The Relationship between User Perceived Value and Use Intention of Digital Cultural Heritage Collection Apps: An Empirical Study from China

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Abstract
The digital cultural and creative industry is experiencing a period of vigorous development, but there is a lack of empirical research on digital heritage collection apps. This study aims to investigate the level of perceived value and use intention of digital heritage collection APPs of Chinese consumers and to determine whether there is a correlation between the two variables. The study findings indicate that users have low perceived value (mean=3.50), with the highest mean value found for functional value (3.61) and the lowest mean value for sensory value (3.26). Similarly, the mean value for use intention is 3.63, with the highest mean value found for recommendation intention and the lowest mean value for intention to pay more (3.48). Spearman correlation analysis shows a significant positive correlation between the dimensions of perceived value and the dimensions of use intention. Additionally, researchers propose three strategies to enhance users' perceived value and thus increase their intention to use.
Keywords: Perceived Value, Use Intention, Digital Cultural Heritage Collection Apps

Introduction
Cultural heritage is a wealth left by historical accumulation, carrying the wisdom of our ancestors, witnessing the development of human culture, and serving as a cultural resource that provides a carrier for world cultural and artistic exchanges (Lin, 2022). In recent years, with the rapid development of network technology, blockchain technology has emerged as the times require. In cultural communication, blockchain technology has exerted its unique advantages. Cultural digitization is a process of continuous integration, development, and evolution of economy and society, culture and technology (Liu, 2022). In May 2022, Chinese government departments implement the overall planning of the cultural digitalization strategy at the national level, and providing infrastructure for the realization of digitalization of cultural resources, cultural production, and cultural communication, industrial ecology, and

governance mechanisms. This provides an important policy guarantee for the rapid development of the digital cultural heritage collection industry.

According to Li (2022), transforming cultural heritage into NFT digital collections can be digitally preserved to avoid loss and destruction. Pushing NFT digital cultural collections to the global market can give them higher value and influence, allow more people to understand and appreciate cultural heritage, and provide more possibilities for its promotion. Furthermore, Digital cultural heritage collections can bring new business models and development opportunities to cultural and creative industries, increase commercial value and income, and enrich the display and interaction of cultural heritage. Users can also achieve a more intuitive experience and interaction and deepen their perception and understanding of cultural heritage (Gu, 2022). Hsiao & Shen (2023) pointed out that cultural heritage carried by digital collections can also be circulated and traded globally, promoting exchanges and integration between different cultures and global cultural exchanges and cooperation. Zhou (2022) stated that based on blockchain technology, cultural heritage can be digitized, stored, and traded in NFT. The transaction records of NFT digital cultural collections are stored on the blockchain, which can ensure the authenticity, uniqueness, and immutability of digital collections and prevent digital collections from being pirated and infringed. Unlike traditional digital collections, NFT digital cultural heritage collections have higher value and scarcity and can endow cultural heritage with new meaning and value. China's Alibaba, JD.com, NetEase, Tencent, and many other companies have begun to build their own NFT platforms and issued corresponding NFT products, and other small platforms have also emerged one after another. With the continuous development of blockchain technology and the digital asset market, NFT digital cultural heritage collections will have more application scenarios and business models with broad prospects (Li and Liu, 2023).

The research on perceived value comes from people's continuous exploration and pursuit of consumer psychology and behaviour. Perceived value refers to the overall evaluation of the utility of a product or service after weighing the benefits that customers can perceive and the cost they pay when obtaining the product or service (Lin and Li, 2015). Due to the complexity of the variable of perceived value, since the 1990s, there have been three representative views in the academic community on the concept of consumer perceived value: the trade-off theory of perceived gain and loss represented by Zeithaml (1988), the theory of perceived multiple factors represented by Sweeney and Soutar (2001), and the comprehensive evaluation theory of perception represented by (Woodruff, 1997). However, there have been no more representative or consistent views so far. Despite this, previous studies have shown that consumers choose the option with the highest perceived value when making a purchase or use decision, and their perceived value directly affects their purchase or user behaviour. The more value they perceive, the greater their intention to purchase or use (Doszhanov and Ahmad, 2015; Gan and Wang, 2017; Hus and Lin, 2016; Hariguna et al., 2020; Li and Shang, 2020). Therefore, it is necessary to understand the current Chinese consumers' perceived value of digital cultural heritage collection apps.

The Chinese government has introduced various policies and invested a large amount of funds in digital innovation and cultural heritage protection. Moreover, leading internet companies have made efforts to develop many applications for digital cultural heritage collection. However, research rarely focuses on the perceived value and use intention of Chinese consumers to these applications. Therefore, this study aims to determine the level of perceived value and use intention of Chinese consumers to these digital cultural heritage

collection apps. The research results can provide a basis for enterprises, technicians, and governments to understand consumer feedback and take necessary intervention measures.

