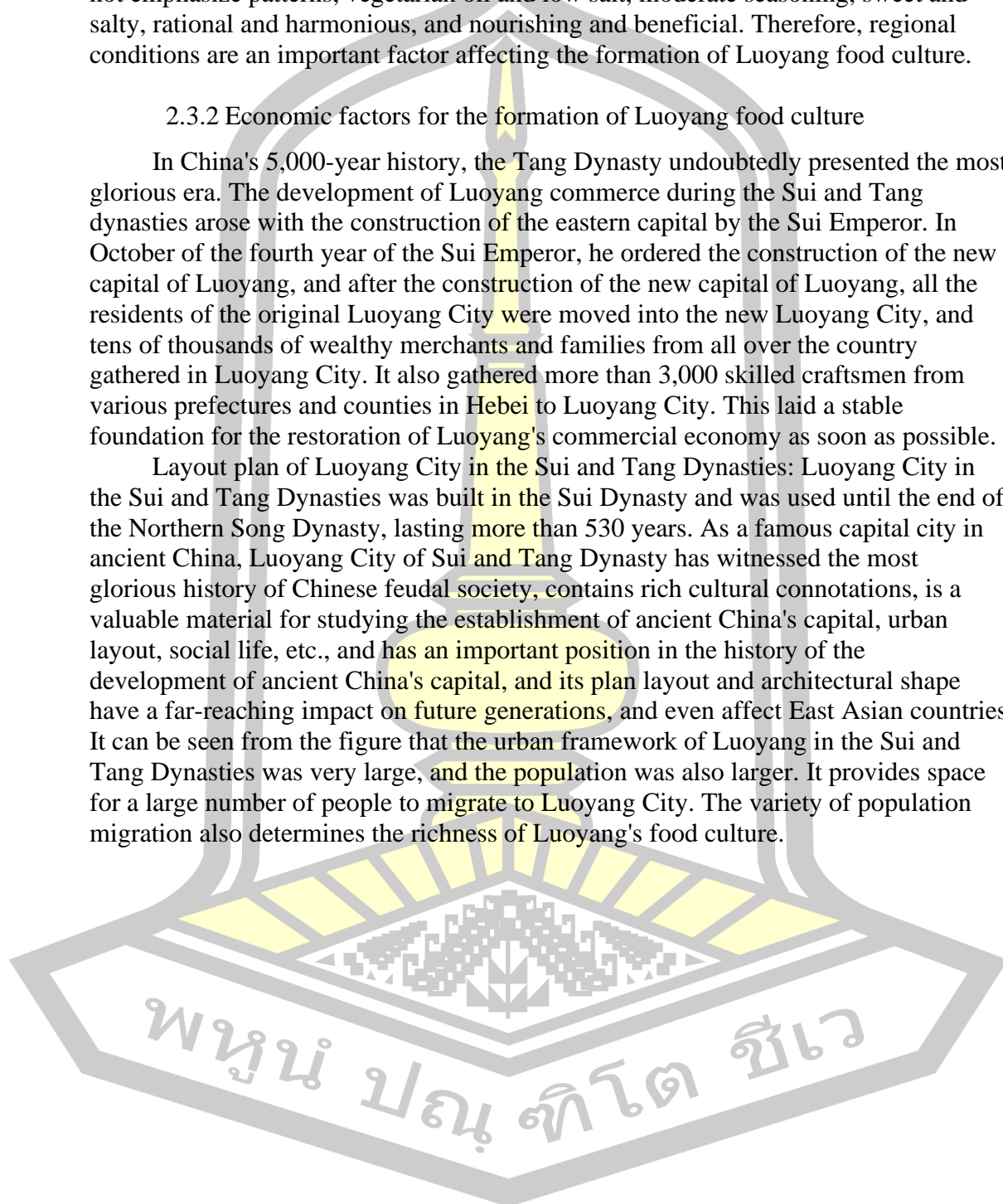




Figure 12 Layout plan of Luoyang City in the Sui and Tang Dynasties

Source : "wwj.ly.gov.cn ",2022

During the Tang Dynasty, Luoyang City's social security and stability, economic prosperity and cultural atmosphere, and relaxed and enlightened ruling class were all the fundamental reasons for the prosperity of this song and dance and poetry. People's material and spiritual lives have reached unprecedented richness. Later scholars commented on Luoyang during the Tang Dynasty, saying that the civilization achievements created by the Tang society at that time involved various fields and contained rich content. At that time, Luoyang's West, East, and South markets and nearby restaurants and restaurants along the Caoqu were lined up, and many exotic Hu merchants opened pubs in Luoyang. There are grand restaurants on Duanmenqian Street in the south of Tianjin Bridge. People's traditional food concepts have changed dramatically, and most people are no longer satisfied with making their own food, but go directly to the street to pick up processed food or buy food directly in hotels to eat and consume. Even ordinary people, the types of diet are very rich, and the distinction between staple food and side food is also very detailed, and the drinks are also diverse.

With the development of commerce, economy and trade, a large number of food raw materials have entered the market, and even the individual vendors on the street are also focusing on the sales of food and beverage products. The Heluo area is the birthplace of Confucian culture, and Luoyang is the center of the Heluo region, and at the same time it was the capital of the Tang Dynasty, and the food culture was extremely developed at that time. The catering industry in the Tang Dynasty was closely related to commerce. The prosperity of commercial trade not only provides people with a place for trade, but also provides a very rich material for the prosperity of Luoyang's catering industry. At the same time, Emperor Sui had three large commercial markets built in Luoyang City, and all commercial activities were carried out in Luoyang City. At this time, Luoyang has become an international trade center, and foreign tourists and businessmen who come to Luoyang to trade have become

very large. Therefore, economic development is also an important factor in the formation of Luoyang food culture. (Fu Ting, 2015:71-73)



Figure 13 Concept map of the restoration of Luoyang City Street in the Sui and Tang Dynasties

Source : "baike.baidu.com ",2022

During the Sui and Tang dynasties, Luoyang City was full of shops, and the streets were full of people and merchants shuttling through the city. You can imagine how prosperous and rich the economy of Luoyang City was at that time. Economic development determines the quality of food, clothing, housing and transportation for the people of Luoyang. The prosperous economy has made the people and dignitaries put forward higher requirements for diet, which has greatly promoted the innovation and quality of Luoyang's diet.

2.3.3 The political factors in the formation of Luoyang food culture

In ancient China, the development of each place was influenced by the rulers of the time. This policy guidance tendency and the direction of the ruler's advocacy, as well as the dietary preferences of the upper dignitaries, can be direct factors that can promote the spread of food customs and food culture.

In 581, Yang Jian established the Sui Dynasty, known as Emperor Wen of Sui, but he could not stand the ruined Han Chang'an City. First of all, when Han Chang'an City was built, deep wells were used to discharge sewage, and as a result, hundreds of years later, the drainage was not smooth, and the sewage gradually penetrated into the soil, resulting in a lot of pollution of domestic water, salty water, difficult to drink, and the city often emitted a foul smell. Secondly, Han Chang'an City is bordered by Weishui to the north, and the capital city is in danger of being flooded. According to the "Sui Tang Jia Dialect", it is recorded: "Emperor Wen of Sui dreamed of flooding the city, and the intention of evil was to move the capital to prosperity." "The planning of Daxing City is modeled on the Han Wei Luoyang City, so its scale scale,

urban outline, layout form, and layout are very similar to the Han Wei Luoyang City. Daxing City was later expanded to become Chang'an City of the Tang Dynasty.

The Sui Dynasty unified the world, and with the "reign of the emperor", the country became rich and the population increased, but the ability to provide for Guanzhong was limited. At that time, the capital had nearly one million people, and food could not be completely supplied by the eight hundred li of Qinchuan. Due to the geographical environment, the country's materials along the Yellow River to the vicinity of Luoyang, further upstream is difficult to transport. In the fourth and fourteenth years of the emperor's reign, Guanzhong was deserted, and Emperor Wen of Sui twice led the officials and people to flee to the eastern capital Luoyang to solve the problem of food.

Yang Guang (569 – April 11, 618), Emperor Wen of Sui, was the second son of Emperor Yang Jian of Sui and Empress Dugu Garo. During his reign, he pioneered the imperial examination system, repaired the Sui-Tang Grand Canal, built the eastern capital, and moved the capital to Luoyang, which had a great influence on later generations. Yang Guang personally came to Luoyang when he took the throne, climbed Mount Huang, and inspected the terrain. He believed that the south of the mountain, the north of Yique, the west of the river, and the east of the Jianhe River were excellent military points, and he decided to build the eastern capital here. In March 605, he appointed Shangshu Yang Su as the eunuch for the construction of the eastern capital, Nayan Yangda as the deputy supervisor, and Yuwen Kai as the general as the master craftsman, and "two million" people a month began a large-scale project to build the eastern capital Luoyang. The following year, Luoyang became the center of politics, economy, culture and transportation in the country, with a population of more than one million and tens of thousands of wealthy merchants, and the West Garden in the west of the city is the largest and most beautiful garden in the country.

However, these projects built by the Sui Dynasty later benefited the Tang Dynasty. Sui Luoyang City was expanded by the Tang Dynasty and became the most prosperous city in the world.

The supreme rulers of the Sui and Tang dynasties lived in Luoyang City for more than half a century, and lived in Shendu for a long time during the Wuzhou Dynasty. In the fifth dynasty, Liang, Tang and Jin all built their capitals here. During the Song Dynasty, it was called "Xijing", and during the Song and Golden Dynasties, it was destroyed in war. Luoyang City in the Sui and Tang Dynasties lasted more than 530 years and was the longest used capital in ancient China. During the Tang Dynasty, the Eastern and Western Beijing systems were implemented. The eastern capital Luoyang is another national political, economic and cultural center outside of Chang'an.

Since the 50s of the 20th century, archaeologists have carried out hundreds of cultural relics surveys and archaeological excavations within the scope of Luoyang City in the Sui and Tang Dynasties, and have basically explored the location, scale, overall layout and main cultural connotations of the Luoyang City site in the Sui and Tang Dynasties.

Waiguo City is nearly square in plan, wide in the south and narrow in the north, with a circumference of 27.5 kilometers. Outside the walls there is a moat 13 meters wide and 2.5 meters deep. Today, nearly a kilometre stretch of the northern city wall can still be seen on the surface. Among them, Dingding Gate is the main gate south of Guocheng, with a total length of about 150 meters from east to west, and the ruins of the pier platform of the main city gate tower are 44.5 meters long from east to west and 21.04 meters wide from north to south. There are three doorways, and rammed earth platforms are built on both sides of the gate. In front of Dingdingmen, there is Tongxian Bridge, one bridge and five roads, also known as "Five Bridges" and "Noon Bridge". The Five Dao Bridge of the Son of Heaven is the highest level bridge in ancient China, and it is the highest ritual system enjoyed by the Son of Heaven.

The inner part of Waiguo City is composed of vertical and horizontal streets to form the Lifang District, forming a checkerboard pattern. Dingdingmen Street starts from the end gate of the south gate of the Imperial City in the north and reaches Dingdingmen in the south through the Tianjin Bridge on Luoshui, which is the main road on the north-south central axis of Luoyang City in Sui and Tang Dynasties.

As for the inner fang of the city, it has been found that there are 55 fangs south of the Luo River and 9 fangs north of the Luo River. Lifang is generally square or nearly square, with a length and width of 500 meters to 580 meters, and a wall is built around the square, with a cross street in the square, and doors are opened on all sides. The town was often inhabited by dignitaries and aristocrats. At that time, the industrial and commercial areas in the city were "three cities", namely the north city, the south city and the west market, and the city was lined with shops and merchants.

The Imperial City and the Palace City are located in the northwest corner of the Shendu Luoyang, and the Palace City is located to the north of the Imperial City. The imperial city is longer from east to west and narrower from north to south, and has a rectangular shape. The imperial city mainly has a central official office and garrison, as well as a temple and storage. During the Tang Dynasty, the Sifang Pavilion, which received guests from all directions, was also moved from the Jianguo Gate (known as Dingding Gate in Tang) to the Imperial City in the Sui Dynasty.

The palace city is called Ziwei City, 2100 meters east and west, 1840-2160 meters north and south, with a total area of about 4.2 square kilometers, which is 6 times that of the Forbidden City in Beijing in the Ming and Qing Dynasties, and 1 million square meters more than the Tang Daming Palace, which was the largest palace city in the world at that time. According to the "Old Book of Tang", Miyagi has four separate cities, from north to south, Yuanbi City, Yaoyi City, Xuanwu City, and Luocheng. Los Angeles is the main hall area of Ziwei City, consisting of the Great Interior, the East and West Separation City, and the left and right sandwich cities, "left and right rings, the elephant of Yiwei", with an area of 2.5 square kilometers. The Great Inner is in the center of Los Angeles, square in shape, with a side length of 1030 meters and an area of about 1 square kilometer. It has been used for more than 530 years, and has successively become the seat of governance of the nine regimes of Sui, Zheng, Tang, Wuzhou, Yan, Houliang, Later Tang, Later Jin and Northern Song Dynasties, and is the imperial palace with the longest use and the most dynasties in Chinese history. Ceremonies such as the Sui Emperor's founding of the Ten Thousand Kingdoms to the Dynasty, Emperor Taizong of Tang's reception of

Xuanzang, Emperor Gaozong of Tang's capture of the King of Baekje, Wu Zetian's proclamation as emperor, and Emperor Xuanzong of Tang's reception of the eighth Japanese envoy to Tang were all held in Ziwai City. The three canonization ceremonies of the Tang Dynasty all started from Ziwai City, and the Japanese name change and canonization of the Silla king were all from Ziwai City, which shows that Ziwai City was the world political center at that time. (Baidu Encyclopedia Sui Tang Luoyang City, 2022: Online)

During the Sui and Tang dynasties, the country's rulers vigorously promoted Sinicization reforms, and generally began to use beef and mutton as ingredients to make delicious food. Before this period, the Han people generally used pork as food to make meat food. The increase in the variety of meat consumed has greatly promoted the improvement of people's diet structure and innovative dishes.

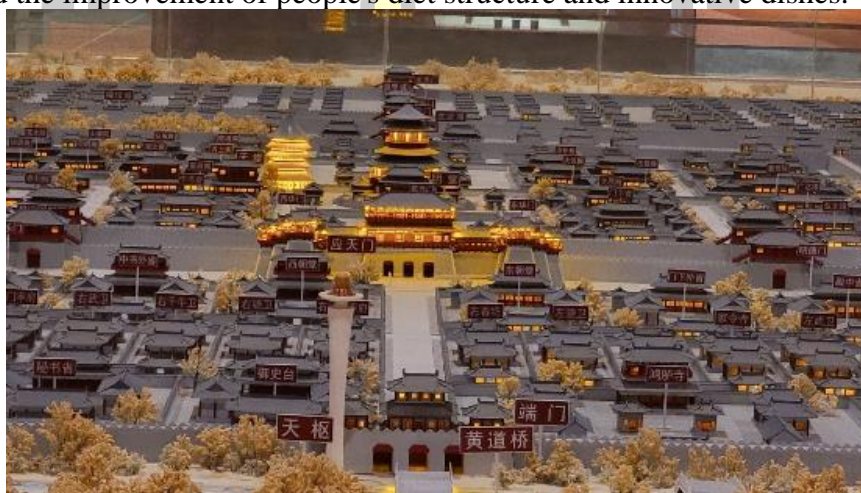


Figure 14 Luoyang Yingtianmen Palace City Gate Museum Sui and Tang Luoyang City Restoration Sand Table

Source : " The author himself filmed ", 2022

From the sand table, it can be seen that the Ziwai City in Luoyang in the Sui and Tang Dynasties was grand in scale and clearly divided, which is also the embodiment of Luoyang's attention by the rulers at that time and tilted a large number of policies. Due to these political reasons, the rapid development of Luoyang City has also led to the rapid development of Luoyang food culture.

During the Northern Wei Dynasty, the rulers attached great importance to Buddhism and built temples and caves. Due to the guidance of the policy, it is also the more frequent exchanges between royal dignitaries and temple monks and nuns, and there are higher requirements for the vegetarian diet of the temple, and at the same time, in order to better attract dignitaries to enter the temple for incense, the temple will also try to find ways to make a vegetarian diet that is more pleasing to the dignitaries. This behavior has greatly promoted the development of vegetarian diets in Luoyang's diet. In order to gain the support of the high-ranking dignitaries, the monks and nuns also began to concentrate on the study of fasting to please the officials of the upper class. These monks and nuns choose some vegetables common among the people as the main ingredients, and mostly use soups. Due to commercial trade and other reasons, Luoyang's diet also began to use pepper as a seasoning to cook food. Therefore, soup with pepper and other spices formed a small bowl of soup that was

later loved by people, and the soup was not turned over. The dignitaries who ate too much mountain and sea delicacies were full of praise after tasting these vegetarian meals, and the preparation and eating methods of these soups were brought into the royal family and aristocracy by the dignitaries of high society, and later the chefs of the royal family and aristocracy continued to innovate and improve. Later, these meals were also brought to the table of ordinary people by some wealthy people, which gradually formed the prototype of Luoyang water mat.



Figure 15 Luoyang Longmen Grottoes Fengxian Temple Night View

Source : " The author himself filmed ",2022

Located in Luoyang City, Henan Province, the Longmen Grottoes were first excavated during the reign of Emperor Xiaowen of Northern Wei, flourished in the Tang Dynasty, and finally ended in the late Qing Dynasty. It has been built for more than 1,400 years by more than 10 dynasties, making it the longest grotto in the world. At the same time, it is also the world's largest and largest treasure trove of stone carving art, and has been rated as "the highest peak of Chinese stone carving art" by UNESCO, ranking first among China's major grottoes.

In modern Chinese history, Luoyang also moved into a large number of people from other places, providing a diverse population sample for the development of Luoyang's diet. So that Luoyang diet has appeared a lot of new dishes similar to Shanghai cuisine, Northeast cuisine, Cantonese cuisine and other tastes.

After the founding of the People's Republic of China, New China began to implement the first five-year plan. Luoyang has become one of the eight key industrial cities in the country, and 7 of the 156 projects that have laid the foundation of China's industry have been placed in Luoyang, becoming the focus of Chinese people's attention. There are tractor factories, mining machine factories, ball bearing factories, thermal power plants, copper processing plants, etc., forming an industrial base mainly in Jianxi District.

More than 100 Soviet experts came to Luoyang one after another, enthusiastically devoted themselves to China's large-scale socialist industrial construction; Tens of thousands of technicians and industrial workers from all over the country came to Luoyang and passionately took root in Luoyang's industrial construction... On the land of Luoyang, the largest tractor manufacturing plant, the

largest bearing factory, the largest mining machine manufacturing plant, the largest copper processing plant, the largest high-speed marine diesel engine factory, Luoyang cement factory and Luoyang thermal power plant were left in China at that time; On the land of Luoyang, not only has a "Soviet-style building complex" that has witnessed the cultural exchange between the two countries. At the same time, it also brought skilled workers from all directions.



Figure 16 Photo of the gate of China's first tractor manufacturing plant in the 20th century

Source : "www.bing.com ",2022

The gate of China's first tractor manufacturing plant is located in the Jianshe Road and Chang'an Road areas of Jianxi District, Luoyang City. It marks that Luoyang is a symbol of the country's heavy industry base. Also because of the construction of the industrial base, a large number of skilled workers from other places who moved into Luoyang also brought the food culture of each place into Luoyang.

After the first tractor factory was located in Luoyang, it attracted related enterprises to gather here, and Luoyang began large-scale industrial construction since then. Due to the needs of construction, the state began to arrange experienced skilled workers nationwide to support Luoyang for industrial construction. This industrial migration due to industrial construction has brought about major changes in Luoyang's demographic composition. The skilled workers and their families brought by large-scale industrial construction caused Luoyang's total population to increase on a large scale, becoming a large city second only to Shanghai, Guangzhou, Beijing and Wuhan at that time. Statistics from the First Archives of Luoyang City show that in 1953, the total population of Luoyang City was 154478, and by 1956, Luoyangkou reached 231216 people. This is clearly not something that can be achieved by natural population growth, but is the result of migration. Luoyang's industrial population mainly comes from Northeast China, Shanghai and Guangdong. According to the statistics of the origins of 271407 people from eight police stations in Jianxi District

conducted by Professor Yang Jinyi's research group in the 1990s, nationality from other provinces accounted for 34.11% of the total number of statistical people.

Table 2 questionnaire on population increase and decrease in Luoyang City year by year from 1953 to 1956 Source : " Luoyang First Archives ",2022

年份	城市总人口	增加人口				减少人口				添加减率	
		出生		迁入		死亡		迁出		增加人	%
		人	%	人	%	人	%	人	%		
1953	154478	4031	2.6	16373	10.6	1159	0.8	5933	3.8	13318	8.6
1954	180810	5133	2.3	42014	23.3	1205	0.65	19610	10.8	26332	14.4
1955	211810	7667	3.6	80546	38	1877	0.9	70839	33.4	15497	7.1
1956	231216	7096	3.6	130688	56	1305	0.6	83914	36.0	52565	23

Through the data in the table, it can be seen that due to the migration of a large number of skilled workers, the population structure and proportion of residents in Luoyang City have changed. It will surely bring about a collision of diverse cultures and food. It provides data support for the dishes of Cantonese, Shanghai and Northeast cuisine that appear in Luoyang's local restaurants.

The First Tractor Manufacturing Plant is the largest of the several enterprises settled in Luoyang, and its number of employees accounts for about 40% of the total number of employees of the seven key enterprises settled in Jianxi District, so the largest number of industrial immigrants gathered during the preparation period. At the same time, its employees come from 30 provinces and autonomous regions in the country, and the proportion of the number of people in each province is relatively even. When the tractor plant began to be built in 1953, there were 314 employees, 1382 in 1954, 1668 in 1955, 6052 in 1956, and 9748 in 1957. Moreover, most of these workers come from other provinces, and the "Luoyang Tractor Factory Factory Transfer and Training Workers Back to the Factory Statistics Table" clearly reflects this characteristic.

In 1958, a total of 10,216 workers were enrolled, of which 268 were recruited in Luoyang, accounting for only 2.6 percent of the total number of newly recruited workers. In interviews with retired workers, Yito learned that "Yito is a technician (with culture) in Northeast China, a technical backbone (with experience) in Shanghai, and an administrative cadre and worker in Henan", and generally speaking, the source of workers in several other factories is roughly the same as that of Tuo.

According to the statistics of 271407 people from eight police stations in Jianxi District conducted by Professor Yang Jinyi's research group in the 1990s, there were 178837 people from Henan, accounting for 65.89% of the total population. There were 92,570 people from other provinces, accounting for 34.11% of the total population. This part of the provincials who moved to Luoyang brought the social culture and eating habits of the original place of residence, and the provincials in different regions have different lifestyles, eating habits, aesthetic trends, communication language and many other areas of life, but none of the regional culture occupies the mainstream position, and all people need to adapt and create a new life, so there will be no conflict over this. As a result, the cultures of various regions

converged, forming Luoyang's inclusive and mutually inclusive daily life form. It has also formed a highly inclusive Luoyang food culture.

The development and inheritance of any kind of food culture has not always been very smooth. The Central Plains region has always been a place of contention for various rulers in ancient China, and Luoyang is a place where soldiers must fight. Luoyang food culture also flourished and declined with ancient wars. After the founding of the People's Republic of China, a new development began with the government's emphasis on the inheritance of Luoyang's local traditional food culture. Officially, because of the support of the government, the development of traditional Luoyang food culture can be guaranteed. Therefore, the government's ruling direction and policies are also the key factors in forming the current Luoyang food culture.

2.4 The composition of Luoyang food culture

Regional culture is formed in the long history of the river, there is the material expression of history, but also the spiritual connotation of its core value, the same is true of the regional food culture.

2.4.1 The material aspects of Luoyang food culture

The material aspects of Luoyang food culture are mainly presented in water mats, soups, noodles, snacks, meat and other aspects.

Water mat is a typical representative of Yu cuisine, one of the major cuisines in China. Luoyang water mat was formed in the Tang Dynasty, with a history of more than 1,300 years, and is the only banquet in China that has been included in the list of intangible cultural heritage with a complete set of production techniques. The name of Luoyang water mat has two meanings: one is that there is soup and water in the entire Luoyang water mat dish; Second, the order of serving dishes is to eat one after eating and withdrawing one another, like a cloud flowing water. The full set of Luoyang water mats is divided into the first eight products, four town tables, eight large pieces, and four sweeping tails, a total of 24 dishes. Luoyang large and small water mats visit a lot, the most famous is the Chinese time-honored brand "Really Different", which launched a single dish made of water mats on the basis of the development of a full set of water mat catering, which is more popular with the general public, and further promotes the market development of Luoyang water mats. In addition to the famous traditional water mat dish "peony swallow dish", "True Difference" also features soup and meat slices and burnt croquettes that are also popular among diners. These dishes taste sour and spicy, but the eight treasure rice and sweet potatoes with honey sauce in the water mat can make you feel sweet. "The clear one goes first, the thick one comes later, the right one is the master, the strange one is mixed, the one who arrives is tired, the hard is shocked, the stomach is full, and the acid is overflowing." The water mat is light, rich, sour and spicy, sweet and salty, and the dishes have soup, and the soup soup is different, which can meet the needs of customers with different tastes.



Figure 17 Luoyang really different palace water table peony swallow dish photos
Source: "www.bing.com",2022

Peony swallow dish is one of the main dishes of the Luoyang court water system, in addition to peony swallow dishes, there are 23 dishes in the full set of Luoyang water mat. It can be seen from the figure that the scale of only one main dish is very large, which fully illustrates the attention and high-quality requirements of the dignitaries in Luoyang City in ancient times..

Luoyang people love to drink soup, morning and noon soup is the most, the streets can see a variety of soup restaurants, the most famous are "Tie Xie beef soup" and "hundred bowls of sheep soup". Luoyang people drink a bowl of beef soup in the morning, which is not available in many other places. Luoyang's soup is varied, including beef soup, mutton soup, donkey meat soup, tofu soup, non-turning soup, and ball soup. Luoyang's soup is different from the southern soup, Luoyang people eat it as a staple food, it is accompanied by flapjacks, oil spinning, or breaking the cake into large pieces by hand, or shredding the cake, soaking it into soup, ordinary soup has become a staple food that makes people eat and satisfy. In Luoyang, the folk have also been circulating the oral saying "a bowl of soup in the morning, it is not appropriate to give a god". It can be seen that the people's love for soup food in Luoyang City has changed from ancient times to the present for thousands of years.



Figure 18 Luoyang hundred bowls of beef soup
Source : "www.bing.com", 2022

The ingredients used in Luoyang's hundred bowls of beef soup are very solid, and it can also be seen that the garlic, chives, pepper, beef and other ingredients used are closely related to the population migration, cross-regional trade, regional climate and so on in the historical development of Luoyang.

Luoyang has a wide variety of noodles, the most distinctive of which are syrup noodles, pasty noodles, sweet noodles and marinated noodles. Pulp noodles are a traditional delicacy in Luoyang, made by fermentation of mung soy milk, flour batter, sweet potato pulp, etc., with a unique sour taste, salty and palatable. Its sour and sour flavor is appetizing, and the leeks, large mung beans, celery stalks and chili oil mixed in the noodles will leave you with an aftertaste. Confused noodles is a staple food of Luoyang public life, loved by people, when making in the pot first put some cornmeal, millet and other coarse grains, and then add some dried vegetables, dried potatoes, shredded carrots, etc. to cook together, and then put in a small amount of noodles, so that miscellaneous, confused in a large pot, is confused noodles. Sweet noodles are mostly wide noodles, cooked in clear broth, without any seasoning, served with shredded pickles, there is soup and noodles, light and convenient, easy to digest. "Lao Luoyang Noodle Restaurant" is a popular noodle restaurant in Luoyang people, famous for its variety of noodle dishes, among which the marinated noodles are a famous Chinese snack, and the fried sauce noodles also have a special flavor. In addition, Luoyang's large bowls of braised noodles, knife-cut noodles, etc. are very affordable, both full and beautiful.



Figure 19 Luoyang Pulp Noodle Photo

Source: "www.bing.com",2022

Luoyang paste noodles have rich ingredients and fine and soft noodles. It can be seen that convenient transportation and rich materials are also the necessary foundation for the development and innovation of Luoyang pulp noodles.

There are also many snacks in Luoyang, such as small street potstickers, Xin'an County hot noodle corner, horseshoe street wontons, stewed vegetables, shabu tripe, shabu tofu skin, fried film sheets, flat jelly, cool powder, etc. are all very good. Pot stickers and hot noodle corners belong to the dumpling category, with thin skin and large filling, beautiful appearance, pleasing to the eye, and mellow taste. The stew is rich in taste, spicy and sour, and rich in ingredients, which can basically meet people's needs for various nutrients. Luoyang people like to use pepper to enhance the flavor, and the amount of pepper in stewed vegetables and wontons is large, just like peppercorns in Sichuan cuisine. Luoyang people love to eat shabu tripe, the skewered tripe is placed in a thermos pot, and some guests order it with sesame paste and chili oil, smooth and moist. Luoyang Old Town snacks, Cross Street is the most lively, the whole street red lanterns are lit at night, accompanied by Luoyang local and snacks from all over the country, diners can not only enjoy the excitement of food, but also can experience Luoyang's simple and rich food culture, stimulate the yearning for a better life.



Figure 20 Photo of a corner of the snack street on North Street in the old town of Luoyang

Source : "www.bing.com",2022

Photo of a corner of the snack street on North Street in the old town of Luoyang: From the photo, just one snack street has attracted countless diners from all over the country to taste Luoyang's local food. It can be imagined that Luoyang's food is rich in variety, diverse in taste and beautiful in taste.

Luoyang's meat mainly includes small crispy meat, button bowls, yellow stewed chicken, etc., each with its own characteristics and hooking people's appetite. Luoyang's small crispy meat is a dish in the water mat, and it is included in the meat here because the small crispy meat is really the representative of Luoyang meat, and it is a common dish for Luoyang people to live and receive relatives and friends, and people often ignore that it is a part of the water mat. The meat of the small crispy meat is pork belly, but it is fat but not greasy, and it feels crispy at first, and it is tender and refreshing in one bite, which can be described as crispy and fragrant.

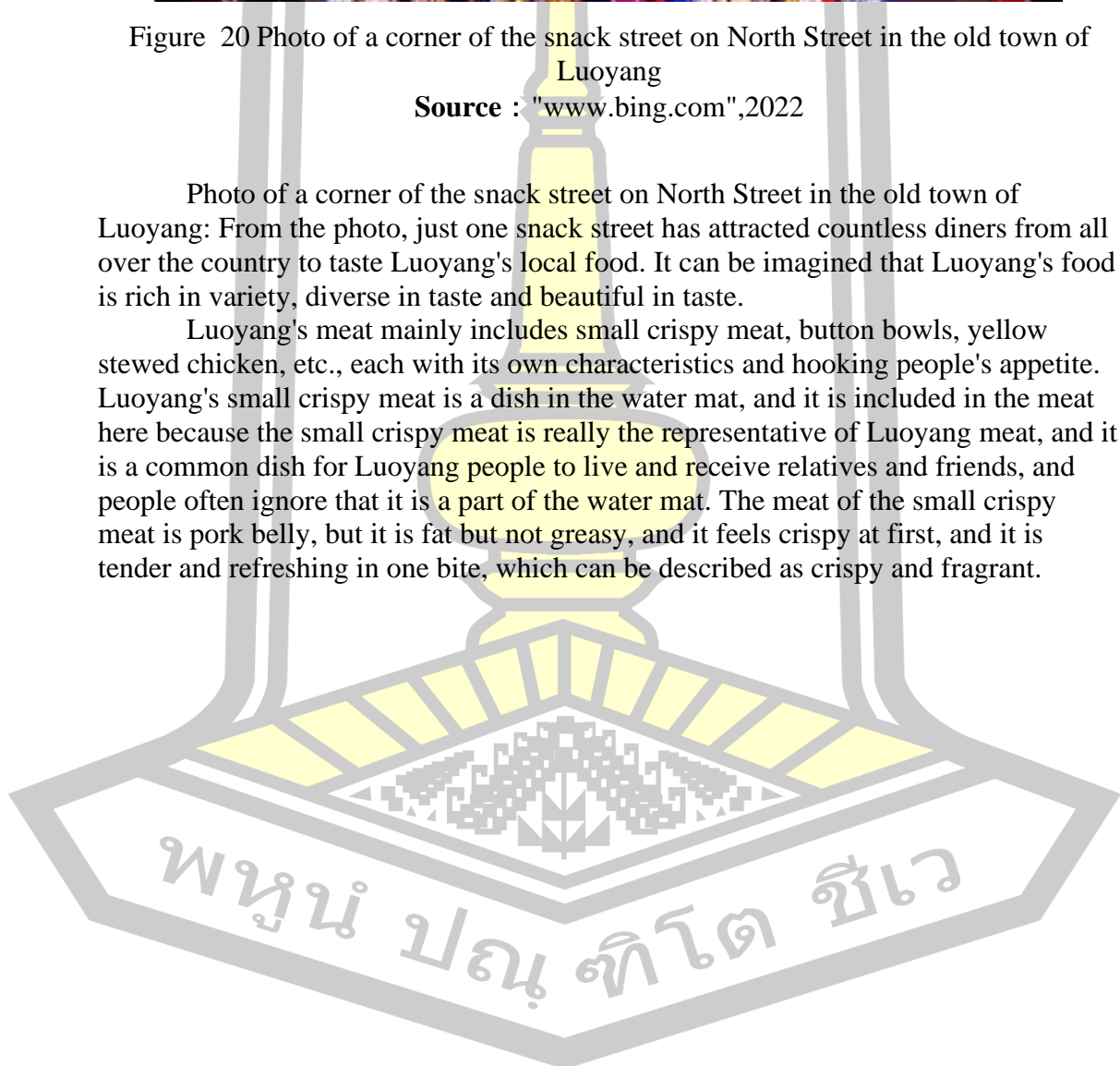




Figure 21 Luoyang small crispy meat dish photo

Source : "new.qq.com",2021

Luoyang small crispy meat dish photo: It can be seen from the photo that Luoyang's small crispy meat is also a dish containing soup, unlike the fried small crispy meat in other places, Luoyang small crispy meat is slowly cooked after frying and using soup containing pepper, pepper and other spices, which is more smooth and tender.

2.4.2 The spiritual aspect of Luoyang food culture

2.4.2.1 Soup culture

Soup, in the life of Luoyang people occupies an important position, from morning to night, you can always find a bowl of soup suitable for yourself. Water mats, beef soup, mutton soup, donkey meat soup, tofu soup, non-turning soup, and meatball soup are all soups. The old Luoyang people will meet and ask: "Have you drunk the soup?" "It can be seen that Luoyang people love soup. Luoyang people love to drink soup, all kinds of soup restaurants can be seen everywhere in the streets and alleys, some are chic decoration, some are simple and elegant, and some look like sanitary conditions, but this does not affect people's enthusiasm for drinking soup. Among these soup restaurants, there are still the largest number of snack shops, and it may be an unexpected surprise to walk into a small snack shop and grab a bowl of beef soup, with a bowl of hot soup in hand, soaked in shredded cakes, or swirling with oil.

In Luoyang, whether you are a billionaire or an ordinary person, you can freely enter and exit the soup house. The beef soup restaurant chef will kindly ask you: "Teacher, do you want meat or miscellaneous?" Clear soup fat soup? "You can add the right salt and pepper to your taste. In the West, drinking coffee with a spoon is considered a monster; In Luoyang, drinking beef soup with a spoon is also regarded as a monster. Luoyang people will choose a beef soup restaurant, a bowl of beef soup to talk about world peace, national politics, regional disputes, cultural interesting events and personal grievances, which is enough to deepen friendship. The price of beef soup in Luoyang ranges from 5 yuan, 10 yuan to 20 yuan, depending on the amount of meat, and no matter how much the price is, guests can wave dashingly after drinking a bowl of soup: "Boss, add soup!" "A bowl of beef soup can keep you from being hungry for a day and increase your work efficiency.



Figure 22 Drinking soup scene in front of Luoyang mutton soup restaurant

Source: "www.bing.com",2023

There is no distance between the soup in Luoyang and the common people, and in Luoyang City, it has been a three-step soup house since ancient times. There are a variety of soup houses in the streets. It can be seen that Luoyang people have no verbal feelings for various soups. It is this soup drinking culture that has also made Luoyang's soup culture always inherited.

Tang in Luoyang, there is no class, no wealth or poverty, embodies care, exudes friendship, is a platform for communication among Luoyang people, and is a friendship between people. Squatting under the street lamp, holding a bowl of beef soup in hand, gazing into the distance, perhaps it is the longing for distant relatives, perhaps it is a calculation of livelihood, or it may be a reflection on the unsatisfactory life. Soup is the life of Luoyang people.

2.4.2.2 Noodle culture and snack culture

Luoyang's pasta is mainly wheat, supplemented by corn, sorghum and other miscellaneous noodles, and the food structure, cooking skills and even food style are typical of the northern type, which is similar to other parts of Henan and neighboring provinces such as Shaanxi, Shanxi and Hebei. Its uniqueness lies in the special type of noodles and is often eaten with snacks.

Many noodle shops in Luoyang mainly serve syrup noodles, pasty noodles, and sweet noodles, and people will also order a shabu tripe or fried film slice and enjoy it slowly. Many small shops also sell potstickers, wontons, hot noodle corners, etc. The other category is a snack bar, mainly selling one or more types of potstickers, wontons, and hot noodle corners, but also shabu tripe. Luoyang also has many special stewed restaurants, during which Luoyang's various snacks are always indispensable.

Luoyang's noodles are mostly a combination of dishes and rice, and they are also a common meal for ordinary families. Now people's living standards have improved, but due to the influence of traditional concepts, people still like to eat traditional pasta, which is also a staple food for receiving relatives and friends. In rural areas, people would serve a large bowl of noodles, walk out of the courtyard, sit or squat or stand, and talk about their parents' shortcomings and laughter while eating.

