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ON THE EXPERIENCES OF PRODUCT DIGITALIZATION OF THE FORBIDDEN CITY BASED ON THE THEORY OF PRODUCE LEVEL

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Abstract: In recent years, China has vigorously advocated the integration of culture and tourism and actively developed national research and study activities.Museums have become the preferred targets of the public as tourist destinations and scientific research and education places, and museums have received a lot of attention. In 2020, the Coronavirus suddenly hit, people's offline travel was blocked, and the physical development of museums slowed down. Fortunately, the development of technology has allowed us to meet "in the cloud", and digitalization has opened up a new path for the development of museums. The public can "visit" the museum without leaving home through the Internet, learn about the museum's collection, and compared to the field visit, the cloud visit can also be quickly browsed according to their own preferences. At present, the level of digital development of domestic museum products is uneven, and even the development of most museums is relatively slow. This study selects the product digitalization of the Palace Museum as the research object, takes the product hierarchy theory as the theoretical basis, and attempts to study and summarize the excellent experience of product digitalization of the Palace Museum, in order to provide reference for the digitalization of other museum products. This research will be carried out through three parts: network data analysis, literature research and expert consultation, and the research results will be elaborated through product level theory.
Keywords: Product digitalization; Palace museum; Product hierarchy theor

1 INTRODUCTION

The theme of International Museum Day of 2022 is "The Power of Museums", and the positive potential of museums is discussed from three perspectives, one of which is "The Power of Digital and Accessible Innovation". The development of digital museum products will make museums more inclusive, stable, and accessible. During the pandemic, when most industries were shut down, businesses relying on the internet were mostly thriving, although most museums were not included. However, in 2022, the cultural and creative product revenue of the Palace Museum continued to surpass the previous year, generating 1.65 billion yuan in revenue. The vast majority of these transactions are completed through online transactions. Why can the digitization of products at the Palace Museum be so successful? How did they do it? In order to identify the reasons for its success and let everyone understand the experience and experience of digitizing the products of the Palace Museum, this study will explore and study the digitization of the products of the Palace Museum, and summarize it from the perspective of product hierarchy theory. I hope that through this study, everyone can have a better understanding of the digital achievements and experience of the products of the Palace Museum, and enrich relevant information in the field of museum product digitization Provide reference for the digital development of other museum products.

1.1 Literature Review and Theoretical Basis

1.1.1 Literature review

With the help of advanced science and technology, museums can replicate the cultural relics and layout inside the museum onto the network, forming new museum extension products, which is the rough process of museum digitization. Currently, there is a lack of support for museums in China,the research on digitalization is not limited and can be roughly divided into two parts.One is the digitization of internal management. An efficient management model can greatly save manpower, material resources, and financial resources. With the development and popularization of social technology, the application of technology to museum management and operation is an unstoppable trend.On the one hand, it is personnel management. Including personnel recruitment and scientific system allocation. For example, Chang Chunyan (2022)From the perspective of building a talent team for museum archive management, it is proposed that museums should introduce talents with high levels of digital information application

and management technology, in order to drive the effective improvement of archive management personnel's information technology application ability and awareness. On the other hand, it is the management of archival materials and cultural relics. The archives of the museum are vast, and various materials and cultural relics are abundant. In addition, there is the restoration and protection of cultural relics, all of which involve the participation of science and technology. For example, Shi Qike (2023) demonstrated in his research that AI technology was used to repair Longmen Grottoes Restoration can restore the original appearance of the grottoes as much as possible, and AI technology plays a significant role in the restoration and protection of large-scale cultural relics . Cong Yumeng and Wu Xiaoling (2023) argue in their research on the restoration of unearthed cultural relics in Sanxingdui that AI technology can greatly improve the efficiency of cultural relic restoration.The second is the digitization of external products, which is also my research focus. Compared to the former, there is more research in this area, mainly focusing on the digitization of cultural and creative products. In addition, there is also digitization of collection display and promotion, which has been mentioned in many articles. Chen Lu (2023) stated in his research on the role of digital technology in the development of museum cultural and creative products that digital technology is the cornerstone and hardware condition of digital cultural and creative applications. He also divided the development forms of digital products in China's museum industry into two categories: digital products and services based on venues, equipment and technology in the museum, and digital products and services on mobile devices. Yang Xiaojuan (2023) explained through her research on the application of digital communication technology in intelligent museums that the use of 3D imaging technology, reality simulation technology, 3D stereoscopic image display technology, and various special effects technologies to display things on multimedia devices greatly improves the display efficiency of museum products, allowing the public to view collections without constraints of time, location, environment, and other conditions, expanding the audience. Fan Yingjie (2022) proposed four forms of digital cultural and creative products in the digital transformation of cultural and creative products, namely: graphic, video, program, and interactive.The previous studies mentioned above have been of great help to me, providing me with literature research materials and theories support.[1-16]