The research questions are as follows
1. What is consumers' perceived value level of digital cultural heritage collection apps?
2. What is consumers' use intention level of digital cultural heritage collection apps?
3. Is there a correlation between digital cultural heritage collection apps consumers' perceived value and use intention
4. What suggestions are there for improving the perceived value of digital cultural heritage collection apps?

Methodology
Research Design
This study aims to investigate the level of perceived value and use intention of digital heritage collection APPs of Chinese consumers and to determine whether there is a correlation between the two variables. Lock et al (2021) pointed out that quantitative survey methods can determine the correlation between research variables. Therefore, the researcher will collect data through questionnaires and do descriptive and correlation analyses.

Research Object
This study selects TOPNOD, a mainstream digital cultural heritage collection app in China, as an example. TOPNOD is a comprehensive application platform based on ant chain technology that integrates digital collectibles purchase, collection, viewing, and sharing. It integrates the technological capabilities of the ant chain and provides consumers with a more immersive service experience. As shown in Figure 1.
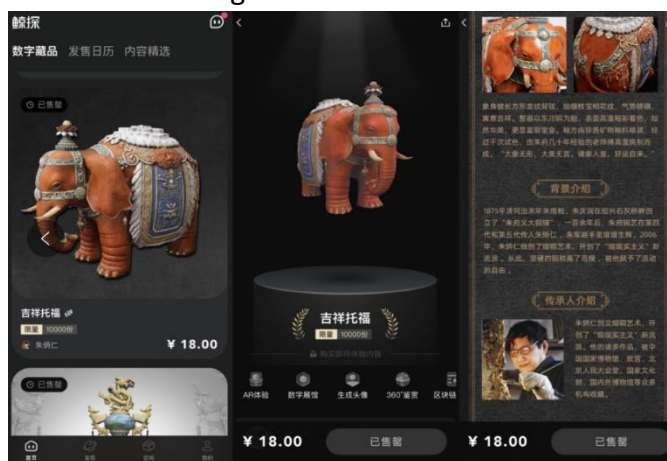

Figure 1: The function of digital cultural and creative products in TOPNOD

Research Instruments
The perceived value scale is adapted from Cengiz & Kirkbir (2007); Cao & Lu (2020), consisting of 18 items and 5 dimensions, namely sensory value (4 items), quality value (3 items), social value (3 items), emotional value (4 items), and functional value (4 items). The use intention scale is adapted from Liang (2016) and comprises four subscales: initial use intention, repeat use intention, recommendation use intention, and intention to pay a higher cost. Both scales use the Likert five-degree notation method, and the scale was verified by 2 experts, and the

Cronbach coefficients were all higher than 0.7, meeting the requirements of academic research (Creswell, 2017).

Data Collection and Analysis
Users of the TOPNOD app voluntarily completed both scales, which took approximately 5 minutes. A total of 370 valid responses were collected in this study. After data collection, due to the non-normal distribution of the data, the researchers computed the correlation between perceived value and use intention using the Spearman correlation coefficient. The strength of the correlation was interpreted according to the classification proposed by Schober and Schwarte (2018), as shown in Table 1.

Table1. Interpretation of correlation levels

Correlation Coefficient Range	Description
0.00–0.10	Negligible
0.10–0.39	Weak
0.40–0.69	Moderate
0.70–0.89	Strong
0.90–1.00	Very strong

Sample / Participants
Table 2
Summary of demographic characteristics of respondents

Variables	Characteristics	N	%
Gender	Male	214	57.8%
	Female	156	42.2%
Age (Year)	20-35	101	27.3%
	35-50	226	61.1%
	≥51	43	11.6%
Education Level	High School	62	16.8%
	Undergraduate	154	41.6%
	Postgraduate	154	41.6%
Income (monthly/$)	≤1000	108	29.2%
	1001-2000	148	40.0%
	2001-3000	84	22.7%
	≥3001	30	8.1%
Total		370	100%

Table 2 presents the demographic characteristics of the participants in the survey. The sample size was 370 individuals, consisting of 214 males (57.8%) and 156 females (42.2%). Age distribution was as follows: 101 (27.3%) were between 20-35 years old, 226 (61.1%) were between 35-50 years old, and 43 (11.6%) were 51 years old or above. Education level was divided into three categories: 62 (16.8%) had completed high school, 154 (41.6%) had an undergraduate degree, and 154 (41.6%) had a postgraduate degree. In terms of income, the majority of participants earned between $1001-2000 per month (148 individuals, 40.0%), followed by those earning ≤$1000 (108 individuals, 29.2%), $2001-3000 (84 individuals, 22.7%), and ≥$3001 (30 individuals, 8.1%).