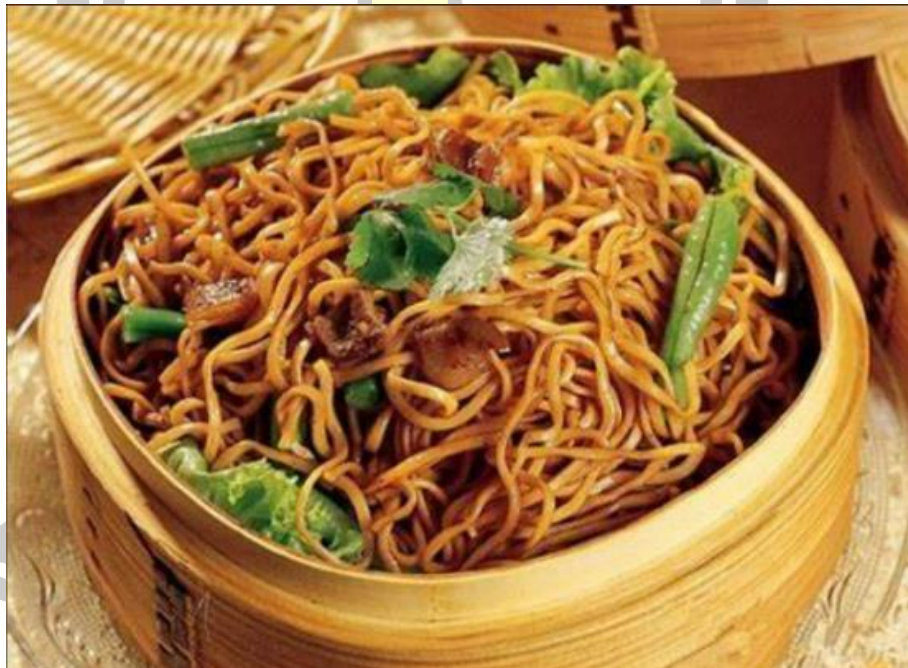


Figure 23 Luoyang marinade steamed noodles

Source: "www.bing.com",2022

Luoyang's marinated steamed noodles are made together with the dish, which is different from the noodle food in many places, where noodles and dishes are made separately. The preparation method of combining noodles can make the noodles more flavorful, and the aroma of the dishes can be immersed in the noodles. This is also the characteristic of Luoyang brine noodles..

Luoyang people love to eat noodles with snacks, of course, casual tasting of snacks is more common. The old city is the gathering place of Luoyang food, in addition to Luoyang local snacks, there are also Kaifeng snacks, Sichuan snacks, Guangzhou snacks, Taiwanese snacks, etc., people linger and eat. Many tourists come to Luoyang to taste the snacks of the old city, and the snacks highlight more cultural and leisure functions. In Luoyang, walking through the streets and alleys, you can see snack operators setting up stalls, carrying baskets, and carrying burdens, as well as Luoyang people eating around the snacks. These snacks are adapted to the times, baked sweet potatoes in winter and mung bean soup in summer, which can always bring people the beauty and leisure of life.

2.4.3 Luoyang food culture listed as an intangible cultural heritage

Up to now, there are many intangible cultural heritage items of food culture at all levels in Luoyang City. Among them, the representative list of national intangible cultural heritage is inscribed on the real different Luoyang water mat making technology; The representative works of provincial intangible cultural heritage are included Luoyang water mats, small street pot sticker making technology, old Luoyang pulp noodles, silver bar planting and cultivation and cooking skills; The representative works of intangible cultural heritage at the level of Luoyang City or county include Xin'an County Hot Noodle Corner, Luoyang Small Street Pot Stickers, Luoyang Soup Drinking Customs (Balls Soup), Luoning Sour Beef, Hengshui Yangli Braised Meat Braised Meat Braised Technique, Pingle Preserved Meat Making Technique, Yanshi Silver Bar Planting and Cultivation and Cooking Customs, Luoning Steamed Meat Making Technology, Tie Xie Mutton Soup Making Technique, Ma Jieshan Beef Soup Making Technique, Laolongmen Farmer Li's Sesame Burnt Dry Cake Traditional Technique, Feng Ji Roast Chicken Making Technique, Master Pei's Traditional Handmade Mooncake, Ruyang upper shop Zhang's twist cooking skills. Here's a detailed introduction.

2.4.3.1 Really different" Luoyang water mat

The intangible cultural heritage items of Zhendifferent Water Seat were declared by Luoyang Zhendifferent Hotel. Founded in 1895, Zhenba is a long-established hotel with a history of more than 100 years. Here, you can taste the local traditional food, and you can also appreciate the long-standing Luoyang water mat culture. The hotel's antique décor and unique flavor of the dishes are highly sought after. The real different water seats are mainly based on the palace water seats.



Figure 24 Luoyang is really different from the first eight cold dishes in the water table

Source : "baike.baidu.com",2022

2.4.3.2 Luoyang halal water mat

The creation of halal water mats is mainly made by the Hui people in the old town of Luoyang City and the Yihe District (the Chinese Hui people do not consume pork), and the food raw materials used are inconsistent with the real water mats, so the taste and dishes are different.



Figure 25 Some hot dishes in Luoyang halal water table

Source: "www.bing.com",2022

2.4.3.3 Luoyang small street potstickers



Figure 26 Luoyang small street potstickers

Source: "www.lyshangdu.com",2022

Luoyang small street pot sticker is a kind of Luoyang traditional noodle skin meat filling food, the mouth is crispy and fragrant, is currently popular with tourists Luoyang special food.

2.4.3.4 Old Luoyang pulp noodles

Every Luoyang person has a bowl of syrup noodles in their hearts. There is a folk saying in Luoyang: "There are three treasures in Henan Province, Mengjin pear, Lingbao date, and Luoyang city pulp noodles." "Old Luoyang syrup noodles are noodles cooked in soup base made by fermenting mung bean soy milk. In Luoyang City, from street restaurants to star-rated restaurants, syrup noodles can be seen everywhere. It is simple and natural, fresh and elegant, which not only nourishes generations of Luoyang people, but also leaves a beautiful aftertaste for tourists from other places.



Figure 27 Old Luoyang pulp noodles

Source: "www.bing.com",2022

2.4.3.5 Luoyang Master Silver Stripe

Yanshi silver bar is a unique root vegetable in Yanshi City, Henan Province. The shape and taste are similar to mung bean sprouts. Yanshi silver bar has a long history of cultivation, white and bright, dense texture, white and tender color, crisp and refreshing, with the functions of hangover and clearing the spirit, eliminating greasy and sharp, and enhancing appetite. It is a famous coleslaw at various banquets. According to the "Annals of Yanshi County", during the Hongzhi period of the Ming Dynasty, the silver bars of Yanshi had become a tribute to the court.



Figure 28 Luoyang Master Silver Stripe

Source: "www.bing.com", 2022

2.4.3.6 Luoyang Xinan County hot noodle corner

The traditional snack "Lao Wang Hot Noodle Corner" was created in the third year of the Republic of China (1914) and has a history of more than 100 years. At Xin'an Laowang Hot Noodle Corner Shop, a cage wrapped hot noodle corner looks very beautiful, and many people come to taste the intangible cultural heritage hot noodle corner. The filling is wrapped in a corner of the face, which is like a crescent moon, and the inside of the mouth is smooth, and the outside is wrinkled and folded, forming a lace, and the ridge is flat. The dumpling belly is concave and convex, with a unique shape and beautiful lines. Put the wrapped hot noodle horns into the cage grate and rotate them into a chrysanthemum-like shape, symbolizing good luck. Steam, 10 minutes to serve. The dumpling skin is as thin as paper, as moist as jade, with complete five flavors, fresh and fragrant, and is the best in snacks.



Figure 29 Luoyang Xin'an County hot noodle corner

Source: "new.qq.com", 2022

2.4.3.7 Luoyang soup drinking custom (ball soup)

Luoyang has a rich variety of soup, and ball soup is one of the important ones. In addition to meatballs, meatball soup should also be accompanied by blood clots, beef, fried tofu, leeks, green onions and other trimmings. The chef poured the piping hot soup into a bowl with a large spoon, and the balls were poured with hot soup, full of aroma, and they tasted charred and tender. In Luoyang, drinking soup is not only a dietary habit, but also a culture. Whether in the morning or at night, in the large and small soup restaurants all over the streets and alleys of Luoyang, you can always see people drinking soup. Soup, has been integrated into the life of Luoyang people.

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Figure 30 Luoyang ball soup
Source : "new.qq.com",2022

2.4.3.8 Luoyang Luoning sour beef

Luoning sour beef, not only delicious meat, bright soup, and rich in nutrition, the presence of vinegar in the recipe neutralizes the thickness of the beef, the strong aroma of the meat and the fragrance of the green onion, fighting each other and blending with each other, the beef entrance is sour and spicy, rotten but not melted, and the aftertaste is endless. Zhongyuan Baiji Restaurant is the birthplace of this delicacy, and the founder of Chef Bai Lin Wu is a well-known chef in the western Yu region.



Figure 31 Luoyang Luoning sour beef
Source: "new.qq.com",2022

2.4.3.9 Luoyang Hengshui salian stewed meat

Hengshui braised meat, founded by Yang Xian in 1838 in Baihe Town, Mengjin District, has been carried forward by four generations of inheritors. In 2010, the fifth-generation inheritor Yang Li moved to Hengshui Town. In 2017, "Hengshui Yangli Braised Meat" was selected as an intangible cultural heritage of Mengjin District. After five generations of inheritors have repeatedly practiced and continuously improved, Hengshui braised meat, from material selection, processing, seasoning to marinating, has strict regulations, and the procedures are numerous and not chaotic. Most tourists who visit Hengshui Town, Mengjin District, Luoyang, will try Hengshui stewed meat. Hengshui Yangli marinated meat has long become a famous food in Luoyang because of its color and aroma, smooth mouth, fat but not greasy, rotten but not melted.



Figure 32 Luoyang Hengshui salian stewed meat

Source: "new.qq.com", 2022

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2.4.3.10 Luoyang Pingle preserved meat

Pingle preserved meat is the characteristic of Pingle Village, bright color, a bite, soft tendons, salty aroma mixed with meat and starch with sour watering sauce, fragrant but not greasy, evocative. In the fifties and sixties of the 19th century, Pingle preserved meat was created by its ancestor Guo Jili. To make Pingle preserved pork, you need to use local specialty sweet potato flour, sweet potato noodles, stupid pork and local eggs as raw materials, boil the sweet potato noodles until six or seven years old, then chop, stir with minced meat, sweet potato flour, green onion, ginger, garlic, and exclusive secret seasonings, and add fresh broth; After that, spread it into cubes and fry it in oil until seven years old; Steam for another hour, cut into long strips and serve in a porcelain bowl. Since the prototype of this dish was laid out when it was made, it took its homonym "preserved meat". Today, after a hundred years of ups and downs, Pingle preserved meat is still fragrant in the ancient capital, and has become a very popular dish for people in Pingle Town and its surrounding areas, and almost every family can cook it. Here, the banquet placed on the New Year's festival or wedding and funeral is called the official table, and Pingle preserved meat is an indispensable dish on the official table.



Figure 33 Luoyang Pingle preserved meat

Source: "new.qq.com", 2022

2.4.3.11 Luoyang Luoning steamed meat

Luoning steamed pork is made of pork slices, green onions, vermicelli, noodle sauce, cornmeal, etc. stirred and steamed in a cage, the mouth is fragrant but not greasy, making people have endless aftertaste. Luoning steamed pork has special requirements for raw materials, the meat is made of fat and lean multi-layer pork belly, the ribs are made of small bones and meat, and the vermicelli uses pure sweet potato noodles. The tools used to make steamed meat are also exquisite, and iron cages and iron pots must be cast from pig iron. After coming out of the pot, the flavor is good, and the noodles do not stick one by one. Although the main ingredient of

Luoning steamed meat is vermicelli, there is not much meat, but according to the feedback of diners, the taste of noodles is more fragrant than meat.



Figure 34 Luoyang Luoning steamed meat

Source : "new.qq.com",2022

2.4.3.12 Luoyang Tie Xie mutton soup

Tiexie mutton soup is a characteristic traditional famous dish in Luoyang City, Henan Province, belonging to the Yu cuisine, the dish originated from Tiexie Village, Baihe Town, Mengjin District, about 30 kilometers away from Luoyang City. Tiexie mutton soup has always occupied a place in many soups in Luoyang area with its characteristics of long history, exquisite material selection, fine production, pure soup quality, umami and refreshing taste, appetizing and spleen-intensifying, fresh but not shuffy, and low price.

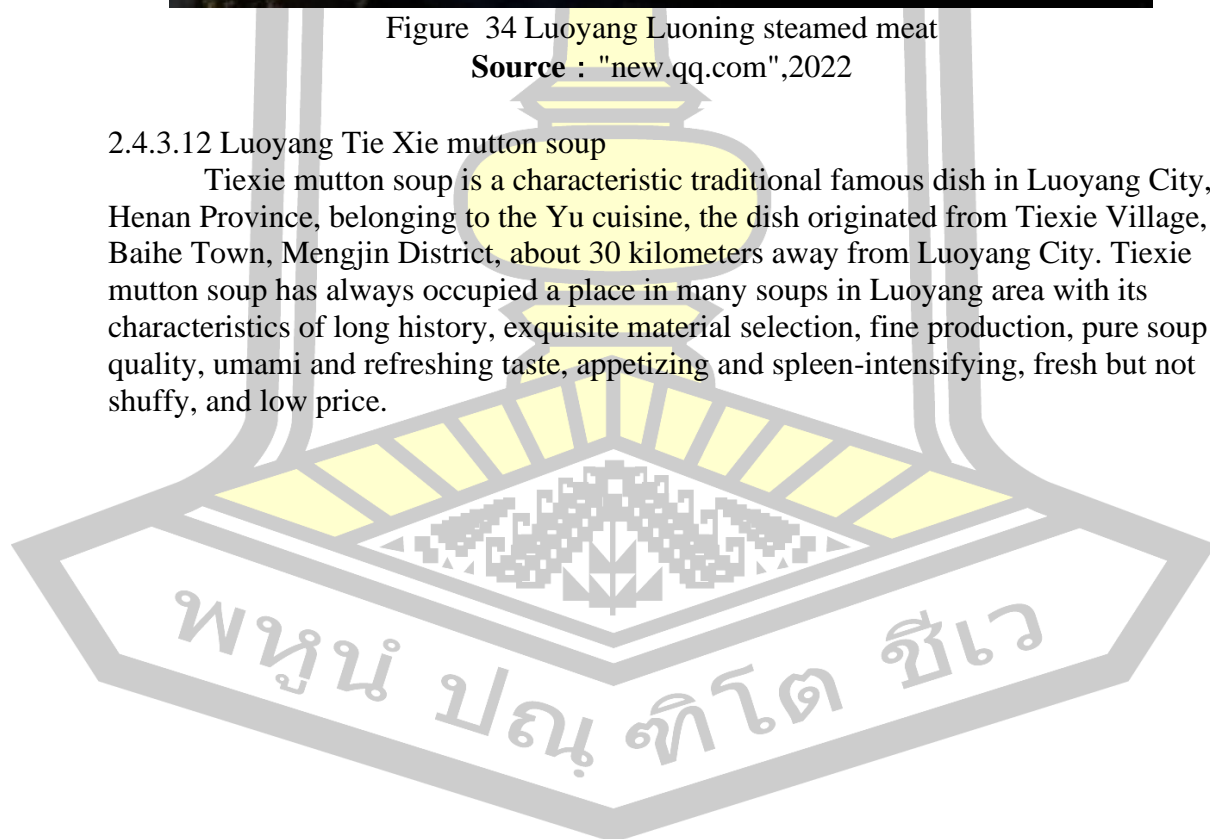




Figure 35 Luoyang Tie Xie mutton soup

Source : "baike.baidu.com",2022

2.4.3.13 Luoyang Majie Mountain beef soup

The Majieshan family's beef soup restaurant has a long history, and its ancestors can make soup back to the early years of Xianfeng in the Qing Dynasty (1851 AD). Today, 74-year-old Mr. Ma Shixian is the sixth generation heir of Ma Jie Shan Beef Soup. In order to cook a good pot of soup, the owner of the soup house starts working at 3 am every day. Washing the beef is the first process, after which the beef is put in a large pot and starts to slow cook, and around 5:30, the beef broth is cooked after nearly 2 hours. Their soup restaurant is very particular about meat, and must use four or five-year-old cows, because such cows are fed for a long time, the meat is textured, and the soup cooked is more delicious. Majie Mountain beef soup must be simmered every day when the beef is six years old, and when the soup is cooked, it must be sold while rolling until it is sold out. It is precisely with this "meticulousness" that is similar to creating handicrafts that the Majieshan beef soup with fragrant teeth and cheeks has been left behind for six generations and is still a good bowl of soup in the hearts of Luoyang people.

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Figure 36 Luoyang Majie Mountain beef soup
 Source : "new.qq.com",2022

2.4.3.14 Luoyang old Longmen farmer Li's sesame burnt dry cake

Although Li's sesame burnt dry cake is delicious, the production process is very cumbersome, and each process has high technical requirements. When mixing noodles, add salt, black sesame seeds, white sesame seeds, crush the chicken gold, cicada molt, and morning glory seeds and sprinkle them into the flour, and then beat the eggs according to a certain proportion to start the noodles. In addition to being delicious, a sesame burnt dry cake can also assist in the treatment of patients' food accumulation and gastrointestinal diseases, which is the old Longmen farmer Li's sesame burnt dry cake. The old Longmen farmer Li's sesame burnt dry cake making skills have been passed down from the Qing Dynasty to the present, and have been passed down for more than 100 years.

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Figure 37 Luoyang old Longmen farmer Li's sesame burnt dry cake

Source : "lyshangdu.com",2022

2.4.3.15 Luoyang Feng Ji roast chicken

As a traditional food of Luoning, Fengjia Roast Chicken has been passed down for more than 100 years and is an intangible cultural heritage of Luoning County. The production process of Fengjia roast chicken is roughly divided into the process of selecting chickens, slaughtering, cleaning, ingredients, stewing, drying, frying, and stewing. When selecting raw materials, we should strictly select about one and a half years of chicken, which is tender, delicious and not woody. The founder of the brand of Fengjia roast chicken making skills is Feng Tingkui, and with the efforts of the second-generation inheritor Feng Qingyun and the third-generation inheritor Feng Fengying, the roast chicken making skills have been continuously improved and upgraded to form their own unique style.





Figure 38 Luoyang Feng Ji roast chicken

Source : "lyshangdu.com",2022

2.4.3.16 Luoyang Master Pei's traditional handmade mooncakes

Chef Pei's traditional handmade mooncake was first created in 1927, Mengzhou native Lu settled in Songxian with the help of friends, and then Lu found that the local area is rich in walnuts, peanuts, almonds and other dried fruits, and felt that he had the skill of making pastries, so he opened a dim sum shop at the entrance of Pailou Alley in the old city of Songxian County. At that time, Pei Shuangxi became an apprentice in a dim sum shop and learned how to make pastries and mooncakes in less than two years. In 1931, Pei Shuangxi founded the "Rongqing" dim sum shop. Subsequently, Pei Shuangxi passed on the mooncake making skills to the three sons of the Pei family. The ingredients of Master Pei's traditional handmade mooncakes are composed of nearly 20 kinds of raw materials, such as rock sugar, peanuts, walnut kernels, sesame seeds, sunflower seeds, ginger shreds, tangerine peel, nuts and so on. The traditional handmade mooncake production processes include: noodles, mixing, wrapping, pressing, baking, packaging, etc.

พหุ ประถมศึกษา ชีเว



Figure 39 Luoyang Master Pei's traditional handmade mooncakes
Source : "lyshangdu.com",2022

2.4.3.17 Luoyang Ruyang upper store Zhang's twist

Ruyang Shangdian Zhang's 8 strands of twist flower, founded in 1898 by Zhang Xinheng's ancestors, has been passed down for five generations. Shangdian Zhang's 8 strands of twist with exclusive recipe, adhere to traditional craftsmanship, not only cooked twist flower beautiful shape, good color, twist fragrant and delicious, but also not greasy and not greasy, more popular with locals, in 2016 was named Ruyang County "intangible cultural heritage". As the saying goes, "twist always has to screw a few strands", the twist of Zhang's twist in Ruyang County Town Store is not only screwed with a few strands, but screwed with a very symmetrical 8 strands of twist flowers, which is not only beautiful, but also crispy to eat. Twist is delicious, but it is by no means easy to make, requiring ingredients, noodles, blanks, kneading, frying and other processes, especially to see the pot is the most difficult, to twist looks good, to see the pot absolutely requires excellent technology. After rubbing the twist under the oil pot, it should be constantly turned, that is, in order not to let the twist sink to the bottom, in a short period of time rapid shape, fluffy, pay attention to fast fishing, oil control, stable storage, oil temperature control directly affect the color and taste of the twist.

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Figure 40 Luoyang Ruyang upper store Zhang's twist
 Source : "lyshangdu.com",2022

2.5 Development status of Luoyang food culture

2.5.1 Characteristics of Luoyang food culture

The long history and suitable climate have made Luoyang form a unique food culture, and the characteristics of Luoyang food culture are mainly reflected in the following four aspects.

2.5.1.1 Harmonize the five flavors, taste and neutralize

Heluo area has a superior geographical location, not south, north, east and west; It is not hot, cold, dry or wet in climate; In addition, it has been in the political, economic and cultural center of the country for a long time, and has absorbed the characteristics of the north and south in terms of food customs, gathered the peculiar smells from all directions, and formed its own Heluo food culture characteristics that emphasize practicality, not on patterns, vegetarian oil and low salt, moderate seasoning, sweet and salty, rational and harmonious qi, and nourishing and beneficial. Luoyang people pay attention to health preservation, pay attention to the harmony of five flavors, and believe that this can maintain good health, which is closely related to the temperament and traditional values and aesthetic views of the people in Heluo area. (Liu Fuxing, 1999:2-3)

2.5.1.2 Coarse grains are finely made and well-made

The people of Luoyang are particular about making meals, with many varieties, and are good at coarse grain and fine cropping. Ordinary homely meals are like confused noodles, and they are also the crystallization of the wisdom of Luoyang people. Simple coarse grain noodles are astringent and sticky, poor taste, Luoyang people use corn flour with shredded carrots, dried potatoes, etc. to boil together, and finally put a small amount of white noodles, so that the taste is good, save fine grains, but also full, kill three birds with one stone. Luoyang water mat is even more delicate in production

skills, paying attention to vegetarian vegetables and meat, coarse grain fine production. Peony swallow vegetables are typical representatives of fine production. Peony swallow vegetables are like a blooming white peony floating in the soup, white and translucent, pleasing to the eye, people can't bear to move chopsticks, in fact, it is made with local radish. Other ingredients such as burnt croquettes, sea cucumbers, honey sweet potatoes, etc., are also local specialties such as radish, sweet potatoes, and vermicelli.

2.5.1.3 Local flavors

Luoyang's diet is mostly local specialties, wheat flour, cornmeal, beef, mutton, radish, vermicelli, soy products, leeks, yams, sweet potatoes, etc. are mostly locally produced, so that the material is convenient, the cost is low, and the local characteristics are highlighted. The characteristics of the water mat are that the dishes bring soup, and the soup is different, the soup is divided into clear soup and white soup, and the soup of each table often has to symmetrically distribute sweet, salty, sour, spicy and other tastes, in line with the characteristics of Luoyang people's taste and neutralization. Luoyang's beef soup is also divided into clear soup and fat soup, the taste of the freshly cooked beef soup will not be too heavy, diners can add the right amount of salt according to their taste, which fully considers the eating habits of Luoyang people.

2.5.1.4 Universality of diet

Inclusiveness is a typical feature of Luoyang's food culture. Walking on the streets of Luoyang, entering a small food shop, especially the beef soup restaurant, there are people in suits and shoes, some are dressed plainly, some come by bicycle, some come by BMW, men and women, old people and children, it can be described as all kinds of things. From the high-ranking officials and nobles to the common people, all kinds of people just want to eat. Luoyang people's love for local food is the internal driving force for the inheritance and development of Luoyang food culture. Luoyang beauty food is cheap and cheap, with an average of 0.7 yuan a hot noodle corner and pot stickers, 1 yuan a bunch of shabu tripe, 5 yuan a bowl of beef soup, 7 yuan a bowl of pulp noodles, pasted noodles, even the water mat of the palace meal for more than 10 yuan can taste a portion. As long as you want to eat, you can eat a beautiful meal for more than 10 yuan. Luoyang food is convenient to make and easy to cook, whether at home or in the hotel, whether it is a housewife or a hotel chef, you can make delicious soup or noodles. It is "cheap", "public" and "convenient" that make Luoyang diet truly integrated into people's lives.

Luoyang diet is a typical representative of Yu cuisine, rich local characteristics, moderate taste, more acceptable to the public, but compared with the "spicy" of Sichuan cuisine, the "sweet" of Cantonese cuisine, the exquisite cuisine of Huaiyang cuisine, Luoyang diet and Yu cuisine are not personalized enough. Civilian diets bring people closer, but they don't seem classy. Therefore, at present, Luoyang's food culture is divided into different scales and grades in various cuisines or soup restaurants, and also meets the needs of richer consumer groups.

Conclusion

As an important part of Luoyang's traditional culture, Luoyang food culture not only witnesses the changes of Luoyang City, but also serves as the life guidance and spiritual sustenance of Luoyang people. Through the analysis and research of the historical origin, development and formation factors of Luoyang food culture, this chapter obtains the dimensions that affect the change and development of food culture. Regional climatic conditions, economic development conditions, and political inclination conditions are all key factors affecting the formation of food culture. Through the material and spiritual analysis of the composition of Luoyang food culture, the importance of Luoyang food culture in the hearts of Luoyang people is concluded. Through the 17 kinds of Luoyang food listed as intangible cultural heritage, it can be seen that Luoyang food culture is rich, prosperous and unique, which is undoubtedly a portrayal of the life of Luoyang people. Neutral taste, excellent production, rich flavor and universal benefit to the public are not only the characteristics of Luoyang's food culture but also the embodiment of the quality characteristics of Luoyang people. Food culture is both production culture and consumer culture, in the era of commodity economy, catering enterprises, catering products and catering consumers constitute the operating body of food culture, catering enterprises are the disseminators and pioneers of food culture, food culture is an important support and the main driving force for the sustainable development of the core value system of the catering industry. Under the rapid development of the catering industry, in addition to being a carrier for the inheritance and dissemination of traditional culture, the food culture exhibition should also give full play to the function of cultural construction in the catering industry and build the cultural power and competitiveness of the catering industry.



Chapter III

The current situation and effect of Luoyang food culture

This chapter explains the current display methods and types of Luoyang food culture; The current communication effect of Luoyang food and your culture was introduced; The advantages of the spread of Luoyang food culture and the current difficulties in the dissemination of Luoyang food culture were analyzed.

3.1 The current display method and type of Luoyang food culture

3.1.1 Traditional museum display

The museum is the historical memory and spiritual home of a country and nation, as well as a cultural landmark and business card with unique characteristics and infinite charm of a city. The Several Opinions of the Henan Provincial Party Committee and the Provincial Government on Supporting Luoyang to Accelerate the Construction of a Sub-central City of the Central Plains Urban Agglomeration under the Guidance of Opening up clearly proposed to strengthen the protection and inheritance of Chinese history and culture and build an "Oriental Museum Capital". "Oriental Museum Capital" is different from the "Museum City" proposed by other cities in that it is the deepening, upgrading and prospect of the construction of Luoyang City "Museum Capital", echoes the new expectations of the construction of international cultural tourism city for the integration of museum resources into urban tourism resources, echoes the shaping of urban cultural background by the construction of Luoyang Metropolitan Area, echoes the new fashion of cultural and erudite study tourism, echoes the new positioning of the International Humanities Exchange Center, and has an international vision and open pattern.

Luoyang City has 13 dynasties built its capital here, and the city has 3 and 6 world cultural heritage sites, 51 national key cultural relics protection units, 115 provincial cultural relics protection units, and 9,000 other immovable cultural relics. According to the statistics of the first national census of movable cultural relics, Luoyang has 419918 sets of cultural relics in the collection of state-owned museums and 51,914 pieces (sets) of non-state-owned museums in the register, which provides unique conditions for the development of Luoyang museums. Up to now, there are more than 100 museums in Luoyang City alone.

Luoyang has many physical museums about food culture, and the following are five most representative physical traditional museums:

3.1.1.1 Luoyang Zhen Different Water Seat Museum

Luoyang Zhen Different Water Seat Museum is China's first thematic museum on food, and the largest water mat museum, mainly displaying Luoyang True Water Seat, Luoyang Water Seat began in the Tang Dynasty, after more than 1300 years, is one of the oldest preserved famous banquets in China, is the oldest, most distinctive and most complete set of banquets preserved so far. Because of its grand and elegant, unique flavor, wide range of fine ingredients, extremely exquisite cooking, delicious and diverse taste, comfortable and refreshing taste, won the praise of ancient and

modern Chinese and foreign guests, over the years, the majority of chefs in different restaurants on the basis of inheriting traditional cooking skills, actively explored, concentrated on development, the variety and structure of Luoyang water mat to improve and transform, to make it richer and more perfect. The so-called water mat has two meanings: first, the dishes are inseparable from the soup; The second is that the previous one to the withdraw, like moving clouds and flowing water, is called a water seat. Together with Longmen Grottoes and Luoyang Peony, it is known as the "Three Absolute of Luoyang".(Baidu Encyclopedia Luoyang Zhendifferent Water Seat Museum, 2022: Online)



Figure 41 Luoyang Zhendifferent Water Seat Museum Building
Source : "www.bing.com",2018

From the plaque of the building in the photo, it can be seen that the status of Luoyang Water Seat Museum is very high, and various honors and status blessings have attracted countless tourists and diners from home and abroad.



Figure 42 Interior view of Wuhuang Hall of Luoyang Water Seat Museum
Source : "www.bing.com",2018

It can be seen from the photos that Luoyang Water Seat Museum has rich exhibits and neatly displayed. It can better show and spread Luoyang's water mat food culture to tourists who come to visit and eat.

Luoyang Water Seat Museum was established and opened on March 30, 2013, and is currently one of the 14 private museums in Luoyang. The newly built Zhen Different Water Seat Museum is located in the lobby on the first floor of the headquarters of the "Zhen Different" Hotel, with an exhibition area of more than 400 square meters, mainly including Yi Yin Hall, Zhou Enlai Hall, Wuhuang Hall, a total of celebrity calligraphy and paintings and covering Yangshao culture and Tang, Song, Yuan, Ming, Qing, Republic of China in various historical periods of various types of catering utensils collection of more than 400 pieces, at the same time, the museum also specially set up a Luoyang water mat simulation banquet display cabinet, so that people can understand the origin of Luoyang water mat from different angles, At the same time of the production method, you can also feel the Luoyang water mat under the Sheng Tang culture. Luoyang Water Seat Museum comprehensively displays the national intangible cultural heritage, the only historical banquet with the most complete preservation in China - the historical inheritance and Tang cultural connotation of Luoyang Water Seat "Water Seat Museum", and has also become the first "edible museum" in China to comprehensively display the history and culture of water mat.

3.1.1.2 Old Luoyang Food Museum

The Old Luoyang Food Museum was established and opened on November 2, 2013, the Old Luoyang Food Museum is mainly a thematic private museum that displays and disseminates Luoyang's characteristic food culture. The museum is located at the intersection of Qingdao Road and Xiyuan Road, Jianxi District, Luoyang City. Old Luoyang Food Museum is the 21st professional museum in Luoyang City approved by the Henan Provincial Cultural Relics Bureau. The exhibits mainly focus on the catering utensils and dining scene etiquette of various periods, allowing visitors to travel through time and space to appreciate the wisdom and research of the ancients in food through these exquisite, diverse styles and historical mottled collections, and at the same time, they can more clearly feel the long history and breadth and depth of Luoyang food culture.





Figure 43 Old Luoyang Food Museum entrance inner hall

Source : "www.bing.com", 2018

From the photos, we can see the decoration style and basic display mode of the Old Luoyang Food Museum. Beginner visitors can intuitively see the exhibits and introductions about the old Luoyang food culture.

Luoyang Laoluoyang Food Museum has an exhibition area of about 560 square meters and a total of 623 collections related to food culture. These collections are selected through long-term accumulation and collection, through multi-party searching, key collection, and classification. The collection has continued from Xia, Shang and Zhou to today, and its large venue area, long historical span and many exhibits in the collection can be called the largest museum of its kind in our province. The museum has five exhibition halls, including stoneware, bronzeware, pottery, porcelain, jade, silverware, ironware, woodware, lacquerware and bambooware. Among the most precious items are Han Dynasty barbecue grills and painted four-tiered wooden food boxes. Han Dynasty barbecue stove: a ceramic oven unearthed from the tomb of the rich man in the Han Dynasty, 20 cm long, 16.5 cm wide and 14 cm high, similar in shape to a modern barbecue stove, with four legs under it, handles at both ends, two "iron rods" on the stove, 5 cicadas worn on each of them, cicada eyes and cicada wings are still clearly distinguishable despite being corroded over thousands of years. Painted four-layer wooden food box: In ancient China, "round is falling, square is box", food box is a common utensil for holding food in the old mansion. In ancient times, the gentry and celebrities, whenever they went out to visit friends, set birthday greetings or have a drink with their best friends, would prepare some food and fruits in advance as a wine dish to help the fun. This is where food boxes come in handy as food and dishes. The painted wooden food box in the Qing Dynasty is the most precious and has been recognized as a national third-class cultural relic by the Provincial Cultural Relics Bureau. This food box is 77 cm long, 36 cm wide and 93 cm high, with four layers of wood and inlaid with nipple studs. The front of the food box is painted with "Fugui Peony", and the back is painted with "Yang Liulang Hangshuai", which is very beautifully made. (Baidu Encyclopedia Old Luoyang Food Museum, 2022: Online)



Figure 44 Interior view of the tableware exhibition hall of the old Luoyang Food Museum

Source : "www.bing.com",2018

Some basic exhibition halls of the old Luoyang Food Museum are integrated with the restaurant, whether it is tourists who come to visit or diners, you can immerse yourself in the charm of Luoyang food culture.

3.1.1.3 Luoyang Museum

Founded in 1958, Luoyang Museum is a comprehensive museum integrating cultural relics collection, scientific research, exhibition and exhibition, social education and cultural exchange, collecting cultural relics from the Paleolithic period to the Ming and Qing dynasties. Henan Province Excellent Patriotism Education Base and Henan Province Science Popularization Base.



Figure 45 Exterior of Luoyang Museum

Source : "www.bing.com",2022

Luoyang Museum is one of the first first-class museums in China. It is open daily and crowded with visitors. In recent years, it has become a popular check-in place for Luoyang cultural tourism. The mantra "When you go to Luoyang, you must go to Luoyang Museum on the first stop" is also popular on the Internet.

Luoyang Museum is located in the northwest corner of Sui Tang Lifang, Luolong District, Luoyang City, Henan Province, east of Dingdingmen Ruins and Congzhengfang Amusement Park, south of Sui Tangcheng Ruins Park, north of Luopu Park, located in the core area of Sui and Tang Ruins complex, is a cultural landmark of Luoyang City. The new Luoyang Museum is planned and built by the Architectural Design Institute of Tongji University, and adopts the design concept of "Ding Li Tianxia" in appearance, and the main building is a square and streamlined Ding-shaped system, taken from the meaning of "Dingding Central Plains". The name of the museum is inscribed by Mr. Dong Biwu, the southeast of the pavilion has a statue of the Great Zhou Wanguo Songde Tianshu (one of the world's three major pillars of achievement) outside the gate of the Wuzhou Dynasty, the column head has a dew plate, holding four fiery beads of the soaring copper dragon, the overall building structure is simple and elegant, the atmosphere is majestic, fully showing the charm of the ancient capital of the thirteen dynasties of Luoyang.

Luoyang Museum is a collection of cultural relics collection, display display, education and scientific research, cultural exchanges and other multi-functional in one of the large-scale comprehensive museum, but also the first batch of national first-class museums, the exhibition area to reproduce the historical development of Luoyang in the context of the basic exhibition hall of Heluo civilization as the theme, in addition to the treasure hall, Han and Tang Dynasty terracotta figurines museum, Tang Sancai museum, stone carving museum, Wang embroidery peony art museum and other special exhibitions, in recent years relying on advanced technology with Heluo light digital museum, in addition, It also cooperated with the Palace Museum and set up special pavilions such as the Qing Dynasty Court Life Hall, which are lined with pavilions and rich collections, displaying the brilliant cultural heritage accumulated by the Heluo civilization as the "source of China" for thousands of years.

Luoyang Museum is a comprehensive museum with a wealth of food-related cultural relics exhibits. For example, the "steamer" pottery pipette and pottery stove more than 5,000 years ago, the Eastern Han pottery stove that is similar to the seven-hole pangolin stove, and the wine warmer that can be used as both warm wine and small hot pot.





Figure 46 Openwork lace copper wine warmer

Source: "wwj.ly.gov.cn.com",2022

A multifunctional small hot pot that can warm wine and cook meat. This openwork lace copper wine oven looks very similar to the small one-person hot pot that modern people usually use. In the Han Dynasty, guests were invited to eat in separate meals, and a warm wine stove was in front of each person, and the lower layer of the warm wine stove burned a fire, and the top could be used to warm wine or make a small hot pot to make shabu meat.

The prototype of the steamer. It is known as the earliest "steamer" in China. There are three bag-shaped feet under the clay pipe, the bottom can be burned, there is also a supporting role, and the clay pipe can be added to cook food. The shape of the pottery is similar to that of a pot and a bowl, and there are more ventilation holes at the bottom, just like the grate in the steamer now. The combination of pottery and tao is the earliest "steamer" in China.



Figure 47 Pottery and pottery

Source : "wwj.ly.gov.cn.com",2022

A wood-fired stove with three pots. The rectangular gray pottery stove in the exhibition hall on the first floor of Luoyang Museum is similar to the seven-hole pangolin stove, on the side of the pottery stove, there is a vent, and 3 stoves are distributed on it, which can make 3 dishes at the same time. This kind of stove was more common in rural areas in the past, and it was a wood-burning stove in the memory of many people.



