Postprint: A Study on Public Digital Cultural Service Satisfaction from the Perspective of Supply-Demand Matching Theory

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Abstract

[目的/意义] This study investigates satisfaction with public digital cultural services to promote enhanced alignment between the supply side and demand side. [方法/过程] Based on the four criteria of supply-demand fit theory, an evaluation model for public digital cultural service satisfaction was constructed. Data were collected through a scale questionnaire, and the model was tested using confirmatory factor analysis and path analysis. Additionally, statistical analysis was conducted on the scale results. [结果/结论] The research demonstrates that the four indicators of supply-demand fit theory—relevance, accessibility, quality, and appropriateness—all exert a significant positive influence on user satisfaction. However, the scores for these four indicators are relatively low, indicating that substantial room for improvement remains in the supply-demand fit of public digital cultural services.

Full Text

Research on Satisfaction with Public Digital Cultural Services from the Perspective of Supply-Demand Adaptability Theory

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Abstract: [Purpose/Significance] This study examines satisfaction with public digital cultural services to promote better alignment between service supply and user demand. [Method/Process] Based on the four criteria of supply-demand adaptability theory, we constructed an evaluation model for public digital cultural service satisfaction. Data were collected through scale questionnaires,

and the model was tested using confirmatory factor analysis and path analysis, with statistical analysis conducted on the scale results. [Result/Conclusion] The findings indicate that the four indicators of supply-demand adaptability theory—relevance, accessibility, quality, and appropriateness—all exert significant positive effects on user satisfaction, yet scores for all four indicators remain low, suggesting substantial room for improvement in the supply-demand adaptability of public digital cultural services.

Keywords: public digital cultural services; supply-demand adaptation; satisfaction
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Public digital cultural services aim to meet the basic digital cultural needs of the public through resource digitization, networked dissemination, intelligent technology, ubiquitous services, and entity-based management, characterized by equality, interactivity, publicness, and digital technology. With technological advancement, these services have continuously innovated in means, forms, and content. In August 2017, the former Ministry of Culture issued the *13th Five-Year Plan for Public Digital Cultural Construction*, proposing to "basically establish an open, compatible, content-rich, fast-transmitting, and efficiently operating public digital cultural service system adapted to the modern public cultural service system by 2020." As we assess public satisfaction with the supply-demand adaptability of these services and consider how the supply side can better align with demand, these issues warrant extensive discussion.

To this end, this study draws on the four criteria of supply-demand adaptability theory and, grounded in the characteristics and connotations of public digital cultural services, designs evaluation indicators and a model for public digital cultural service satisfaction from four dimensions: relevance, accessibility, quality, and appropriateness. Through empirical testing, we aim to understand and enhance public satisfaction with the supply-demand adaptability of public digital cultural services and identify directions for optimizing service supply.

2 Literature Review

Our literature review reveals that while domestic and international scholars have conducted research on public cultural service user evaluation and satisfaction, few studies have systematically examined satisfaction with public digital cultural services. However, the essence of satisfaction research lies in investigating service users and exploring the demand side. Therefore, we synthesized recent research on the demand side of public digital cultural services, categorizing it into three areas:

First, studies on user needs for public digital cultural services. Understanding user needs is essential for clarifying service development directions. Xiao Ximing et al. investigated user needs for public digital cultural services using libraries and museums as examples. Tang Yi found that the public requires

access to cultural resources through different platforms and advocated for integrating archival resources into public digital cultural resource consolidation. Wei Jingzhu et al. explored copyright issues in resource construction from a public demand perspective and surveyed public resource needs. Ru Meng et al., Wanyan Dengdeng et al., and Dai Yanqing et al. examined utilization issues, concluding that a gap exists between current service supply and public demand. Feng Xian et al. explored how digitization affects the accessibility of public cultural services for Beijing villagers. Yu Min et al. constructed and empirically tested a conceptual model of factors influencing service demand. M. Agosti et al. proposed a cross-site user modeling platform for cultural heritage websites based on user needs to provide customized services. N. Younghee et al. predicted library user needs by analyzing borrowing data and social media data, offering four service improvement recommendations.