Results

Table 3

Descriptive Statistics of the Perceived Value of Digital Cultural Heritage Collection APP

Perceived Value of Digital Cultural Heritage Collection APP							
Dimension	Min	Q1	Median	Q3	Max	Mean	SD
Sensory value	1.00	2.50	3.50	4.00	4.75	3.26	0.95
Quality value	1.00	2.33	3.67	4.33	5.00	3.44	1.13
social value	1.00	2.67	4.00	4.67	5.00	3.60	1.16
Emotional value	1.00	2.75	3.75	4.50	5.00	3.60	1.16
Functional value	1.25	2.50	3.75	4.25	5.00	3.61	1.15
Total	1.67	2.78	3.72	4.22	4.89	3.50	0.93

Table 3 provides the results of the perceived value of a digital cultural heritage collection app. The perceived value is measured across five dimensions: sensory value, quality value, social value, emotional value, and functional value. The minimum, first quartile (Q1), median, third quartile (Q3), and maximum values are reported, along with the mean and standard deviation (SD) of each dimension.

The results show that the highest perceived value is in the functional value dimension, with a mean score of 3.61 and a standard deviation of 1.15. The sensory value dimension has the lowest mean score of 3.26 and the highest standard deviation of 0.95. The other three dimensions, quality value, social value, and emotional value, have mean scores of 3.44, 3.60, and 3.60, respectively, and standard deviations ranging from 1.13 to 1.16.

The interquartile range (IQR) values for all dimensions are relatively narrow. The total perceived value of the app is reported with a minimum value of 1.67, a lower quartile of 2.78, a median of 3.72, an upper quartile of 4.22, a maximum value of 4.89, and a mean of 3.50.

Table 4

Descriptive statistics of the use intention of the Digital Cultural Heritage Collection APP

use intention of Digital Cultural Heritage Collection APP							
Dimension	Min	Q1	Median	Q3	Max	Mean	SD
Initial use intention	1.00	3.00	4.00	4.00	5.00	3.56	1.07
Repeated use intention	1.00	3.00	4.00	4.00	5.00	3.51	1.15
Recommendation use intention	1.00	4.00	4.00	5.00	5.00	3.98	0.99
Paying higher cost	1.00	3.00	4.00	4.00	5.00	3.48	1.18
Total	1.25	3.25	3.75	4.25	5.00	3.63	0.90

Table 4 describes the statistical summary of the use intention of a digital cultural heritage collection application across four dimensions: initial use intention, repeated use intention, recommendation use intention, and intention to pay a higher cost. The results indicate that the mean scores for initial use intention, repeated use intention and recommendation use intention are moderate to high, ranging from 3.51 to 3.98. Specifically, recommendation use intention has the highest mean score of 3.98, while initial use intention has a mean score of 3.56, and repeated use intention has a mean score of 3.51. The intention to pay a higher cost dimension has the lowest mean score of 3.48.

The interquartile range (IQR) values for all dimensions are relatively narrow, indicating little variability in the distribution of the use intention scores. The total use intention of the application is reported with a minimum value of 1.25, a lower quartile of 3.25, a median of 3.75, an upper quartile of 4.25, a maximum value of 5.00, and a mean of 3.63.

Table 5
Correlation between perceived value and Initial use intention of Digital Cultural Heritage Collection APP

Initial use intention	r	p-value
Sensory value	0.492	0.000
Quality value	0.626	0.000
social value	0.725	0.000
Emotional value	0.665	0.000
Functional value	0.673	0.000
Total	0.745	0.000

As shown in Table 5, all correlations are statistically significant with p-values of 0.000, indicating a significant relationship between the perceived value dimensions and the initial use intention of the digital cultural heritage collection app. The correlation coefficients range from 0.492 to 0.745, indicating a moderate to strong positive relationship between the perceived value dimensions and the initial use intention. The highest correlation was observed between initial use intention and social value (r=0.725), followed by functional value (r=0.673), quality value (r=0.626), emotional value (r=0.665), and sensory value (r=0.492). The total perceived value had the strongest correlation with initial use intention (r=0.745), suggesting that the overall perceived value of the digital cultural heritage collection app is a strong predictor of initial use intention.

Table 6
Correlation between perceived Value and Repeated use Intention of Digital Cultural Heritage Collection APP

Repeated use intention	r	p-value
Sensory value	0.452	0.000
Quality value	0.581	0.000
social value	0.569	0.000
Emotional value	0.660	0.000
Functional value	0.613	0.000
Total	0.681	0.000

Table 6 indicates that all perceived value dimensions have a statistically significant positive correlation with repeated use intention, with correlation coefficients ranging from 0.452 to 0.681 and p-values of 0.000. The strongest correlation is observed between total perceived value and repeated use intention, with a correlation coefficient of 0.681. Specifically, emotional value showed the strongest correlation with repeated use intention (r = 0.660), followed by quality value (r = 0.581), functional value (r = 0.613), social value (r = 0.569), and sensory value (r = 0.452).