Figure 48 Rectangular gray pottery stove
Source : "www.ly.gov.cn.com",2022



Figure 49 Animal Face Pattern Fang Ding
Source : "www.j.ly.gov.cn.com",2022

From a meat cooking artifact to a national heavy weapon. This bronze square with a beast face pattern in the treasure hall on the second floor of the Luoyang Museum is 36 centimeters high. During the Western Zhou Dynasty, Yuanding was the mainstream, and this high-specification Fangding could only be used by nobles. Liang Ran said that ding was originally a utensil used by people to cook and serve meat, and the bottom of the columnar foot could be used to light a fire and cook food. At the same time, the ding was regarded as a heavy weapon of national establishment in ancient times, a symbol of the state and power, this beast face pattern square ding,

named because of the animal face pattern above, is a larger and more beautifully decorated square ding unearthed in Luoyang at the same time.

In Luoyang Museum, special exhibitions or research activities related to food culture are often held. For example, the program "Museum on the Tip of the Tongue - Food Culture Discovery Tour" jointly launched with Luoyang Evening News every year is a hot registration every time, and the Luoyang food culture display is spread to more people through similar research activities.

3.1.1.4 Luoyang Sui and Tang Grand Canal Cultural Museum

The Sui-Tang Grand Canal Cultural Museum is an important node project of the construction of the National Grand Canal Cultural Belt, and an important carrier for Luoyang and even Henan to integrate into the national Grand Canal Cultural Belt construction strategy. After completion, it will provide strong support for promoting international exchanges and integration, strengthen the national cultural symbols of the Sui-Tang Grand Canal, and contribute important forces to Luoyang City to accelerate the construction of "Oriental Museum Capital" and build an international cultural exchange center.



Figure 50 Luoyang Sui-Tang Grand Canal Cultural Museum New Overview

Source : "www.bing.com",2022

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Luoyang Sui-Tang Grand Canal Cultural Museum New Museum is located at No. 171, Jiudu East Road, Luopu Street, Old Town, Luoyang City, Henan Province, with a land area of about 47.7 mu and a total construction area of about 33,000 square meters, which is a local professional canal theme museum. It officially opened on May 18, 2022. As of May 2022, the Sui-Tang Grand Canal Cultural Museum has a collection of nearly 400 pieces (sets) of cultural relics related to the Grand Canal. Luoyang Sui and Tang Grand Canal Cultural Museum is located in the center of the Sui and Tang Grand Canal - Luoyang City Luo River and Yi River confluence, the venue to "canal source, Sui Tang Yun River Luoji" as the design concept, extract the arch elements of the Grand Canal as the basic structure, one arch after another structure to support a magnificent building, but also support people's historical memory and imagination space of canal culture. The building area of the museum is 33,000 square meters. The first and second floors are the permanent exhibition of "National Fortune - Sui-Tang Grand Canal Cultural Exhibition", and the third floor is the interactive experience exhibition of "The Journey of One Grain of Rice", in addition to a temporary exhibition hall.

The overall architectural concept of the museum extracts the profile characteristics of Sui and Tang architecture, which looks like the skyline of a Tang Dynasty palace complex from a distance, highlighting the grand Tang style and cultural symbols of Luoyang's characteristics; The interior forms rich layers through concrete arches integrated into the structural space, suggesting the motif of the "canal bridge"; In terms of building materials and construction technology, through the Tang Sancai broken porcelain plate finish, the Tang style and cultural symbols of Luoyang's characteristics are highlighted; The roof and the wall are integrated together, supplemented by green bricks, fair-faced concrete and other elements, making the museum more artistic atmosphere and Luoyang characteristics.

The museum takes "National Fortune - Sui-Tang Grand Canal Cultural Exhibition" as the basic display, takes the time context throughout the history of the Grand Canal as a clue, and divides the overall content into four parts: "Shape wins the world, the center of the canal", "Millennium Canal, all things are prosperous", "the eastern capital is prosperous, the national fortune is prosperous", "Ancient and modern, long history", to tell the urban prosperity and cultural exchanges brought by the Sui-Tang Grand Canal, show the urban status of Luoyang in the center of the Sui-Tang Canal, and the background and technical achievements of the canal excavation. Present to the public the Grand Canal, an outstanding human creation and the unique value it contains.



Figure 51 A corner of the exhibition hall of "The Journey of One Grain of Rice" on the third floor of the Sui-Tang Grand Canal Cultural Museum in Luoyang

Source: "Filmed by the author himself", 2022

The "The Journey of the Transportation of One Grain of Rice" interactive experience exhibition tells the whole process of a grain of rice from collection and transportation to Luoyang, and then through processing and cooking to the people's table, through the carefully designed interactive multimedia form to fully demonstrate the great role and function of the canal transportation.

The most noteworthy is the interactive experience exhibition "The Journey of One Grain of Rice" in the exhibition hall on the third floor of the Luoyang Sui and Tang Grand Canal Cultural Museum, which tells the whole process of a grain of rice from collection, transportation to Luoyang, and then through processing and cooking to the people's table, through the carefully designed interactive multimedia form to fully demonstrate the great role and function of canal transportation. Finally, the immersive ring film of "City and Fortune" concludes, connecting cities along the Sui-Tang Grand Canal, vividly showing the thousand-year encounter between the city and the canal and the importance of promoting the development of Luoyang food culture.

3.1.1.5 Luoyang Folk Museum

Luoyang Folk Museum, located at the south end of Xinjie, Yihe District, Luoyang City, is a thematic museum of folk customs built on the Luze Guild Hall, an ancient building complex of the Qing Dynasty. Luze Guild Hall was built in the ninth year of Qianlong of the Qing Dynasty (1744 AD), covering an area of 15,750 square meters and an ancient building area of more than 4,100 square meters, built by Juluo merchants in Lu'an Fu (now Changzhi City) and Zezhou Fu (now Jincheng) in Shanxi, mainly used for gathering and distributing materials, liaison, lodging, etc., and is the product of Jin merchant culture. This ancient building is the culmination of local architectural art and French construction in the Qing Dynasty, and is one of the most complete preserved and largest ancient buildings in the Central Plains. In 1981, the relevant departments turned the Luze Hall into the Yuxi Museum, which was renamed Luoyang Folk Museum in 1987, officially opened to the public on April 14, 1988, and announced as a national key cultural relic protection unit in June 2001.



Figure 52 Luoyang Folk Museum
 Source: "Filmed by the author himself", 2022

Luoyang Folk Museum systematically introduces the folk customs of Luoyang area with the main purpose of displaying folk customs and promoting Heluo culture, mainly displaying folk cultural relics such as food customs, embroidery, beliefs, folk crafts, wedding customs, life customs, agricultural tools, and living utensils in western Yu.

Luoyang Folk Museum is now a national A-A level tourist scenic spot, one of the top ten tourist attractions in Luoyang City, a demonstration base for patriotism education in Henan Province, and an educational practice base and patriotism education base for Henan University of Science and Technology, Luoyang Normal College, Luoyang Institute of Technology and other universities, primary and secondary schools. In 2018, it was announced as a national second-class museum, and in 2019, it was announced as a demonstration base for social science popularization in Henan Province.

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Figure 53 A corner photo of the wedding customs exhibition hall of Luoyang Folk Museum

Source: "Filmed by the author himself", 2022

The wedding customs exhibition hall of Luoyang Folk Museum not only displays the wedding customs and habits of Luoyang area, but also displays and introduces the content of wedding food and banquets in Luoyang area. By combining customs and habits to display the supporting food culture, tourists can understand the reasons and customs of Luoyang food culture from multiple angles and aspects.

Luoyang Folk Museum currently has six basic displays: embroidery, beliefs, marriage, birthday, folk crafts, agricultural tools, historical photos and shadow puppets. Luoyang Folk Museum takes the display of folk customs and promotes Heluo culture as the main purpose, systematically introduces the folk customs of Luoyang area, mainly displays the food customs, embroidery, beliefs, folk crafts, wedding customs, life customs, agricultural tools, living utensils and other folk cultural relics in the western Yu region, and also collects and displays the carriages, cars, sedans and other transportation tools used by the people in the old times, and the production tools such as stone mills, stone mills, stone mortars, spinning floats, looms, etc., reproducing the old life and production scenes in Luoyang area. It provides tourists with a nostalgic visiting environment, showing the hardworking wisdom and simple folk customs of Luoyang people. The exhibits and explanations about food culture inside allow visitors to delve into customs and scenes to deeply feel. It is of great significance to the dissemination and promotion of Luoyang food culture.

3.1.2 Presentation in the context of new media

Food culture is an important cultural tourism resource, and high-quality and distinctive food experience is an important factor affecting tourists' motivation and perception. In 2017, according to the statistics of the well-known travel company Booking, nearly 75% of tourists said that they would pay special attention to places with gourmet food when choosing a place to travel, among which tourists aged 18 to

34 paid the most attention to the combination of food and travel, and nearly 80% of tourists liked to travel to places with food. (Zhu Xiaoxiang, 2010:4-6)

In the context of the new media era and the integration of culture and tourism, on the one hand, various network platforms, as important carriers of food culture communication, play an important role in expressing cultural and tourism resources, disseminating tourism information, and triggering tourism behavior, which can effectively promote the development of regional cultural tourism industry. On the other hand, rich and high-quality food culture elements can significantly enhance the connotation and influence of film and television communication. As a famous cultural tourism city, Luoyang is rich in traditional food and cultural resources, including traditional banquet dishes Luoyang water mats, as well as syrup noodles, small street potstickers, Tiexie mutton soup, Xin'an hot noodle corner and other folk famous foods. These resources provide rich story elements, cultural elements, scene elements, production factors, etc. for the spread of Luoyang food culture.

Film and television works with the theme of food culture are mainly disseminated through documentaries, movies, TV series, short videos and other forms. In recent years, with the continuous improvement of the public's aesthetic taste, the exploration and practice of visual dissemination of food culture has gradually increased, among which documentaries and short videos with the theme of food have been greatly improved in quality and quantity. (Yang Bo, 2022:1-2)

In the field of documentaries, the film "Luoyang Water Seat" released in 2012, the film takes an old chef who has been searching for the true meaning of Luoyang water mat all his life in Luoyang Zhen Different Hotel as the protagonist, telling the family changes, children's marriage, master-apprentice concept that happened around him, and the twists and turns of his final success in excavating and restoring Luoyang water mat, a Tang feast, explaining the true meaning of Luoyang water mat - family, family affection, and reunion. With the help of the promotion and dissemination of the film, more people have learned about the food culture of Luoyang Water Table.





Figure 54 Movie "Luoyang Water Seat" poster
Source : "movie.douban.com", 2022

The film combines the food culture of Luoyang water mat with film art, and under the performance of modern media technology, it not only shows the audience the oriental food wonder, but also spreads its own ancient wisdom and splendid culture to a broader field and a higher level, so that more consumers can smell its fragrance before tasting its taste, and know its name without understanding its meaning.

In 2021, guided and initiated by the Chinese Society of Cultural Relics, and co-sponsored and guided by the UNESCO Delegation in China, the State Administration of Cultural Heritage, the Department of Resource Development of the Ministry of Culture and Tourism, the Publicity Department of the State Administration of Radio, Film and Television, the Institute of Cultural and Creative Development of Tsinghua University, and the Institute of Journalism and Communication of the Chinese Academy of Social Sciences, China's first non-fiction cultural variety show on World Heritage Visits broadcast on Zhejiang Satellite TV on weekends was recorded in Luoyang with the theme of "The 'Eastern Starting Point of the Silk Road' is the entrance, telling the historical culture and customs and food culture stories behind Luoyang. It not only meets the public's demand for understanding Luoyang culture, but also makes the audience have a sense of closeness when treating cultural relics, thereby prompting them to understand cultural relics and understand Luoyang traditional culture. By telling the key points of Luoyang's history and culture, this program attracts the audience to take the initiative to go to Luoyang to explore and feel Luoyang's history and food culture. After the first episode of the

program was broadcast, the ratings ranked third in the variety show category in the same period, and the topic of the whole network's public opinion popularity list ranked first, and the first episode of the broadcast won 23+ hot searches on the whole network, of which #How exquisite can the desserts of the Tang Dynasty be## Thousands of miles to ride the second season of the start of the broadcast# and other topics have continuously appeared on the Weibo hot search list. The program tells and disseminates the world cultural heritage through a very homely and pyrotechnic way, and has been praised and reported by many mainstream media such as People's Daily, Guangming Daily, Hong Kong Wen Wei Po, as well as government media such as the State Administration of Cultural Heritage and the Henan Provincial Department of Culture and Tourism. Many netizens said, "Thanks to this show, I have experienced the charm of our national essence, and I also realized that promoting traditional culture has always been something that should be done", "I always felt that the world heritage was too far away from us, but now I suddenly find that it is actually around us", "It really allows us to see the prosperous Tang Dynasty, every smile, every move, all contain the style".



Figure 55 In the second season of Zhejiang Satellite TV's variety show "Thousands of Miles of Single Riding - China in the Heritage", the Wanli Youth Group tasted Luoyang's traditional food banquet and dessert clips

Source : "new.qq.com", 2022

In the second season of "Thousands of Miles of Single Riding - China in the Heritage", the guests walked into Luoyang City in the first issue. Starting from a steaming bowl of beef soup, the Wanli Youth Group walked through Luoyang City in Han Wei, Yingtianmen Ruins in Sui and Tang Dynasties and other places, watching Luoyang traditional dramas and tasting Luoyang traditional food to feel the ancient life passed down for thousands of years step by step.

In the field of variety shows, in 2017, China Central Radio and Television variety channel "China on the Tip of the Tongue - Luoyang Chapter", the whole episode tells and shows Luoyang's non-turning soup, as well as the story and production process about the food culture of non-turning soup. At that time, Luoyang non-turning soup is famous, and tourists from all over the world come to Luoyang for their first meal is to taste Luoyang's non-turning soup. In the documentary "China on the Tip of the Tongue - Luoyang Does Not Turn Soup", more with the relaxed and fast narrative rhythm and exquisite and delicate pictures from the first perspective, showing the audience, especially overseas audiences, Luoyang's daily dietary changes, the rich experience accumulated by Luoyang people in diet, the wide variety of eating habits and unique taste aesthetics, as well as the oriental life values that rise to the level of survival wisdom. The variety show fully shows the origin, raw material selection, production technology, and tourist evaluation of Luoyang soup to audiences around the world.



Figure 56 Clip of China Central Radio and Television's variety show "China on the Tip of the Tongue - Luoyang Does Not Turn Soup"

Source : "v.qq.com", 2022

In 2020, iQiyi's exclusive comic "The Wind Rises Luoyang: The Rotting Grass is Ying" was broadcast online, showing Luoyang's customs, living habits, urban style construction and food culture through the perspective of comics. Loved by audiences in the manga industry.

พหุ ม ประ โท ชี เว



Figure 57 iQIYI exclusive comic "Fengqi Luoyang's Rotten Grass for Ying" poster

Source : "baike.baidu.com", 2022

"Feng Qi Luoyang's Rotten Grass for Firefly" is a suspenseful, fantasy, and love comic created by iQIYI Comics, which promotes Luoyang's customs, life and eating habits through comic controversy and living life. The comic was serialized on the iQIYI Comics website.

In 2021, Hunan Satellite TV's "Debut, Luoyang" was recorded in Luoyang for half a year, and the program is a panoramic humanistic exploration program. In the ancient capital Luoyang Jiuzhou Pond there is a Shendu Academy, which is the base camp of the Luoyang Exploration Group, each program, they through the national treasure-level cultural relics in the museum, they carry out an immersive exploration journey with different themes, get the core information, and together with the restorers, present eight Luoyang highlight shows, panorama shows the infinite charm of Luoyang's ancient and modern brilliance. The multi-dimensional upgrade of the "Debut" series shows the Chinese roots and Chinese pride flowing in Luoyang in "Among the World" in a more refined way. In addition to the restorers, experts and scholars with strong ties to Luoyang culture also formed a mentor group of Shendu Academy, they are cultural scholar Yu Gengzhe, archaeologist Wang Xianqiu, archaeologist Shi Zishe, director of Longmen Grottoes Research Institute Shi Jiazhen, archaeologist Xu Hong, director of Luoyang Museum Li Wenchu, director of Henan Thousand Tang Zhizhai Museum Chen Huarong, archaeologist Qian Guoxiang, national first-class writer Mei Yi, experts and scholars from all walks of life gathered here, with professionalism and perseverance, so that those cultural relics left in the long years shine again.



Figure 58 Hunan Satellite TV's "Debut, Luoyang" poster and guests and food skills inheritors making Luoyang food together

Source : "baike.baidu.com",2022

Hunan Satellite TV's "Debut, Luoyang" deeply experienced Luoyang's customs and prosperity through program guests, and participated in the production and tasting of Luoyang food. After the program was broadcast, it was loved by the national audience. It further promoted Luoyang's food culture.

Luoyang cuisine recorded in the 5th and 6th episodes of the second season of the 2022 Oriental Satellite TV variety show "Check in the Foodie Group". Food culture is an important part of the long and splendid culture of the Chinese nation, with the rapid development of society and the continuous improvement of people's living standards, food check-in is becoming an increasingly popular way of life. In this context, "Check in! The second season of "Foodie Group" writes the "big chapter" of Chinese culture through the "small cut" of Chinese food, shows the national characteristics and life philosophy of the Chinese nation in a down-to-earth way, and experiences the imperial examination system of the Tang Dynasty as Tang Dynasty candidates through the guests of the program, and feels the history and humanistic heritage of the ancient capital Luoyang through food culture. The guests of the program conducted a etiquette exam and let the audience know Luoyang food culture by rushing to answer the dining etiquette of Luoyang and the Tang Dynasty. At the same time, under the leadership of the inheritors of Luoyang food skills, guests will taste and produce Luoyang street specialties, and invite passers-by to evaluate and other ways to display Luoyang food culture. It conveys the spirit and style behind Chinese cuisine.





Figure 59 Poster for the second season of the Oriental Satellite TV variety show "Check in the Bar Foodie Group"
 Source : "baike.baidu.com", 2022

Punch in! "Foodie Group" interprets the local cultural customs through the method of "food + travel", travels through various places, crosses mountains, rivers, lakes and seas, plays Luoyang cuisine, and triggers the exclusive taste of the hometown that cannot be forgotten for a long time. The show emphasizes the importance and ritual sense of "eating well" through the form of check-in food, and "eating well" is living well. In the show, eating is not only a monotonous action that must be clocked in every day, but also gives the meal a deeper content, and each meal has a unique memory.

In the field of TV dramas, the 2021 TV series "Fengqi Luoyang" has more space to express the food culture of the ancient Luoyang area. In "The Wind Rises in Luoyang", Baili Hongyi, played by Wang Yibo, is the first gluttony in Shendu, as the name suggests: a food critic of the Tang Dynasty, a humanoid public commentator. Usually likes to explore the store, the specialty is to discover the Black Pearl restaurant, and according to the taste: acceptable, very good, excellent. "The Wind Rises in Luoyang" is a hit, and overnight, everyone wants to go to Luoyang. Luoyang has leapt from a thousand-year-old capital to a newly promoted Internet celebrity city. At the same time, Luoyang cuisine took the lead in the circle and became a hot spot for discussion among netizens. The Luoyang delicacies such as black fish, ice cheese, mutton soup, and water mats that appeared in the play made many netizens moved. It further promoted the spread of Luoyang food culture. Driven by this TV series, the topic brought by Luoyang food has appeared on the Weibo hot search list several times, and many netizens have expressed their desire to taste food in Luoyang. These intentions have an important impact on the tourist's decision on where to go, and even become the direct motivation for the tourist's trip.



Figure 60 iQIYI TV series "Fengqi Luoyang" poster

Source: "baike.baidu.com", 2022

In terms of the development and promotion of urban image IP, in 2021, iQIYI officially launched the "Luoyang" IP linkage plan, announcing that it will carry out subdivided development in 12 fields including comics, dramas, variety shows, online movies, animation, games, documentaries, stage dramas, VR full-sense movies, cloud performances, derivatives, and real estate around the "Luoyang" IP, so as to build an entertainment ecology of "one fish and twelve eats". It has become a panoramic case presentation of iQIYI's "one fish eats more" business model. Fully display Luoyang's cultural heritage, customs, mountain scenery, and delicious food.



Figure 61 "Luoyang" IP launch ceremony poster

Source: "baike.baidu.com", 2022

In the field of short video platforms, the first Henan (Luoyang) Kuaishou Internet Celebrity Cultural Tourism Conference, hosted by the Henan Provincial Department of Culture and Tourism, Henan Provincial Internet Information Office and Luoyang Municipal People's Government, and undertaken by Luoyang Municipal Bureau of Culture, Radio, Television and Tourism and Beijing Kuaishou Technology Co., Ltd., was officially launched. From July to October 2020, the four-month "Meet Kuaishou, Hi in Luoyang" Internet celebrity cultural tourism promotion conference invited nearly 300 coffee-level Internet celebrities from the short video platform to gather in Luoyang, and nearly 300 Internet celebrities spread Luoyang to audiences around the world through short video shooting in Luoyang's life, tourism, and meals. Kuaishou will talk about Luoyang's customs, magnificent mountains and rivers, rich history, cultural landscapes, and tempting food to netizens on major short video platforms through Kuaishou Big V Travel Auction + live broadcast. It has further promoted the spread of Luoyang food culture.



Figure 62 "Meet Kuaishou, Hi in Luoyang" Internet Celebrity Cultural Tourism Promotion Conference Launching Ceremony

Source: "baike.baidu.com", 2022



3.2 The current spread effect of Luoyang food culture

Luoyang, living in the world, since the opening of the heaven and earth, since the three emperors and five emperors, with its great beauty of heaven and earth, has become the ancient capital of the "Thirteen Dynasties" envied by heaven and everyone. As an extension of the imperial city's court diet, the official cuisine, temple cuisine, folk cuisine, farm native cuisine, market snacks, etc. accumulated and derived from this are many categories and unique, which is the root culture of Chinese food culture. With the change of regime and the southward migration of the capital, these dishes are like dust of history, which has long been lost in the people of Heluo. But the years still can't take away the familiar "faces", they are like the old streets, villages, wells, and houses left by the old capital, all faintly showing the royal vein, exuding a simple and vicissitudes of nostalgia.

In the 80s of last century, with the reform and opening up and the gradual development of the catering tourism market, the Luoyang municipal government began to pay attention to catering. Bai Guangdi, then executive vice mayor, and Zhang Shijun, vice mayor, presided over government meetings to study the excavation of Luoyang water mats and Luoyang's local famous foods, established a leading group and the municipal culinary association, and issued relevant incentive policies. However, because people still stay in the concept of food and clothing, and do not realize the foreseeable potential significance of catering, so for a considerable period of time, although Luoyang's famous food occasionally appears like a meteor among the people, it is still buried deep in the mountains and no one knows.

However, with the opening of Luoyang's tourism market, the government has pushed for the rapid spread of Luoyang's food culture in Luoyang, the thousand-year-old ancient capital of Luoyang. At present, online hot words such as "Luoyang cuisine", "Luoyang diet", "Luoyang beef soup" and "Luoyang water mat" frequently appear in online short videos. It attracts many tourists to come to Luoyang to taste Luoyang food.

According to the two short video apps and long video websites that are currently popular in China, the number of topics related to Luoyang food on the above video data is cited to analyze the spread effect of Luoyang food culture:



Table 3 Douyin APP, Kuaishou APP, Bilibili website about Luoyang food topic cited data

Short video platform	The name of the topic	Topic citation video volume	remark
Douyin APP	Luoyang cuisine	1 billion times	
Douyin APP	Luoyang Food Guide	190 million times	
Douyin APP	Luoyang beef soup	54.729 million times	
Douyin APP	Luoyang Food Exploration Shop	38.385 million times	
Douyin APP	Luoyang soup culture	13.762 million times	
Douyin APP	Luoyang Food Guide	10.872 million times	
Douyin APP	Luoyang food recommendation	10.761 million times	
Douyin APP	Luoyang snacks	12.371 million times	
Douyin APP	Which Luoyang beef soup is good	7.811 million times	
Douyin APP	Old Luoyang beef soup	5.163 million times	
Douyin APP	Henan Luoyang cuisine	3.831 million times	
Douyin APP	Dahenan Luoyang cuisine	6.662 million times	
Douyin APP	Luoyang gourmet Saint Roni	5.454 million times	
Kuaishou APP	Beef broth	270 million times	
Kuaishou APP	Luoyang cuisine	12.531 million times	
Kuaishou APP	Luoyang water mat	6.019 million times	
Kuaishou APP	Luoyang beef soup	5.753 million times	
Kuaishou APP	Luoyang traditional food	1,676,000 times	
Kuaishou APP	Beef broth recipe	3,453 million times	
Kuaishou APP	Luoyang Food Guide	1,651,000 times	
Kuaishou APP	Luoyang small street Tianfu	118,000 times	
Bilibili	Luoyang cuisine	1020 themed videos	Some videos have been viewed more than 5 million times
Bilibili	Luoyang beef soup	Nearly 1,000 themed videos	Some videos have been viewed by more than 4 million people
Bilibili	Luoyang water mat	Nearly 1,000 themed videos	Some videos have been viewed more than 5 million times

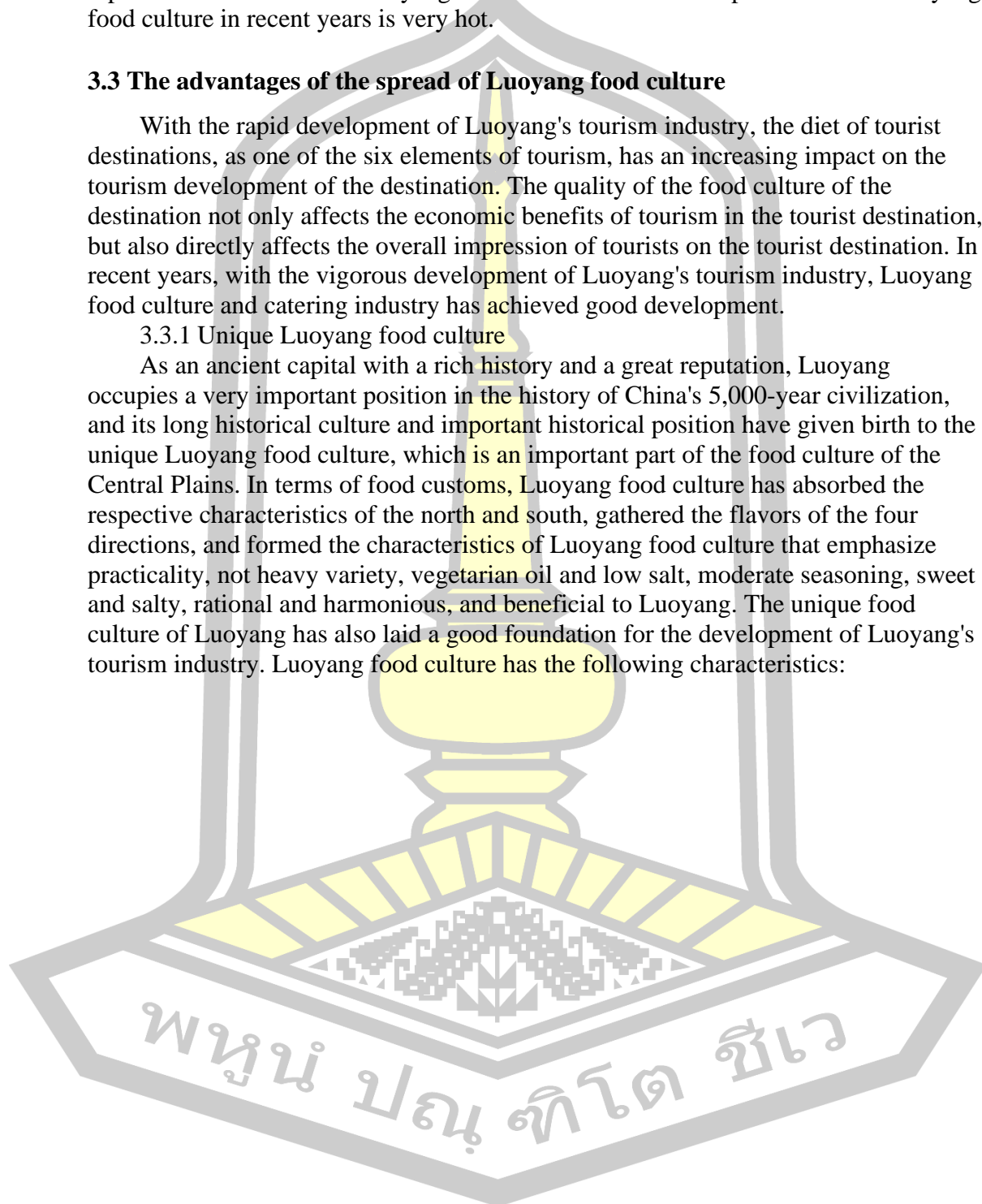
Through the above two short video platforms Douyin and Kuaishou and the video resources of the independent open long video platform Bilibili, the number of topics and citations about Luoyang food can be seen that the spread effect of Luoyang food culture in recent years is very hot.

3.3 The advantages of the spread of Luoyang food culture

With the rapid development of Luoyang's tourism industry, the diet of tourist destinations, as one of the six elements of tourism, has an increasing impact on the tourism development of the destination. The quality of the food culture of the destination not only affects the economic benefits of tourism in the tourist destination, but also directly affects the overall impression of tourists on the tourist destination. In recent years, with the vigorous development of Luoyang's tourism industry, Luoyang food culture and catering industry has achieved good development.

3.3.1 Unique Luoyang food culture

As an ancient capital with a rich history and a great reputation, Luoyang occupies a very important position in the history of China's 5,000-year civilization, and its long historical culture and important historical position have given birth to the unique Luoyang food culture, which is an important part of the food culture of the Central Plains. In terms of food customs, Luoyang food culture has absorbed the respective characteristics of the north and south, gathered the flavors of the four directions, and formed the characteristics of Luoyang food culture that emphasize practicality, not heavy variety, vegetarian oil and low salt, moderate seasoning, sweet and salty, rational and harmonious, and beneficial to Luoyang. The unique food culture of Luoyang has also laid a good foundation for the development of Luoyang's tourism industry. Luoyang food culture has the following characteristics:



3.3.1.1 Characteristic "Luoyang Water Table" banquet culture

Represented by "Luoyang Water Table", the banquet culture is a unique food culture born in Luoyang area. This banquet is known as "Luoyang Water Table" because of its strong local flavor in Luoyang and the serving procedure of the dishes that are not separated from soup and running water. "Luoyang Water Table" is the result of the development of Luoyang food culture, and it is also an important part and typical representative of Luoyang food culture. Its representative dish is Luoyang peony swallow dish, which is one of the most representative dishes carefully made. The commonly used methods of water mat cooking are mixing, boiling, marinating, burning, grilling, stewing, stir-frying, steaming, etc.; The second is the unique serving procedure, which reflects a major feature of this banquet. There are a total of 24 dishes in total, divided into four large dishes, eight medium dishes, and four table dishes; The third is unique containers, and Luoyang water mats also have relatively strict customs requirements for containers. Plates and bowls require porcelain, and bowls are used for hot dishes, one is convenient for holding soup, and the other can serve more dishes, to show that the host is sincere and generous.

3.3.1.2 A variety of flavored snacks

Luoyang style snacks have a long history, coarse grains are finely made, fine grains are skillfully made, and Luoyang traditional flavor snacks with distinctive personalities have been produced. Soup as the main snack is a major feature of Luoyang, and it is difficult to find anything comparable to any other city, which can really be described as a five-step shop, a ten-step shop, mainly donkey meat soup, beef soup, mutton soup, ball soup, non-turning soup, etc. In addition, pot stickers, egg scones, green onion oil cakes, small oil rolls, small oil swirls, and pulp noodles all have local characteristics.

3.3.2 Luoyang catering enterprises have a good development momentum

With the profound influence of food culture and the support of relevant departments, a number of tourism catering enterprises with Luoyang that can show Luoyang food culture have emerged, such as Luoyang Zhenji Hotel, Luoyang Restaurant, Old Luoyang Noodle Restaurant, etc., these enterprises have considerable scale and market competitiveness. Founded in 1895, Luoyang Zhenji Hotel is a time-honored Chinese restaurant, a famous Chinese restaurant, an international restaurant, and the main reception "window" of Luoyang City. There is a saying among the people that "if you don't enter the real difference, you haven't arrived in Luoyang City". At the end of 2009, Luoyang Water Table became the "First Banquet in China" recognized by the Ministry of Commerce and the China Hotel Association.

Luoyang's superior tourism resources and location conditions make Luoyang the preferred tourist destination for many tourists at home and abroad, and tourism has become a pillar industry of Luoyang City. According to the statistics of Luoyang Tourism Bureau, in 2008, Luoyang received 45.67 million tourist tourists, including more than 200,000 inbound tourists, and the broad source market laid a good foundation for the development of Luoyang tourism catering.

3.3.3 Luoyang food culture has a broad source market

Luoyang's superior tourism resources and location conditions make Luoyang the preferred tourist destination for many tourists at home and abroad, and tourism has become a pillar industry of Luoyang City. According to the statistics of Luoyang Tourism Bureau, in 2008, Luoyang received 45.67 million tourist tourists, of which more than 200,000 were inbound tourists, and the broad source market laid a good foundation for the development of Luoyang tourism and catering.

According to the information in the "Luoyang Tourism Development Report" released by the Luoyang Municipal Government in 2010, during the "Eleventh Five-Year Plan" period, Luoyang received 227 million tourists, with an average annual growth of 20.96%. Among them, 1,596,200 inbound tourists were received, with an average annual increase of 19.43%; The number of domestic tourists received was 225 million, with an average annual growth of 20.97%; The total tourism revenue was 111.44 billion yuan, with an average annual growth of 21.61%. In 2016, during the Luoyang Heluo Cultural Tourism Festival (September 17 to October 7), a total of 11,419,200 domestic and foreign tourists were received, with a comprehensive tourism income of 7.131 billion yuan.

In 2019, Luoyang received 142 million tourists throughout the year, and its comprehensive tourism revenue has exceeded 132.102 billion yuan.

During the 8-day holiday of the Eleventh National Day in 2020, Luoyang received a total of 7.0235 million tourists, with a comprehensive tourism income of 6.359 billion yuan.

In 2021, Luoyang received 249.27 tourists during the three-day holiday of Qingming Festival, with a comprehensive tourism income of 2.091 billion yuan.

In 2022, according to Luoyang Evening News: Sohu.com announced the ranking of China's top 100 city tourism, and Luoyang ranked 5th. Affected by the new coronavirus, Luoyang received 3,576,900 tourists during the Spring Festival in 2022, with a comprehensive tourism revenue of 1,712.87 million yuan. In the same year, Luoyang received 6,236,300 tourists during the seven-day holiday of the Eleventh National Day.

In 2023. According to the data of Tongcheng Tourism Platform, Luoyang received a total of 5.9386 million tourists during the seven-day Spring Festival holiday, with a total tourism revenue of 3.228 billion yuan.

At the same time, Luoyang was included in the list of key tourism cities in the "14th Five-Year Plan" for tourism development issued by the State Council of China. The Sui and Tang Luoyang City National Archaeological Site Park project was selected as a national cultural and tourism investment and financing project and invested 50 billion yuan, building Luoyang into a "special cultural zone". (NetEase, 2022: Online)

According to the above Luoyang tourism data analysis, the market of Luoyang food culture is very broad.

3.4 The dilemma in the spread of Luoyang food culture

In recent years, with the vigorous development of Luoyang's tourism industry, Luoyang's catering market has also developed rapidly. At present, the turnover of Luoyang's tourism catering industry has also maintained double-digit rapid growth for many consecutive years. And a number of diversified comprehensive enterprises integrating catering, culture and tourism have emerged. However, compared with other cities with developed tourism catering and catering, there are still some shortcomings in the development of catering industry in Luoyang. Therefore, in the face of the current situation, how to give full play to the advantageous conditions and take measures to promote the rapid development of Luoyang's tourism catering industry has become an urgent problem to be solved in the development of Luoyang's tourism industry.

3.4.1 The catering market is small

In countries and regions with developed tourism, the income of tourism, catering and catering accounts for about 30% of the total tourism revenue. Compared with these areas, the scale of Luoyang's catering market is more obviously small. At present, Luoyang's tourism catering revenue only accounts for about 20% of Luoyang's tourism revenue. Tourism catering income is significantly lower than the level of tourism-developed areas.

3.4.2 Food culture has not been fully excavated and publicity is not in place

With the improvement of people's consumption level, tourists increasingly want to experience the unique food culture of tourist places. However, in the process of the development of Luoyang catering, some catering enterprises have neglected the excavation and development of local delicacies, and lacked the excavation and refinement of the connotation of Luoyang food culture. This inevitably makes it difficult to improve the level of tourism and catering consumption of tourists, and it is also difficult to have a deep understanding of Luoyang's food culture. In addition, Luoyang tourism publicity has not yet regarded tourism catering products as the basic components of the overall tourism products, and the publicity of Luoyang food culture is small, which affects the comprehensive economic benefits of Luoyang tourism.

3.4.3 The environment for eating and drinking needs to be further improved

The state of a local catering service industry is also one of the image windows of a city. The quality of the catering environment will directly affect the first impression of tourists on the tourism catering of the entire city. The operating environment and service level of small and medium-sized restaurants in Luoyang City are generally not high, and the outstanding problems are manifested in poor sanitary conditions and poor dining environment. These will directly leave a bad impression on tourists and affect tourism food consumption.