Second, studies on user evaluation of public digital cultural services. User evaluation helps identify the crux of supply-demand contradictions. Wang Meng et al. identified user perception factors affecting public digital cultural services and proposed a user acceptance model for service effectiveness. Dai Yanqing et al., Wei Jingzhu et al., Liu Rui et al., and Chen Zeqian et al. designed user evaluation indicators or models for public digital cultural service platforms and assessed user experience. G. Sarah et al. evaluated the usability of the University of Toronto Scarborough Library website and proposed improvements. L. Luo et al. used self-administered questionnaires to evaluate reference services at the University of Education, Winneba, providing suggestions for enhancing user experience.

Third, studies on user behavior regarding public digital cultural services. Research on user behavior is equally important for optimizing service supply strategies. Gao Feng et al. found that while the public recognizes copyright protection for public digital cultural resources, infringement behaviors persist, recommending cultivation of copyright respect, strengthened public awareness, risk prevention, and establishment of copyright librarian positions. Wang Meng et al. studied information avoidance behavior in rural public digital cultural services, developing a framework encompassing individual, environmental, information, and technological factors, and created a measurement scale for this behavior. E. Bortey et al. examined user records at the Manhyia Archives of the Institute of African Studies in Kumasi and analyzed them using SPSS. S. Hennicke discussed user information retrieval behavior at the German Federal Archives and proposed improvements for archival information system access.

In summary, existing research on the demand side of public digital cultural services provides a foundation for understanding actual needs and formulating targeted supply plans. However, most studies are not directly related to user satisfaction in terms of theme or methodology and lack necessary theoretical support. Therefore, this study proposes the research topic of public digital cultural service satisfaction from the perspective of supply-demand adaptability theory.

3 Construction of the Public Digital Cultural Service Satisfaction Evaluation Model Based on Supply-Demand Adaptability Theory

British scholars Stephen Devereux and Rachel Sabates-Wheeler, in their book *Needs and Rights: Social Policy in the Transformation of China*, examined issues between social policy and social needs. They argued that resources allocated to social policy inevitably reflect the interests and concerns of central government policymakers and fiscal and technical support providers, leading to top-down intervention designs that inadequately consider social realities and target population needs, creating gaps between policy supply and demand. To evaluate whether social policies meet social needs, they proposed four criteria for supply-demand adaptability theory.

These four criteria are relevance, accessibility, quality, and appropriateness. According to Devereux and Sabates-Wheeler: (1) Relevance refers to whether products and services provided to impoverished and vulnerable groups consider their actual and urgent needs; (2) Accessibility concerns whether these products and services are physically and economically accessible, and what conditions and qualifications are required to obtain them; (3) Quality indicates whether products and services meet certain standards; (4) Appropriateness means whether the interventions and mechanisms for delivering products and services consider the activities and constraints of impoverished and vulnerable groups. They applied these four criteria to analyze education provision in Malawi, an African country.

With the advent of the digital age, public cultural consumption needs have changed dramatically. To adapt, public digital cultural services have emerged in the public cultural service sector. As a component of public cultural services, public digital cultural services share the same fundamental goal of ensuring basic cultural needs for the general public, with "publicness" as their essential characteristic. To guarantee this publicness, service supply must rely on state power. Unlike traditional public cultural services, public digital cultural services are products of the digital age, possessing distinct contemporary features and depending on digital technology for survival and development. In terms of content, public digital cultural services represent the sum of public digital resources, technologies, carriers, and facilities provided by the government to meet basic public digital cultural needs, embodying characteristics of openness, transparency, equal access, and mutual benefit.