The digitization of museum products in foreign countries developed earlier and there are more literature studies. However, there are few researches on the digitization of museum products. We can learn from the researches on the digitization of museum products in other countries. In general, the integration of technology and museums is reflected in three aspects: the restoration and protection of collections, the display of collections, and the interaction between collections and customers.

In these three links, foreign scholars pay more attention to interaction, so there are a lot of research for visiting customers. George Ioannakis, Loukas Bampis and Anestis Koutsoudis(2020) believe that mobile devices can be used to enrich customers' visiting experience in digital museums, which is also a way to promote the digitalization of museum products. For example, N. Chivarov, V. Ivanova, and D. Radev (2013) generate corresponding two-dimensional code for all collection information, so that customers can scan it with their personal devices or visit the portal website to obtain it, which is also an interactive digitization of museum products. Eugene Ch'ng, Shengdan Cai, and Fui-Theng Leow (2019) believe that different technologies will show different effects in the integration of many emerging technologies and cultures. They investigated augmented reality (AR), virtual reality (VR), projection display, and other technologies. Interactive 2D (i2D), interactive 3D (i3D), mobile exhibition and other interactive devices play a role in creating digital museums, presenting effects through data and providing references for the technical selection of museum products digitalization. Secondly, some scholars have done a lot of research on the restoration and protection of collections in some special museums. Watsaporn Arayaphan, Kannikar Intawong and Kitti Puritat (2022) believe that the use of modern technology (such as virtual reality) to display the existing products of museums is not only conducive to better display the collections to customers, but also conducive to the protection of the collections. At the same time, the same collection can be displayed in different places at the same time to reduce the risks that may arise from borrowing the collection .

The product protection of some special museums can also provide reference for us to sum up the digital experience of museum products. For example, Caroline Erolin, Matthew Jarron and Laszlo J. Csetenyi (2017) studied the collection technology of the D 'Arcy Thompson Zoology Museum. This is an open zoological museum, and they use modern technology for scanning capture, with various capture techniques including 3D surface scanners (Li et al., 2010), photogrammetry (Marine Fau et al., 2016), and clinical imaging techniques . The above researches are mostly experimental analysis and lack of summary research on museum construction experience, but they provide theoretical basis and literature materials for my research.[17-21]

There are many researches on the digitization of museum products at home and abroad, and the directions are relatively similar, but the researches on the digitization of museum products in China are more extensive. Comparatively speaking, domestic research is more useful for reference.

1.2 Theoretical Basis

In 1988, the marketer Philip Kotler put forward the theory of three levels of product in the Principles of Marketing. In view of the shortcomings of the three-level theory, Philip Kotler extended the three-level theory to the five-level theory in the revised edition of his monograph Market Management: Analysis, Planning, Execution and Control in 1994. This study adopts the latest concept proposed by Mr. Philip Kotler in the 8th edition of Tourism Marketing in 2022, and divides the product into four levels, which are: core products, facilitating products, supporting products, and augmented products. The core product is the most basic level, which answers what customers really buy; Formal products refer to the services or goods that customers must have when using the core products; Support products are additional products provided to add value to the core product, helping to distinguish it from the competition; auxiliary
Products include accessibility, atmosphere, customer engagement and interaction with the service organization. (see Table 1)

Table 1 Product Three Level Theory, Five Level Theory, and Four Level Theory Display

Three level theory	Five level theory	Four level theory
Core product	Core product	core product
Facilitating product	Generic Product	Facilitating product
Augmented Product	Expected Product	Supporting product
	Augmented Product	Augmented product
	Potential Product	

The latest version of the four-level theory of products is more detailed than the three-level theory and the five-level theory,after the precipitation of the three-level theory and the five-level theory, it is more mature, which is more consistent with the content of this study.