3.4.4 The quality of some catering workers is not high

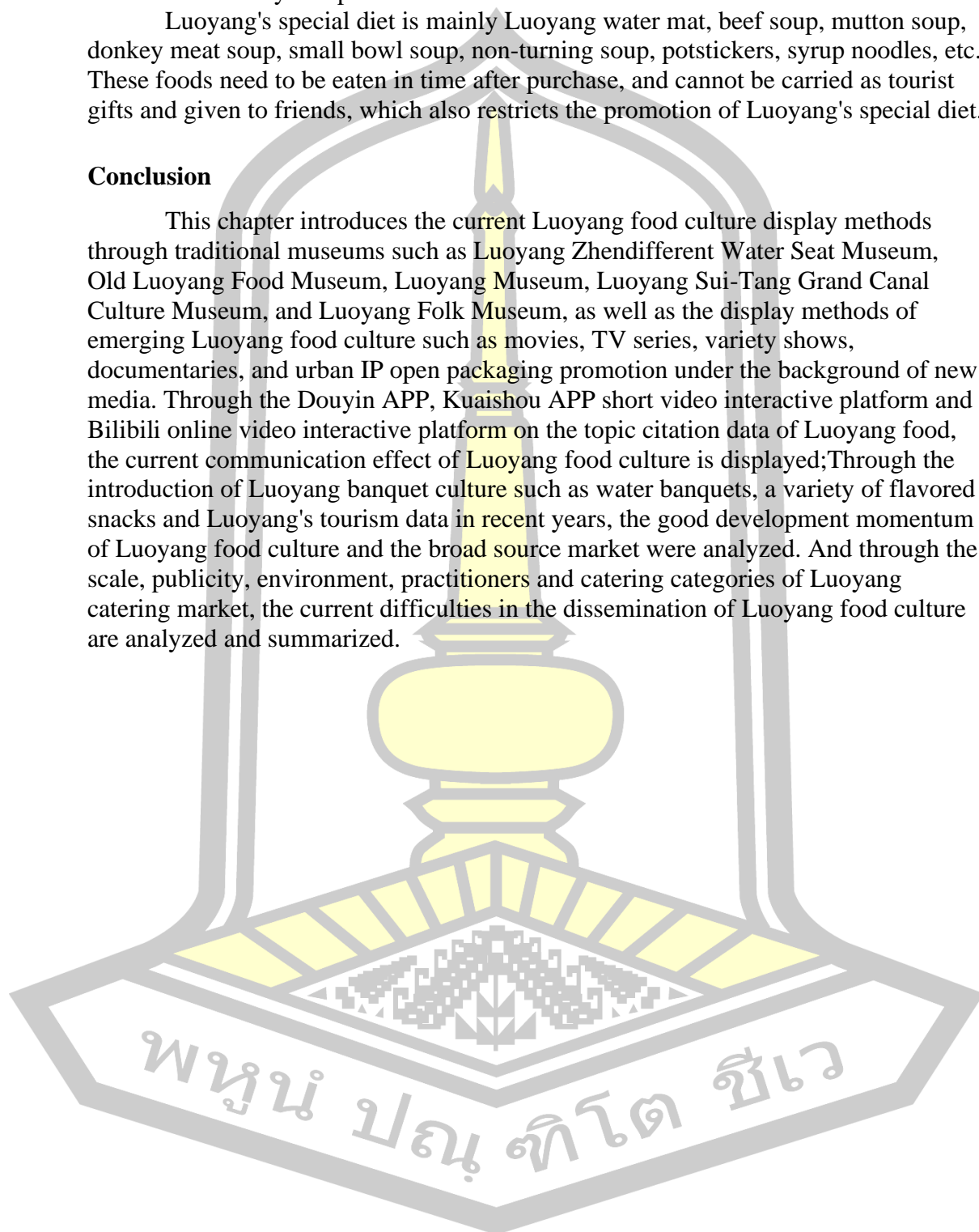
Compared with other cities in the country, the cultural quality of the managers and service personnel of some tourism catering enterprises in Luoyang is generally low, resulting in weak and low corporate culture content, and it is difficult to shape a good corporate image and promote national food culture. In addition, due to the aging and weakening of the chef team, the overall quality of chefs has declined, and some traditional snacks have lost their due flavor.

3.4.5 Luoyang's special diet is mainly an existing food, which is not convenient to carry and promote

Luoyang's special diet is mainly Luoyang water mat, beef soup, mutton soup, donkey meat soup, small bowl soup, non-turning soup, potstickers, syrup noodles, etc. These foods need to be eaten in time after purchase, and cannot be carried as tourist gifts and given to friends, which also restricts the promotion of Luoyang's special diet.

Conclusion

This chapter introduces the current Luoyang food culture display methods through traditional museums such as Luoyang Zhendifferent Water Seat Museum, Old Luoyang Food Museum, Luoyang Museum, Luoyang Sui-Tang Grand Canal Culture Museum, and Luoyang Folk Museum, as well as the display methods of emerging Luoyang food culture such as movies, TV series, variety shows, documentaries, and urban IP open packaging promotion under the background of new media. Through the Douyin APP, Kuaishou APP short video interactive platform and Bilibili online video interactive platform on the topic citation data of Luoyang food, the current communication effect of Luoyang food culture is displayed; Through the introduction of Luoyang banquet culture such as water banquets, a variety of flavored snacks and Luoyang's tourism data in recent years, the good development momentum of Luoyang food culture and the broad source market were analyzed. And through the scale, publicity, environment, practitioners and catering categories of Luoyang catering market, the current difficulties in the dissemination of Luoyang food culture are analyzed and summarized.



Chapter IV

Development Status and Application of Digital Pavilions

This chapter explains the concept, characteristics and functions of digital pavilions; The origin and development history of the digital pavilion were introduced; By introducing and analyzing the construction status of foreign digital exhibition halls and the current situation of domestic digital exhibition hall construction, the development comparison is carried out, and the experience of China's digital exhibition hall construction and development in the future is summarized. At the same time, according to the characteristics and development of the digital exhibition hall, the advantages and necessity of building a digital exhibition hall of food culture are summarized.

4.1 Overview of the Digital Pavilion

4.1.1 Digital pavilion concept

Throughout the long history of mankind, museums have existed as institutions for the collection, protection and presentation of human cultural heritage. The digital museum is a museum that presents the functions of traditional museum collection, display, education, research and other functions in a digital form. To borrow the definition of digital museum in the book "Digital Museum and Related Issues": "Digital museum is a combination of computer science, communication and museology, collecting, managing, displaying and processing information of all cultural relics (including movable and immovable cultural relics) in digital form, and providing the audience with information service systems for digital display, education and research through the Internet."

With the rapid development of information technology, digital museums have emerged at home and abroad and developed rapidly. Digital museums can be understood as a manifestation and product of applying information technology to museum construction. Along with the digitalization and informatization of museums, many similar concepts have emerged during the same period, such as digital museums, digital museums, digitalization of museums, virtual museums, online museums, digital space museums, etc. (Mingdi Wang, 2015:1-2)

4.1.2 Features of the digital pavilion

Traditional museums, as non-profit social service institutions open to the public, have different user groups of different ages, needs and education, especially digital museums. The following is the author's summary of the characteristics of digital museums.

(1) Digitization of exhibits

The use of digital relaying and storage to display all the information of the exhibits is the most typical feature of digital museums. Digital exhibits can use high-definition pictures or three-dimensional models to provide visitors with a more intuitive and convenient way to view. Therefore, the fragility, fragility, temperature, light, humidity and other problems faced by physical exhibits are no longer a limitation.

(2) Transcend spatial boundaries

Due to geographical restrictions, traditional museums can only be limited to a small area, and cannot be moved or transferred at will. Digital museums can transcend the spatial barriers of traditional museums, and audiences can visit museums thousands of miles away while sitting at home. At the same time, the digital museum will not worry about the floor area, and digital exhibits can be stored digitally using computer storage space.

(3) Break through the time limit

Traditional museums due to the need for cultural relics protection, the audience can only visit within a fixed time, while the digital museum does not have this time limit, the audience can enter the digital museum at any time and enjoy the exhibits. And the digital museum can use computer technology to restore the environmental information of the exhibits, adding its original cultural connotation and background.

(4) Highly interactive communication

For traditional museums, the audience can only "passively" appreciate the physical exhibits, while the digital museum can allow the audience to carry out personalized interactive communication and use the Internet for independent browsing experience, in order to bring the audience a relatively independent interactive experience, which greatly meets the different needs of the audience. Not only that, the digital museum can also provide personalized display services according to the various requirements of the audience.

(5) Multidisciplinary cross-display

Physical museums are divided according to the types of cultural relics and displays, mainly including historical, artistic, scientific and comprehensive museums. Depending on the field, the artifacts on display are also different. The digital museum can cross the boundaries of disciplines and integrate resources and cultural relics in different fields.

4.1.3 The function of the digital pavilion

As an important part of social and cultural infrastructure, traditional museums need to have the basic functions of education and communication, scientific research and collection and preservation, because digital museums are an extension of traditional museums, so their functional parts have also been expanded accordingly. (Ruoja Wang, 2014:1-2)

(1) Education science popularization function

Digital museums can target different target groups, especially children and teenagers, to carry out a series of educational science activities, introduce them to a wider history and culture, stimulate their interest in cultural heritage, and improve their ability to appreciate art. The Palace Museum has a website dedicated to providing young people with lively and vivid science education topics. The website gives full play to the characteristics of "edutainment", uses some features and elements of the game, does not aim at entertainment, integrates historical and cultural knowledge into small games, and creates an experience and exploration atmosphere that is both interesting and open.

(2) Digital Archives feature

The digital collection function is the foundation of the digital museum. The digital museum collects the information of exhibits through digital means, not only limited to the shape of the exhibits, but also extends to the in-depth information of the digital exhibits, such as the cultural connotation, material size and use of the exhibits, and further establishes an exhibit database to store and display exhibit resources in a unified manner.

(3) Knowledge management function

The knowledge management function in the digital museum is to process digital exhibits, including information editing, classification, processing, etc., and display or reorganize the content according to a certain theme. And when digital exhibits involve multi-disciplinary disciplines, they can also provide horizontal connections between the knowledge structures of different disciplines.

(4) Virtual display function

The virtual display function is the most indispensable part of the construction of a digital museum. Due to the limitation of time and space, traditional museums have a relatively limited audience that can enjoy the exhibitions in person. Different from the traditional museum's display form with physical objects as the carrier, the virtual display exists with the digital museum as the carrier. The virtual display function is able to use multimedia, virtual reality and information resource management and other technical means to integrate the collections scattered in various physical museums for "display".

4.2 Analysis of the construction status of the digital exhibition hall

4.2.1 The advent of digital pavilions

In developed countries such as Europe, the United States, and Japan, there is an average of one museum per thousands of people, and the total number of museums that have been put on the network has reached as many as three to four million. The emergence of the concept of digital museums can be traced back to the late 70s of last century, when with the maturity and popularization of computer technology, foreign scholars wrote articles discussing the application of computer technology to the museum field. With the continuous development of computer technology, the digital museum discussed by the theoretical community has become a real thing, and countries around the world have used computer digital technology to protect cultural heritage, gradually moving from digital libraries to the construction of digital museums and other collections.

As a new type of museum, the digital museum first emerged in the United States, and then in Europe and Asia.

4.2.2 Status quo of international digital exhibition hall construction

The United States is the first country in the world to begin to study "digital museums". In 1990, the Library of Congress launched the "Memory of America" project, which planned to systematically digitize and store the library's documents, manuscripts, photographs, audio recordings, videos and other collections, and edit them into a series of thematic works. The implementation of this plan can be regarded as the early practice of the idea of "digital museum", which marks the first step of great historical significance in the concept of digital museum construction in the world museum industry from theoretical discussion to practical construction.

In 1992, UNESCO launched the "Memory of the World" programme, which uses modern information technology to permanently store and remember the world's tangible and intangible human cultural heritage at different levels in different countries and regions, and share resources through the Internet. In 1995, the United States officially established a museum Internet system, incorporating the collection information databases of many domestic museums into the network dissemination system, so that the information of museum collections broke through the limitations of time and space. Since then, the construction of digital museums in the United States has officially surpassed the initial stage of museum Internet access and moved towards the road of mature development. For example, the website of the Metropolitan Museum of Art in New York, USA, fully integrates the museum's collection management system, collection display system, online learning system, museum visitor community and online store e-commerce system, and makes full use of multimedia technologies such as pictures, videos, and virtual real scenes, so that visitors can get high-quality audiovisual enjoyment while enhancing their interest in learning. The project is the most famous digital museum project in the United States, and its collection mainly includes historical photographs, documents, manuscripts and other materials in the United States. In 2001, the Library of Congress digitized more than 5 million materials and made them freely available to the public, well received by the public and scholars. (Qi Chun, 2017:3-4)

On April 21, 2009, UNESCO in Paris, France, officially opened its headquarters the "World Digital Library", an online library that brings together world civilizations and human cultures, which is the result of UNESCO's cooperation with libraries in more than 30 countries around the world, which provides readers around the world with free access to a rich and diverse collection of human cultural and artistic works, including books, maps, manuscripts, films and photographs. Launched by UNESCO and 32 partner institutions (including the National Library of China), the World Digital Library project was developed by the Library of Congress, the world's largest library, and the main server of the library's website is located in Washington, D.C. The website has a search engine in seven languages: Chinese, English, French, Portuguese, Arabic, Russian and Spanish. The establishment of the World Digital Library will further promote cultural exchanges between regions of the world.

The Metropolitan Museum of Art in New York is the largest art museum in the United States, a world-famous museum, located at 82nd Street on Fifth Avenue in New York, USA. It covers an area of 130,000 square meters and houses 3 million exhibits. The Metropolitan Museum reviews the development of human civilization and is one of the world's five largest museums, along with the Forbidden City in Beijing, China, the British Museum in London, the Louvre in Paris, France, and the Hermitage Museum in St. Petersburg, Russia. Metropolitan Museum of Art website web design, display The content is concise and clear, artistically appealing and visually impactful, reflecting the connection with the physical museum. The navigation bar is set up from visits, displays, collections, learning, research, cultural relics donation exchange to blogs, shops and other sections, reflecting the interaction and communication with different types of audiences. Under the exhibition section, each theme display has audience questions, and you can consult with the management at any time about the questions related to the exhibition theme, and have detailed answers; The collection section sets up the function of retrieving collection

information, and each search result displays its basic information and picture information in detail, as well as other artworks, exhibitions and historical backgrounds or historical events related to it; The learning section provides different learning and communication resources for different ages and types of audiences, including children, adolescents, adults, university students, educators and people with disabilities, providing different communication platforms and specially created learning resources for these different groups of audiences, and can continue to communicate at a deeper level through social networking sites such as Facebook.



Figure 63 Metropolitan Museum of Art website homepage
Source: " www.metmuseum.org",2023

Some famous museums and cultural institutions in Europe, such as the Louvre Museum in Paris, the British Museum, the National Gallery in London, the Vatican Museums, etc., have also implemented their own digital construction plans in the mid-90s. In March 1995, the Bibliothèque Nationale de France completed the digital storage of its books and fine art. In May of the same year, the national libraries of France, Japan, the United States, the United Kingdom, Canada, Germany and Italy established the G7 Global Digital Library Group in France, organizing a large-scale virtual collection of human knowledge to serve the general public around the world through the Internet. On July 14, 1995, the website of the Louvre Museum in Paris, France was officially launched, and the webpages provided on the website included English, French, Japanese and other Chinese. Louvre. Located on the north bank of the Seine in the heart of Paris, France, it ranks first among the four major museums in the world. Originally built in 1204 as the royal palace of France, home to 50 French kings and queens, it is one of the most precious buildings of the French classicist period, and is famous for its rich collection of classical paintings and carvings. Now the Louvre Museum, covering an area of about 198 hectares, divided into two parts, old and new, the pyramid-shaped glass entrance in front of the palace, covering an area of 24 hectares, was designed by the Chinese architect I.M. Pei. On August 10, 1793, the Louvre Art Gallery was officially opened as a museum. The Louvre has become a world-famous temple of art, one of the largest art treasures, and a palace of all treasures that attracts worldwide attention. In March 2002, the Louvre revamped

its website to organize its digital collection into cultural areas or creative forms, displaying more than 165,000 pieces. The British Museum website in London is largely based on the promotion of physical museums, and visitors can search more than 2 million collections through the database.



Figure 64 Louvre Museum website homepage
Source: " www.louvre.fr",2023

The British Museum was founded in 1753. Its collection is based on more than 71,000 works bequeathed by Sir Hans Sloan. Today, the collection has reached more than 8 million items, covering more than 2 million years of human history. Adhering to the principles of openness and knowledge sharing, the museum has been free and open to the public since its establishment. This principle is based on the idea of the Enlightenment that despite the differences between human cultures, different cultures and groups of people can understand each other through communication. The role of museums is to provide a platform for exchange and research across cultures and ethnic groups.

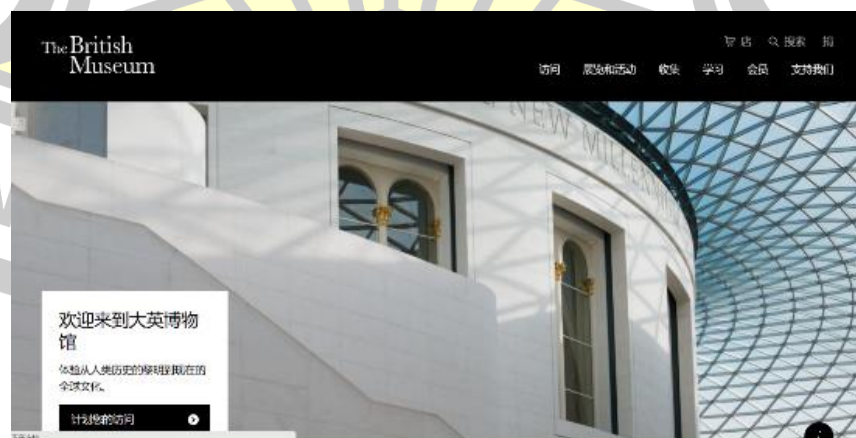


Figure 65 British Museum website homepage
Source: "www.britishmuseum.org",2023

Since 2000, the European Commission has been working on the digitization of cultural heritage and the creation of a virtual museum online, and in the following five years, it has actively sought cooperation between member states in the construction of cultural heritage network projects. Inspired by the ambition of the Library of Alexandria in ancient Egypt to bring together knowledge from around the world, on December 30, 2005, the European Commission published a document entitled i2010: Digital Library Communication, announcing policies to promote and support European digital libraries. In September 2007, the "Virtual Museum of Europe" project received the support of the European Parliament by an overwhelming majority of votes. On November 20, 2008, the "European Virtual Museum" was officially opened to the public, which is a comprehensive website that spans the 27 member states of the European Union and spans more than 2,000 years of European human history, covering literature, history, art, film and music, and integrating digital libraries, museums and archives. Currently, the museum website is still in beta. The development of the Asian Regional Digital Museum can be traced back to the launch of the National Diet Library's Digital Library project in 1994. In 1995, IBM Research Institute Tokyo cooperated with the Japanese Museum of Ethnology to implement the famous "Global Digital Museum Project", which is the most well-known digital museum project in Japan. This program focuses on museum education, and the content of the program is mainly to provide online collection data retrieval, web browsing and editing.



Figure 66 National Diet Library's Digital Library Website Home
Source: "ndl.go.jp/zh/index.html", 2023

National Diet Library's Digital Library Website Home: The National Diet Library is the national library of Japan, directly under the Diet, serving both government agencies and the general public. It is also the only library that houses all publications in Japan.

The Hermitage is a famous royal palace in Russia, now the State Hermitage Museum. Designed by the famous architect Rastrelli, the Hermitage is a three-storey building built in 1754-1762 with a closed rectangle and is a fine example of mid-18th-century Russian Baroque architecture. Once the palace and residence of the Tsar, it was converted into the National Museum in 1922. The Hermitage has a collection of art from all over the world, such as paintings, statues, carpets, furniture, handicrafts, etc., and is one of the largest museums in the world, along with the Louvre in Paris and the Metropolitan Museum in New York, USA. The museum uses a large number of virtual reality technology to highly restore all the scenes in the museum, leading the audience to feel the style of the Hermitage in different periods.



Figure 67 Russian Hermitage Museum website virtual simulation scene module
Home

Source: "www.britishmuseum.org", 2023

Combine the above 6 digital museums and compare the specific businesses and functions offered by their websites. According to the comparative analysis of the above six typical foreign museum websites according to the business and functional settings, we can see that the selected digital museums are in the forefront of the world, and each has its own characteristics. Accordingly, the following aspects are proposed that are worthy of reference for the construction of digital museums in China:

(1) Humanized interface interaction design: Visiting any of the above websites can feel that its page design is concise and clear, focused, flexible and diverse, so that the audience can easily obtain the required information and provide convenient services for the audience.

(2) Establish a comprehensive knowledge link for digital collection display: Whether it is a boutique display or a general collection display, in addition to the basic graphic and multimedia descriptions, the historical background, events, documentary materials and other similar collections related to it in the same period are also added. Let the audience feel as if they are in the historical environment at that time, and obtain comprehensive and complete knowledge information.

(3) There are various forms of virtual display, paying attention to the details of virtual display: virtual display uses the current more advanced virtual reality technology, panorama technology, multimedia technology and other all-round and multi-angle display collections, exhibition halls, exhibition halls and even the entire

museum. Among them, the display of the collection is detail-oriented, and any part of the collection can be enlarged or reduced, so as to observe the collection more closely.

(4) Focus on the design of learning and communication resources for different types of audiences: The above websites have designed different learning and communication resources for different types of audiences, targeting children, teenagers, adults, college students, educators, people with disabilities and volunteers.

(5) Pay attention to the educational communication function of museums: the above museums have educational resources for different types of audiences, especially the cultivation of children and adolescents. Museums mostly cooperate with schools or teachers to cultivate and educate children, so that children in their own countries can contact and understand the historical culture and splendid cultural heritage of their countries and even countries around the world from an early age, and cultivate their interest in cultural heritage and art appreciation ability.

(6) Pay attention to interaction and communication with the audience, and learn in a fun and educational way: The above-mentioned museums have set up official blogs and other social networking sites, focusing on interaction and communication with the audience, and timely answering and absorbing the questions and suggestions raised by the audience. The website provides novel and interesting games and activities, so that the audience can learn the knowledge of the museum, stimulate the interest in knowledge in related fields, cultivate the creative thinking of the audience, and thus enhance the innovation of the people.

4.2.3 The construction and application status of digital museums in China
China's digital museum theory and technology research began at the end of the 90s of the 20th century, the real digital museum construction began at the beginning of the 21st century, compared with other countries started late, but has also attracted the attention of relevant departments in China, and the implementation of policy support. In 2001, the Ministry of Education funded the digital construction of 18 distinctive university museums in the project of "Construction of Modern Distance Education Online Public Resources - Construction of University Digital Museum"; In September 2003, with the strong support of the State Administration of Cultural Heritage, the China Digital Museum Project was officially launched; In November of the same year, the Chinese Society of Museums established a digital professional committee. (Ding Haolun, 2015:10-11)

Today, hundreds of museums in China have carried out digital construction. With a history of more than 600 years, the Palace Museum has the most important and rich historical and cultural resources in China, and is the largest museum in China. In 2000, the Forbidden City proposed the idea of establishing a "digital Forbidden City". In July 2020, the Palace Museum released the "Digital Forbidden City" mini program. The "Digital Forbidden City" mini program explores the world of cultural relics with the audience, roams through the panorama of ancient buildings, and walks through the four seasons of the Forbidden City in a slow live broadcast... Today, the "Digital Forbidden City" has collected a total of 1863404 collections, and gradually built a digital museum integrating libraries, audio-visual museums, digital cultural relics libraries, panoramic Forbidden City, V Forbidden City and other projects, which is the first digital museum in the true sense of China. Viewers can enjoy the treasures of the Forbidden City with a click of the mouse, and can roam the palaces and pavilions of the Forbidden City by tapping the keyboard. Nearly 5 million visitors from

Tiannanhaibei reached the Forbidden City, learned about the Forbidden City, and approached the Forbidden City through this new channel. Science and technology transform the old antiquities into the cultural power of the new era, and convey the infinite charm of the excellent traditional Chinese culture in the current rejuvenation through the "Digital Forbidden City".



Figure 68 The homepage of the "Digital Forbidden City" Mini Program of the Palace Museum of China

Source: "www.dpm.org.cn", 2023

The National Museum of China, referred to as the National Museum, is located on the east side of Tiananmen Square in the center of Beijing and the south side of East Chang'an Avenue, opposite the Great Hall of the People from east to west, and is the highest institution representing the national collection, research, display and interpretation of representative material evidence that can reflect the excellent traditional Chinese culture, revolutionary culture and advanced socialist culture, and is the country's highest historical culture and art hall and cultural living room. It is a comprehensive museum that pays equal attention to history and art, and integrates collection, exhibition, research, archaeology, public education and cultural exchange. On November 1, 2012, the National Museum of China was rated as "National First-class Museum" by the State Administration of Cultural Heritage; On October 30, 2020, the National Museum of China was identified by the Ministry of Culture and Tourism as the "Sixth Batch of National Key Ancient Books Protection Units"; At the end of 2021, according to the 2020 Global Theme Park and Museum Index Report, the National Museum of China ranked second in the world.

中国国家博物馆网站内容丰富、详实，页面风格大气、庄重。网站导航栏设有关于国博、展览、资讯、藏品欣赏、学术研究、考古、国博讲堂、

公共教育、文化产业、服务等版块。其中展览板块除了包含常规展览外，还推出了网上展览，以图文结合的形式与社交网站的观众进行互动，同时推出了与微软的合作项目“在线展厅”，使展品在虚拟展厅中展示，给观众带来新奇的体验。藏品欣赏板块中设有藏品数据库，包含 2 688 件精品，可以通过时代、质地和品类进行检索。藏品以图文结合的形式展示，同时可了解与之相关的文献资料和同一时代、同一质地、同一品类的其他藏品。国博讲堂版块定期为观众提供不同主题的讲座，视频的形式展示。公众教育版块为不同类型的观众提供了课程、活动介绍和交流方式。



Figure 69 National Museum of China homepage

Source: "www.chnmuseum.cn", 2023

In 1998, China carried out the "Digital Dunhuang" project, through the introduction of digital technology to protect Dunhuang culture, spread the purpose of Dunhuang culture, and the use of VR technology to digitally scan and shoot some important grottoes in Dunhuang and carry out the construction of virtual scenes, making a panoramic virtual cave, so that tourists can view every section in the cave in a 360-degree all-round way at home, and appreciate the breadth and depth of Chinese culture. On May 1, 2016, the "Digital Dunhuang" resource library was launched, "Digital Dunhuang" is a virtual project of Dunhuang protection, which includes three parts: virtual reality, augmented reality and interactive reality, so that the treasures of Dunhuang are digitized, breaking the limitations of time and space, and meeting people's needs for sightseeing, appreciation, research and so on. Through "Digital Dunhuang", netizens around the world can log in to 360° to enjoy high-definition digital images of 30 cave murals spanning 10 dynasties including Northern Wei, Western Wei, Northern Zhou, Sui and Tang dynasties, as well as text descriptions of the murals and virtual tour experience.

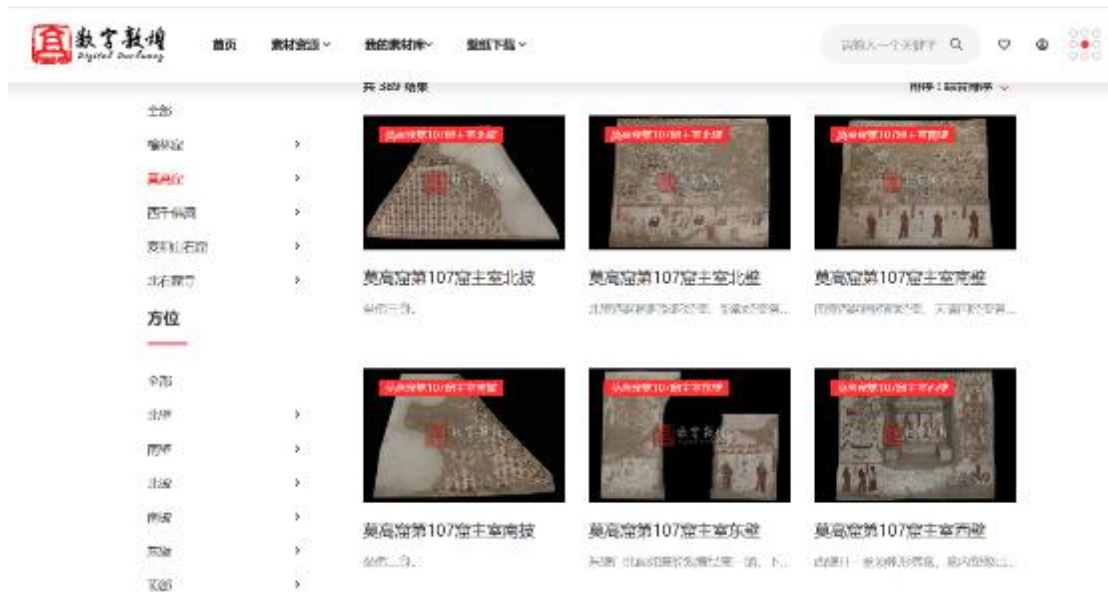


Figure 70 Digital Dunhuang Mogao Grottoes Catalog Page

Source: "ip.e-dunhuang.com", 2023

Shanghai Museum, located at No. 201, Renmin Avenue, Huangpu District, Shanghai, with a total exhibition area of 12,000 square meters, the first floor is the ancient Chinese bronze hall, ancient Chinese sculpture hall and exhibition hall; The second floor is the ancient Chinese ceramics hall, the temporary building ceramic hall and the exhibition hall; The third floor is the Chinese Calligraphy Museum, the Chinese Dynasty Painting Museum, and the Chinese Dynasty Seal Printing Museum; The fourth floor is a comprehensive museum for the Ancient Chinese Jade Museum, the Chinese Historical Coin Museum, the China Ming and Qing Dynasty Furniture Museum, the Chinese Ethnic Minority Arts Museum and the Exhibition Hall.

The website of the Shanghai Museum mainly introduces the exhibitions, activities and lectures of the physical museum, and its navigation bar is set up with sections such as historical development, cultural and cultural news, collection selection, exhibition grand view, special exhibition, visual arts, education and learning, event reservation, academic park, resource download, store and so on. Among them, the collection selection introduces the classic collection information by category and the combination of pictures and texts. It is worth mentioning that the visual art section uses a large number of virtual reality technology, three-dimensional display technology and multimedia technology to provide three-dimensional scene tours, three-dimensional collection displays, painting skills introduction and other content. The three-dimensional scene display realizes the virtual tour of the ceramic pavilion and the bronze hall, so that the audience can choose the collections of interest for further understanding during the tour, so that the audience has an immersive tour experience. The three-dimensional collection display selects the fine products for three-dimensional interaction, structure display and the display of the detailed parts of the collection, so that the audience can observe its exquisite skills and connotations in more detail. The painting technique part uses three-dimensional animation to reproduce Chinese painting techniques and related works of art, and the display form is vivid and novel.



Figure 71 Shanghai Museum Home

Source: " www.shanghaimuseum.net",2023

Nanjing Museum is located at No. 321, Zhongshan East Road, Xuanwu District, Nanjing, Jiangsu Province, is one of the three major museums in China, referred to as Nanyuan or Nanbo, its predecessor is the National Central Museum initiated by Cai Yuanpei and others in the 22nd year of the Republic of China (1933), which is the earliest museum in China and the first large-scale comprehensive museum invested by the state. At present, it is a large-scale comprehensive national museum, the first batch of national first-class museums, the first batch of national museums jointly built by the central and local governments, a national AAAA-level tourist scenic spot, a national key cultural relics protection unit and China's 20th century architectural heritage.

Nanjing Museum Focusing on the construction and development of digital museums, it has built a virtual digital museum and a "museum around you" project. "Museum around" is a key project of cultural construction in Jiangsu Province, breaking through the platform technical limitations of hardware, through software multimedia means, combined with network platform and users' own computer equipment, the audience is no longer limited, shortening the distance between the audience and the museum, making this project truly become a museum "around" by users, and leaving room for independent continuation and development in the later stage. The "Museum Around You" project strives to expand more in terms of software multimedia effect display and content, and realizes the spatialization, informatization and virtualization of cultural relics, which is a successful attempt to combine science and technology and humanities. In future development plans, "museums around you" will appear on various platforms such as mobile phones and interactive TVs. Its website navigation bar is set up with overview, exhibition, cultural relics, information, services, academic, experts, exchange, cultural and creative sections. Its Chinese section uses three-dimensional display technology to realize the three-dimensional display of a small number of fine cultural relics, and can observe and appreciate the collection from all angles through rotation and scaling. The service section provides interactive and interesting activities for young people, and educational courseware with different exhibition themes for teachers. The Virtual Digital Museum section provides information about collections and related events by category, presented in a combination of graphic and video formats. It is worth mentioning that the

communication section of Nanbo is different from the communication section of other museum websites, which can respond to the questions and suggestions raised by the audience in a timely manner, and really play a role in interaction and communication.



Figure 72 Nanjing Museum Virtual Exhibition Hall Dajiang Wangulu-Lower Yangtze River Civilization Special Exhibition Hall
Source: " www.4dkankan.com",2023

Northwest University Museum is a large-scale comprehensive university museum based on Northwest University, located in Northwest University Taibai Campus. Northwestern University Museum has a total construction area of 15,000 square meters and was officially completed in 2012. At present, there are more than 5,000 cultural relics and specimens in the collection, which have been fully opened to the public free of charge. Since its opening, the museum has given full play to the characteristics of natural disciplines and cultural relics collection inherited by Northwest University for a century, and has displayed Northwestern's teaching and scientific research achievements to the majority of teachers, students and social audiences from multiple angles, ways and aspects. Adhere to the principle of "effective protection, rational utilization and strengthened management", and organically combine the functions of collection and preservation, scientific research, publicity and education. The museum adopts a variety of advanced technologies, and has major innovations in data collection, cultural relics retrieval, and virtual restoration. To a large extent, it has promoted the digital protection and development of museums in China.

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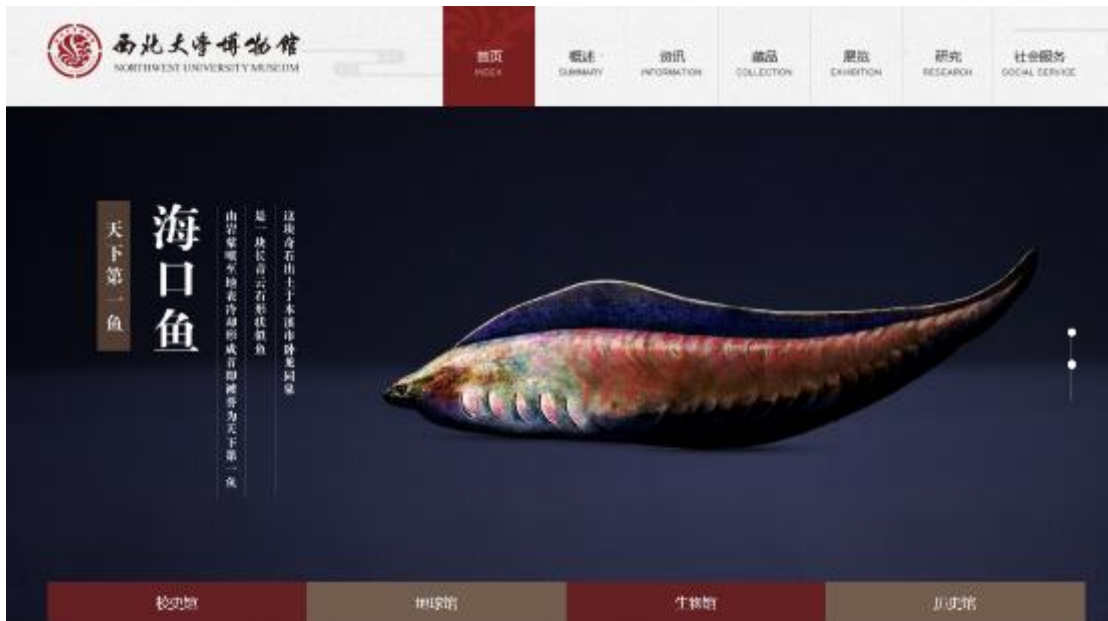


Figure 73 Northwestern University Museum Home

Source: "ip.e-dunhuang.com", 2023

Combine the above 6 digital museums and compare the specific businesses and functions offered by their websites. According to the comparative analysis of the above six typical domestic museum websites according to the business and function settings, we can see that although the development of digital museums in China started late, it still formed a certain scale and characteristics after more than ten years of development. Therefore, for the development and construction of digital museums in China, the current advantages are summarized: virtual display forms are diverse. The Shanghai Museum and the National Palace Museum in Taipei both use a large number of virtual technologies to present the information of collections and venues, and have a high level of virtual technology application. Self-development characteristics. The Palace Museum in Beijing and the China Science and Technology Expo have effectively combined the collection advantages and discipline content of their own museums to establish their own characteristic theme exhibitions, which have left a deep impression on the audience. Increased interactivity. The above-mentioned museums have opened social networking sites or communication sections such as Weibo, which can push the latest information and interact with the audience at any time.