Since 2002, China has launched national public digital cultural service projects such as the National Cultural Information Resources Sharing Project. In recent years, with deepening development, the public digital cultural service system has gradually formed and improved. However, long-term underinvestment in public cultural services has hindered adaptation to rapidly developing economic and social conditions. Moreover, for an extended period, China's public cultural service construction adopted a traditional top-down model. Although

significant progress was made in system construction, this supply approach inevitably created imbalances between supply and demand, as numerous studies have demonstrated. Therefore, applying supply-demand adaptability theory to government-led public digital cultural services for satisfaction evaluation is reasonable.

Devereux and Sabates-Wheeler's four criteria primarily address supply-demand contradictions between social services and impoverished or vulnerable groups, not encompassing the entire population. Considering the "publicness" of public digital cultural services and the need to understand general public satisfaction, this study adapts the four criteria for broader application, as shown in Table 1 .

Table 1. Evaluation Criteria for Public Digital Cultural Service Satisfaction Based on Supply-Demand Adaptability Theory

Criterion	Definition
Relevance	Whether services provided to the public consider their actual and urgent needs
Accessibility	Whether services provided to the public are physically and economically accessible, and what conditions and qualifications are required
Quality	Whether services provided to the public meet certain standards
Appropriateness	Whether interventions and mechanisms for delivering services consider public activities and constraints

Building on these criteria and considering the characteristics of public digital cultural services, we designed evaluation indicators (see Table 2). Relevance refers to whether public digital cultural services meet public needs, encompassing resources, facilities, equipment, and activities. Accessibility concerns physical and economic access, including platform operability, facility proximity, reasonable opening hours, free services, and information availability. Quality indicates whether services meet standards, assessed through personnel, facilities, equipment, platforms, resources, and activities. Appropriateness means whether service delivery considers public lifestyles and constraints, including personalized interfaces, targeted content design, diverse service forms, and care for vulnerable groups. Additionally, "user satisfaction" was introduced as a dependent variable to measure how relevance, accessibility, quality, and appropriateness affect satisfaction.

Table 2. Evaluation Indicators for Public Digital Cultural Service Satisfaction Based on Supply-Demand Adaptability Theory

Dimension	Indicator	Reference
Relevance	XG1: Public digital cultural resources meet current needs	Wanyan Dengdeng et al.; Qian Dan et al.
	XG2: Public digital cultural facilities meet current needs	Lu Zhangping et al.
	XG3: Public digital cultural equipment meets current needs	Su Xiang et al.; Chen Zeqian et al.
	XG4: Public digital cultural activities meet current needs	Dai Yanqing et al.; Wei Jingzhu et al.; Liu Rui et al.; Qian Dan et al.
Accessibility	KJ1: Public digital cultural service platform is simple to operate, with convenient search and no invalid links	Xie Yuting; Feng Xian et al.; Zhao Yimin et al.
	KJ2: Public digital cultural service facilities are nearby and convenient to reach	Xie Yuting; Chen Yijin et al.
	KJ3: Public digital cultural facility opening hours are reasonable	Xie Yuting; Feng Xian et al.; Zhao Yimin et al.; Chen Yijin et al.
	KJ4: Public digital cultural services are basically free	Fu Boda et al.; Yu Min et al.
	KJ5: Information about public digital cultural services is frequently seen and helpful	Wanyan Dengdeng et al.; Qian Dan et al.
Quality	ZL1: Public digital cultural service personnel have strong service capabilities	Xiong Chunlin et al.

Dimension	Indicator	Reference
	ZL2: Public digital cultural service facilities are high quality	Lu Zhangping et al.
	ZL3: Public digital cultural service equipment is advanced and runs smoothly	Yao Yuan et al.
	ZL4: Public digital cultural service platform functions are comprehensive	Hao Chunliu et al.
	ZL5: Public digital cultural resources are high quality	Lu Zhangping et al.; Hao Chunliu et al.
	ZL6: Public digital cultural activities are exciting and attractive	Dai Yanqing et al.; Wei Jingzhu et al.; Liu Rui et al.; Shi Guohong et al.
Appropriateness	XS1: Platform provides personalized pages and push services based on preferences	Lu Zhangping et al.
	XS2: Local services provide targeted content design based on residents' age, education, occupation, and preferences	Chen Zeqian et al.
	XS3: Local areas provide diverse public digital cultural services based on residents' lifestyles and habits	Chen Zeqian et al.
	XS4: Local services care for vulnerable groups, such as delivering services to homes or organizing life skills training	Developed for this study

