

Research on the Digitalization of Cultural Heritage of the Palace Museum and Its Impact on Consumer Purchase Behavior

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ABSTRACT

With the rapid development of digital technology, in the post-pandemic era, consumption patterns have changed, and emotional value-based consumption has increased. The digitalization of cultural heritage has become an important way for cultural and museum institutions to innovate in communication and commercial development. As the largest ancient art and culture museum in China, the Palace Museum has carried out extensive digitalization practices, providing many excellent cases for research. This paper mainly studies the digitalization process of the cultural heritage of the Palace Museum from the perspective of consumers and how the digitalization of cultural heritage (3D modeling, AR and VR) affects consumers' purchase intention by influencing their perceived value (cultural identity, functional value, emotional value) and consumer participation. Data was collected from 100 consumers through questionnaires and combined with secondary data collection. The research found that online digital experiences positively regulate the path from cultural identity to purchase intention. The combination of online and offline channels forms a closed loop of "experience - identity - consumption", greatly enhancing the value of cultural consumption.

KEYWORDS

Palace museum; Digitalization of cultural heritage; Cultural identity; Digital experience; Consumers

1 Introduction

The Palace Museum is an invaluable treasure of Chinese civilization. In recent years, through the "Digital Palace Museum Construction", it has successfully transformed the heavy historical relics into vivid digital IPs, leading the way in the global museum digital transformation. From "Palace Museum Community", VR immersive experiences to best-selling cultural and creative products, the Palace Museum has perfectly completed the first step of museum digitalization. This phenomenon raises a question worth exploring: How does the digitalization of cultural heritage affect consumers' psychology and behavior, thereby stimulating huge consumption potential and opening up new consumption markets?

Previous studies on the purchase behavior of Palace Museum cultural and creative products have mostly focused on the form of cultural and creative products (physical cultural and creative products, digital collectibles), the promotion of consumer purchase behavior by the digitalization of cultural heritage, functional attributes, and brand extension. However, the success of Palace Museum cultural and creative products may not be fully explained by these traditional factors. There is also a lack of research on how the digitalization of cultural heritage promotes consumer purchase behavior. The core charm of the Palace Museum's digitalization lies in telling stories through digital means, stimulating consumers' cultural identity and emotional resonance with cultural relics. Does the "cultural identity" generated by "digital storytelling" drive consumers to pay a higher premium for cultural and creative products more than the "functional attributes" of the products themselves? And what is the catalytic relationship between the Palace Museum's digital experiences (cloud tours) and offline physical consumption (cultural and creative products)? How does digital storytelling (VR reenactment of cultural relics' history) strengthen consumers' cultural identity? Answering these questions is of crucial significance for understanding the mechanism of how the digitalization of cultural heritage affects consumers' purchase behavior.

This paper aims to intervene from the perspective of consumers, collect consumers' views on the digitalization of cultural heritage through questionnaires, and explore the digitalization process of the Palace Museum's cultural heritage and the new experiences it brings, as well as the innovative income that can be generated from the digitalization of cultural relics through data analysis and secondary data collection.

2 Digitalization Process of the Palace Museum

2.1 Definition of Digital Museum

In George E. R. Burck's "The New Museum Handbook", it is mentioned that the International Council of Museums gave the definition of a museum in 1960: a public institution that uses various methods to preserve, study, and enhance objects and specimens of cultural value, and especially focuses on presenting these objects and specimens to the public

for entertainment and education.

A digital museum is a virtual platform that uses digital technology to collect, store, display, and disseminate the collections, exhibitions, and other contents of physical museums. The core feature is that through 3D modeling, virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) technologies, it breaks through the limitations of time and space, allowing viewers to browse cultural relics online anytime and anywhere, participate in interactive exhibitions, and acquire relevant knowledge. It presents a complementary relationship with physical museums, breaking the boundaries of time and space in cultural dissemination. Through interactive design, it stimulates the interest of viewers and provides a new solution to the potential damage to cultural relics caused by the sharp increase in the number of visitors. It also offers cross-disciplinary digital resources for academic research. In foreign literature, digital museums are generally referred to as Digital Museum or Virtual Museum. The idea of a virtual museum was first proposed by André Malraux in 1947. He put forward the concept of the imaginary museum (*le musée imaginaire*), a museum without walls, location or spatial boundaries, similar to a virtual museum, where the content and information revolve around the objects and can be accessed throughout the planet ^[1].