Three development models of digital museums in China: single museum mode, group museum mode and combination mode; The single-library model is the initial model of the development of digital museums, which mainly refers to the digital transformation of the collection content of a single physical museum, and then exhibited in the form of a web page. The group museum model generally refers to the collection information of all museums in the vicinity of some museums in the joint area of some museums, which is classified and unified and then disseminated and displayed on one platform. The combination model is the forefront of the current development of digital museums, which is to carry out unified planning and classification exhibitions of museum resources in China and even the world, and only

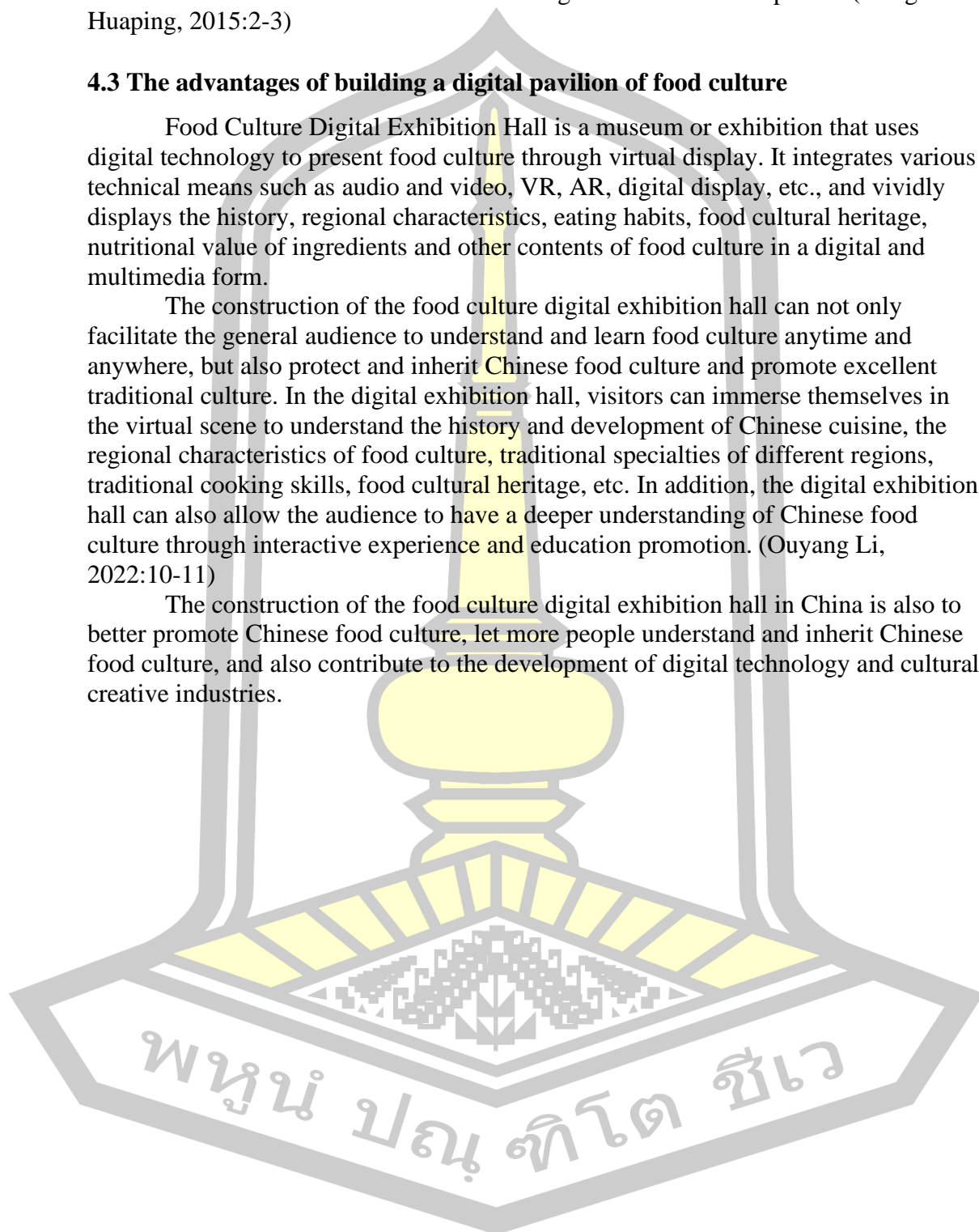
some developed countries in the United States and Europe have reached the first level, which is also the latest direction of China's digital museum development. (Gong Huaping, 2015:2-3)

4.3 The advantages of building a digital pavilion of food culture

Food Culture Digital Exhibition Hall is a museum or exhibition that uses digital technology to present food culture through virtual display. It integrates various technical means such as audio and video, VR, AR, digital display, etc., and vividly displays the history, regional characteristics, eating habits, food cultural heritage, nutritional value of ingredients and other contents of food culture in a digital and multimedia form.

The construction of the food culture digital exhibition hall can not only facilitate the general audience to understand and learn food culture anytime and anywhere, but also protect and inherit Chinese food culture and promote excellent traditional culture. In the digital exhibition hall, visitors can immerse themselves in the virtual scene to understand the history and development of Chinese cuisine, the regional characteristics of food culture, traditional specialties of different regions, traditional cooking skills, food cultural heritage, etc. In addition, the digital exhibition hall can also allow the audience to have a deeper understanding of Chinese food culture through interactive experience and education promotion. (Ouyang Li, 2022:10-11)

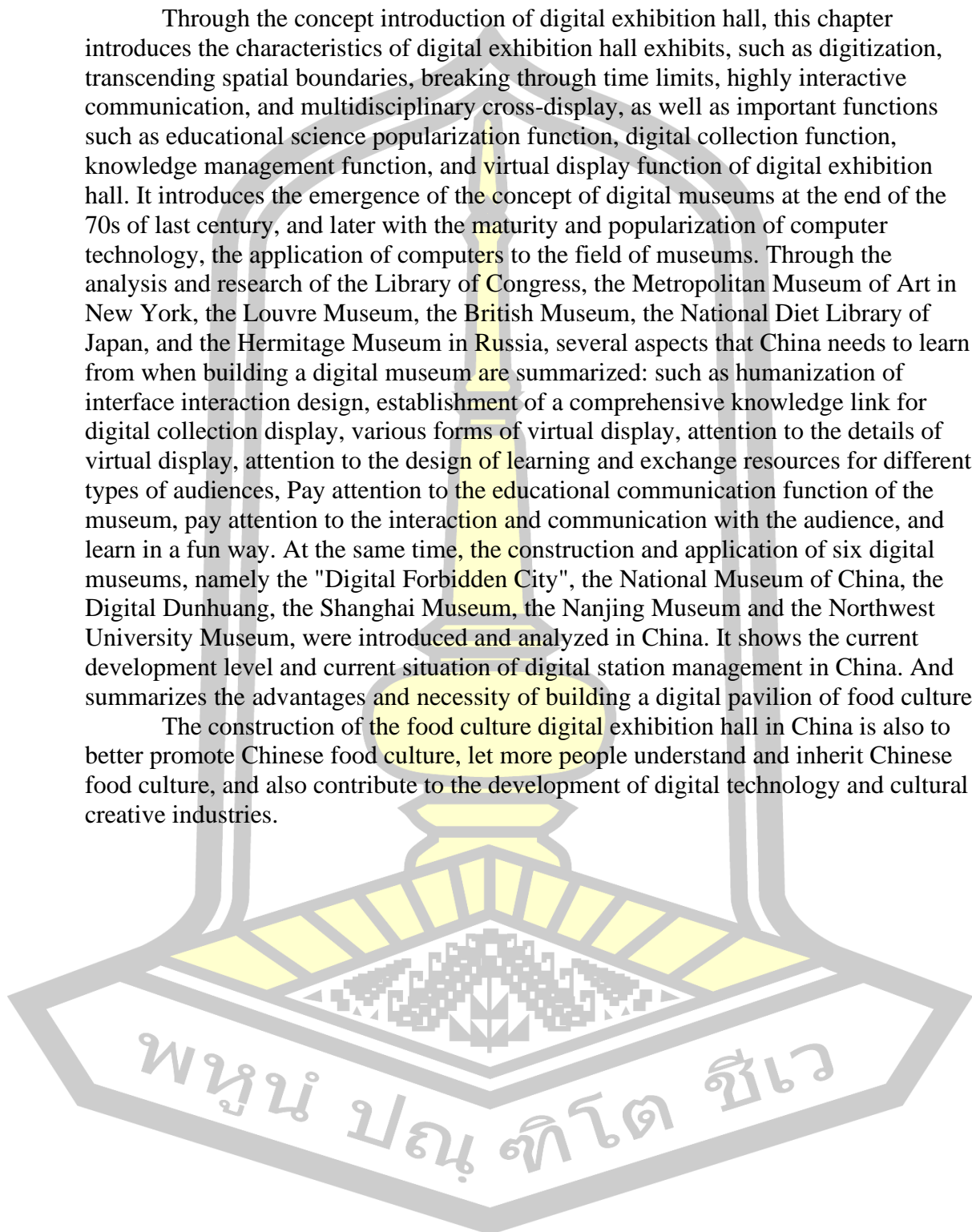
The construction of the food culture digital exhibition hall in China is also to better promote Chinese food culture, let more people understand and inherit Chinese food culture, and also contribute to the development of digital technology and cultural creative industries.



Conclusion

Through the concept introduction of digital exhibition hall, this chapter introduces the characteristics of digital exhibition hall exhibits, such as digitization, transcending spatial boundaries, breaking through time limits, highly interactive communication, and multidisciplinary cross-display, as well as important functions such as educational science popularization function, digital collection function, knowledge management function, and virtual display function of digital exhibition hall. It introduces the emergence of the concept of digital museums at the end of the 70s of last century, and later with the maturity and popularization of computer technology, the application of computers to the field of museums. Through the analysis and research of the Library of Congress, the Metropolitan Museum of Art in New York, the Louvre Museum, the British Museum, the National Diet Library of Japan, and the Hermitage Museum in Russia, several aspects that China needs to learn from when building a digital museum are summarized: such as humanization of interface interaction design, establishment of a comprehensive knowledge link for digital collection display, various forms of virtual display, attention to the details of virtual display, attention to the design of learning and exchange resources for different types of audiences, Pay attention to the educational communication function of the museum, pay attention to the interaction and communication with the audience, and learn in a fun way. At the same time, the construction and application of six digital museums, namely the "Digital Forbidden City", the National Museum of China, the Digital Dunhuang, the Shanghai Museum, the Nanjing Museum and the Northwest University Museum, were introduced and analyzed in China. It shows the current development level and current situation of digital station management in China. And summarizes the advantages and necessity of building a digital pavilion of food culture.

The construction of the food culture digital exhibition hall in China is also to better promote Chinese food culture, let more people understand and inherit Chinese food culture, and also contribute to the development of digital technology and cultural creative industries.



Chapter V: Virtual performance of Luoyang Food Culture Digital Exhibition Hall

This chapter expounds the relevant concepts of digital exhibition hall display, and analyzes and summarizes the spatial characteristics and functional composition of digital exhibition hall exhibition. The preliminary form of digital exhibition hall exhibition was introduced, and the current status and specific form of virtual exhibition mode of digital exhibition in China were analyzed and studied. Design questionnaires and analyze and summarize the results of the questionnaires; Investigate the current construction and basic introduction of Luoyang Food Culture Museum and the representatives of Luoyang food culture inheritors, and analyze and summarize; According to the survey results of the digital exhibition hall questionnaire, the audience demand analysis was carried out, and the design strategy and design prospect of the virtual expression mode of the Luoyang food culture digital exhibition hall were studied and summarized.

5.1 Overview of the digital pavilion display

5.1.1 Concepts related to digital pavilion displays

Digital exhibition hall exhibition is the use of digital technology to display the information to collect, compress processing, through the network and computer technology to form a virtual display space, the audience in the virtual information space does not contact the real exhibits, in this virtual space is displayed virtual exhibits - digital exhibits. Virtual exhibition is one of the core technologies of digital exhibition hall, which refers to the presentation of exhibition scenes, exhibits and display information in the virtual space through computer graphics, virtual reality technology, three-dimensional modeling, animation production and other technical means, so that the audience can browse and interact in the virtual environment in real time through computers, mobile phones, VR glasses and other equipment. This chapter will discuss and research the design and technology of virtual representation of exhibitions in digital pavilions. (Ding Haolun, 2015:10-11)

Whether it is for physical museums or digital museums, exhibition is an important work, which directly affects the exhibition experience of the audience, and then affects the realization of the educational function of the museum. In the field of museums, digital display refers to the display and display of museum collections through certain digital means, which can vividly and intuitively express the information contained in digital exhibits. At present, digital exhibition technology is not only used in the construction of digital museums, but also in a large number of physical museums have been widely used, such as virtual tour guides, multimedia displays, interactive roaming and other systems common in physical museums. Compared with the traditional display method, digital display has the following characteristics:

(1) It realizes the multi-channel interactive communication between the audience and the museum based on multimedia technology, and transmits the information to the audience in the form of multiple channels through the integration of text, images, graphics, video, animation, audio and other forms, so as to fully mobilize the audience's hearing, vision and even touch and smell, so that the audience's multiple senses can feel the information transmitted, and promote the audience to have a systematic and comprehensive understanding of the information contained in the exhibits. In addition, unlike physical museums, in digital exhibitions, the flow of information is bidirectional. The audience can interact with the exhibition system, independently choose the display content, control the perspective of the exhibition observation, so as to understand all aspects of the display object, and even have an impact on the display object, and personally participate in the virtual historical scene. This interactive feature helps to cultivate the audience's interest in participating in exhibitions and learning about history and culture, and also stimulates the imagination and creativity of the audience.

(2) The digital exhibition of the museum generally needs to be presented to the audience in a virtual form, such as: Web websites, desktop virtual reality systems, digital film and television, virtual tour systems, etc. displayed in flat form through displays, touch screens, PDAs, projectors and other devices; Or virtual reality and augmented reality systems that display in the form of dynamic spaces through wearable devices, ring domes, multi-projection systems, simulation simulators and other devices. Although the current level of technology is not enough to make the display effect reach the realm of fake reality, the virtual display method also has unique advantages. The virtual display provides a larger space for imagination, which breaks through the limitations of physical exhibits and greatly extends the scope of exhibition themes. Designers can use this characteristic to fully expand their imagination, visualize and present things in the abstract or non-present through reasonable artistic techniques and technical means, reproduce distant historical events, restore disappeared ancient scenes, and repair damaged historical relics, so that the audience can freely tour in history, obtain experience across time and space, and even immerse themselves in historical scenes as participants.

(3) Provide the audience with a non-sequential personalized tour experience, traditional museum exhibitions require the audience to tour in a certain order in time and space, along a certain route. This kind of exhibition method generally adopts time clues or logical clues, first arranging the order of the exhibition according to the focus of the exhibition, and then conveying information to the audience through the method of narration with the physical object as the carrier. The structure of this linear display method lacks flexibility, and it is difficult for the audience who lacks relevant background knowledge to form a complete impression of the display object; At the same time, the exhibits are basically independent and independent of each other, and the audience cannot get all the information of other exhibits related to the exhibit when browsing an exhibit, which limits the free play of the audience's thinking, while the digital display can adopt a non-sequential tour method, which conforms to the non-linear information organization structure. For example, the digital museum based on the web page arranges the hierarchy of the page according to the progressive logical relationship between the pages, and integrates the page through hyperlinks to form a network information structure, and users can jump freely between nodes with

different network structures. To a certain extent, this display method overcomes the drawbacks of sequential display and enhances the audience's cognition of the exhibits and their connotations.

5.1.2 Spatial characteristics of digital exhibition hall displays

The characteristics of the virtual space of the digital pavilion include the following aspects:

Virtual reality experience: Through virtual reality technology, the virtual space of the digital exhibition hall can present a realistic, three-dimensional and immersive exhibition scene, so that the audience can feel an immersive visiting experience.

Interactivity: The virtual space of the digital exhibition hall can allow the audience to interact with the exhibition content through interactive exhibition design, such as exploring the exhibition space, scaling exhibits, interacting with other audiences, etc.

Diversity: The virtual space of the digital exhibition hall can display various forms of exhibition content, such as artworks, scientific and technological exhibits, historical relics, etc., as well as exhibitions with various themes, such as contemporary art, scientific and technological innovation, cultural heritage, etc.

Visual data presentation: The virtual space of the digital exhibition hall can present exhibit information and data through data visualization technology, such as the presentation of the timeline and map of the historical development of the exhibits, providing a more intuitive visiting experience.

Reconfigurability: The virtual space of the digital exhibition hall can be changed and adjusted according to the needs of the exhibition space, such as redesigning the exhibition hall, replacing exhibits, etc., to adapt to different exhibition needs.

No geographical restrictions: The virtual space of the digital exhibition hall can transcend geographical restrictions through digital technologies such as the Internet, allowing visitors to visit at any time and any place.

Sustainability: The virtual space of the digital exhibition hall can reduce the material consumption in the physical exhibition, save energy and environmental resources, and have better sustainability through the form of digital exhibits.

5.1.2.1 Spatial function compounding

China's Ministry of Culture proposed that the three basic functions of museums are: collection, education, and research. However, at present, museums with only traditional collection, research and education functions are no longer enough to meet the needs of the audience and the development of the museum itself. Today's museums have developed into a cultural complex integrating culture, leisure, entertainment, service, and sightseeing in addition to traditional functions such as collection, display, research, and education. The functional appeal of the exhibition space has also evolved from a simple box space for exhibits to a composite space possibility. The exhibition space not only accommodates objects, but also serves as a place for interaction between visitors. As the main functional space of the museum, it can combine exhibits, entertainment and leisure, and information exchange. Space processing is not necessarily just to show needs, but also to create a variety of spatial feelings, so that the audience has a different experience in the viewing process. For the exhibition performance of the digital exhibition hall, the function of social function attribute similar to the nature of the forum can be added, so that visitors can comment, evaluate, speak and communicate with netizens while viewing a certain

exhibition hall or exhibit. The embodiment of education, culture and entertainment is maximized.

5.1.2.2 Space display personalization

In the past, limited to the similarity of exhibits, or due to the limitations of funds, time and space, etc., it is easy to lead to weak personalization of exhibitions, many museums have similar exhibition spaces, unclear exhibition themes, and unprominent display characteristics, such a homogeneous space is increasingly losing its attractiveness to visitors. In the current museum design, designers in the plastic art, architectural environment art, video art, model scene production and other aspects of the exhibition space, more emphasis on highlighting the main characteristics of the display, and with more economic and technical support, there are more choices in the content and way of display. For example, the display of intangible cultural heritage such as dance can be directly introduced into performances related to its theme. The architect then creates an interesting and personalized space around the qualities of its display. Such a unique, stylized and personalized space shaping can strengthen the artistic expression of the exhibition content, enhance the appeal of the exhibition, and attract visitors to experience immersion in it. The exhibition performance of the digital exhibition hall is not limited by time, region and venue, and can be more free and open to build a series of themed and atmospheric exhibition expressions.

5.1.2.3 Diversification of spatial interfaces

The diversification of the interface of the virtual exhibition space of the digital exhibition hall can be achieved in the following ways:

Multi-dimensional display: The digital exhibition hall can be displayed in multiple dimensions, such as 3D display, panoramic display, VR display, etc., so that the audience can have a deeper understanding of the exhibits.

Interactivity: Digital pavilions can allow visitors to experience exhibits more in a more participatory way by increasing interactivity, such as setting up interactive games and allowing visitors to choose their own display paths.

Color matching: The digital exhibition hall can make the exhibition hall more beautiful and attractive through good color matching, and also highlight the characteristics of the exhibits.

Digital design: The digital pavilion can make the exhibits more vivid and vividly displayed in front of the audience through digital design means, such as digital modeling and data visualization.

Special effects application: The digital exhibition hall can allow the audience to experience the exhibits more immersively through the application of special effects, such as lighting effects, sound effects, etc.

Personalized display: The digital exhibition hall can adopt personalized display methods according to the characteristics of different exhibits, such as combining and arranging different exhibits, so that the audience can feel the exhibits more targetedly.

In summary, the diversification of the interface of the virtual exhibition space of the digital exhibition hall can be achieved in a variety of ways. These will not only allow visitors to better understand the exhibits, but also enhance the attractiveness and user experience of the digital pavilion.

5.1.2.4 Diversification of display media

Digital pavilions can display content in a variety of media, here are some of the digital pavilion display media:

3D display: The digital pavilion can use three-dimensional virtual reality technology to display the exhibits in 3D. Visitors can have interactive experiences through VR headsets and other devices to gain insight into the exhibits.

Video display: The digital pavilion can display exhibits through video, such as short films, documentaries, etc. The audience can watch through the screen, which is more vivid and intuitive.

Data visualization: Digital pavilions can use data visualization technology to present relevant data of exhibits as visual charts or animations. Viewers can explore and analyze data in an interactive way.

Interactive games: The digital pavilion can develop some interactive games, such as puzzle games, interactive stories, etc. Visitors can better understand the content of the exhibits through games.

Model display: The digital pavilion can use digital modeling technology to model exhibits as digital models. Visitors can drill down into the exhibits by rotating, zooming, and more.

Immersive display: Digital pavilions can use immersive display technologies, such as 360-degree panoramic displays, interactive projections, etc. Visitors can experience the exhibits in an immersive way.

The above are some of the exhibition media methods of the digital exhibition hall, and the exhibition medium of the digital exhibition hall can also be innovated according to the different characteristics of the exhibits to achieve better display effects.

5.1.3 Functional composition of the exhibition space of the digital exhibition hall

5.1.3.1 Functional composition of the exhibition space

The functional composition of the exhibition space of the digital exhibition hall includes the following aspects:

Exhibition scene design: The exhibition space of the digital exhibition hall can present a variety of exhibition scenes through virtual reality technology, such as exhibition halls, galleries, museums, etc., and the design of these scenes can be created through 3D modeling technology to present a more realistic exhibition scene.

Exhibit display: The digital exhibition hall can present the traditional physical exhibits in the virtual space in the form of digital exhibits to achieve a more realistic exhibition effect. In addition, the digital exhibition hall can also display and interpret the information of the exhibits through multimedia display technology and data visualization technology.

Interactive experience: The exhibition space of the digital exhibition hall can realize the interaction between the audience and the exhibits, scenes and other elements through interactive exhibition design, and increase the sense of participation and experience of the audience. For example, in a digital pavilion, visitors can explore the exhibition space, zoom exhibits, interact with other audiences, and more through devices such as mice, gamepads, or VR glasses.

Data statistics and analysis: The digital exhibition hall can also record and analyze the visiting behavior of the audience through digital technology, such as the audience's dwell time, browsing trajectory, interactive behavior, etc. This data can provide an important reference for the operation and improvement of digital pavilions.

Service functions: The digital exhibition hall can also provide some auxiliary service functions, such as guided tour services, online ticket purchase, digital gift shop, etc., so that the audience can better visit and experience the exhibition.

5.1.3.2 Functional subdivision of exhibition space

The functions of the digital exhibition space can be subdivided into the following aspects:

Virtual exhibition hall design: The virtual exhibition hall of the digital exhibition hall needs to create an artistic, aesthetic, usable and accessible exhibition scene through 3D modeling technology, light and shadow rendering.

Digital exhibit display: Digital pavilions need to digitize physical exhibits, such as taking high-definition photos of exhibits, making 3D models, etc., in order to present them in virtual exhibitions.

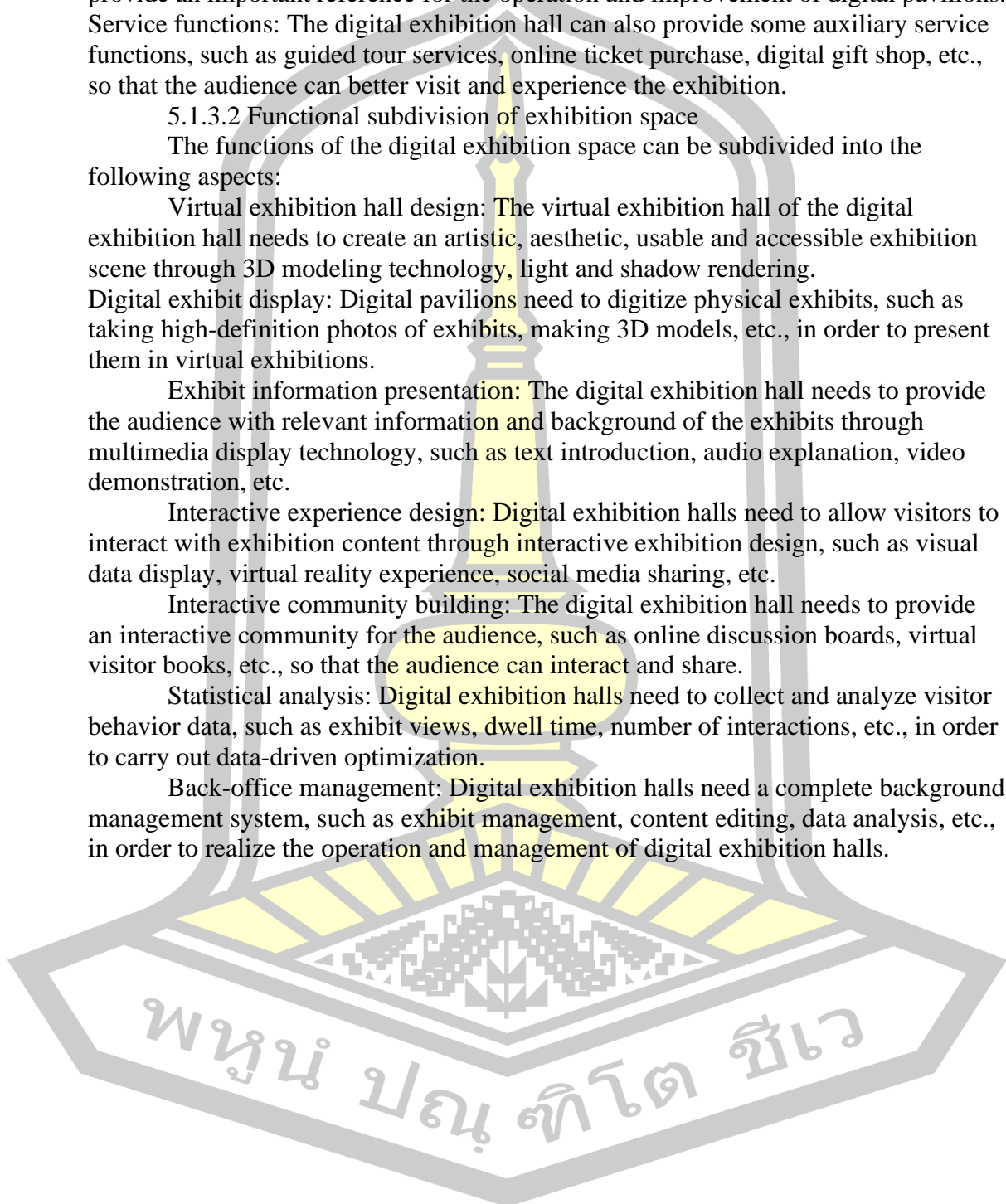
Exhibit information presentation: The digital exhibition hall needs to provide the audience with relevant information and background of the exhibits through multimedia display technology, such as text introduction, audio explanation, video demonstration, etc.

Interactive experience design: Digital exhibition halls need to allow visitors to interact with exhibition content through interactive exhibition design, such as visual data display, virtual reality experience, social media sharing, etc.

Interactive community building: The digital exhibition hall needs to provide an interactive community for the audience, such as online discussion boards, virtual visitor books, etc., so that the audience can interact and share.

Statistical analysis: Digital exhibition halls need to collect and analyze visitor behavior data, such as exhibit views, dwell time, number of interactions, etc., in order to carry out data-driven optimization.

Back-office management: Digital exhibition halls need a complete background management system, such as exhibit management, content editing, data analysis, etc., in order to realize the operation and management of digital exhibition halls.



5.2 Research on the development and current situation of digital exhibition hall exhibitions

5.2.1 Early forms of digital pavilion displays

In the late 90s, with the vigorous development of the Internet, the advancement of multimedia technology and virtual reality technology, digital museums were born and gradually entered a stage of rapid development. In recent years, China has made great achievements in the construction of digital museums. But began to go from "museum digitization", "museum Internet access" to the later mentioned "digital museum", "digital museum",

In the context of the rapid development of digital technology, museums have begun to put digital exhibitions on the agenda in order to break the limitations of technical or regional conditions in their collections and make it more convenient and comprehensive for viewers to view the exhibits. (Xu Ying, 2020:4-5)

(1) Network technology

Today, museums are no longer confined to physical space, thanks to the development of the Internet. The remoteness of the network not only allows visitors to receive cultural information even after leaving the museum, but also gives the public who do not have the opportunity to visit the opportunity to transmit culture to all parts of the world in an instant. For example, the public around the world can learn about the exhibits, view the details of the collection, and consult historical facts on the official website of the Palace Museum through the Internet.

(2) Remote terminals

Smartphones have become a hallmark of modern life, and communication between people has begun to move towards the information age. As the most common and fastest communication medium today, mobile phones can not only spread information, but also replace various tools. During a museum visit, mobile phones can replace brochures, docents and even navigators. At the same time, social media has brought museums closer to the public. The Art Institute of Chicago has an official Weibo account in China to make it easier for the Chinese public to learn about its exhibitions and attract potential international audiences.

Not only that, but museums have also launched their own apps. Users can taste the authentic works of famous artists in the "Wuhufan" App launched by the Shanghai Museum, and learn about the stories of the collection from multiple angles by watching the evaluation videos of scholars from all walks of life at home and abroad. The "Google Arts & Culture" application launched by Google allows users to view thousands of artworks from more than 70 countries on Cardboard, query museum information and map guides, and also prepare Street View visiting functions for users who do not have Cardboard equipment and cannot visit abroad.



Figure 74 The Palace Museum of China "Digital Forbidden City" Mini Program homepage

Source: "zhuatlan.zhihu.com",2023

In July 2020, the Palace Museum released the "Digital Forbidden City" mini program. Science and technology transform the old antiquities into the cultural power of the new era, and convey the infinite charm of the excellent traditional Chinese culture in the current rejuvenation through the "Digital Forbidden City". (Haili Guo, 2020:9-10)

5.2.2 Current situation and analysis of virtual exhibition methods of China's digital exhibition halls

In recent years, with the high development of technology, virtual display can not only use fully immersive VR products, such as head-mounted stereoscopic displays, large-scale projection systems, etc., but also combine virtual display with Web 3D technology to realize non-immersive VR experience in digital museums. At present, many museums in China have carried out digital construction projects and established their own Web digital museums, such as the Palace Museum, Dunhuang Museum, Hebei Museum, Henan Museum, etc., and have achieved very gratifying results. According to the different presentation forms and application technologies, the domestic and foreign web digital museums are divided into four types: two-dimensional graphic web pages, three-dimensional cultural relics web pages, panoramic three-dimensional and web three-dimensional websites. The following will analyze the different types of digital museums in combination with case studies.

5.2.3.1 Two-dimensional graphic web-based digital exhibition hall

The two-dimensional graphic web-based digital museum is a collection of print media such as pictures, text and audio, and its essence is a picture display website for the cultural relics in the collection. It is simple to produce, low cost, fast to access, and not high technical requirements, its main role is to publicize and publish some information materials of the museum. Such as the Shadow Puppet Digital Museum. Shadow puppets, commonly known as "shadow lamps" and "shadow puppets", is one of the oldest folk art forms of the Chinese nation, which is a plastic

art hand-carved from donkey skin or cowhide, and is also a performance art that combines speaking, singing and music and is operated by artists. This kind of "trinity" art through light and shadow is full of unique charm, known as the "originator of movies" and "the earliest cartoon animation", with a deep mass base and extensive social influence.

The project relies on the collection of shadow puppets in the Folk Art Museum of the China Academy of Art, and makes full use of modern information technology to digitally collect, manage and permanently preserve relevant materials in the shadow field. At present, the project has collected more than 48,000 shadow image resources, covering shadow puppet modeling from all parts of the country and genres; 1,366 volumes were collected, and full text downloads were available online; At the same time, more than 700 representative shadow puppet performance programs from various places were recorded; Among the collected shadow puppet singing documents, there is no shortage of precious singing passages of the shadow puppet characters of the Republic of China; In addition, shadow puppet opening gong and drum performances and oral history programs were recorded. Further data will be collected in the future. In addition to the regular search method, the project also provides a map presentation method, in order to provide scholars with a way to study digital humanities. The project is helpful for the research of folk art, literature, fine arts, music, film and television animation, drama and other disciplines, and is a first-hand source of research in these fields.



Figure 75 Shadow puppet digital museum home

Source: " shadow.caa.edu.cn",2023

Such digital museums use the method of flat websites, cultural relics are mainly presented in two-dimensional ways, it is difficult to transmit complete visual information, and the visual art effect of some websites is poor, resulting in the audience does not have much patience to browse, which is also the biggest defect of such digital museums.

5.2.3.2 Three-dimensional cultural relics web-based digital exhibition hall

The three-dimensional cultural relics web-based digital museum is based on the two-dimensional flat web-based display of exhibits. From the visual and structural point of view, it is not much different from the two-dimensional graphic web-based digital museum, but the exhibits are presented in three-dimensional form, which is the form of "2D + 3D" joint display. For example, the Hebei Digital Museum is a typical three-dimensional cultural relics web-based digital museum. Hebei Digital Museum is the only digital museum in Hebei Province, China, established in 2018. Located in the Cultural Center of Yuhua District, Shijiazhuang City, the museum is a modern digital museum integrating digital display, digital interaction, digital learning and digital research. Hebei Digital Museum has advanced digital technology and equipment, which can provide audiences with a more vivid, intuitive and interactive digital exhibition experience. Visitors can learn about history, culture and natural ecology through digital exhibits, virtual reality, holographic projection and other means.

Tourists only need to search on the computer or mobile phone for "Hebei Digital Museum", click to enter to see the home page including Hebei cultural relics, three-dimensional cultural relics, digital exhibitions, Hebei million years, cultural relics exploration, cultural and creative development, history and culture, news information, academic exchanges and other columns, of which the "three-dimensional cultural relics" column, can be viewed 720 degrees interactively, and can be virtually disassembled of cultural relics, understand the internal structure, patterns, inscriptions and other details of cultural relics, such as the Eastern Han "Filigree Golden Tianlu" in the collection of Dingzhou Museum, With the sliding of the finger, you can see its front, side, back and other angles, which is more comprehensive than going to the museum to see the real thing; The "Digital Exhibition" column has "moved" the exhibition hall of the Hanjia Mausoleum of the Dingzhou Museum to the platform, and you can also "visit" the exhibition hall with your fingers; The analysis of cultural relics in "Exploration of Cultural Relics" explains the details and history of cultural relics, such as the Liu Jun drawing the Liu Hai toad axis drawn by Liu Jun in the Ming Dynasty in the collection of Shijiazhuang Museum. (2021:2-3)

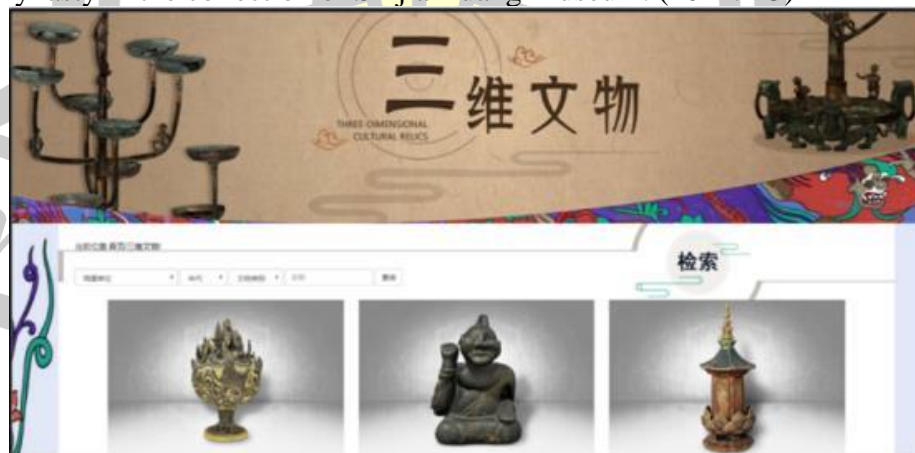


Figure 76 Hebei Digital Museum 3D Cultural Relics Module Home

Source: "www.hb-museum.com/HomePage/index.html", 2023

This kind of digital museum not only retains the characteristics of a two-dimensional flat web-based digital museum, has a clear content display framework, but also transmits more exhibit information to the audience, and the audience can enlarge or rotate the exhibits and other interactive operations, so that they can have a more comprehensive understanding of the appearance characteristics of the exhibits. However, the technical difficulty and cost of development of such museums have also increased, such as the production of three-dimensional models and the processing of lighting materials. In addition, the three-dimensional cultural relics web-based digital museum also has certain requirements for the loading speed of the browser in order to ensure the smoothness of the display of exhibits.

5.2.3.3 Panorama three-dimensional digital pavilion

The panoramic three-dimensional digital museum uses panoramic three-dimensional shooting technology, and its working principle is to use digital cameras to shoot the existing scene from multiple angles, and then the establishment of digital models by a professional three-dimensional platform, and finally the use of panoramic work software to produce, its essence is a "fake three-dimensional" virtual display technology. In June 2022, the Dunhuang Academy launched a key project "Digital Hidden Scripture Cave" to meet the public. Through laser scanning and photo reconstruction technology, the digital cave allows the details of cultural relics to be restored with millimeter-level accuracy, and better presents the valuable information in the cultural relics, reaching the extent that it can be viewed with a magnifying glass, as if crossing with one button, and "dialogue in the air" with ten thousand cultural relics. In November, "Digital Dunhuang" was selected as a "Fine Case of Working Together to Build a Community with a Shared Future in Cyberspace" at the 2022 World Internet Conference.

As shown in the Dunhuang Academy Digital Scripture Cave. Such digital museums are real scenes obtained through live-action shooting, rather than computer-generated images, so that the scenes displayed are authentic and more responsive. Secondly, because its production process is simple and fast, it eliminates the complex modeling process and does not have much requirements for the browser, and has become the primary display method of 3D digital museums at home and abroad.