Table 7
Correlation between perceived value and Recommendation use intention of Digital Cultural Heritage Collection APP

Recommendation use intention	r	p-value
Sensory value	0.428	0.000
Quality value	0.479	0.000
social value	0.601	0.000
Emotional value	0.587	0.000
Functional value	0.608	0.000
Total	0.645	0.000

Based on Table 7, the correlation coefficients between the dimensions of sensory value, quality value, social value, emotional value, functional value, and recommendation use intention were all found to be statistically significant ($p < 0.05$). The strongest correlation was found between the total value perception and recommendation use intention, with a correlation coefficient of 0.645. The emotional value dimension also showed a high correlation with recommendation use intention ($r = 0.587$), followed by the social value ($r = 0.601$), functional value ($r = 0.608$), quality value ($r = 0.479$), and sensory value ($r = 0.428$).

Table 8
Correlation between perceived value and Paying the higher cost of Digital Cultural Heritage Collection APP

Paying higher cost	r	p-value
Sensory value	0.489	0.000
Quality value	0.604	0.000
social value	0.707	0.000
Emotional value	0.675	0.000
Functional value	0.658	0.000
Total	0.738	0.000

According to Table 8, paying higher cost was positively and significantly correlated with all use intention factors, including sensory value ($r = 0.489$, $p < 0.05$), quality value ($r = 0.604$, $p < 0.05$), social value ($r = 0.707$, $p < 0.05$, emotional value ($r = 0.675$, $p < 0.05$), functional value ($r = 0.658$, $p < 0.05$), and total use intention ($r = 0.738$, $p < 0.05$). The correlation coefficients ranged from moderate to very strong, indicating that paying higher cost significantly impacted consumers' intention to use the product, with social value showing the strongest association.

Conclusion
The study results indicate that the mean perceived value of users of Chinese digital cultural heritage collection apps was 3.50, with the highest mean score found for functional value (3.61), followed by social value and emotional value, both of which had a mean score of 3.60. The quality value had a mean score of 3.44, while the mean score for sensory value was the lowest at 3.26. Additionally, the overall mean score for use intention was 3.63, with the highest score observed for recommendation use intention (3.98) and the lowest for intention to pay more (3.48). Spearman correlation analysis revealed a positive correlation between the perceived value dimensions of the digital cultural heritage collection app and the use intention dimensions. Based on the above analysis, the study concludes that the perceived

value and use intention of Chinese digital heritage collection app users are not high. Therefore, the study proposes the following three points to improve users' perceived value and thus increase their intention to use.

Optimize User Experience

Design a simple and clear user interface that allows users to easily find the desired features and information, and provide useful feedback and guidance to make the user experience smoother and more enjoyable. By understanding users' interests and needs, provide personalized recommendation services to help them quickly find and collect digital cultural heritage of interest. Strengthen social interaction so that users can share and communicate their collections and experiences, enhancing user interaction and sociability. Provide high-quality digital cultural heritage collections, including rich cultural and historical backgrounds and related artistic values, to attract users' interest and improve their cultural literacy. Optimize the performance and speed of the app, improve loading and response speed to ensure the stability and smoothness of the user experience, and avoid situations where users abandon the use of the app due to long waiting times. Pay attention to listening to user feedback and suggestions, respond promptly to user questions and needs, and use user feedback as a reference to improve the app to improve user satisfaction and perceived value..

Market Promotion

Emphasize the uniqueness of the app, highlighting its differences from similar products in market promotion, such as the digital cultural heritage resources and personalized recommendation services provided by the app. Build a strong brand image for the digital heritage collection app to establish a good reputation and attract more users. Advertise the app through various channels, such as social media, search engine marketing, email marketing, and offline promotion, to increase its visibility and exposure. Strengthen word-of-mouth marketing by increasing the app's visibility and credibility through user reviews and recommendations, such as inviting well-known bloggers or domain experts to evaluate and recommend the app.

Education and Promotion Activities

Conducting education and promotion activities to enhance public awareness and interest in digital cultural heritage. Organizing online webinars, lectures, exhibitions, and other events to showcase the advantages and value of the app, as well as educate users on how to utilize and appreciate digital cultural heritage.

Significance and Limitations of the Study

The present study contributes to the existing literature by investigating the perceived value and use intention of users of digital cultural heritage collection apps and the relationship between the two variables. The findings can provide evidence for technology developers, companies, and policymakers to formulate appropriate policies. However, the conclusions of this study are subject to certain limitations due to the limited sample size. Future research is needed to investigate further factors influencing the use intention of digital heritage collection apps.

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