2.2 The Necessity of Digitalization of the Palace Museum

In 2016, the National Cultural Heritage Administration, in collaboration with the National Development and Reform Commission and other departments, issued the "Three-Year Action Plan for 'Internet + Chinese Civilization'" ^[8], encouraging the digital display and utilization of cultural relics and supporting qualified cultural relic museums in conducting smart museum work. In May 2021, the National Cultural Heritage Administration and nine other central departments jointly issued the "Guiding Opinions on Promoting the Reform and Development of Museums" ^[4], clearly stating that smart museums should be vigorously developed, with business needs at the core and modern technology as support, gradually achieving smart services, smart protection, and smart management. On January 24, 2025, the General Office of the State Council issued the "Several Economic Policies for Promoting High-Quality Development of Culture" ^[5], indicating that support for cultural and technological innovation should be further increased in national and local science and technology development plans, and support should be provided for the establishment of national technology innovation centers in fields such as news media and cultural heritage, as well as for cultural and technology integration enterprises, to accelerate the layout of cultural innovation platforms. As a brilliant crystallization of 5,000 years of Chinese civilization, the Palace Museum, however, has shown limitations in traditional protection methods in dealing with natural erosion, spatial constraints, and the increasing public demand. The rapid development of digital technology has opened up new paths for the protection, research, display, and dissemination of cultural heritage. The digitalization of cultural heritage at the Palace Museum is not only a protection and inheritance of historical culture but also an important measure to innovate cultural dissemination methods and enhance public cultural experience. In Chen Yujie's "Exploring Digital Media Dissemination Methods with the Digitalization of the Palace Museum's Painting Collection as an Example", it is stated that the Palace Museum in Beijing has attempted to use digital media in multiple dimensions to endow the ancient museum with new connotations and turn it into a super IP. Among them, the digitalization of the painting collection is one of the first art forms to be innovatively disseminated through digital media, attracting domestic and international attention through new media platforms and providing excellent cases for digital media dissemination. In the post-pandemic era, the cultural consumption model has been reconstructed, with visitors shifting from "physical visits" to "immersive experiences", and the demand for consumption that adds emotional value has sharply increased. A new consumption market has been opened up.

2.3 The Digitalization Process of the Palace Museum

China began exploring the construction of digital museums in the late 1990s, integrating new media into museum construction and enriching the display methods and experience of traditional museums ^[3].

In 2018, the Palace Museum received over 17 million visitors, increasing the pressure on museum reception and making the further protection of cultural relics an urgent matter. The demand for digitalization has become more prominent ^[6]; On March 15, 2019, the Palace Museum in Beijing and Huawei Technologies Co., Ltd. collaborated to build a 5G smart Palace Museum, promoting digitalization, informatization, and intelligence construction ^[7]. In 2019, the "Digital Cultural Relics Database" was launched, making high-definition images of cultural relics available to the public and the internet. Over the past few years, the number of cultural relic images has continued to increase, exceeding 100,000. Users can search for cultural relics by name, era, author, or even color. Additionally, the launch of the "Virtual Tour of the Palace Museum" project has created a virtual image of the Palace Museum that is completely consistent with reality through 3D modeling, allowing users to experience the rich historical and cultural atmosphere of the Palace Museum from home ^[2]. On May 18, 2023, the "Palace Museum - Tencent Joint Innovation Laboratory" jointly established by Tencent Group and the Palace Museum officially began operations. This laboratory, relying on advanced digital technologies such as digital

twins, big data, and artificial intelligence, provides new application demonstrations of high-standard and high-quality digital collection technologies for the cultural relics field, exploring new forms of digital protection and utilization of cultural relics^[9]. By May 2024, about 920,000 sets of cultural relics had completed basic digital collection, accounting for 50% of the total collection.

3 Research Methods and Results

3.1 Questionnaire Survey

A professional questionnaire platform, "Wenjuanxing", was used to conduct a sample questionnaire survey across the entire society.