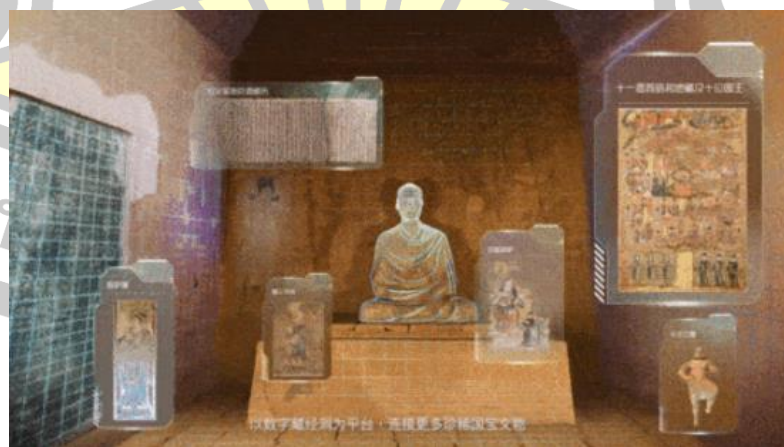


Figure 77 Dunhuang Academy Digital Scripture Cave Viewing Scene

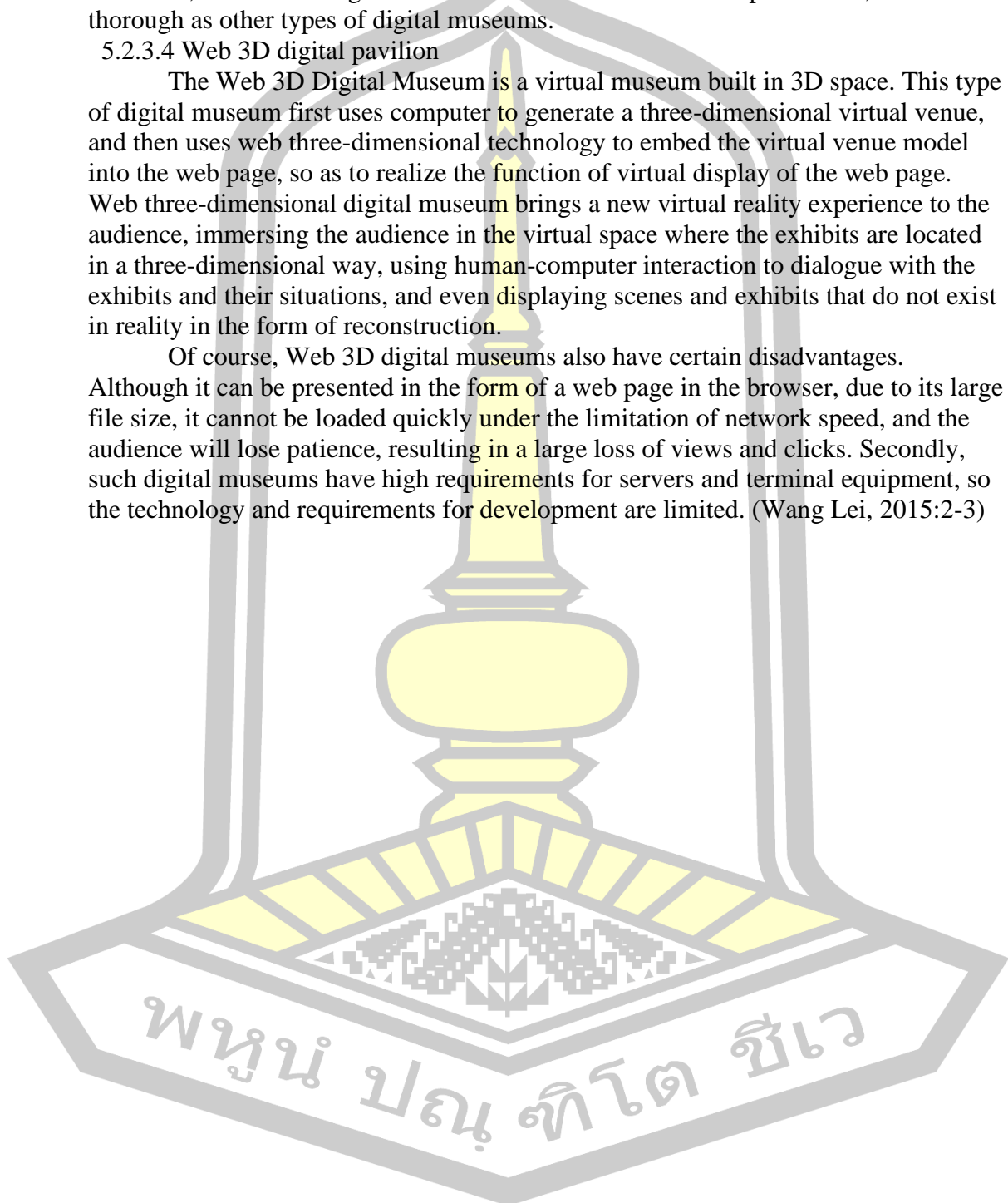
Source: " www.hb-museum.com/HomePage/index.html", 2023

However, the panoramic three-dimensional digital museum also has certain defects, it has not broken the restrictions of traditional museum display forms, the placement of exhibits and the construction of venues are only copies of physical museums, and the mining of exhibit information is not as comprehensive, detailed and thorough as other types of digital museums.

5.2.3.4 Web 3D digital pavilion

The Web 3D Digital Museum is a virtual museum built in 3D space. This type of digital museum first uses computer to generate a three-dimensional virtual venue, and then uses web three-dimensional technology to embed the virtual venue model into the web page, so as to realize the function of virtual display of the web page. Web three-dimensional digital museum brings a new virtual reality experience to the audience, immersing the audience in the virtual space where the exhibits are located in a three-dimensional way, using human-computer interaction to dialogue with the exhibits and their situations, and even displaying scenes and exhibits that do not exist in reality in the form of reconstruction.

Of course, Web 3D digital museums also have certain disadvantages. Although it can be presented in the form of a web page in the browser, due to its large file size, it cannot be loaded quickly under the limitation of network speed, and the audience will lose patience, resulting in a large loss of views and clicks. Secondly, such digital museums have high requirements for servers and terminal equipment, so the technology and requirements for development are limited. (Wang Lei, 2015:2-3)



5.3 Museum visitor questionnaire survey

5.3.1 Questionnaire design

In order to know the results of the audience's experience information on the expression of the digital exhibition hall, on the one hand, the advantages and disadvantages of the museum exhibition space can be obtained through the audience's experience evaluation of the museum visited, and on the other hand, the audience can choose the option in the questionnaire that best suits them by asking questions. Therefore, the results of the audience's evaluation tendency for the digital exhibition hall exhibition were analyzed. The questionnaire is divided into three parts for design, fill in the questionnaire, first of all, we have to know some basic information of the audience, so in the questionnaire design, the first part is designed the basic information of the audience including the audience's age, gender, city, occupation, education level for statistics. The second part evaluates the type of museum you like, the purpose of visiting a digital museum, the way to visit a digital museum, and the focus of visiting a digital museum. The third part of the audience felt the necessity of digital exhibition design, the objective evaluation of the exhibition method that impressed the most in the digital museum, and the suggestions for the virtual expression of the digital exhibition hall. (Zhang Bing, 2021: 57-58)

According to the study of past data, it was found that Sakchai Sikka (2009: 52) once wrote in a book titled "Design and Development of Folk Museums" that Selection of media in the museum. The following important points should be considered.

- 1) The selected media is suitable for the museum's visitor group such as race, language, age range, culture, intelligence and interests ; ;
- 2) The format and method are suitable for the displayed content. ;
- 3) Media design looks interesting, eye-catching, exotic. ;
- 4) Match the objectives that you want to present. ;
- 5) The activation method does not take much time. ;
- 6) Simple, uncomplicated communication ;
- 7) Media helps create a positive attitude among museum visitors. ;
- 8) The presentation of the media is simple. Help visitors understand the content better. ;
- 9) Media contributes to enhancing skills or knowledge or concepts for visitors.

5.3.2 Analysis of basic audience information

(1) The type of structure of the visitor population

In the collection of data, it was found that relevant scholars had conducted very detailed research on the structural analysis of the visitor population in previous research centers, and the author sorted it out.

In this paper, the author integrates the classification research done by previous scholars, combined with the actual situation of digital museums and the distribution of questionnaires, hoping to target a wider range of people, and after comprehensive comparison, the survey of the population of the museum questionnaire is classified by the age, gender and education level of the audience. After the survey, through the collation of 113 valid questionnaires, the following situation was found:

In the age group, most of the people are young and middle-aged, of which the largest proportion is the audience between 17-22 years old, accounting for 28.3%, the proportion of audience between 23-30 years old is 26.5%, and the audience between 31-40 years old accounts for 27.4%. Young and middle-aged people are the main group of various learning places in society, and their time is relatively sufficient.

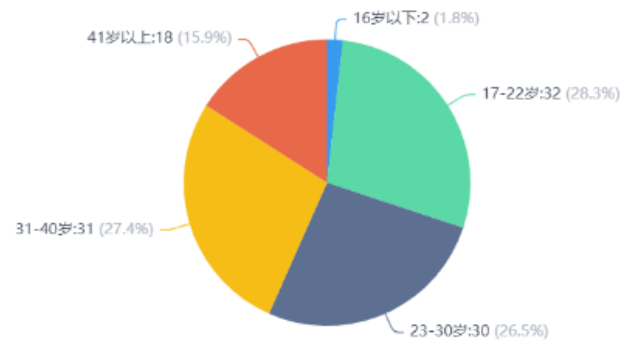


Figure 78 Age distribution of people who filled in the questionnaire survey among the people who visited the museum

Source: "The author draws it himself", 2023

The gender hierarchy has approximately the same proportion of men and women, with 47.8 % of boys and 52.2 % of girls.



Figure 79 Gender distribution of people who filled in the questionnaire survey among the people who visited museums

Source: "The author draws it himself", 2023

Distribution of educational level: 6.2% of primary and secondary school education, 5.3% of high school, 66.4% of university education, and 22.1% of postgraduate students (master's and doctorate). This shows that people who have experienced higher education are more interested in or more receptive to innovative digital pavilions.

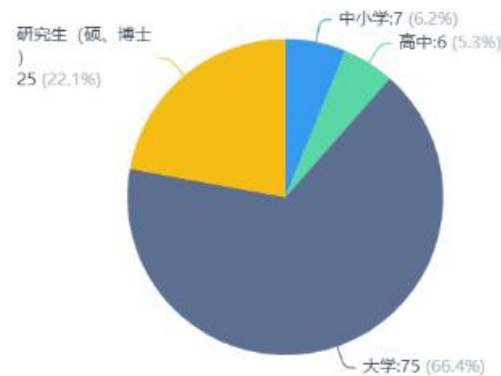


Figure 80 Distribution of education level of people who filled in the questionnaire survey among the people who visited the museum

Source: "The author draws it himself",2023

5.3.3 Evaluation analysis of audience experience tendency

The distribution of favorite museum types: site category accounted for 13.27%, history category accounted for 30.97%, culture accounted for 9.73%, art category accounted for 23.89%, natural category accounted for 22.12%. It can be seen that more people like historical and art museums. Smaller groups of people prefer cultural museums.

6. 您喜欢什么类型的博物馆?

收集结果: 113条

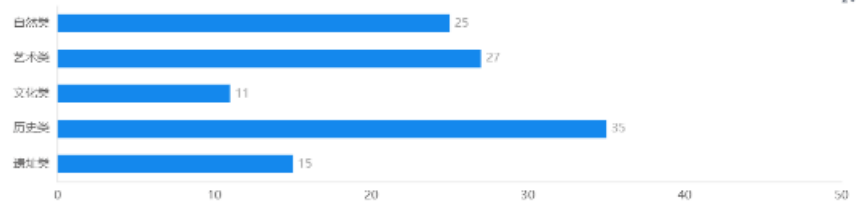


Figure 81 Distribution of museum types among those who filled in the questionnaire survey

Source: "The author draws it himself",2023

The distribution of the purpose of visiting the museum: appreciation of cultural relics accounted for 40.71%, learning related knowledge accounted for 29.2%, leisure and entertainment accounted for 25.66%, and work needs accounted for 4.42%. It can be seen that more people come to visit the museum or put the acquisition of knowledge in the first place, which also reflects the high requirements for the transmission of knowledge of museum exhibition design. Secondly, leisure and entertainment accounted for 25.66%, thinking about whether it can combine the acquisition of knowledge and leisure and entertainment, and the complex exhibit knowledge can be acquired by the audience in a relaxed and playful space, which has higher requirements for museum exhibition design.

选项	计数	比例
休闲娱乐	29	25.66%
欣赏文物	46	40.71%
学习相关知识	33	29.2%
工作需要	5	4.42%

Figure 82 Distribution of the purpose of visiting the museum among the people who filled in the questionnaire survey

Source: "The author draws it himself",2023

The distribution of the process or route of visiting the museum: 34.5% of the people who will carefully look at all cultural relics, 34.5% of the people who skip browsing and encounter interest that can't stop, 25.7% of the people who follow the instructions of the arrow, and 5.3% of the people who have walked around and watched the flowers. It can be seen that most of the crowd can take the initiative to carefully visit the museum exhibits. Jumping browsing meets 34.5% of the interested people who can't stop, which also requires thinking about how to make some boring exhibits and knowledge more interesting through the display of expression, which can attract the audience to stop and watch.



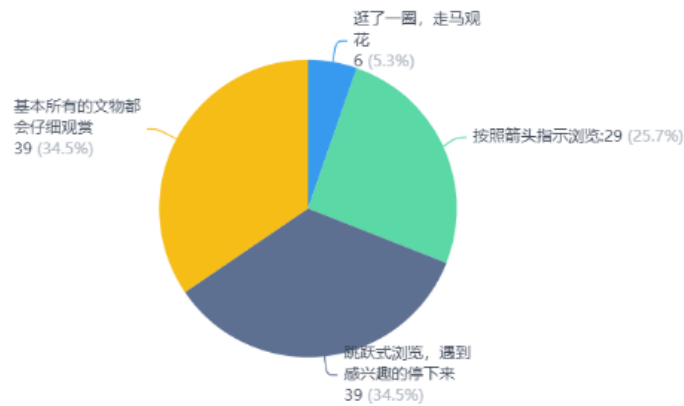


Figure 83 Distribution of the route of visitors to the museum by filling in the questionnaire survey

Source: "The author draws it himself",2023

When visiting the museum, the proportion of people who watched the exhibits and the text introduction accounted for 74.3% of the people, 24.8% of the people who saw the text introduction first, and 0.9% of the people who only saw the exhibits. It can be seen that most of the crowd will be attracted by the display of exhibits, some of the crowd can take the initiative to watch the text introduction and then enjoy the exhibits, and a very small number of people only watch the current status of the exhibits.

选项	计数	比例
先看展品	84	74.34%
先看文字介绍	28	24.78%
仅看展品	1	0.88%

Figure 84 The people who filled in the questionnaire survey among the people who visited the museum visited the museum according to the order distribution of viewing the exhibits and text introduction

Source: "The author draws it himself",2023

After visiting the museum, the audience thought that the difference between digital exhibition halls and physical exhibition hall visits was 34.5% of the people, 23.9% of the people who felt that the hands-on operation was interesting, 21.2% of the people who felt that it was more convenient and time-saving, 16.8% of the people who felt that they could see more carefully, and 3.5% of the people who felt that the two were similar. It can be seen that after most of the crowd visited the digital museum, they felt that the novel exhibition method and the fun of the operation of the digital museum attracted more to the audience. A very small number of people feel that there is little difference between digital pavilions and physical pavilions.

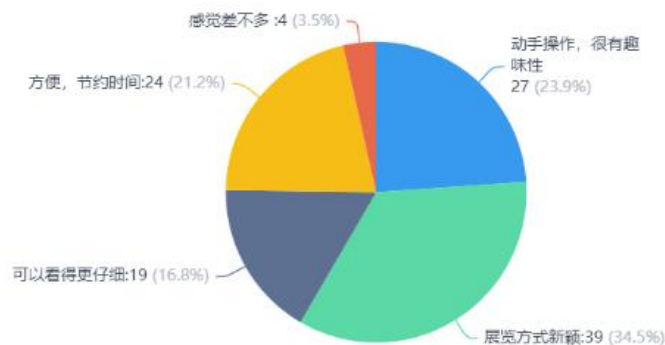


Figure 85 The people who filled out the questionnaire survey among the visitors felt the difference between digital museums and physical museums

Source: "The author draws it himself", 2023

After visiting the digital museum, the audience thought that the digital exhibition hall could meet the demand: 44.6% of the people felt that they could basically meet the demand, 33.9% of the people felt that they could meet the demand, and 21.4% of the people who felt that they could not meet the demand. It can be seen that most of the crowd after visiting the digital museum, feel that the digital museum can still meet the basic visiting needs, but there are also 21.4% of the crowd feel that they cannot meet the visiting needs, which needs to consider imitating some displays and content of the physical exhibition hall in the digital exhibition hall, so that the content and exhibits of the digital exhibition hall are richer.



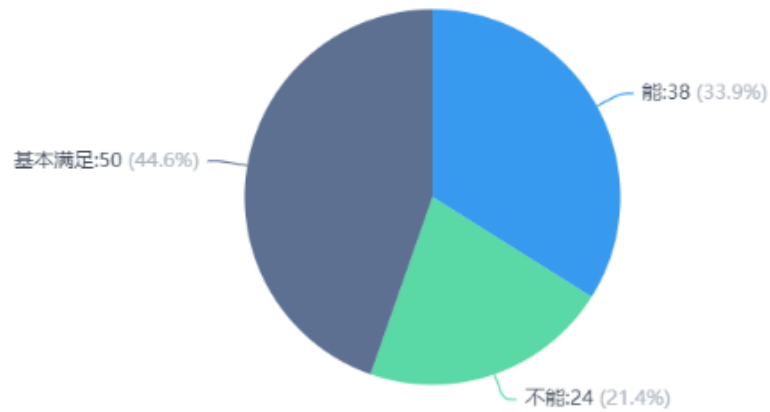


Figure 86 The people who filled out the questionnaire survey felt that the digital museum could meet the needs of visitors

Source: " The author draws it himself",2023

5.3.4 Analysis of the exhibition form of the audience's preferences

After visiting the digital museum, the audience thought that the exhibition design in the digital exhibition hall was important: 84.8% of the people felt very important, 9.8% of the people felt that it did not matter, and 5.4% of the people felt that it was unimportant. It can be seen that most of the crowd still feels that the exhibition design in the digital exhibition hall is still important, so it is necessary to invest more in the expression of the exhibition design to meet the needs of the audience.

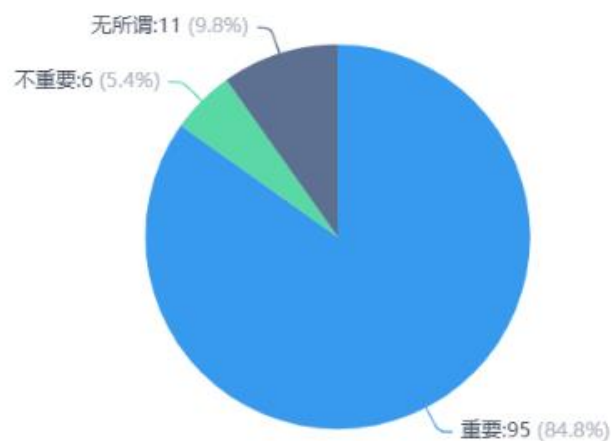


Figure 87 The number of people who visited the museum who filled out the questionnaire felt the importance of exhibition design in the digital museum

Source: " The author draws it himself",2023

The third part also has two questionnaires in the form of questions and answers: First, what is the most impressive exhibition method for the digital pavilion? Second, what suggestions do you have for the virtual representation of digital pavilion displays? After the analysis of the summary questionnaire results, it was found that the audience preferred the three categories of scene restoration and multimedia interaction, virtual reality, like the technical sense, interactive display method, the display form of text and pictures has been unable to be recognized by the audience, they like a more relaxed, more expressive way of display, the deepest impression of the scene restoration display method accounted for about 70%, the scene restoration is closest to the original face of the exhibits, the audience is more direct when watching. This requires the designer's ability to control the design of the digital exhibition hall.

5.4 Luoyang food culture digital exhibition hall exhibition virtual expression design

5.4.1 Overview of virtual performance projects of Luoyang Food Culture Digital Exhibition Hall

5.4.1.1 Construction of physical food culture museum

"Food culture museum should refer to a specialized museum with material or spiritual content such as food life, food production and food customs as the core. Museums with the core content of cuisine genres, dietary ingredients, famous dishes, wine and tea, spices and even food customs and etiquette can be collectively called food culture museums. (Liu Junli, 2017:1-2)

There are currently two Luoyang Food Culture Theme Museums, namely the Old Luoyang Food Museum and the Luoyang Zhendifferent Water Seat Museum.

(1) Old Luoyang Food Museum

Luoyang Laoluoyang Food Museum was officially opened on November 2, 2013. Old Luoyang Food Culture Museum is a thematic private museum reflecting food culture in Luoyang City, and is also an important cultural place, committed to inheriting and promoting the food culture of Luoyang area. The museum displays Luoyang's food history, traditional food culture, eating habits, ingredients and cooking skills, which is an important window to understand the culture of Luoyang area.

Luoyang Laoluoyang Food Museum has an exhibition area of about 560 square meters and a total of 623 collections related to food culture. These collections are selected through long-term accumulation and collection, through multi-party searching, key collection, and classification. The collection has continued from Xia, Shang and Zhou to today, and its large venue area, long historical span and many exhibits in the collection can be called the largest museum of its kind in our province. Inside, visitors can enjoy a large number of exhibits, including tableware, kitchenware, ingredients, food pictures, dining tables and chairs, and more. Many of them are the families where our ancestors eat that are rare to see, which makes people feel the long history and breadth of Luoyang's food culture, which is an important part of Heluo culture.

In addition, the Old Luoyang Food Culture Museum also regularly holds various activities, such as cooking competitions, food exhibitions, food culture forums, etc., attracting many tourists to visit and experience. The construction and opening of the museum is of great significance to inherit and promote Luoyang food culture, and has also made positive contributions to the local cultural tourism industry.

(2) Luoyang Zhendifferent Water Seat Museum

Luoyang Zhendifferent Water Seat Museum is located in the old town of Luoyang, Henan Province, China, and opened on March 30, 2013. It is currently the only museum in China with the theme of water mat culture. It mainly displays and introduces the culture of Luoyang water mats. Water mat is one of the traditional food cultures in Luoyang area, which is a form of catering based on soup and side dishes, and is a very popular way of eating in Luoyang area.

The exhibition hall of the museum includes water mat exhibition hall, water mat etiquette hall, water mat tasting hall, water mat cooking hall, water mat tea art hall and other display areas. The museum displays a large number of cultural relics, objects, pictures and videos about water mats, and also provides services such as water mat tasting and production experience, allowing visitors to better understand and experience Luoyang's water mat culture.

The opening of Luoyang Water Seat Museum not only makes a positive contribution to Luoyang's cultural tourism industry, but also provides an opportunity for tourists to understand and experience Luoyang's traditional food culture.

At present, the two museums with the theme of physical food culture in Luoyang belong to private museums, and the operation of the museum is stable, and the tourists who visit each person are also endless. It provides an immersive experience for the display and dissemination of Luoyang food culture. It also provides a physical blueprint for the Luoyang Food Culture Digital Exhibition Hall.

5.4.1.2 Analysis of the characteristics of inheritor resource information

Two representatives of Luoyang food culture practitioners were selected, namely Wang Tianxi, director of the Old Luoyang Food Culture Museum, and Yao Yanli, chairman of Luoyang Zhenji Hotel Co., Ltd. The following describes the individual position representatives.

(1) Wang Tianxi, director of the Old Luoyang Food Culture Museum

Wang Tianxi, Director of Laoyang Food Culture Museum, Deputy Director of the Snack Committee of China Cuisine Association, Chairman of the Snack Committee of Henan Catering and Hotel Industry Association, Vice Chairman of Henan Private Museum Association, Director of Laoluoyang Food Culture Museum, Senior Advisor of Luoyang Heluo Catering Culture Research Association and Vice Chairman of Luoyang Cuisine Culture Expert Committee, President of Luoyang Yiyin Culture Research Association, Provincial Inheritor of Intangible Cultural Heritage Pulp Noodle Project, Chairman of Henan Laoluoyang Catering Service Co., Ltd.

There is a proverb in old Luoyang: Henan Province has three treasures, Mengjin pear, Lingbao date, Luoyang city pulp noodles. Laoyang paste noodles are the intangible cultural heritage of Henan Province, authentic original taste, using exclusive brewed mellow old pulp and a variety of side dishes, the taste is sour, tempting appetite, the famous Chinese banquet Luoyang water mat is the favorite taste of Luoyang people, these delicacies have nourished generations of Luoyang people.

Wang Tianxi is an authentic Luoyang person, hospitable and bold, loves to eat since childhood, deeply influenced by the traditional culture of old Luoyang, and loves the collection of old objects. Wang Tianxi is the provincial inheritor of the intangible cultural heritage pulp noodle project, and the Lao Luoyang Restaurant, Lao Luoyang Water Table, and Lao Luoyang Noodle Restaurant he founded are popular local food brands, and are currently Chinese famous restaurants, Henan tangible cultural heritage inheritance enterprises, Henan time-honored enterprises, China's top ten snack brand enterprises, and Henan Province's top 100 catering enterprises.

In order to commemorate the outstanding contribution of the culinary ancestor Yi Yin and show the unique charm of Chinese cooking, Luoyang City has held worship activities for more than ten consecutive years. At the same time, the "Yiyin Cup" Laoyang Pulp Noodle Folk Master Competition and Luoyang Pulp Noodle Inheritance and Development Seminar, and "Taste Love Pulp Noodles, Inherit the Taste of Luoyang for a Thousand Years" public welfare activities such as "Love Pulp Noodles, Inherit the Taste of Luoyang for a Thousand Years" and other activities. It closely combines Heluo food culture with the life of the people with heavy fireworks and gas, and wins the praise of the society. Let the Lao Luoyang Noodle Restaurant, Lao Luoyang Water Table, and the authentic Luoyang taste go out of Henan and go to the world, which has become a new dream that Mr. Wang Tianxi can expect in the future.

Recalling the past, Wang Tianxi has also experienced a tortuous exploration in the catering industry. After the reform and opening up, with the high activity of the economy, the catering industry has also fully recovered. Sichuan cuisine, Cantonese cuisine, Huaiyang cuisine, Hubei cuisine, Hunan cuisine, etc. have entered Luoyang. Wang Tianxi was engaged in the catering industry and was first engaged in the Huangyuan Restaurant, which operated Sichuan cuisine and Yu cuisine, and the business was very hot, becoming the leader of private restaurants at that time. He later went north to seek and introduced "Quanjude Roast Duck" and "Donglai Shun Brush Mutton", and after a few years of boom, both fell flat.

After careful thinking and discussions with veterans in the catering industry, he analyzed that foreign catering will eventually fall into loneliness after a while, because foreign dishes have no foundation and have a short life cycle. China's time-honored restaurants, century-old shops and catering intangible cultural heritage enterprises are all local food characteristics, Wang Tianxi said: "The local is the national, and the national will never be eliminated."

As a caterer, you must make authentic local dishes, inherit and develop Luoyang traditional food culture", he found a new direction through the study of the eating habits and dietary structure of the original people, adhered to the root vein of the old Luoyang food culture, excavated and restored the old Luoyang water mat, as the provincial inheritor of the intangible cultural heritage pulp noodle project opened

the Laoyang noodle restaurant, the old Luoyang restaurant, the old Luoyang water mat, operating authentic Luoyang cuisine, the business is booming, very prosperous, there are more than 60 directly operated stores in Henan Province, There are more than 20 in Luoyang urban area, covering every surrounding county, and have developed cities such as Zhengzhou, Nanyang, Jiaozuo, Pingdingshan, Sanmenxia and Jiyuan.

Mr. Wang Tianxi is the inheritor and perseverance of Chinese traditional food culture, he is determined and enterprising, has been constantly forging ahead on the road of upholding the right and new, and constantly strives to inherit and carry forward the excellent traditional culture, he firmly believes that "the local is the national, and the national is the world; The more traditional, the more modern it is." It is precisely because Luoyang has countless people of insight like Wang Tianxi who inherit and carry forward the excellent traditional culture, which highlights the rich heritage and uniqueness of the ancient capital culture of the thirteen dynasties, so that the Chinese food civilization can be inherited and developed.

(2) Yao Yanli, chairman of Luoyang Zhenji Hotel Co., Ltd

Yao Yanli, male, born on August 16, 1949, Han nationality, from Luoyang, Henan Province. The second batch of national intangible cultural heritage items are really different from the representative inheritors of Luoyang water mat making skills. In 1949, Yao Yanli was born in Luzhuang, at the confluence of the Yiluo River in Gong County (now Gongyi City). One year, when the Yellow River flooded and the village was flooded, my father fled with his family to Luoyang, where he made a living by cooking at the "four (bowl) eight (plate) table" handed down by his grandfather.

In 1964, 15-year-old Yao Yanli entered the Luoyang Dali Hotel under the Luoyang Municipal Bureau of Commerce as an apprentice, learning to cook southern cuisine with Shanghai chefs. He was down-to-earth and diligent, and after a few years, he learned Huaiyang cuisine, Suxi cuisine, and Shanghai local cuisine, and practiced excellent craftsmanship and became a chef in the restaurant.

In June 1978, Yao Yanli was transferred to Luoyang Fengtai Hotel Department Director, and three years later was promoted to deputy manager. In 1982, by chance, he was selected by the Ministry of Foreign Affairs to work as a full-time chef at the Chinese Embassy in Malta. The first task Yao Yanli received to make a banquet was to receive the Minister of Culture of Malta. The embassy counselor specifically told him: "You have to show Chinese culinary culture!" Yao Yanli decided to make a table of "jade pot spring", which means Wang Changling's famous phrase "Luoyang relatives and friends ask each other, a piece of ice heart in the jade pot". This banquet made the Chinese food famous by the Chinese Embassy. The ambassadors to Malta regard it as a privilege to be able to enjoy and taste Chinese food at the Chinese Embassy. Maltese Prime Minister Mintov, who has never attended the banquet at various embassies, specially asked the Chinese Embassy for two platters of dishes known as oriental art, and took out two bottles of Zun Lan brand superb whisky and gave them back to Yao Yanli.

After returning to China in 1987, Yao Yanli refused the good intentions of the Ministry of Foreign Affairs to stay in the Diaoyutai State Guesthouse, returned to his hometown Luoyang, and became the deputy manager of Luoyang Guangzhou Restaurant; A few years later, he became the chairman and general manager of Luoyang Restaurant Co., Ltd.

As a native of Luoyang, many legendary anecdotes such as Shang Zhou Yayun, Northern Wei relics, and the prosperous era of the Tang Dynasty have penetrated into his blood. Making northern and southern dishes, understanding astronomy and geography, knowing the natural avenue, going through ancient and modern ruins, and making a real Luoyang water mat has always been a dream that haunts his heart.

In 1997, the Luoyang municipal government decided to put Yao Yanli in charge of the "Really Different" hotel. Founded in 1895, "True Difference" is a century-old brand, and it is also the leader of Luoyang Water Seat, and its brand influence is unique. However, due to various reasons, its operating efficiency has always been unsatisfactory. In view of this, the city leaders hope that Yao Yanli can sweep away the decline and bring new vitality to him. When Yao Yanli stood in front of the "really different" shop, facing this time-honored brand with a century-old reputation but dying, he sighed with emotion, restoring the real Luoyang water mat, this dream that had been hovering in his heart for many years, suddenly so close. The six ancient capitals of Beijing, Hangzhou, Xi'an, Kaifeng, Luoyang and Nanjing once gathered in Luoyang, and Feng Enyuan, secretary general of the Chinese Cuisine Association, praised the Luoyang water table. He revealed that the application for Chinese culinary heritage has quietly begun, "As a palace banquet with a history of more than 100 years, Luoyang water mat can take root and germinate among the people, and it will surely become an important support for the work of 'applying for heritage'." "

When it comes to Luoyang's catering industry today, we cannot fail to mention Yao Yanli. As a national technician, he is a superb cook, and has won gold medals in national culinary competitions many times; As the head of Luoyang Restaurant, the "big brother" of Luoyang's catering industry, he innovated dishes, integrated cultural connotations, and created one business miracle after another, which contributed to the "true difference" to today. Recently, in the office of the leader, Yao Yanli poured clear tea and talked about his entrepreneurial road from "cooking" to "running a restaurant".

Yao Yanli said that he knows that it is more difficult to cultivate a good chef than a manager, and he also loves the catering industry, but he does not want to be only a chef for the rest of his life, and he wants to make a difference in the catering industry.

"Really different" is like a forest, and the people have the saying that "not entering the real difference is equivalent to not entering Luoyang City", but how to make this thousand-year-old food treasure always alive is a problem that Yao Yanli has been thinking about.

In 1998, the first year that Yao Yanli took over "Really Different", he implemented the GB/T13391-92 national quality standard in the hotel, and loudly put forward the slogan "Make a fuss around the Tang Dynasty, tightly hold Wu Zetian's hand".

Talking about the tough measures of measuring side dishes, cooking procedures, and standardizing services, Yao Yanli said that in the past, chefs made Chinese food, especially water mats, all based on feelings, which made it difficult for Luoyang water mats to be elegant, and only by re-examining the catering standards could Luoyang water mats be truly high-grade.

Nowadays, 1 kilogram of vermicelli can fry 355~360 balls, Luoyang meat slices can be manually stirred 450 times to get off the pot, all vegetarian foods are not allowed to be separated... "Really different" chefs are operating according to these rules every day.

In 1998, Yao Yanli threw out his reform plan, which can be called "super combination boxing". "Really Different" is scattered with heroic posts, and famous teachers, experts and scholars, folk artists and other famous people are invited to discuss the innovative plan of the water seat. In the second half of 2001, on the basis of Luoyang's traditional water mats, they successfully developed two medium-to-high-end mats, such as palace water mats and Wuhuang water mats, which were launched in 2002 and the effect was surprisingly good.

Talking about the "creation" process of the "Martial Emperor's Feast", Yao Yanli felt a lot.

For a while, "Luoyang Daily" serialized Luoyang writer Zhang Yuanchun's "Old Stories of Luoyang", which attracted Yao Yanli's attention, with legends of "true difference" on it, as well as the origin of Wuhou Shuixi, etc., and he cut out all these articles.

These articles gave Yao Yanli a deeper understanding of water mat culture. Luoyang water mat was originally known as Wuhou water mat, which blended the taste of north and south, east and west, salty, and eclectic, showing the openness, tolerance and confidence of the Tang Dynasty. Therefore, some people say that Luoyang water mat is the most cultural Yu cuisine, a classic in the Central Plains cuisine, and also a chapter of Chinese food culture.

In 2001, Yao Yanli began to think about launching the "Wuhuang Water Table". In order to design 8 cold cuts, he locked himself in the office, pondered for a few days, and finally took out the first draft, tried it for half a month, and after repeated revisions, after the appearance of these 8 cold cuts, some connoisseurs and consumers were amazed.

The cool dish "Zen" is made of Dongguan radish and arranged in the shape of a wooden fish. A few days later, he had a dream and found inspiration: wouldn't adding a circle of Buddhist beads next to the wooden fish better reflect the charm of "Zen"? The next day, he sent someone to the monastery to inquire about the number of Buddhist beads and replace them with seedless dates.

Mr. Yao Yanli said that many people will make Luoyang water mats, but how to make the "really different" water mats not repeat the mistakes of Tang Sancai? Only continuous breakthrough, continuous excavation and continuous innovation in inheritance is the right way.

The business of different hotels is prosperous, and the spread of Luoyang water mat culture is inseparable from Mr. Yao Yanli's reform and innovation of Luoyang water mat. Thirty years ago, he threw out a reform plan, scattered heroic posts, and sincerely invited famous teachers, experts and scholars, folk artists and other famous people to jointly find the god, soul, qi and rhyme that the water mat

should have. On the basis of Luoyang folk water mats, "True Difference" has successfully developed two medium-to-high-end dishes such as palace water seats and Wuhuang water seats, and more than 20 dishes such as the first eight products, four town tables, and eight large pieces, each with its own color, each in its own shape, each with its own swaying and colorful attention and story, it is no longer a simple dish, but a table of living stunners.

Mr. Yao Yanli expressed his great pleasure with the research on the virtual exhibition mode of Luoyang food culture digital exhibition hall, and hoped that Luoyang food culture can be spread to further places through emerging science and technology.

(3) Introduction of Luoyang Zhen Different Hotel and Luoyang Water Table: "Zhen Different" is a registered trademark of Luoyang Zhen Different Hotel Co., Ltd. Founded in 1895, Zhenji Hotel has a history of more than 100 years, and is a time-honored Chinese restaurant, a famous Chinese restaurant, a well-known trademark in China, an international restaurant, and the main reception "window" of Luoyang City. Its predecessor was "Yu Ji Restaurant" and "Xinsheng Chang", and its founders were Yu Tingxuan and Yu Baohe. In 1947, it was named "True Different Hotel". It is now located in the bustling commercial area of the old city of Luoyang City, Henan Province. The famous writer Li Huang wrote with deep feelings that "looking back in half a life, it is still really different" and mentioned the signboard of "really different hotel". There is a saying among the people that "if you don't enter the real difference, you haven't arrived in Luoyang City". The most famous of the water mats is naturally the True Different Hotel. "What a difference" is to the water mat as it is to the roast duck.

Luoyang Water Seat was recognized as "Chinese Famous Banquet" and won the "International Food Quality Gold Award". In 1973, when Premier Zhou Enlai accompanied Canadian Prime Minister Trudeau to visit Luoyang, he tasted the first dish of the water table, Luoyang Yan Cuisine, and said humorously: "Luoyang peony is a world, and peony flowers can also be born in the dish." On October 25, 2009, at the 10th China Food Festival and the 8th International Food Expo, Luoyang Zhenji Hotel won the title of "China's First Banquet". At the same time, Luoyang Zhen Different Tang Feast won the title of "Top Ten Feasts of Chinese Cuisine".

Water table eight products: There are a total of 24 dishes in the whole table, including 8 cold cuts, 4 large items, 8 medium items, and 4 table dishes, hot and cold, vegetarian, sweet and salty, sour and spicy. The order of serving is extremely exquisite, first 8 cold dishes are served as the appetizer, each dish is meat and vegetarian three spells, a total of 16 samples; After three rounds of wine, the guests will serve hot dishes: first serve 4 large hot dishes, each followed by two medium dishes (also called foil dishes or seasoned dishes), which is called "belt up"; Finally, 4 table-pressing dishes are served, including an egg soup, also known as the send-off soup, to show that the table is full. Hot dishes must be served with soup to taste, chicken, duck and fish, fresh goods, fungi, seasonal vegetables are all delicious, shredded, sliced, strips, chunks, diced, fried, endless. However, there are still many ways to make water mats in the folk people, such as the last dish is eight treasures. A long history.

Some people say that the soup of Luoyang water mat is like a soothing music, the taste is light at the beginning, then add a little spicy, then add sugar to become sweet and salty, and then the acid of vinegar... After a few bowls, it can only be described as "refreshing".

Luoyang water mat eight cold dishes, sixteen hot dishes. The eight cold dishes are the names of dishes with the themes of clothing, etiquette, tao, desire, art, literature, Zen, and politics; The sixteen hot dishes are divided into four town tables, eight large pieces, and four sweeping tails.

"Clothing": Use egg yolk to make egg clothes and bind them to the dish, the egg clothes are as thin as paper, golden and free of impurities, and the edible red and green silk is embellished with dragon and phoenix patterns on the egg clothes, which also indicates that the imperial yellow robe is added.

"Gift": Go to the deer tendon white into a hook, like a bow, (there are also other materials instead) the look of white and crystalline, placed in an orderly dish, reflecting the courtesy.