Dimension	Indicator	Reference
User Satisfaction	SA1: Satisfied with public digital cultural services in resources, facilities, equipment, and activities	Developed for this study
	SA2: Satisfied with easy access to public digital cultural services	Developed for this study
	SA3: Satisfied with quality of public digital cultural services	Developed for this study
	SA4: Satisfied that services fit public living environments, lifestyles, and capabilities	Developed for this study

Based on the evaluation criteria and indicators above, we constructed the public digital cultural service satisfaction evaluation model from the perspective of supply-demand adaptability theory, as shown in Figure 1 [Figure 1: see original paper].

4 Empirical Testing of the Evaluation Model

4.1 Questionnaire Design and Pre-testing

To understand public satisfaction with the supply-demand adaptability of public digital cultural services, we designed a scale questionnaire based on the satisfaction evaluation model. The questionnaire comprised two parts: basic information about respondents (gender, age, occupation, education, monthly usage frequency of public digital cultural services) and scale items corresponding to the secondary indicators of the five primary dimensions in the evaluation model. A 5-point Likert scale was adopted, with response options ranging from "strongly disagree" (1 point) to "strongly agree" (5 points) to reflect attitude strength. To ensure accurate understanding, the questionnaire began with a definition of public digital cultural services, and each item included necessary explanations.

Before formal distribution, pre-testing was conducted to examine item reliability. From November 5 to 24, 2020, we distributed 312 questionnaires nationwide via Wenjuanxing platform, obtaining 246 valid responses after screening. With 23 scale variables and 246 samples (exceeding the 10:1 sample-to-variable ratio), the sample size was adequate. Cronbach's alpha coefficients were used for reliability analysis, with results shown in Table 3 .

Table 3. Reliability Test of Pre-test Scale

Variable	Cronbach's Alpha	Alpha if Item Deleted
XG1: Resources meet needs	0.841	0.881
XG2: Facilities meet needs	0.833	0.879
XG3: Equipment meets needs	0.881	0.882
XG4: Activities meet needs	0.833	0.876
KJ1: Platform operability	0.819	0.879
KJ2: Facility proximity	0.687	0.879
KJ3: Facility opening hours	0.718	0.880
KJ4: Basically free	0.684	0.886
KJ5: Information ubiquity	0.777	0.880
ZL1: Personnel professionalism	0.705	0.877
ZL2: Facility quality	0.723	0.876
ZL3: Equipment quality	0.689	0.876
ZL4: Platform soundness	0.709	0.877
ZL5: Resource quality	0.740	0.880
ZL6: Activity richness	0.798	0.878
XS1: Platform personalization	0.683	0.877
XS2: Content targeting	0.796	0.875
XS3: Service diversity	0.748	0.879
XS4: Vulnerable group care	0.861	0.877
SA1: Satisfaction with relevance	0.711	0.880
SA2: Satisfaction with accessibility	0.747	0.877
SA3: Satisfaction with quality	0.702	0.880
SA4: Satisfaction with appropriateness	0.720	0.883

As shown in Table 3, the reliability of the five dimensions ranged from 0.819 to 0.881, indicating good scale reliability. Examining the "alpha if item deleted" values revealed no significant reliability improvement from deleting any item, so all 23 items were retained.

4.2 Formal Distribution and Sample Characteristics

Since pre-testing demonstrated satisfactory reliability, the pre-test data could be included in further analysis. To expand the sample and comprehensively understand public satisfaction, we distributed questionnaires nationwide from November 24 to December 12, 2020, again via Wenjuanxing. After screening, 359 valid questionnaires were obtained, bringing the total to 605 when combined with the pre-test sample. Demographic characteristics are shown in Table 4 .