1.3 Definition of Core Concepts

1.3.1 The palace museum

The Palace Museum specifically refers to the Beijing Palace Museum. It is a large-scale comprehensive ancient art museum established on the basis of the Ming and Qing imperial palaces and their collections. It is the largest and most well preserved wooden structure palace complex in the world,it is also the largest ancient cultural and artistic museum in China.

1.3.2 Digitalization of museum products

The digitization of museum products is the use of information technology to digitize the functions and extensions of museums, as well as additional products. This involves converting various information such as building entities, images, sound, and text into digital signals, which are then presented on the network, allowing these products to circulate indefinitely on the network,to meet the needs of customers for remote utilization of museum resources.

2 RESEARCH DESIGN

2.1 Research Object

This article takes the Palace Museum as the research object to study its product digitization experience. The digitization of the Palace Museum began in the 1990s, and its development began with the digitization of internal information. In 2001, the Palace MuseumThe opening of the hospital website has taken a major step towards digitizing its products, and now it has formed internal information digitization.The layout of digital joint development with external products. At present, the Palace Museum is actively seeking a new path for the digital development of its products. On May 18, 2023, the Palace Museum held a press conference on the achievements of the construction of the "Digital Palace Museum" on May 18, 2023. It also held a ceremony for the completion of the "Palace Museum Tencent Joint Innovation Laboratory", hoping to promote the sustainable development of the digital protection and utilization of cultural relics in the Palace Museum through the new generation of digital facilities, and to enhance the digitalization of its various products Good development.[22-29]

2.2 Research Methods

2.2.1 Theoretical deduction method

The theory deductive method takes a certain theory as its major premise and the exact facts within the scope of the theory as its minor premise.

The general form of theoretical deduction is as follows:

Major premise: There is a certain range of M-theory is correct, in this range of law P is generally applicable.

Minor premise: Suppose that the behavior of thing S is governed by M-theory

Conclusion: The behavior rule of S is P.The successful development of anything has certain rules and experience to follow, but the application of theory needs specific analysis of specific problems. This paper assumes that the Palace Museum is a museum, so its growth and development will be affected by the law of museum development. Similarly, the experience of the successful digital development of the Palace Museum's products will also have an impact on other museums.

2.2.2 Literature research method

In the study of social phenomena, researchers make use of the literature that has been accumulated by people, through searching for the literature, extract the relevant data, and then sort out and analyze the research method, to draw conclusions. The literature research method is not restricted by time and place. This study will make use of the books and documents in the official website of the Palace Museum, and collect documents through knowledge platforms such as CNKI and Chinese museum journals to understand the development process of the Palace Museum, and summarize it by using the product hierarchy theory.

2.3 Data Source

This article mainly explores the official website of the Palace Museum (website: Palace Museum (dpm. org. cn)) and academic platforms such as CNKI to collect data and information. The official website of the Palace Museum is the product number of the Palace Museum.A comprehensive collection of works, covering various exhibition methods such as books, images, text, mini programs, videos, etc., making it an online museum. [30-33]

This study will be conducted from the official website on "homepage, guide, exhibition, education, exploration, academia, cultural and creative, and about".

In addition to exploring the seven annotated sections, we will also explore literature information through the following websites:

China Museum Association: China Museum Association (chinamuseum. org. cn)

China Museum: China Museum (cnki. net)

China National Knowledge Infrastructure: China National Knowledge Infrastructure (CNKI. net)

3 RESEARCH IMPLEMENTATION AND RESULTS

3.1Web Data Analysis and Discovery

3.1.1 Web page data analysis

Through exploring the official website of the Palace Museum and referring to the four forms of digital cultural and creative products proposed by Fan Yingjie (2022), this study provides a preliminary summary of the digital achievements of the Palace Museum products:

Table 2 Summary of Digital Achievements of the Products of the Palace Museum

Large category	Main Representative
Graphic and textual categories	Library: Journal of the Palace Museum, Academic Journal of the Palace Museum, Forbidden City, and Yearbook of the Palace Museum
	Exploration section: Architecture, Collections, Ancient Books, Palace History, Cultural Themes, Records of Famous Paintings, Digital Cultural Relics Library, and Digital Duobao Pavilion
	Cultural and Creative Part: Wallpaper of the Forbidden City
Video class	Audiovisual Hall: Palace Museum Lecture Hall, Ancient Painting Society Singing, Eight Masterpieces, Palace Museum Inviting You to Cloud View Exhibition, Music, Other
Application class	Emperor's Day, Palace Museum Exhibition, Yinzhen Beauty Picture, Forbidden City Auspicious PRO, Daily Palace Museum, Palace Museum Ceramics Museum, Han Xizai Night Banquet Picture, Forbidden City Auspicious, Qing Dynasty Emperor Clothing, Forbidden City 365
Large category	Main Representative

Interaction Class	Panoramic Palace Museum, V Palace Museum, Digital Treasure Pavilion, Exhibition Section
	The Forbidden City game: the roof figures of the Taihe Hall, the palace gate pass, the winding water flowing cup, the Ming emperor's picture, the ninety-nine cold elimination picture, the prince's timetable, the gold inlaid treasure "Jinou Yonggu Cup", rouge, blue ground rolled enamel color folding branch pattern Albizia bottle, Emperor Qianlong's Tianhuang triple seal, the multicolored plus golden egret lotus pattern statue, sandalwood "the treasure of the emperor"
Guidance publicity	Home message board, navigation part, education part, WeChat, microblog, program class, andlearning power account, video number, Tiktok number
	Cultural and Creative Products

In Table 2, the guidance and publicity category was independently proposed in this study. The products in the guidance and publicity category mixed the above four categories, making it difficult to specifically classify them into which category.[34-41] Moreover, these products play a role in guiding incoming customers,The purpose of promoting customers who have not entered and providing after-sales service to customers who have left is to create a separate category.In addition, there are also sites on the official website of the Palace Museum that are not mentioned in the above table:

Youth website of the Palace Museum (dpm. org. cn)

Education - Palace Museum (dpm. org. cn)

3.3.2 Presentation of Results

According to the product hierarchy theory, this study stratifies the digital products of the Palace Museum:

Core Products:

Culture is the core product of the Palace Museum. In its official website, the Palace Museum describes "dedicating inexhaustible cultural resources in the Forbidden City to distant friends" and building a platform for the development of "Forbidden City studies". The official website of the Palace Museum has dedicated education and academic sections, established the Palace Museum youth website and the Palace Museum education website; The product descriptions in each section of the official website of the Palace Museum reveal a strong cultural connotation, which shows that culture is the core product of the Palace Museum. The Palace Museum's protection, restoration and publicity of cultural relics and books are all for the purpose of inheriting and promoting the culture contained in these cultural relics and books. So what customers are really buying is the culture embedded in these products, whether virtual or real.

3.3.2.1 Form product

According to the basic summary of the digital achievements of the Palace Museum products in Table 2, this study considers that the cultural and creative products in the graphic, video, program, interactive and guidance and publicity categories in Table 2 are formal products of the Palace Museum. Customers who want to buy form products of the Palace Museum must use these goods or services. The form product is the carrier of the core product, which is mainly composed of five factors: product quality (also known as quality, material), characteristics, style (also known as style), brand and packaging. For the Palace Museum, quality refers to the digital products of all the collection entities of the Palace Museum, such as the digital cultural relics library; The feature is the imperial palace of Ming and Qing dynasties advertised by the Palace Museum, which has a wealth of books, cultural relics and digital products of Ming and Qing dynasties; The style is the product type, there are graphic classes, audio and so on. The brand is the cultural IP of the Palace Museum.[42-50]

3.3.2.2 Augumented product

According to the products in Table 2, this study believes that the message board, education part, wechat, Weibo, Learning Power number, Douyin number and video number in the category of guidance and publicity in Table 2 are all auxiliary products in the digital products of the Palace Museum. All of them have increased the value of the Palace Museum culture, such as the education part, learning the Great Power, etc., and some have enhanced the publicity of the Palace Museum culture, making it more popular.