"Tao": Rolled up with five-spice curd (with ears born from the bushes of fragrant wormwood on the banks of the Luo River after the rain, fungi. The local saying is that "the circle of the earth" is the best. The outside does not know the inside, the inside does not know its taste, and eating it in the mouth has an indescribable sense of deliciousness.

"Desire": take the outer waist flower of the three-year-old dog cut into pieces, open the middle, insert the inner waist of the year-old rooster as a shape, garnish with goji berries, and surround it with cordyceps sinensis, look gorgeous, and the aphrodisiac of food makes up for the deficiency.

"Art": In the past, it was made into a dish with crisp lotus tongue. It refers to the picturesque lotus and the singing of spring, which means that the river and mountain are picturesque, and the song and dance are leveled. Of course, today we want to protect birds, and finchtongues have been replaced.

"Wen": Use green shoots to make carp whiskers into a dish. The bamboo shoot is the bamboo soul, the bamboo is the wen you, and the wen cheng is the principle of the world (carp).

Zen": Wu Zetian was once a monk, which can be regarded as a relationship with Buddha Zen. This dish is vegetarian and non-sticky.

"Politics": Made of goose breasts and goose palms. The geese know the cold and migrate, and the goose paw carries the body and floats in the water. The metaphor of the regime should know the cold and warm of the world, and the way of public opinion. Today the goose breast has been replaced by the goose breast.

Four Town Table:

1. Swallow vegetables, many swallow vegetables in Luoyang area are named "peony swallow vegetables". Because in October 1973, Premier Zhou Enlai accompanied Canadian Prime Minister Trudeau on a tour of Luoyang, and the leaders of Luoyang City entertained him with a water banquet. The celebrity chef carefully made a peony flower with eggs and placed it on the swallows. Premier Zhou was very happy to see it and said: "Luoyang peony is a world, and peony flowers also bloom in the dish." Since then, the swallow dish has been renamed "peony swallow vegetables".

2. Tiger head carp with green onion, carp is made of long-bearded carp produced by the Mengjin Yellow River, and it is put on a plate with an open mouth and a fluttering shape. The head of the fish must be addressed to the Venerable, the elder, or the distinguished friend, and the person sitting on the upper seat moves the chopsticks first, showing a sense of respect and courtesy.

3. Cloud cover with curd meat, and the person sitting in the next seat moves the chopsticks first. According to legend, the four sons born to Wu Zetian made her dissatisfied, but she was quite appreciative of Princess Taiping. Later, Taiping married Xue Shao, and when he sent his daughter to marry, Wu Shi spread his own milk on the meat and asked his daughter to eat it, so that the daughter could not forget the old woman's heart.

4. Haimi Sheng Baicai, that is, Haimi stewed cabbage, called "Baicai" for a picture of an auspicious and pleasant heart. Cabbage is sometimes vegetarian, but it is actually used for the first two meat dishes.

The "eight major pieces" are divided into the first five and the last three: the first five are "fast three", "five willow fish", "fish kernels", "chicken diced", and "popping crane". The last three are three sweet dishes, generally including eight treasure rice, sweet pulling silk, sweet and sour tenderloin.

Four sweeps: "Shark fin flower arrangement", "Golden monkey exploring the sea", "Squid fighting for spring", and "Bibo umbrella pill". "Bibo Umbrella Pill" is "ball", but because it sounds like "End", when Wu Zetian was ill, she ate the last dish and heard it as "End", she sighed in frustration, at this time Fang realized, but everything was late. So I shouted, and I also sat on the water mat... One life whine. With this reason, people in the future will inevitably be a little disappointed, and they will always think of the death of a woman. It is said that since the Northern Song Dynasty, this last dish was changed into a bowl of sour and sharp egg-coated soup, which has been preserved to this day.

On the water mat, people who love cold food can find cold dishes that suit them, and people who love sour and spicy dishes, water mat dishes can make you spicy sweat and sour raw jin. Some people like sweets, and the fourth set of dishes is enough to make people eat deliciously. The unique feature of the water table is that there is a lot of soup, and the soup is eaten alternately at the banquet, which can make people feel comfortable in the stomach, and although the dishes are more than appetizing. Seeing the egg soup on the table, those who know the local customs know that all 24 dishes have been served, and this bowl of soup shows that the water table is over, and the guests and hosts are happy and get up and leave the table.

5.4.2 Design strategy of virtual expression of Luoyang Food Culture Digital Exhibition Hall

5.4.2.1 Digital pavilion audience demand analysis

Demand analysis is an important step in the virtual representation of exhibition, and the result of demand analysis is the basic basis for evaluating the audience's feelings about the virtual representation of exhibition. To analyze the needs of the exhibition method of Luoyang food culture digital exhibition hall, on the one hand, it is necessary to consider the characteristics of Luoyang food culture from the perspective of the display party, and analyze the purpose of the exhibition; On the other hand, it is also necessary to fully consider their motivation and aesthetic characteristics from the perspective of the vast audience. As mentioned in Chapter 4, collection, research and

education are the basic functions of museums, of which education is the most important function and where digital pavilions can best reflect their strengths. Let more people understand the history and connotation of Luoyang food culture, and help the general public improve their cultural literacy through digital exhibition means, which is the fundamental purpose of the exhibition mode of Luoyang food culture digital exhibition hall. However, at present, the popularity of Luoyang food culture in the country is still low, under such circumstances, how to attract more audiences to visit through reasonable publicity and packaging has become the primary issue of Luoyang food culture digital exhibition design. (Yinwen, 2021:2-3)

Luoyang food culture has strong regional and ethnic characteristics, and there are some differences with the traditional agricultural culture of the Central Plains, in view of these differences, it is necessary to help the audience understand the culture through detailed explanations; At the same time, Luoyang food culture is also a cultural resource in Heluo area, so it is also an important exhibition demand to give full play to the advantages of digital communication means and contribute to the improvement of the local food culture image. Through the analysis of the audience experience tendency of the questionnaire survey, it is found that the purpose of the audience to participate in the digital exhibition is different from person to person, and entertainment and knowledge acquisition may be the reasons for the audience to visit. The acquisition of knowledge is a higher-level demand for exhibiting, reflecting the desire of the audience to enrich their spiritual life. Although in contrast, entertainment is still a more common purpose for audiences to participate in exhibitions, but unlike other entertainment methods, the audience hopes to experience entertainment with certain intrinsic value from the museum, and the entertainment provided by the museum should not be separated from the original intention of cultural communication, so the content and method of exhibition that takes into account culture and interest can meet the needs of more audiences.

Luoyang food culture has a wealth of intangible cultural heritage category dishes, many of which representative dishes such as Luoyang water mat, old Luoyang pulp noodles, etc. have a high degree of rarity and technical achievements, through the origin story and legend of these intangible cultural heritage dishes, food raw materials, production process experience, food recommendation list and other aspects of the browsing to let the audience feast their eyes, and at the same time carry out the dissemination of food culture knowledge, so that the audience's entertainment and knowledge needs can be satisfied. In addition, during the tour of the museum and in the questionnaire, it is not difficult to find that the most popular area of the museum is often the experience area of high-tech display equipment. It can be said that gaining an unforgettable sensory experience and satisfying curiosity through advanced exhibition technology is also an important need for visitors to participate in digital exhibition halls. (Yu Na, 2021:2-3)

5.4.2.2 Design strategy of virtual representation of digital exhibition halls

Audiences have different needs for digital pavilion displays, and each visitor will enter the museum with the expectation that the museum will meet their unique needs. With the help of audience classification, clarifying and digging into the needs of different levels, and then establishing a systematic exhibition performance design strategy, it is an important starting point for the system to enhance the competitiveness of digital exhibition halls and build a harmonious relationship

between digital exhibition halls and audiences. The needs of various groups of people visiting the digital pavilion have different needs for digital pavilion displays.

(1) Participatory strategies

The exhibition design strategy usually adopted by digital exhibition halls is based on market demand, which requires digital exhibition halls to fully grasp the needs and wishes of potential audiences as much as possible when designing exhibition forms, and determine the exhibition theme and exhibition form based on this. The most direct way to ensure that the design results meet the needs of the audience is to introduce the target audience into the design process. The essence of the digital exhibition hall exhibition design for audience participation is to use the digital exhibition space as the carrier, with the help of different participatory tools and modes, to enrich the audience's viewing experience, and then provide the audience with more entrances to establish "connection" with related exhibitions.

(2) Appropriateness strategy

Section 32 of the Museum Ordinance emphasises that museum exhibitions should use appropriate means of expression to achieve unity of form and content. This moderation can be understood on two levels. Before determining the theme, the existing and potential visitors of the digital exhibition hall should be investigated in depth to understand the needs and preferences of the target audience, so as to ensure that the theme, form and communication purpose of the exhibition are clear. When designing exhibitions, we should always insist on maximizing the effective dissemination of information, and reduce the occurrence of only enhancing sensory stimulation or simply using cutting-edge technology.

(3) Systematic strategy

User experience is a complex system process based on the multiple perceptual activities of the audience. As an exhibition design that provides users with perceived objects, spaces and scenarios, it must also put forward clear systematic requirements for its process and results. Specifically, the exhibition should meet the material and spiritual needs of the audience, and the exhibition atmosphere should be unified and harmonious with the content and form of the exhibits, infecting the emotions of the audience in a subtle way, promoting the audience's deep thinking, and strengthening the dissemination of exhibit information. From the perspective of the audience, zoom in on all material and immaterial details involved in the whole process of participating in the interaction, deeply study the movement state and psychological changes of the audience in the exhibition space, and determine the use of system design elements such as space, lighting, color, and technology, in order to better meet their multi-level needs for exhibition design.

(4) Open strategy

Any design process, methodology and strategy should be forward-looking and expansive. With the rapid development of science and technology today, the iteration cycle of all digital exhibition hall exhibition support technologies, including digital technology, has been greatly shortened. If the digital exhibition exhibition expression design wants to be competitive with the times, it not only needs to be continuously updated in technology and design practice, but also to meet the current exhibition needs while maintaining the inclusive and open characteristics of the exhibition system, that is, by reserving the expandable modules and interfaces of the system, etc., to provide redevelopment possibilities for the subsequent and future development of

technology, market and design. In this way, it can not only greatly reduce the cost of upgrading the exhibition system of the digital exhibition hall, but also win more time and space for the gradual and even leapfrog development of related exhibition design.

5.4.2.3 Preliminary design scheme of virtual representation of digital exhibition hall

According to the questionnaire survey results of the audience and the analysis of some common digital exhibition virtual expression methods, combined with the actual situation of Luoyang food culture, a preliminary design was carried out, and three digital exhibition virtual expression methods were screened out for selection. The following are described separately:

(1) Glasses-free 3D projection display method

The imaging principle of the glasses-free 3D projection class is based on the grating principle, so the viewer can view the 3D picture without wearing 3D glasses, but it is actually flat. When the audience experiences naked-eye 3D, in order to obtain a good 3D effect, there are certain requirements for viewing angle and distance. You need to stand at a relatively specific angle and distance to see a more stereoscopic and realistic effect. Instead, you see an image stretched by deformation. In terms of playing film sources, glasses-free 3D film sources can be made exclusively for video sources, but they can be converted from ordinary 2D movie sources without remastering. Both construction and operating costs are low. However, the display method of naked-eye 3D projection is less interactive and interactive with the audience. Such as the display method of the 3D projection laser show in Luoyang, China. Luoyang Yingtianmen 3D projection laser show is a combination of museum architecture and international advanced equipment, using visually stimulating naked-eye 3D, dazzling and shocking light show and modern sound and optoelectronics and other high-tech methods, reorganizing history and modern elements, integrating music, film, architecture and history, and reproducing the majesty and grandeur of Yingtianmen. The entire 3D projection laser show takes Yingtianmen City Tower as the curtain wall and takes "Dreaming of the Yellow River" as the theme, telling the historical changes of the Yellow River in the Central Plains culture from slash and burn to modern civilization.

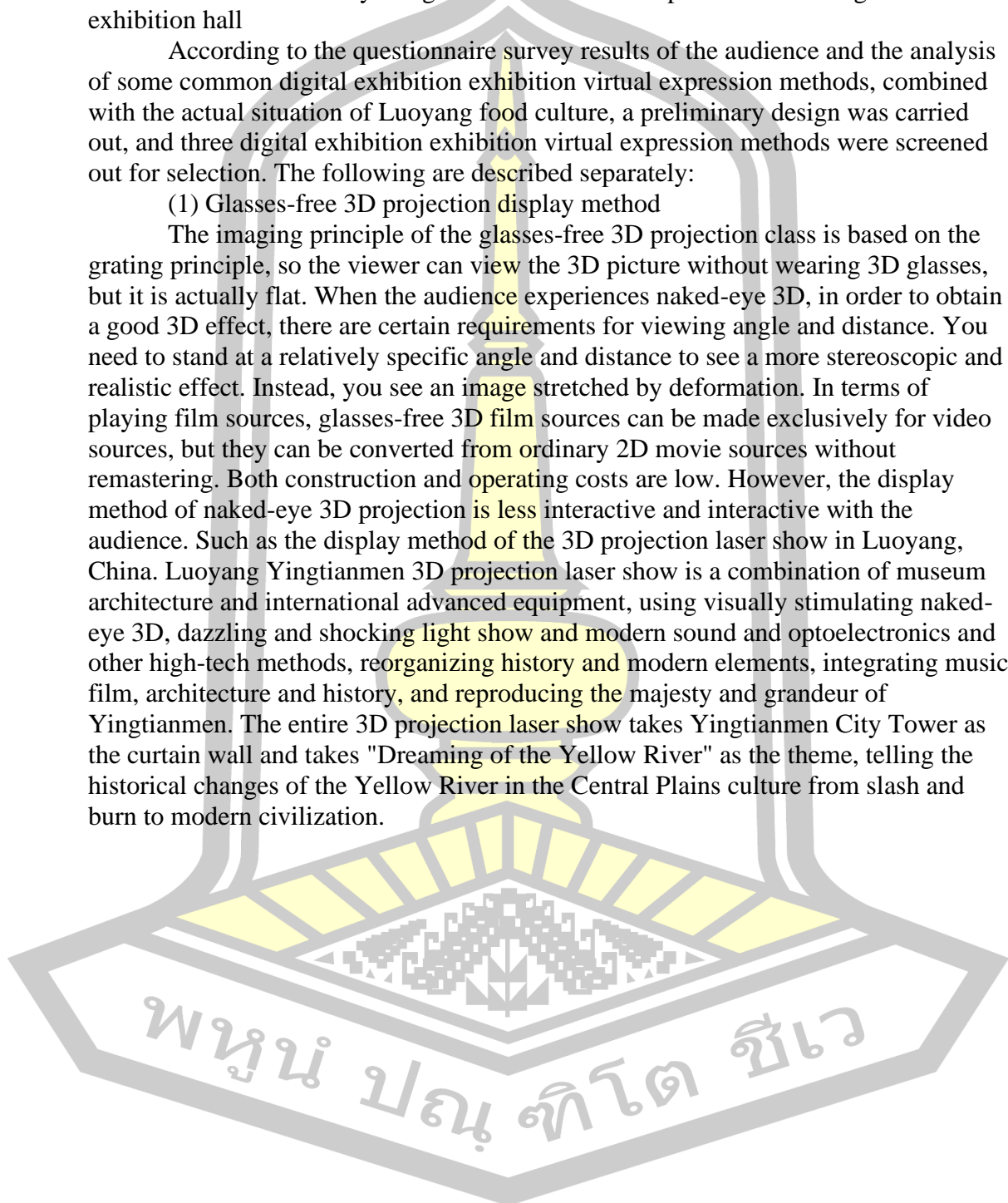




Figure 88 Luoyang Yingtianmen 3D projection laser show

Source: “Photographed by the author himself”, 2022

(2) Holographic projection stereoscopic imaging exhibition method

Holographic projection technology is a three-dimensional image of a real object through the principles of interference and diffraction. Holographic projection technology can produce three-dimensional aerial illusions, and can also make illusions interact with people to produce shocking performance effects. Holographic projection technology is sometimes called virtual imaging, but not all 3D effects are true holographic projections, and some are holograph-like projections simulated by other methods. Holographic projection technology is considered to be a revolutionary new technology in the field of display. Such as the holographic projection exhibition hall on the fourth floor of the Tengwang Pavilion in Nanchang, Jiangxi, China. Nanchang Tengwang Pavilion holographic projection exhibition hall: Tengwang Pavilion, one of the three famous buildings in Jiangnan, China, is located on the east bank of the Gan River in Nanchang City, Jiangxi Province, and was built in the fourth year of Tang Yonghui (653 AD), named after the brother of Tang Taizong Li Shimin - King Li Yuanying of Teng. The holographic projection exhibition hall on the fourth floor of the Tengwang Pavilion uses new scientific and technological means to show the world the ups and downs experienced by the Tengwang Pavilion, which has collapsed again and again, and rebuilt again and again, becoming more brilliant every time.

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Figure 89 Nanchang Teng King Pavilion holographic projection exhibition hall

Source: “Photographed by the author himself”,2022

With the improvement of science and technology, the current holographic projection can not only produce phantoms in the air, but also can be combined with somatosensory equipment to form a holographic interactive display system to achieve interaction between people and exhibition halls. Holographic interactive display system is the crystallization of nano-induction touch film and scattering rear projection development technology, is a novel, extraordinary display method, visitors can interact through holographic display glass, giving visitors a mysterious and magical fantasy feeling, for the display query to provide a modern, fashionable interactive means. Under the specific software production method, the holographic interactive display system can also provide special image effects floating on the glass, presenting customers with a strong visual shock. At the same time, this technology can realize the touch selection of fingers or other natural objects on the projection screen, open the interface, transform the screen, information query, drag and other control functions. The interactive experience enhances the emotional connection between people and the exhibition hall, making browsing more interesting and attracting the attention of visitors. Through interactive experience, the interest of the entire exhibition space is enhanced, which can bring a new sensory experience to visitors. This is shown in the figure below.

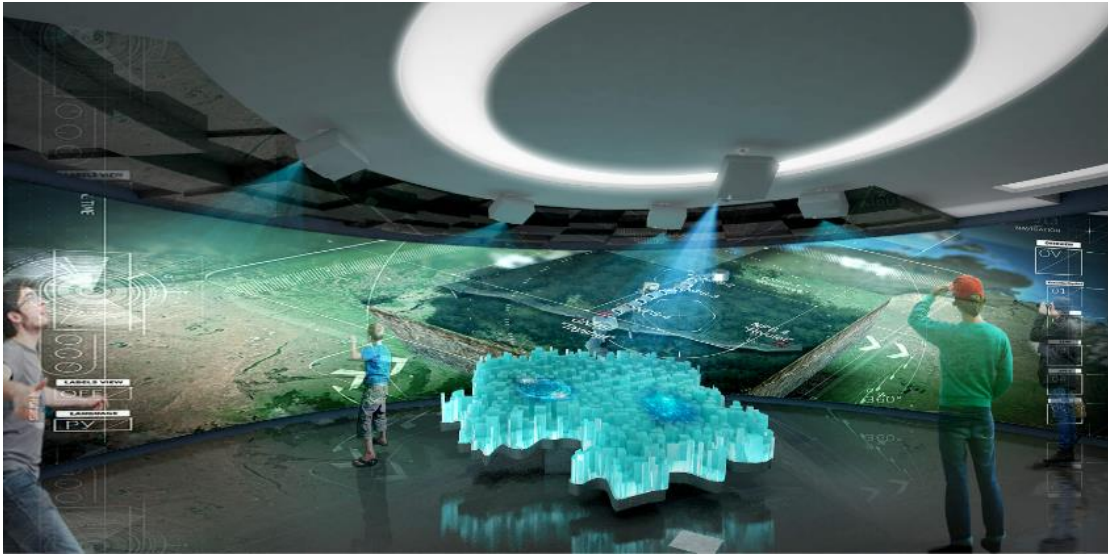


Figure 90 Holographic interactive display system conceptual art

Source: "www.bing.com",2022

Holographic interactive display system technology is a new product of the development of digitalization and information technology, which brings new concepts to the display in the design of the exhibition hall.

However, holographic projection video cannot be played with normal video sources and must be specially made video. And the holographic interactive display system is the industry's leading technology, there is a technology monopoly, so the construction period is long and the operating cost is very high.

(3) Panoramic virtual tour head-mounted stereoscopic display mode

The panoramic virtual walkthrough head-mounted stereoscopic display is a virtual display method built in a three-dimensional space. This kind of exhibition performance needs to use computers to generate three-dimensional virtual venues, and then use software and hardware related technologies to integrate virtual venues into visual, auditory, tactile and other senses, so that people can have an interactive experience of the virtual world through appropriate devices.

The panoramic virtual tour head-mounted stereoscopic display display can bring a new virtual reality experience to the audience, immersing the audience in the virtual space where the exhibits are located in a three-dimensional way, using human-computer interaction to dialogue with the exhibits and their situations, and even displaying scenes and exhibits that do not exist in reality in the form of reconstruction. It can also imitate a variety of climatic conditions such as day, night, clouds, fog, rain, snow, lightning, etc., a variety of special effects such as dancing flames, fluttering flags, flowing water, fountains, neon lights, waves, explosions, delays, etc., as well as various spatial sound effects.

In the panoramic mode, the situation is restored to the form of display, and virtual technology and digital technology are used to expand the space for displaying content, bringing visitors an immersive audio-visual feast. And in any position, any angle to observe the scene and switch between a variety of sports modes such as walking, driving, flying, etc., but also not limited by the type of area. It can be used inside and outside the building. Such as the Silk Road Experience Tour Exhibition

Hall in the Luoyang Museum's Heluo Light Digital Exhibition Hall. In the exhibition hall, you can see a touch wall with the Silk Road route map drawn on it, and gently touch the place names such as Luoyang, Xi'an, ancient India, and Dashi to see the corresponding graphic materials. At the same time, the audience put on VR equipment and immersed themselves in "re-walking" the Silk Road, experiencing the magnificent scenes of various places. Panoramic virtual tour head-mounted stereoscopic display technology is currently the most advanced means of scene reproduction and display in the world. Its construction period and operating costs are longer, more expensive and more restrictive than the previous two.



Figure 91 The Silk Road Experience Tour exhibition hall in the Heluo Light Digital Exhibition Hall of Luoyang Museum

Source: "Photographed by the author himself", 2022

The above naked-eye 3D projection display methods, holographic projection stereoscopic imaging display methods, and panoramic virtual tour head-mounted stereoscopic display display methods are all combined with the current status of Luoyang's digital exhibition hall construction and the digital exhibition hall virtual exhibition methods that tourists prefer and have a high degree of experience.

5.4.2.4 Selection of design solutions for virtual representations in the digital exhibition hall

Four industry technicians and authoritative experts were invited to select the virtual expression design scheme of the digital exhibition hall, and the four experts were:

(1) Jin Zhuo, male, professor, researcher, doctor of design, doctoral supervisor
 Research interests: integrated design industry strategy, visual communication design theory, soft science field. Ph.D. Supervisor of Design Engineering at Gaya University, City University of Malaysia, Professor of School of Art and Design, Wuhan Institute of Technology, Visiting Scholar of Design at China Academy of Arts, Member of Korea Basic Modeling Society, Member of Korea Multimedia Society, Member of Korea Society for Integration of Science and Art, Member of China Artists Association, Member of Academic Committee of China Advertising Association,

Judge of China University Digital Art Competition (National Competition), "Tiangong" Editorial Board Member of the magazine, Deputy Secretary-General of Digital Photography Creative Committee of China Electronic Video Industry Association, Editor-in-Chief of Art and Marketing Strategy Magazine, and Host of the Large-scale Talent Training Project of the National Art Fund of China.

(2) Yao Zhang, female, senior engineer, doctoral student in art.

Expert of Digital Creativity Committee of National Computer Basic Education Research Association of Colleges and Universities, member of the Design Committee of China Packaging Federation, member of Comprehensive Materials Committee of Liaoning Artists Association, member of Cultural and Creative Art Committee of Zhengzhou Artists Association, and expert member of Henan Region of National Digital Creative Skills Competition. His main research interests are exhibition space design and service design.

(3) Wang Xiangru, male, is the original designer of Huanyi of China Huaqiang Fantawild (Shenzhen) Animation Co., Ltd.

Engaged in digital exhibition hall three-dimensional space design and construction, virtual scene design and construction industry for 8 years. The projects he has participated in include Jiuxiang Dome, Xiangyang Flying Theater, Xiangyang Dynamic Warehouse, Beijing Changping Leduoxiang Flying Theater, etc., and the original large-scale three-dimensional virtual scene models include the 19th season "Root Carving Tea Table", the 20th season of "Dry Branch Wood Art", the 21st season "Rockery and Water Scene", the 22nd season "Iron Relief", and participated in the three-dimensional animation film production "Bear Haunted with Me Bear Core" is currently being released in China.

(4) Wang Yanan, female, master candidate, engineer of Information Technology Department, Luoyang Museum, China.

Technical engineer of Heluo Light Digital Exhibition Hall. Engaged in museum information technology and website design and maintenance industry for 6 years. At present, he is mainly responsible for the operation and maintenance of the Luoyang Museum Digital Museum website and the technical support of Heluo Light Digital Exhibition Hall.



Table 4 Expert selection of the draft virtual expression of the exhibition of Luoyang Food Culture Digital Exhibition Hall

Presentation plan Selection of experts	Glasses-free 3D projection display	Hologram projection stereoscopic imaging exhibition method	Panoramic virtual walkthrough, head-mounted stereoscopic display
Jin Zhuo	✓		✓
Zhang Yao	✓	✓	
Wang Xiangru	✓		✓
Wang Yanan	✓	✓	

According to the comprehensive evaluation of the characteristics of Luoyang food culture, the time of the construction cycle, the level of operating costs, the technical maturity and application of the three virtual expression methods, the four experts voted two votes per person, and the result of the selection was the highest number of votes for the naked-eye 3D projection exhibition method. At the same time, four experts said that although the naked-eye 3D projection exhibition method has the highest votes, based on the audience's participation experience and interactive interaction is the weaker aspect of the virtual exhibition method, researchers need to improve the naked-eye 3D projection exhibition method and integrate the audience participation experience and interactive content.


5.4.2.5 Organizational process and main content of virtual exhibition design of Luoyang Food Culture Digital Exhibition Hall

(1) Five organizational processes for the design of Luoyang food culture digital exhibition hall

As a typical Internet product, user experience is an important factor to test whether the design of a digital exhibition hall is appropriate. The development process of digital pavilion exhibition design can be divided into five levels: strategic layer, scope layer, structural layer, framework layer, and presentation layer. (Mingdi Wang, 2015:9)



Table 5 The five organizational processes of the digital pavilion exhibition virtual expression design

	Functional exhibition Information-based exhibition	Functional exhibition Information-based exhibition	Specific
Presentation layer	Perceptual design		
Frame layer	Interface design	Interface design	
	Navigation design	Navigation design	
	Information design		
Structural layer	Interaction Design Information architecture	Interaction Design Information architecture	
Scope layer	Functional specifications Content requirements	Functional specifications Content requirements	
Strategic layer	Audience experience needs		
	Showcase goals		abstract

(2) The main content of the virtual exhibition design of Luoyang food culture digital exhibition hall

The main content of the Luoyang Food Culture Digital Exhibition Hall refers to the cultural and artistic information resources related to Luoyang food displayed by the display system. The digital content is not limited to Luoyang food itself, but also includes cultural resources, news trends, visiting interaction and other aspects of information related to Luoyang food.

The content of the exhibition can be roughly divided into two categories, one is digital simulation display, and the other is digital art creation. The digital simulation display is mainly to display cultural resources such as Luoyang diet related utensils, production skills, and food category display. It can be realized by means of text description, image collection and processing, video recording, etc. Digital art creation refers to the analysis and research of Luoyang food culture and the creation of relevant art according to its resources. For example, the origin, historical replacement, formation factors and other contents of Luoyang food can be artistized through animation demonstrations and other means, and the charm of Luoyang food culture can be more vividly displayed. The main contents of the virtual exhibition design of Luoyang Food Culture Digital Exhibition Hall are as follows:

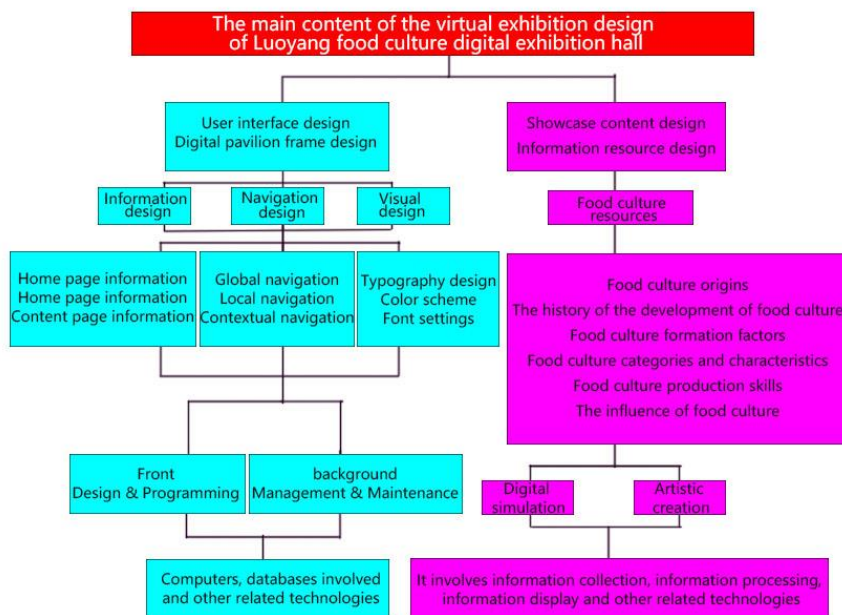


Figure 92 The main content of the virtual exhibition design of Luoyang food culture digital exhibition hall

Source: Researcher, March 2023, 3.

(3) The structure and organization of the virtual exhibition design of Luoyang food culture digital exhibition hall

After defining the organizational process and main content, the next work is the structural organization designed for the virtual exhibition of Luoyang Food Culture Digital Pavilion, mainly for information architecture and interaction design.

According to the previous content, the virtual exhibition design information architecture of Luoyang Food Culture Digital Exhibition Hall adopts a tree structure to create a classification system. For the audience, the tree structure is one of the easiest to understand types of structure, the structural form is like an inverted branch, each node represents a content or function, and a node or several nodes have a common parent node. In the design scheme, the most important content and functions are classified and graded, the main classification is placed at the top of the structure, and the secondary content or function is placed in the lower node. As shown in the following figure.

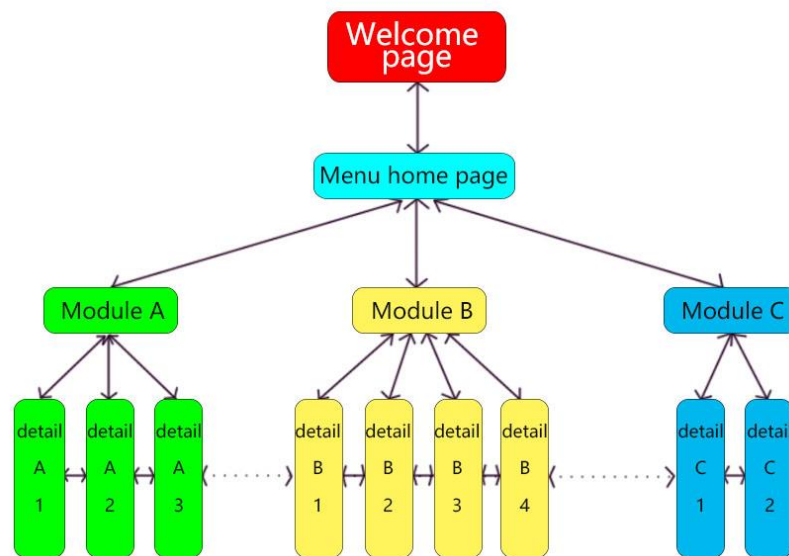


Figure 93 Luoyang Food Culture Digital Exhibition Hall Virtual Exhibition Design Information Architecture

Source: Researcher, March 2023, 3.

Interaction design is more and more widely used in the exhibition design of digital exhibition halls, and visitors entering the digital exhibition hall of Luoyang food culture can use the handheld somatosensory control handle to view the display screen and information of the digital exhibition hall at any angle, and can complete personalized operations such as zooming in, zooming out, forward, and backward. It can also send barrage messages to interact with other visitors, and also play relevant background music to enhance the viewer's browsing experience. The figure below shows the design of the virtual tour of the grottoes in Dunhuang. In the virtual exhibition of Digital Dunhuang, a virtual tour of part of the grottoes is realized through "fake 3D", and placed as independent components in the virtual exhibition display system.



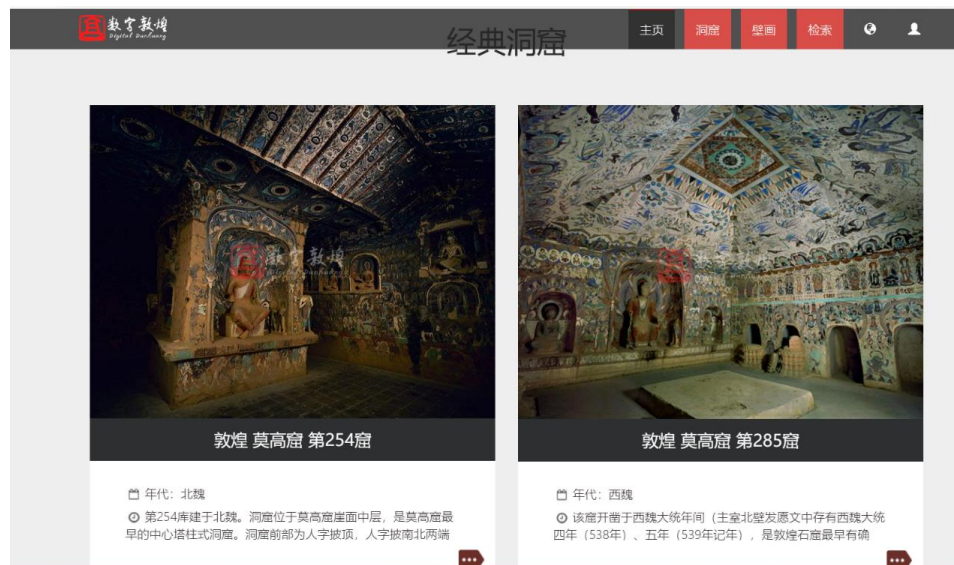


Figure 94 A virtual exhibition page of Digital Dunhuang

Source: "e-dunhuang.com", 2023

The technical architecture design of the virtual exhibition system of Luoyang Food Culture Digital Exhibition Hall mainly includes program modules to realize calibration, measurement, spatial matching, calculation, display and interaction. The system first measures the three-dimensional information of the wall of the room where the user is located, as well as the position information and angle information of the audience through the depth sensor, and then calculates the image content selected by the audience according to the command information of the audience on the handheld somatosensory handle, and projects it on the space wall through a panoramic 360-degree projector. In the operation process of the entire software system, the core part is the acquisition and calculation processing of depth data and audience instructions. The technical architecture of the virtual exhibition system of Luoyang Food Culture Digital Exhibition Hall is shown in the figure below.



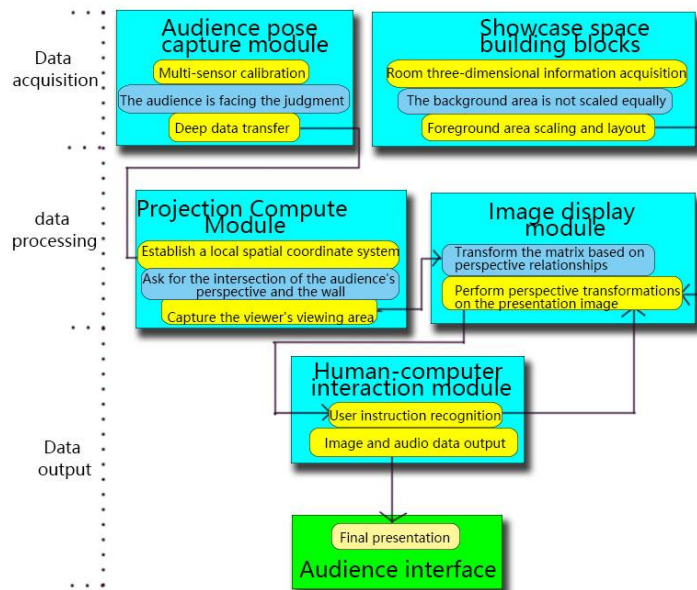


Figure 95 Technical architecture design of virtual exhibition system of Luoyang food culture digital exhibition hall

Source: Researcher, March 2023, 3.

5.4.2.6 Luoyang Food Culture Digital Exhibition Hall Exhibition Virtual Expression Design Concept

According to the results of the audience survey and the characteristics of Luoyang food culture, combined with the advantages and disadvantages of various virtual exhibition methods, a combination of handheld somatosensory control handle + naked-eye 3D projection was finally proposed for food culture display. Through the combination of two devices, the solution of Luoyang food culture digital exhibition system for natural human-computer interaction. On the one hand, such a solution realizes the display and interaction with a certain sense of immersion interaction and audience participation through a relatively simple combination of equipment, which meets the audience's demand for the novelty of display means and is also conducive to promotion and popularization. It is suitable for small and medium-sized groups, educational institutions, exhibitions, experience halls and individual users, and is also suitable for remote joint exhibition between exhibition halls; On the other hand, this scheme has a large display area and makes full use of the exhibition space, which is very suitable for the exhibition of Luoyang food culture with many contents, wide categories and large volume.