Table 4. Sample Demographic Characteristics

Characteristic	Category	Count	Percentage
Gender	Male	262	43.30%
	Female	343	56.69%

Characteristic	Category	Count	Percentage
Age	Under 18	13	2.15%
	18-44	485	80.17%
	45-59	81	13.39%
	60+	26	4.30%
Occupation	Student	298	49.26%
	Enterprise staff	114	18.84%
	Civil servant/Public institution (excl. teachers)	90	14.88%
	Self-employed/Private business owner	111	18.35%
	Freelancer	30	4.96%
	Unemployed/Laid-off	18	2.98%
Education	Primary school or below	4	0.66%
	High school/Technical secondary	47	7.77%
	Undergraduate	317	52.40%
	Master's	78	12.89%
	Doctorate	4	0.66%
Monthly usage	0 times	42	6.94%
	1-5 times	191	31.57%
	6-12 times	191	31.57%
	13-21 times	26	4.30%
	22+ times	24	3.97%

4.3 Data Analysis

4.3.1 Reliability Analysis Cronbach's alpha coefficients were used to assess reliability. The overall scale reliability was 0.871, with all latent variables exceeding 0.8, indicating good internal consistency and reliable scale quality (see Table 5).

Table 5. Scale Reliability Test

Latent Variable	Cronbach's Alpha	Total Cronbach's Alpha
Relevance	0.833	0.871
Accessibility	0.838	
Quality	0.868	
Appropriateness	0.842	
User Satisfaction	0.826	

4.3.2 Validity Testing **(1) Model Fit Analysis.** Model fit indices assess overall model fit. Commonly used indicators include chi-square/degrees of freedom ratio, GFI, RMSEA, RMR, CFI, and NNFI. Analysis of the 23 observed variables showed all indices met acceptable standards (see Table 6), indicating good model fit.

Table 6. Model Fit Analysis

Index	Criterion	Value
^{2}/df	< 3.0	2.906
GFI	> 0.9	0.919
RMSEA	< 0.1	0.056
RMR	< 0.1	0.082
CFI	> 0.9	0.930
NNFI	> 0.9	0.919

(2) Convergent Validity Analysis. Average Variance Extracted (AVE) and Composite Reliability (CR) evaluate convergent validity. When CR > 0.7 and AVE > 0.5, convergent validity is considered good. As shown in Table 7 , all factors met these criteria, with standardized loading coefficients exceeding 0.5, indicating satisfactory convergent validity.

Table 7. Convergent Validity Analysis

Factor	Indicator	Estimate	CR	AVE
Relevance	XG1: Resources meet needs	0.724	0.8368	0.5634
	XG2: Facilities meet needs	0.707		
	XG3: Equipment meets needs	0.850		
	XG4: Activities meet needs	0.712		
Accessibility	KJ1: Platform operability	0.687	0.8392	0.5112
	KJ2: Facility proximity	0.718		
	KJ3: Opening hours reasonable	0.684		
	KJ4: Basically free	0.777		
	KJ5: Information ubiquity	0.705		
Quality	ZL1: Personnel professionalism	0.723	0.8687	0.5252
	ZL2: Facility quality	0.689		
	ZL3: Equipment quality	0.709		
	ZL4: Platform soundness	0.740		
	ZL5: Resource quality	0.798		
	ZL6: Activity richness	0.683		
Appropriateness	XS1: Platform personalization	0.796	0.8463	0.5808
	XS2: Content targeting	0.748		
	XS3: Service diversity	0.861		
	XS4: Vulnerable group care	0.711		
User Satisfaction	SA1: Satisfaction with relevance	0.747	0.8286	0.5479
	SA2: Satisfaction with accessibility	0.702		
	SA3: Satisfaction with quality	0.828		
	SA4: Satisfaction with appropriateness	0.720		

(3) Discriminant Validity Analysis. Discriminant validity was assessed by

comparing the square root of AVE values with inter-factor correlations (see Table 8). The square root of AVE represents factor "cohesion," while correlation coefficients represent relationships. If factor cohesion is stronger than its correlations with other factors, discriminant validity is established. Table 8 shows all square roots of AVE exceeded correlation coefficients, confirming good discriminant validity.