3.3.2.3 Extensions and Additional Products

In terms of accessibility, the digital products of the Palace Museum include wechat, Weibo, Learning Power number, Douyin number, video number and the official website of the Palace Museum; In terms of atmosphere, this study considers the digital products of the Palace Museum as its network background, including red walls, red bricks and red glazed tiles. It can be said that red is the main color of the Palace Museum, and the primary color of the official website of the Palace Museum is red. Although the background is different in the four seasons, different red colors are used. In terms of customer participation and interaction with service organizations, the digital products of the Palace Museum are all contents of guiding and promoting, including all processes of customer entry, participation, departure and after-sales.

3.2 Literature Research and Discovery

3.2.1 Literature research

In order to study the digital experience of the Palace Museum products, this study searched some documents for literature research. In this research, 43 Chinese literatures were used for literature research, which were mainly from CNKI, the Journal of Chinese Museums and the Journal of the Palace Museum. In addition, the yearbook of the Palace Museum was also used for literature research. Considering that after the outbreak of the epidemic, the demand for museum digitization has increased and more attention has been paid to it, so there are a lot of literatures on the digitization of Palace Museum products since 2020. Therefore, this study basically selects literatures since 2020, and literatures of individual years are of reference significance for understanding the digitization process of Palace Museum products, so they are included in the study.

3.2.2 Presentation of results

After reading and analyzing the literature, this study found the reasons for the achievements of the digitization of the Palace Museum products.

There are the following points:

Policy-driven: The development of the Palace Museum has been closely following the national development plan, and the development of the digitalization of its products is naturally the result of experimentation and bold experiments driven by national policies. For example, Opinions on Further Strengthening the Protection of Intangible Cultural Heritage issued by the General Office of the CPC Central Committee and The General Office of the State Council in 2021; In 2022, the General Office of the CPC Central Committee and The General Office of the State Council issued the "14th Five-Year Plan for Cultural Development" to strengthen the protection and utilization of historical heritage.

A reasonable and lasting plan: The success of a thing cannot be separated from a reasonable plan, and a successful plan does not happen overnight. The development plan of digital products of the Palace Museum can be traced back to the 1990s. After a period of development to 2019, the Palace Museum officially proposed four construction systems of "Safe Palace Museum", "Academic Palace Museum", "digital Palace Museum" and "dynamic Palace Museum" (Wang Xudong 2021). A plan that not only focuses on the vertical development of the product, but also takes into account the horizontal. The product digitalization of the Palace Museum is from the digitalization of information archives to the digitalization of cultural relics protection, supervision, collection, publicity, and extension of products, and all aspects are blossoming together.

Finally, good plans need to be implemented consistently and efficiently.

Training and introduction of talent team: the digitalization of museum products cannot be separated from people's suggestions. Museums are places where education can be carried out, so the training and construction of talent team is a part of the construction of the Palace Museum. For the introduction of talents, the Palace Museum selects various types of talents in the introduction of talents in view of the complex situation faced by product digitalization. For talent training, the Palace Museum not only conducts regular training for its staff, but also digitizes its training to make it accessible to outsiders. (Palace Museum official website Education section)

Environmental impact: On the one hand, social environment refers to the development of science and technology. The development of Internet and cloud technology has made the digitization of museum products from a possibility to a general trend. On the other hand, the emergence of social emergencies, the epidemic that lasted nearly three years, made the digitization of museum products have to develop rapidly.

4 EXPERIENCE SUMMARY AND INSPIRATION

4.1 Summary of Experience in Digitizing the Products of the Palace Museum

Based on the above research and analysis results, this study summarizes the experience of product digitization at the Palace Museum based on the product hierarchy theory, and conducts a shallow analysis and evaluation of the advantages and disadvantages of product digitization. With the following is the result presentation:

4.1.1 Experience in product design

Firstly, overall, this study suggests that the Palace Museum has achieved two things in product digitization construction.One is that the product formed after digitization is a brand new product, not just a "network substitute" for museum collections. Every digital product is an independent entity, even a virtual entity without any entity. The digitization of museum products is developing and creating new products that can revitalize museums. The Palace Museum has a dedicated digital information department to carry out product digitization related work to digitize the products of the Palace Museum as an independent branch.

The second is that the product needs to have a "story". This study believes that the digitization of products at the Palace Museum has always adhered to a theme of "cultural sentiment". Whether it's physical or digital products, the Palace Museum has been selling "culture" rather than products. The digitalization of the products of the Palace Museum has always adhered to this theme in its development, whether it is the development of exhibitions and education, the development of games and apps for the Palace Museum, or the development of the Palace Museum Museum, the hospital has always upheld this idea among them.