The combination of handheld somatosensory control handle + naked-eye 3D projection can solve the contradiction between equipment cost, participation interaction and display effect to a certain extent, although it cannot be compared with the realistic three-dimensional sense of holographic projection stereoscopic imaging, nor can it be compared with the immersion of the panoramic virtual tour head-mounted stereoscopic display mode. However, because the audience's viewing angle range is limited, only the area within the audience's field of view needs to be projected to obtain a better three-dimensional visual display effect. Similar to the real

tour, the audience can move freely around the effective areas of the room for an exploratory, immersive tour. In addition, we use the glasses-free 3D projection screen and the handheld somatosensory handle to assist the audience in human-computer interaction, so we only need to define some simple actions to complete a wide variety of command inputs. These two aspects will be introduced in detail in conjunction with the design concept map:

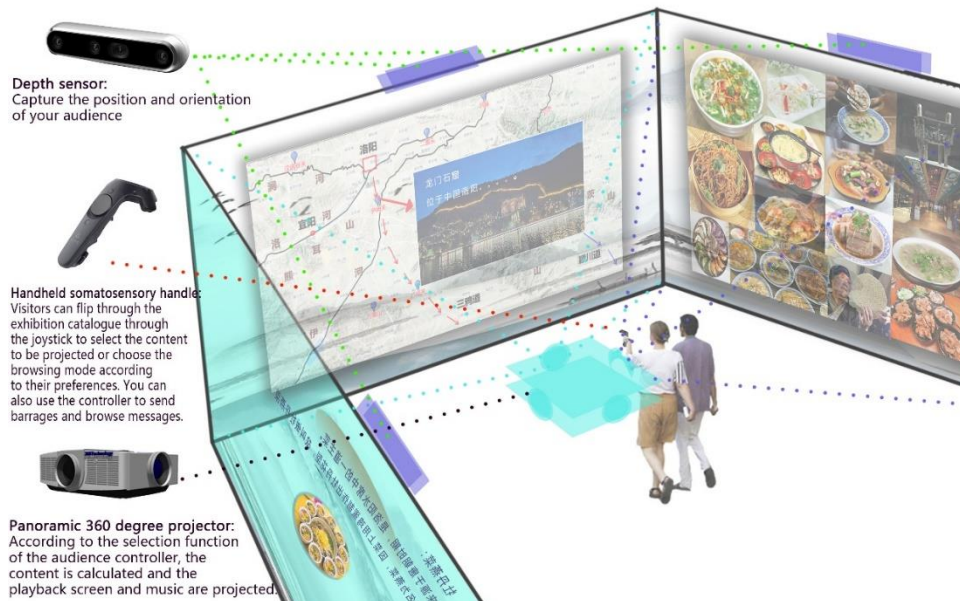


Figure 96 Luoyang Food Culture Digital Exhibition Hall virtual expression design concept map

Source: Researcher, March 2023, 3.

(1) Realistic roaming tour based on mapping projection

In digital displays, the size of the display space often has a great impact on the visual effect of the display. The virtual representation of the exhibition is to use panoramic 360-degree borderless projection equipment, the entire wall of the space can be used as a projection surface, the display range of the picture is no longer limited by the size of the screen or curtain. In this space, visitors can view the displayed pictures and information projected in 360 degrees, and can choose the playback of video in the screen through the handheld control handle, change the order of exhibit browsing, view the exhibit catalog, view the exhibits from multiple angles, zoom in and out of the exhibits, and interact with drifting bottles or barrage messages. At the same time, if it is a free browsing mode, the audience holds the control handle to tour indoors, the system measures and calculates, obtains the distance and angle relationship between the audience and the wall, calculates the irradiation range of the projector on the wall, generates the corresponding picture in this range in real time, and projects it on the wall. Users can move freely within the space, browse the screens of different areas through the change of the position and angle of the audience, and carry out exploratory and immersive "live-action" roaming.

(2) Human-computer interaction based on audience body sensing and controller commands

The virtual representation of the exhibition is to capture and feedback the position of the human body and the operation of the handheld handle through depth sensors, and project the corresponding picture on the wall, which can realize natural human-computer interaction based on body sensing. In many somatosensory interactions, the human body can move freely, but the eyes must always look at the fixed-position display to get real-time operational feedback. Unlike these somatosensory interactions, because the content and position of the virtual representation of the exhibition change with the position of the audience and the operation of the handle, the picture is in front of the audience's vision in most cases, so the audience does not need to stare at a position all the time, so as not to hinder the audience's free movement in the room. At the same time, since the walls of the entire room can be used as a medium for human-computer interaction, the system also has a larger operating space. The audience's operating tools mainly rely on the hand-held somatosensory manipulator in the hand, and when using it, the system can automatically identify the user's browsing content, and then improve the effect of the tour by playing the corresponding menu, screen, audio explanation, background music, interactive message or interactive mini game. It fully reflects the audience's sense of participation, immersion and interactive experience.

5.4.2.7 Luoyang Food Culture Digital Exhibition Hall exhibition virtual expression design vision

The design of the virtual expression mode of the Luoyang Food Culture Digital Exhibition Hall has always been closely related to new technologies in the development process, and the virtual expression technology of the exhibition is no exception. The use of virtual exhibition technology has played a huge role in promoting the development of Luoyang food culture digital exhibition hall exhibition and even the digital exhibition hall industry, and the digital exhibition hall exhibition has always maintained an inclusive and accepting attitude towards the application of new technologies. The development of technology is the result and characterization of the overall progress of human society and human civilization, in this context, the needs of the audience of Luoyang Food Culture Digital Exhibition Hall also present many new era characteristics, in response to such changes, the relevant design strategies must be updated in time. At the same time, the development practice of Luoyang food culture digital exhibition hall exhibition design also fully proves that the relevant technology and design can be integrated and developed, in the actual operation process, Luoyang food culture digital exhibition hall designers should be virtual exhibition and other related technologies and exhibition design as an ecosystem to look at, in the level of sustainable development of the whole system, promote the design of digital exhibition hall virtual expression and even the healthy development of the digital exhibition hall industry.

Conclusion

Through the introduction of the relevant concepts of digital exhibition hall display, this chapter introduces and analyzes the spatial characteristics of digital exhibition hall exhibition with complex spatial functions, personalized space display, diversified spatial interface and diversified display media. In addition, the functional composition and functional subdivision of the digital exhibition hall exhibition such as exhibition scene design, exhibit display, interactive experience, data statistics and analysis, and service functions were summarized. The virtual exhibition methods introduced from the early form of digital exhibition halls into China's digital exhibition halls are mainly composed of four mainstream methods: two-dimensional graphic web digital exhibition hall, three-dimensional cultural relics web digital exhibition hall, panoramic three-dimensional digital exhibition hall, and web three-dimensional digital exhibition hall. Through the investigation and analysis of the basic information of the audience, the evaluation of the audience's experience tendency, and the exhibition form of the audience's preference, the results also lay a data foundation for the subsequent virtual expression design of the exhibition. Through the basic introduction of the two physical food culture museums in Luoyang, "Old Luoyang Food Museum" and "Luoyang Zhendifferent Water Seat Museum", as well as interviews with Wang Tianxi, director of the Old Luoyang Food Culture Museum, and Yao Yanli, chairman of Luoyang Zhenji Hotel Co., Ltd., two representatives of Luoyang food culture inheritors, the content of Luoyang food culture display was summarized; According to the analysis of the survey results, the content and methods of the exhibition that are both cultural and interesting can meet the needs of more visitors. To summarize the design strategy of the virtual expression mode of Luoyang food culture digital exhibition hall, it needs to include four aspects: participatory strategy, moderation strategy, systematic strategy and open strategy. Through the perspective of the digital exhibition hall and the audience, comprehensively considering the characteristics of Luoyang food culture, the advantages and disadvantages of each exhibition virtual expression mode and the aesthetic expectations of the audience, a combination of handheld somatosensory control handle + naked-eye 3D projection was proposed, and then the exhibition method and operation principle were introduced. And designed the Luoyang food culture digital exhibition hall exhibition virtual expression design concept map. Finally, the design prospect of the virtual expression of Luoyang food culture digital exhibition hall is also summarized.

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Chapter VI

Summary and Conclusion

6.1 Summary

Research topic: Research on the virtual expression mode of exhibition exhibition in Luoyang food culture digital exhibition hall

Research Methodology: This study uses a "qualitative research method"

Information collection methods: There are only three information collection methods in this study: fieldwork, literature research, and questionnaire survey.

Research Objectives: The research objectives of this study are as follows:

6.1.1 The composition and development status of Luoyang's food culture are studied from the dimensions of the origin of Luoyang food culture, the historical development of Luoyang City and the factors affecting the formation of food culture

Culture is the soul of a country, a region and a nation. The Heluo culture nurtured in the Heluo region of the Central Plains of China is an important core and birthplace of the Yellow River civilization, and it is also the mainstream culture of the Chinese nation. As an important part of Luoyang's traditional culture, Luoyang food culture directly reflects the lifestyle and customs of Luoyang people.

The combination of cultural resources and cultural experience is a commonly used method in the development of cultural resources. Luoyang has unique food and cultural resources, and the main development mode is the promotion and innovation of food culture, as well as the application for inscription of intangible cultural heritage protection and theme museum display and development. Luoyang's diet is varied, with a long history and complex formation factors. Some large-scale and well-known catering institutions and food culture museums can constitute cultural publicity and experience places alone, and become the main window for spreading Luoyang food culture. On the other hand, there are a wide variety of special snacks with various flavors, such as pulp noodles, small street potstickers, etc., although they cannot form a certain scale of cuisine, but they are all Luoyang special foods that occupy a high position in Luoyang food culture. Luoyang's food culture that blooms everywhere makes cultural experience tourists come to Luoyang, whether it is to feel the thick history and culture of Luoyang's thousand-year-old capital, or to appreciate the natural scenery of Luoyang, it is impossible to avoid experiencing Luoyang's rich food culture with the tip of the tongue. With the development of cultural Luoyang cultural resource tourism and the promotion of Luoyang tourism and diet, Luoyang food and drink culture and economy have achieved new development, and at the same time have produced the requirements for new development of cultural tourism and cultural economy. Famous century-old brands have begun to set up their own small food pavilions, food introduction materials are placed in the halls of their own restaurants, and some large-scale Luoyang specialty catering enterprises have also built exclusive food museum pavilions for the dissemination of Luoyang food culture and the exhibition and sales of Luoyang food. In order to better attract diners to experience Luoyang food culture at home.

Luoyang's food culture can be traced back to China's first dynasty, the Xia Dynasty, and even earlier. From the Xia Dynasty to the Eastern Zhou Dynasty, the utensils used in cooking were further improved, and the government at that time also began to pay attention to the cooking industry and institutions. Luoyang food culture began to develop rapidly. In modern society, food culture has become a tourism resource that reflects the unique culture, image, customs and history of a city, attracting the taste buds of tourists from all over the world.

6.1.2 Research and analyze the current publicity and promotion of Luoyang food culture from the perspectives of current display communication methods, communication effects, influence, communication advantages and existing development dilemmas.

The museum is the historical memory and spiritual home of a country and nation, as well as a cultural landmark and business card with unique characteristics and infinite charm of a city. The Several Opinions of the Henan Provincial Party Committee and the Provincial Government on Supporting Luoyang to Accelerate the Construction of a Sub-central City of the Central Plains Urban Agglomeration under the Guidance of Opening up clearly proposed to strengthen the protection and inheritance of Chinese history and culture and build an "Oriental Museum Capital". "Oriental Museum Capital" is different from the "Museum City" proposed by other cities in that it is the deepening, upgrading and prospect of the construction of Luoyang City "Museum Capital", echoes the new expectations of the construction of international cultural tourism city for the integration of museum resources into urban tourism resources, echoes the shaping of urban cultural background by the construction of Luoyang Metropolitan Area, echoes the new fashion of cultural and erudite study tourism, echoes the new positioning of the International Humanities Exchange Center, and has an international vision and open pattern. This paper analyzes the current way of spreading Luoyang food culture through traditional forms by introducing Luoyang Zhendifferent Water Seat Museum, Old Luoyang Food Museum, two Luoyang food culture theme museums and Luoyang Museum, Luoyang Museum, Sui-Tang Grand Canal Culture Museum and Luoyang Folk Museum. Then, by introducing the communication methods and communication effects of Luoyang food culture in new media fields such as film, variety shows, documentaries, TV dramas, online short videos and urban image packaging promotion.

However, with the opening of Luoyang's tourism market, the government has promoted various publicity methods to spread the food culture of Luoyang, the ancient capital of Luoyang, for thousands of years. At present, online hot words such as "Luoyang cuisine", "Luoyang diet", "Luoyang beef soup" and "Luoyang water mat" frequently appear in online short videos. It attracts many tourists to come to Luoyang to taste Luoyang food. This paper analyzes the characteristics of Luoyang diet through the categories, stories, tastes and other dimensions of Luoyang diet, and summarizes the advantages of Luoyang food culture dissemination in combination with Luoyang's vast visitor sources, location conditions and tourism resources. At the same time, by comparing the proportion of tourism catering revenue in tourism revenue in tourism developed cities and the proportion of Luoyang tourism catering revenue to Luoyang's total tourism revenue, it is very necessary to analyze the publicity packaging that promotes Luoyang's food culture. However, according to the category of Luoyang diet and the current development status analysis, most of the

food in Luoyang needs to be eaten in time after purchase, and cannot be carried as a tourist gift and given to friends, which also restricts the promotion of Luoyang's special diet.

6.1.3 Through the investigation of the concept, characteristics and other basic conditions of the digital exhibition hall and the current development status and application of the international and domestic digital exhibition hall, the basic preparation of the exhibition design of the digital exhibition hall of Luoyang food culture is studied and analyzed.

Throughout the long history of mankind, museums have existed as institutions for the collection, protection and presentation of human cultural heritage. The digital museum is a museum that presents the functions of traditional museum collection, display, education, research and other functions in a digital form.

Through the concept introduction of digital exhibition hall, the characteristics of digital exhibition hall exhibits, transcending spatial boundaries, breaking through time limits, highly interactive communication, multidisciplinary cross-display and other characteristics were introduced, as well as important functions such as education and science popularization, digital collection, knowledge management and virtual display functions of digital exhibition halls. It introduces the emergence of the concept of digital museums at the end of the 70s of last century, and later with the maturity and popularization of computer technology, the application of computers to the field of museums. Through the analysis and research of the Library of Congress, the Metropolitan Museum of Art in New York, the Louvre Museum, the British Museum, the National Diet Library of Japan, and the Hermitage Museum in Russia, several aspects that China needs to learn from when building a digital museum are summarized: such as humanization of interface interaction design, establishment of a comprehensive knowledge link for digital collection display, various forms of virtual display, attention to the details of virtual display, attention to the design of learning and exchange resources for different types of audiences, Pay attention to the educational communication function of the museum, pay attention to the interaction and communication with the audience, and learn in a fun way. At the same time, the construction and application of six digital museums, namely the "Digital Forbidden City", the National Museum of China, the Digital Dunhuang, the Shanghai Museum, the Nanjing Museum and the Northwest University Museum, were introduced and analyzed in China. It shows the current development level and current situation of digital exhibition halls in China. And summarizes the advantages and necessity of building a digital pavilion of food culture.

6.1.4 The spatial characteristics, functional composition, development status and questionnaire survey based on audience experience of the digital exhibition hall were homomorphic to study and analyze the design scheme of the virtual expression mode of the digital exhibition of Luoyang food culture.

Digital exhibition hall exhibition is the use of digital technology to collect and compress the displayed information, through the network and computer technology to form a virtual display space, through the digital exhibition hall virtual exhibition comparison with the traditional exhibition, analyze the advantages and characteristics of virtual exhibition.

Based on the theme of Luoyang food culture and audience experience, this paper selects the virtual expression mode of digital exhibition hall for research, and completes the relevant research work based on the system design principle. After a lot of analysis and research, sufficient information on the trend of audience experience was obtained, and finally a set of design scheme of virtual expression of digital exhibition hall was completed as the research result of this paper. In recent years, visitors have become more and more inclined to visit the exhibition hall, and their expectations for the way of exhibition experience, participation and interaction are also increasing, and correspondingly, the virtual expression of the digital exhibition hall should also be changed. This study uses the questionnaire survey method and analytic hierarchy method to design a survey based on the collection of basic information of tourists, the experience of tourists in the current exhibition mode, and the tendency of tourists to virtual exhibition methods, and collects the results of the exhibition methods expected by tourists, and analyzes and summarizes the collected questionnaire results. The survey results show that the audience's satisfaction with the traditional exhibition method is not high, especially the frequency of exhibit updates, the audience's sense of participation, experience, and interaction. Among them, 55.3% of the visitors felt that the current digital exhibition hall could not meet the needs of the audience; More than 84.4% of the visitors felt that exhibition design was very important; The audience prefers to interact with scene restoration and multimedia, virtual reality, like a technical, interactive display method, the display form of text and pictures can no longer be recognized by the audience, they like a more relaxed, more expressive way of display, the deepest impression of the scene restoration display method accounted for about 70%.

According to the results of the questionnaire survey analysis of the audience, combined with the current virtual exhibition technology application and maturity. The naked-eye 3D projection display mode, holographic projection stereoscopic imaging display mode and panoramic virtual tour head-mounted stereoscopic display display mode were selected as the preset scheme. Four professional experts and industry technical experts were invited to evaluate the three preset schemes. Then, by combining the characteristics of Luoyang food culture, the construction period of the exhibition hall, the level of operating costs, and the inclination needs of the audience, the naked-eye 3D projection class was finally selected as the selected scheme for optimal design. However, based on the immersion and participation of panoramic virtual walk-through head-mounted stereoscopic display displays, the interaction and experience of holographic projection stereoscopic imaging displays, the technical maturity of naked-eye 3D projection, and the advantages of short construction period and low operating costs. According to the advantages and disadvantages of the three design drafts and the suggestions of experts, it was improved and combined, and finally a combination of handheld somatosensory handle + naked-eye 3D projection was finally determined as the virtual expression of Luoyang food culture digital exhibition hall.

According to the results of the previous questionnaire survey, the organizational structure, display content structure and audience experience process of the display system were designed. Finally, through the four dimensions of participation, appropriateness, systematization and openness, the design of virtual expression of digital exhibition halls in the future is prospected.

6.2 Discussion

6.2.1 Academic Counseling

Luoyang catering practitioners and Luoyang food culture researchers should get rid of the previous research on the origin of "Luoyang food culture" and traditional dishes, and only analyze the development history of Luoyang food culture through the historical changes of Luoyang.

The combination of cultural resources with cultural tourism and cultural and creative industries is a common way in the development of cultural resources. The main development mode of cultural resources is the cultural tourism industry development of immovable cultural resources and the museum-like protection and development mode of movable cultural resources. (Van Feifei, 2020: 59).

In order to further understand and analyze the innovation of Luoyang food culture, this study explores the characteristics of Luoyang food culture, and spreads and develops under today's market economy and tourism economy. It helps researchers understand the influencing factors of the formation of Luoyang food culture, and provides more creative development ideas and forms for the innovation of Luoyang food to meet the needs of diners in emerging tourism markets and the dissemination of Luoyang food culture.

By collecting the needs of real users of digital museums, the Kano model is used to construct the evaluation index of digital museum service design based on user satisfaction and establish the weight. The evaluation index system can provide certain reference and guidance for the design of other digital museum services, and is innovative. (Tie Zheng, Jiang Chao, Yan Yao, & Lei Tong, 2022: 8)

This study conducts research on the current exhibition development by interviewing the working staff of the digital exhibition industry and museums, randomly distributes electronic questionnaires, collects research information and data from the audience, analyzes and summarizes according to the results of the questionnaires, understands the direction of audience needs, selects three appropriate groups, and invites industry experts to comprehensively evaluate and select the three groups. Combined with the suggestions and actual situation, the selection method was optimized and improved, and the combination of handheld somatosensory control handle + naked-eye 3D projection was designed as the virtual expression of Luoyang food culture digital exhibition hall.

Through the research on the development, dissemination methods, constituent factors and exhibition methods of food culture, and the penetration of food culture into various disciplines, we will create cross-border cooperation in the fields of catering, art and science and technology. In the process of discussing the development of Luoyang food culture, let the rich Luoyang food culture achieve new innovation and inheritance, inject fresh blood into Luoyang's regional cultural construction, and play a beautiful Luoyang cultural business card.

6.2.2 Social Advice

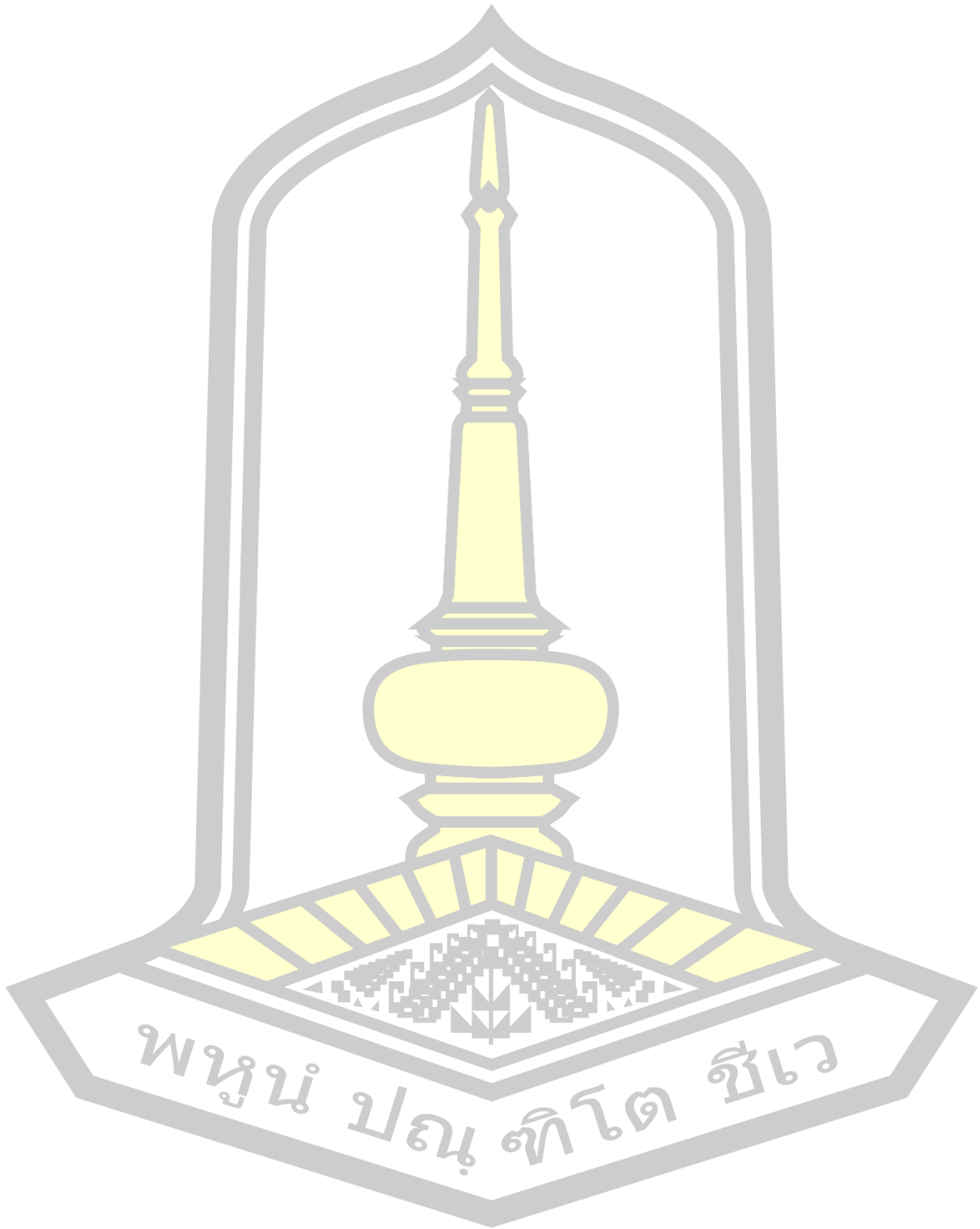
This study describes the food culture of Luoyang under the influence of social change, population migration, economic development and political change from its origin to the formation of Luoyang food culture. However, this still has some research limitations. First, the source of information, this study is mainly literature research and questionnaire survey. In the literature research, the number of literature on Luoyang food culture is insufficient, the research foundation is weak, the research depth is shallow, and the technical monopoly in the exhibition of digital exhibition halls is the reason. The low quality and insufficient quantity of literature available for reference make the arguments of the literature research results not authoritative enough. Therefore, in future research, attention should be paid to the accumulation of relevant content of "Luoyang Food Culture", the in-depth communication of staff in the catering industry, and the exchange and interview of engineers of third-party companies undertaking digital museums or technologies. On the other hand, in the questionnaire survey, the audience who fills out the questionnaire may make subjective choices about the type and display method of the digital exhibition hall according to their personal professional status and preferences, which can be avoided by sending more electronic questionnaires to expand the research population base as much as possible by expanding the age span, geographical span, education span, etc.

6.2.3 General Recommendations

After the completion of this study, practitioners in the catering industry can use this research to develop new Luoyang dishes that are more in line with the tastes of current tourism market consumer groups, and can also be used as the historical background, story mining and publicity of dishes, so that Luoyang's cuisine has more cultural background and artistic value. The research on digital exhibition design can better meet the needs of the audience experience for the staff of the digital exhibition hall design industry in the future digital exhibition hall construction. This topic will also help to supplement and adjust Luoyang's guidelines and policies in the development of the tourism and catering market, and help Luoyang to upgrade from a scenic tourism city to a cultural tourism city.



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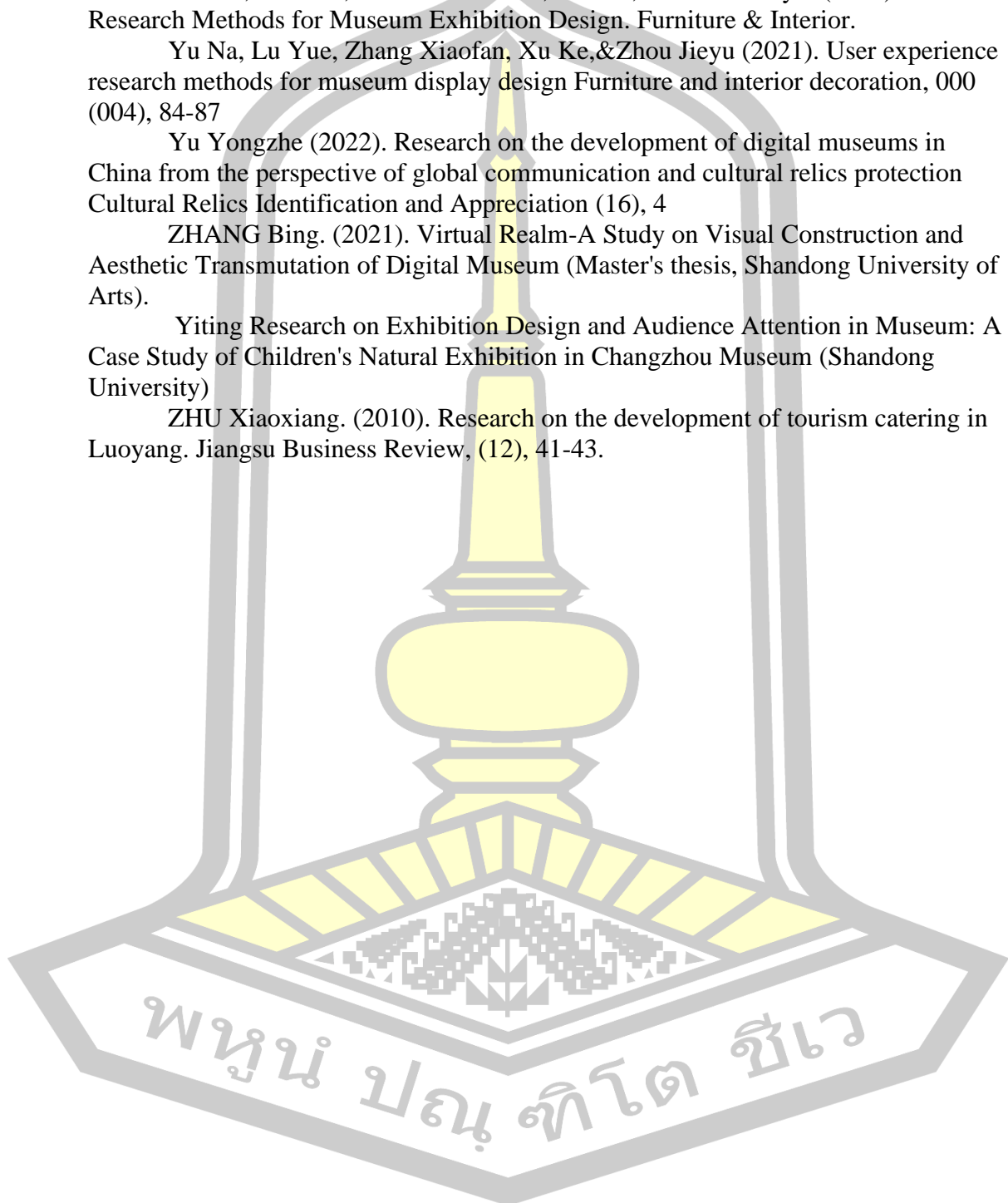
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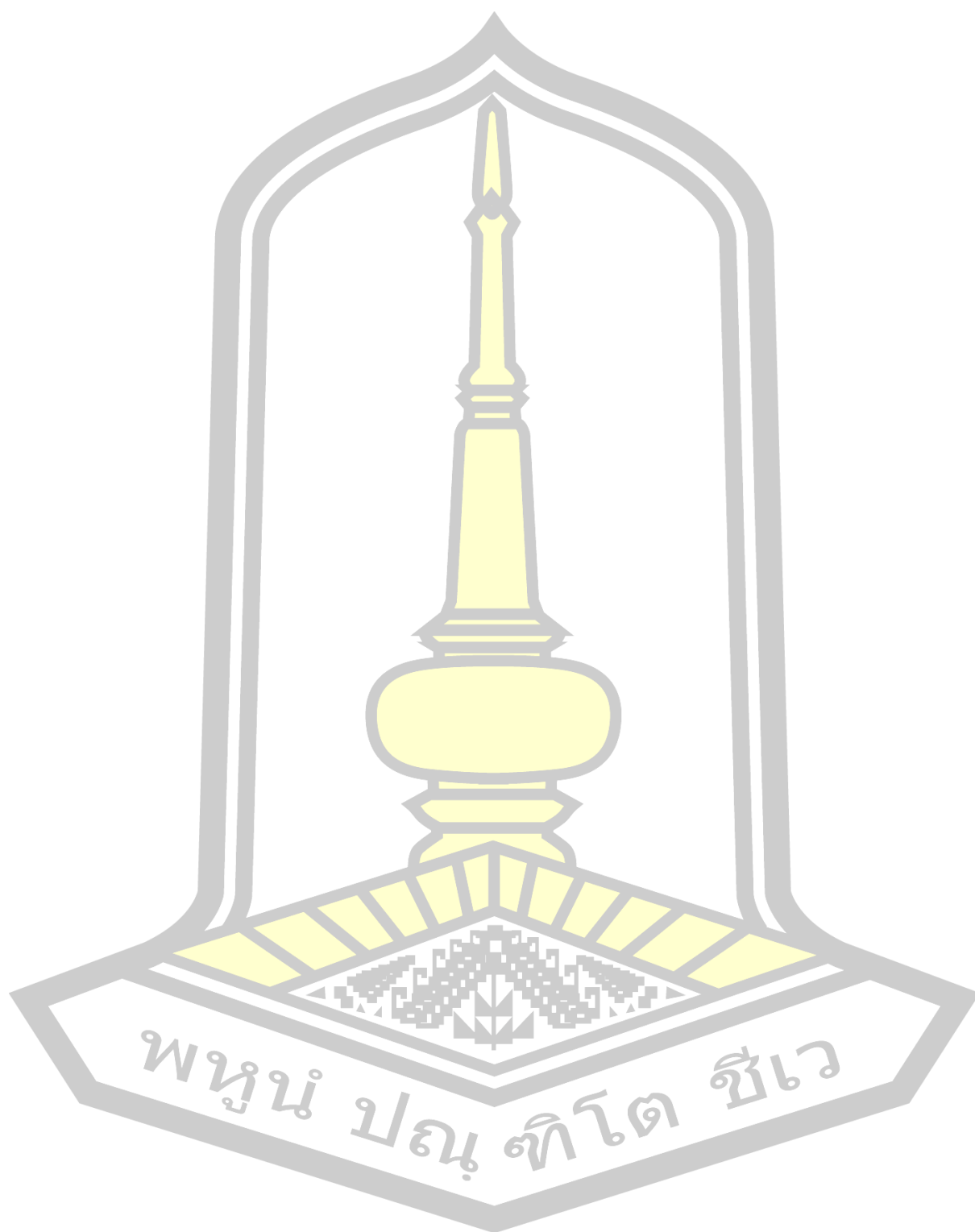
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Annex

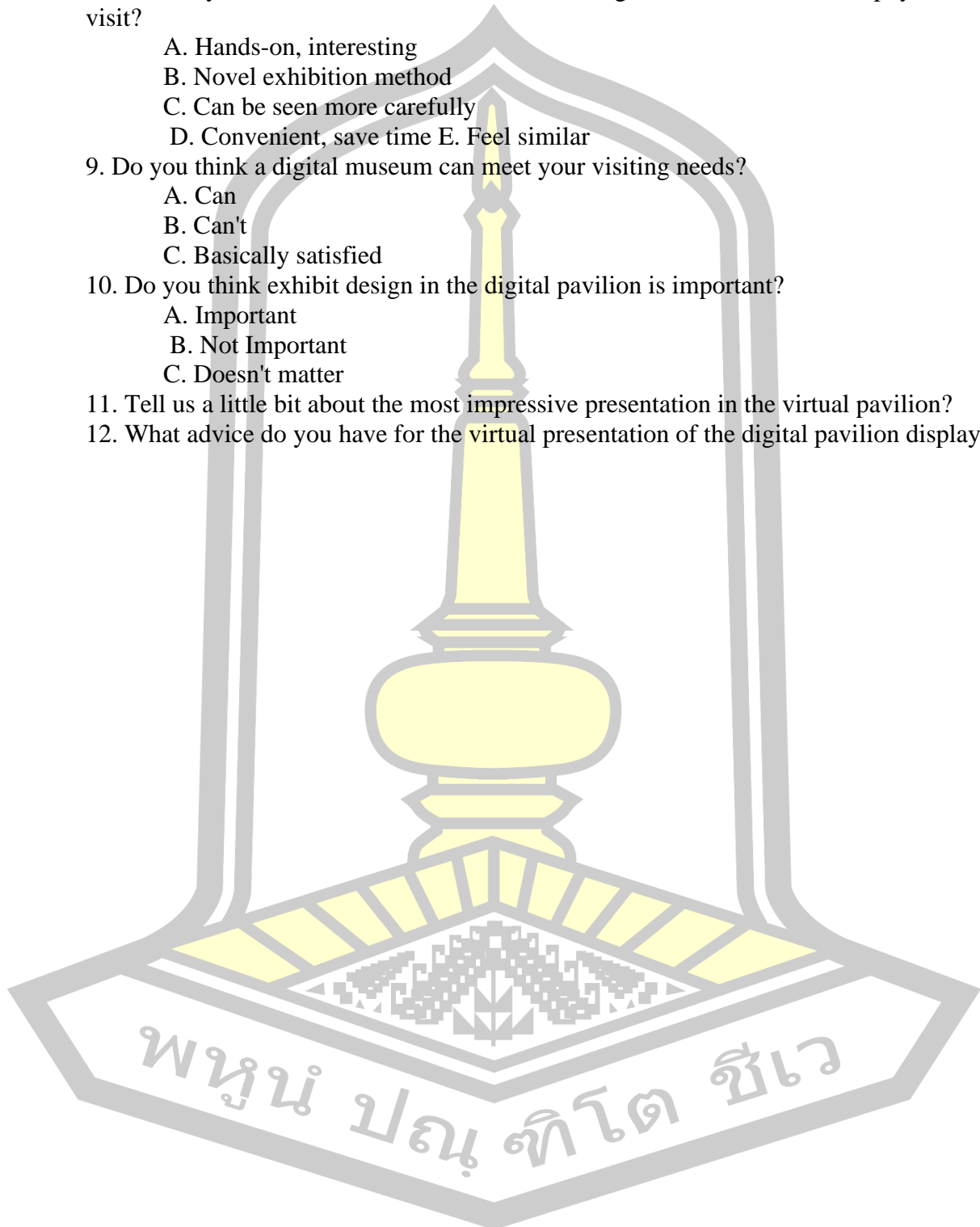
Annex A Questionnaire on the virtual representation of digital pavilion exhibits

Hello! We are doing a research on the digital exhibition project, the purpose is to provide visitors with richer exhibits and a better experience, the questionnaire is anonymous, there is no right or wrong answer, we invite you to join us. We will be grateful for your understanding and support and cooperation.

Your age: Gender: City of Life: Occupation:

1. Your level of education:
 - A. Primary and secondary schools
 - B. High schools
 - C. Universities
 - D. Graduate students (master's and doctoral)
 - E. Overseas students
2. What type of museum do you prefer?
 - A. Site
 - B. History
 - C. Culture
 - D. Art
 - F. Nature
3. What is the purpose of your visit to the Digital Museum?
 - A. Leisure and entertainment
 - B. Appreciation of cultural relics
 - C. Learning related knowledge
 - D. Work needs
4. How did you visit the Digital Pavilion?
 - A. Walk around and watch the flowers
 - B. Follow the arrows to browse
 - C. Jump browsing, encountering stops of interest
 - D. Almost all artifacts will be carefully viewed
5. What is the order in which you view the exhibits and the text introduction?
 - A. Look at the exhibits first
 - B. Look at the text introduction first
 - C. Just look at the exhibits
6. What aspects of the exhibits did you pay more attention to during the visit?
 - A. Styling
 - B. Color
 - C. Presentation Method
 - D. Historical background
7. Would you like to learn more about the artifacts you saw in the exhibition after your visit?
 - A. will
 - B. will not

- C. occasionally
8. What do you think is the difference between a digital museum visit and a physical visit?
- A. Hands-on, interesting
 - B. Novel exhibition method
 - C. Can be seen more carefully
 - D. Convenient, save time
 - E. Feel similar
9. Do you think a digital museum can meet your visiting needs?
- A. Can
 - B. Can't
 - C. Basically satisfied
10. Do you think exhibit design in the digital pavilion is important?
- A. Important
 - B. Not Important
 - C. Doesn't matter
11. Tell us a little bit about the most impressive presentation in the virtual pavilion?
12. What advice do you have for the virtual presentation of the digital pavilion display?



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