First, the theme of the questionnaire was clearly defined as the digitalization of the Palace Museum's heritage and the purchase of cultural and creative products. The research questions were broken down into measurable variables, such as the quantity purchased, whether purchased online or offline, and the degree of support for the Palace Museum's digitalization. At the same time, control variables such as gender, age (from 15 to 60 years old, with each 5-year interval as an age group), and living area were included.

Through the questionnaire survey, a total of 328 questionnaires were collected. After eliminating invalid questionnaires, 289 valid samples were obtained. The valid samples were mainly young women aged 20-25 and living in first-tier cities, which matched the main audience of the Palace Museum's digital products. The data was integrated and analyzed to obtain the following two conclusion models.

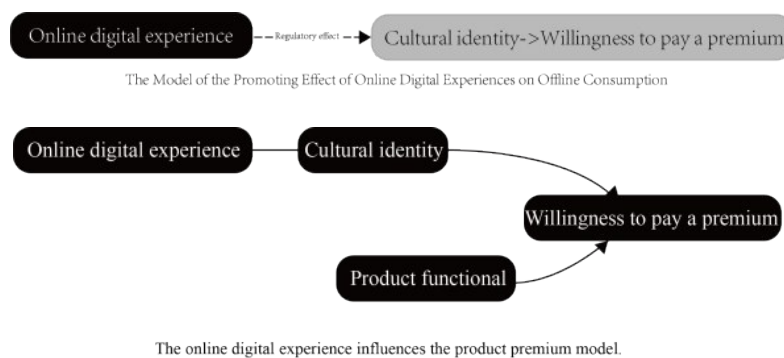


Figure 1

3.2 Secondary Data Collection

Data was collected through multiple channels and analyzed for content and sentiment. The main areas were social media platforms, e-commerce platforms, and online communities. Social media platforms included Sina Weibo, Xiaohongshu, and Douyin. Posts and comments with topics such as #PalaceMuseum#, #DigitalPalaceMuseum#, and #PalaceMuseumCulturalProducts# were captured. The focus was on analyzing users' spontaneous sharing of digital experience and purchase experiences of cultural and creative products. E-commerce platforms included Taobao Palace Museum, Tmall Palace Museum Cultural Products Flagship Store, and Palace Museum Cultural Products Flagship Store. User reviews of popular cultural and creative products (especially those with pictures) were randomly selected. In online communities such as Zhihu, discussions about the Palace Museum's digital projects and cultural and creative products were collected. A large number of comments were processed by extracting keywords such as "immersive", "pride", and "history" related to emotions and cultural identity. In comments about the "Digital Palace Museum" VR exhibition, words like "being there in person" and "immersive" appeared frequently. Sentiment analysis showed that the positive sentiment value of related discussions was significantly higher than other negative impacts. Digital narratives, by creating an immersive experience atmosphere, efficiently stimulated users' emotional resonance and cultural identity.

In high-priced cultural and creative products, over 70% of positive reviews mentioned "cultural value", "collecting significance", and "supporting traditional culture", etc., which are consumers' cultural value demands. Data analysis indicated that the "cultural identity" score explained "willingness to pay a premium" much more than the "functional attribute evaluation score". With the support of various data, in the field of cultural consumption, emotions and value recognition are the core drivers of high-end consumption. Cultural identity indeed explains the willingness to pay a premium better than product functional attributes. A large number of complete "grass-planting - grass-pulling" paths were discovered on the three major platforms of Xiaohongshu, Douyin and Weibo. The data correlation was high. After

the launch of new functions of "Digital Forbidden City" or the release of related popular videos, the number of online ticket reservations for the Forbidden City and the online search volume and sales data of related cultural and creative products would show a small peak simultaneously. Online digital experiences are not only independent service entities but also powerful catalysts for offline consumption. The two are not separate. Through several years of digitalization efforts by the Palace Museum, a closed loop of "online experience - immersive experience to stimulate interest - offline consumption - online sharing" has gradually formed. Online experiences drive offline traffic, and offline experiences provide more content and topics for online experiences.