Secondly, through literature analysis, this study suggests that the digitalization of the products of the Palace Museum can be summarized through the product hierarchy theory, and the digitalization achievements of the Palace Museum's products include all levels of the four hierarchy theory. Below from four levels of perspective:

4.1.1.1 Clear theme of core product layer

The core product is of course the "culture" that the Palace Museum adheres to. This level of product construction determines the overall trend of museum development, that is, what to choose as the theme. The Palace Museum first started from the museum itself and chose "culture" as its main theme for development. Combined with the fact that the Palace Museum was a palace of the Ming and Qing dynasties, it formed a Palace Museum culture dominated by the Ming and Qing dynasties, and developed its own unique "Palace Museum culture" in the museum's overall culture, covering various aspects such as ancient books, music, architecture, calligraphy and painting. In terms of the construction of its core products, this study believes that its product design has been very successful, fully utilizing its own advantages and resources, and demonstrating its grand national concept. By combining its product orientation with national development policies (such as emphasizing cultural confidence and promoting traditional culture in recent years), its product status has been improved, and it is conducive to gaining support from all parties. In addition, the selection of its core products also caters to the needs of the general public. Chinese people believe that "poetry and calligraphy are essential to one's belly" and "all things are inferior, only reading is high". China respects and recognizes culture.It has been a matter that has been passed down from generation to generation and deeply ingrained in the bone marrow of the Chinese people for thousands of years.

4.1.1.2 The combination of ideological innovation and technological innovation in the form product layer

The design of this level of formal products is mainly ideological innovation + technological innovation. Ideological innovation is for the development of the digital horizontal expansion of the Palace Museum products, while technological innovation is for the vertical development. Taking the digital multi-treasure Pavilion as an example, in 2019, the digital multi-treasure Pavilion was launched together with the digital cultural relics library and the digital famous paintings. The launch of these three products represents the continuous ideological innovation of the Palace Museum. The digital multi-treasure Pavilion and the digital cultural relics Library are digital products of the Palace Museum collection, but the digital cultural relics library can only be displayed two-dimensional, while the digital multi-treasure Pavilion is a three-dimensional display. This is technological innovation.From the perspective of the construction of its formal products, this study believes that the digitization results of the Palace Museum's products at this level are more prominent. While other museums in China can only display their collections in the form of two-dimensional graphics and text descriptions, the Palace Museum takes the lead in launching three-dimensional display (digital multi-treasure Pavilion). But there are drawbacks to its success. The Palace Museum's VR Palace Museum, panoramic Palace Museum and online exhibition technology are inferior to the online virtual exhibition of Nanjing Museum. The online virtual exhibition of Nanjing Museum has features such as integrity, mobile fluency, four-dimensional, three-dimensional and other multi-dimensional switching functions, which can make customers experience the feeling of on-the-spot visit to a greater extent. At present, the Palace Museum is mainly based on three-dimensional technology, and its virtual reality technology has a narrow coverage, and it has not created a three-dimensional model of the entire building. The development area of VR Palace Museum is also less, and tourists will always have regrets when visiting online.

4.1.1.3 The auxiliary product layer has built a rich and diverse product system

The auxiliary product construction of the digitization of the Palace Museum's products is mainly a large variety, large quantity and rich level of products. Taking into account the different preferences of the audience, the Palace Museum has also formed products aimed at young, young, middle-aged and elderly people. For example, the museum has built a youth website for young people (dpm.org.cn). In addition, there are products for scientific scholars such as the Forbidden City Society, the Qing Dynasty Palace History Research Society. The construction advantage of its auxiliary products lies in the wide audience of its radiation, and the pertinence of the digital construction of the Palace Museum's products is strong. In this way, each customer who uses this product will psychologically think that this product is produced for me, so that customers can meet their needs at all levels.

4.1.1.4 Extension and additional product layer to create a comprehensive and rapid information receiving and reaction system

Extension and add-on products have the most and earliest contact with consumers. So its main construction is "customer is God". In this era of "wine flavor is afraid of the alley", good publicity and after-sales service have attracted customers and retained customers for the digital products of the Palace Museum to a large extent. The reflection of the digitization of the Palace Museum's products in this regard is the "wide net" publicity + "there will be an answer" type of after-sales service. As long as it is a public contact channel, there will be digital figures of Palace Museum products, such as wechat, Weibo and Douyin. The message board on the official website of the Palace Museum is open to questions and will be answered promptly. The list goes on and on. The digital extension of the Palace Museum's products and the construction of additional products have achieved comprehensive development. Compared with the construction of other museums, although there is no backward place, there is no outstanding place.[51-53]

4.1.2 Experience in handling the relationship between different levels of products

In dealing with the four levels of relationship, the most important thing is to distinguish the primary and secondary. Obviously, the core product is the focus. The other three products will be integrated into and highlight the core product of the Palace Museum, namely "Palace Museum culture". And the other three levels of products will not be completely "equal". Formal products, as the carrier of core products, are an indispensable part of the digitalization of museum products. Complementary products and extensions and add-ons can attract and retain customers for digital products. The three cooperate with each other to support the core products.

In addition, these four levels of products can not be clearly defined, they should be integrated with each other. For example, the mini programs and apps of the Palace Museum are not only formal products, extensions and additional products, but also core products and auxiliary products.

4.2 Inspiration for the Digital Development of Other Museum Products

Through the discussion and reflection on the digitization construction of the Palace Museum's products, combined with theoretical deduction, this study believes that the successful experience of the digitization of the Palace Museum's products can provide help to the digitization construction of other museums' products, and the digitization of other museums' products can also be summarized by the product hierarchy theory. Therefore, this study puts forward some suggestions for the development of other museums from the perspective of product hierarchy theory.

4.2.1 Core product layer: unique culture as the core basis

Any museum can choose culture as its core product, but in order to highlight the museum itself, it should add "embellishment" to culture, such as Nanjing as the ancient capital of the six dynasties can promote "imperial city culture"; Xi 'an can promote the culture of "Terracotta Warriors" and "Datang"; Sichuan can promote "Sanxingdui culture". In short, choose a characteristic culture that people can associate with

4.2.2 Formal product layer: enables products to be innovative or practical

Form products are the key to customer retention. If the museum's capacity permits, it can consider building a more advanced four-dimensional model from the two points of "new and strange"; If the ability is not very outstanding, you can also find a new way, from the practical aspect of eye-catching, you can develop more daily cultural and creative products, such as the Palace Museum has developed clothing, makeup, stationery and other daily necessities with the characteristics of the Palace Museum.

4.2.3 Auxiliary product layer: focus on product characteristics and differentiation

All the well-developed museums in China have developed the education section as an auxiliary product to increase their competitiveness, and the academic research section is also blooming. Therefore, this study suggests that some "restraints" can be added to this part. Learning in all aspects, of course, can be fully developed, but it is difficult to shine, if the research on the one hand can always become a leader in this piece. As with the selection of core products, education and academia can also choose to focus on one area.

4.2.4 Extension and additional product layer: do a good job in receiving and disseminating information

For this level of product construction, this study believes that as long as it follows the trend, where the hot spot of the current explosion, our publicity will be done. Do a good job in the development of all aspects of publicity channels, do a good job of customer after-sales service, the atmosphere is set off in place, the service is ready in place.

5 RESEARCH DEFICIENCIES AND PROSPECTS

5.1 Insufficient Research

First of all, researchers have limited abilities, and may not be objective and impartial in the selection and research of literature materials, and may be insufficient in the induction and research of experience. Secondly, this study focuses on the research of the digitization of museum products in China, and has little exploration of foreign countries.

5.1.1 Research prospects

There are two research prospects in this study, one is for the Palace Museum. Through the exploration of the official website of the Palace Museum, this study believes that under the conditions of existing science and technology, the panoramic palace of the Palace Museum and VR Palace Museum can be further improved. The probe surface can be expanded and the probe content can be further enriched. It may be possible to digitize the

entire Palace Museum building with the help of modeling technology. The other is for museums where the digitization of their products is weak. This study believes that museums with weak digitalization of other products can proceed step by step. They can first improve the digitalization of guiding and promotional products, and then consider the two-dimensional and three-dimensional digitalization of collections. Finally, it is hoped that all museums can learn from each other's strengths and actively learn from the excellent experience of other museums.

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