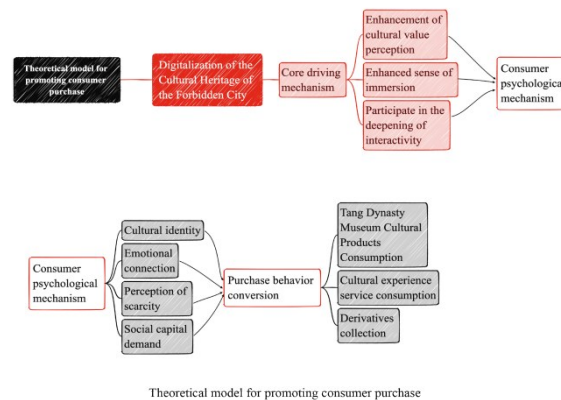


Figure 2

4 Conclusion

This study confirmed the mechanism by which the digitalization of the Palace Museum influences consumption through multiple paths such as "cultural identity" and "digital narrative". It enriched the theoretical model in the field of digitalization of cultural heritage and consumer behavior. The core of the digital strategy should not merely be the accumulation of technology, but rather content is king. It is necessary to deeply explore the stories behind IPs and transform them creatively with modern language. The focus of marketing can shift from product functions to emotional value communication, aiming to establish a deep resonance with the target audience on basic cultural values. It is essential to integrate online and offline channels and design seamless experience processes, so that the emotional accumulation in the virtual world can be smoothly transformed into consumption behavior in the real world. Encourage consumers to share their offline experiences online to form a virtuous cycle of "online - offline". Future research can compare the differences between online and offline audiences.

References

- [1] Chen, Xinyi. (2024). Research on Embodied Communication Practice of Digital Museums (Master's Thesis, Soochow University). Master's https://kns.cnki.net/kcms2/article/abstract?v=Y2E-z2Sa5CPd5aFw3xHcZCZzD6l2Nx2OWvTBEIOarxgO1MMhW7FNM6Hhpnu1tC7Z7wY5ksDNuaZfQ_N6DKtgqUas3orJEY0A2XQUHsghwO2Sy4YfgoXtPSCB1zZFXRLTqrfbKB_OgNiZLDz6r3jZGYw3P-ES1m4_NkuxCRlo6y3EigMnbnEEK3A==&uniplatform=NZKPT&language=CHS.
- [2] Deng, Jiani. (2024). Research on Digital Communication Practice and Communication Strategies of Museums - Taking the Palace Museum as an Example. *News and Culture Construction*, (21), 49-51.
- [3] Zhang, Yu. (2023). Research on the Development of Public Cultural Communication of Digital Museums.
- [4] National Cultural Heritage Administration website 2021 "Guiding Opinions on Promoting the Reform and Development of Museums by the Central Propaganda Department, National Development and Reform Commission, Ministry of Education, Ministry of Science and Technology, Ministry of Civil Affairs, Ministry of Finance, Ministry of Human Resources and Social Security, Ministry of Culture and Tourism, and National Cultural Heritage Administration" https://www.gov.cn/zhengce/zhengceku/2021-05/24/content_5610893.htm.
- [5] General Office of the State Council, 2025, "Notice of the General Office of the State Council on Issuing Several Economic Policies for Promoting High-Quality Development of Culture", https://www.gov.cn/zhengce/content/202501/content_7000958.htm.
- [6] China News Service, 2018, "The Number of Annual Visitors to the Forbidden City Exceeds 17 Million for the First Time, Making It the World's Most Visited Museum", <https://baijiahao.baidu.com/s?id=1619889793140950241&wfr=spider&for=pc>.
- [7] Huawei Official, 2019, "Huawei and the Palace Museum Sign Strategic Cooperation Agreement to Jointly Build '5G Smart Palace Museum'", <https://carrier.huawei.com/cn/success-stories/industries-5g/the-imperial-palace>.
- [8] National Cultural Heritage Administration, 2016, "Five Departments Jointly Issue the 'Three-Year Action Plan for Internet + Chinese Civilization'", http://www.ncha.gov.cn/art/2016/12/8/art_722_135614.html.
- [9] China National Radio, 2023, "The Joint Innovation Laboratory of the Palace Museum and Tencent is Established, Creating a Smart Cultural Heritage Model with Next-Generation Internet Technology", <https://baijiahao.baidu.com/s?id=1766283827211353688&wfr=spider&for=pc>.