Table 8. Discriminant Validity Analysis

	Relevance	Accessibility	Quality	Appropriateness	User Satisfaction
Relevance	0.751				
Accessibility	0.213***	0.715			
Quality	0.255***	0.143***	0.725		
Appropriateness	0.370***	0.333***	0.358***	0.763	
User Satisfaction	0.223***	0.216***	0.301***	0.384***	0.740
AVE√	0.751	0.715	0.725	0.763	0.740

(4) Path Coefficients and Significance. Table 9 shows significant relationships between all independent and dependent variables. The model's factor influence paths are illustrated in Figure 2 [Figure 2: see original paper].

Table 9. Path Coefficient Estimates

Path	Estimate	C.R. (t-value)	P
Relevance → Accessibility	0.213	4.257	0.003
Relevance → Quality	0.255	5.061	***
Relevance → Appropriateness	0.370	6.862	***
Accessibility → Quality	0.143	2.962	***
Accessibility → Appropriateness	0.333	6.372	***
Quality → Appropriateness	0.358	6.806	***
User Satisfaction → Relevance	0.223	4.383	***
User Satisfaction → Accessibility	0.216	4.256	***
User Satisfaction → Quality	0.301	5.775	***
User Satisfaction → Appropriateness	0.384	6.986	***

Note: "***" indicates significance at the 0.01 level.

4.3.3 Questionnaire Item Response Statistics Table 10 presents response statistics. Mean scores for observed variables ranged from 3.1 to 3.8. Among independent variables, only XG3, KJ4, ZL5, and XS2 had over half of respondents selecting "agree" or "strongly agree." Among dependent variables, only SA3 exceeded 50% for these response categories.

Table 10. Scale Response Statistics

Item	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
XG1	10.7%	14.2%	35.5%	24.7%	14.9%
XG2	12.8%	14.0%	40.8%	22.8%	9.6%
XG3	12.5%	11.2%	37.5%	25.9%	12.9%
XG4	14.2%	15.7%	39.6%	20.0%	10.5%
KJ1	18.8%	15.3%	36.1%	20.6%	9.2%
KJ2	16.1%	16.3%	38.8%	20.3%	8.5%
KJ3	14.2%	19.6%	35.7%	22.8%	7.7%
KJ4	11.2%	17.8%	27.9%	28.4%	14.7%
KJ5	15.7%	18.8%	25.1%	27.2%	13.2%
ZL1	18.8%	16.3%	38.6%	18.8%	7.5%
ZL2	19.8%	18.8%	35.0%	17.3%	9.1%
ZL3	18.8%	24.6%	32.5%	15.0%	9.1%
ZL4	12.3%	28.5%	31.7%	17.3%	10.2%
ZL5	15.5%	17.3%	25.7%	31.0%	10.5%
ZL6	17.3%	15.5%	26.6%	26.2%	14.4%
XS1	16.6%	14.5%	35.3%	24.7%	8.9%
XS2	15.5%	12.8%	30.9%	32.3%	8.5%
XS3	15.7%	12.2%	35.0%	24.7%	12.4%
XS4	18.8%	25.9%	34.3%	15.3%	5.7%
SA1	14.2%	15.0%	36.8%	24.7%	9.3%
SA2	11.0%	14.5%	34.3%	28.5%	11.7%
SA3	12.8%	12.2%	28.5%	31.7%	14.8%
SA4	14.5%	15.3%	35.9%	25.1%	9.2%

Dimension means and overall mean were calculated (see Figure 3 [Figure 3: see original paper]). The overall mean was 3.35, with independent variable means ranking from highest to lowest as: quality (3.61), accessibility (3.46), relevance (3.34), and appropriateness (3.22). The dependent variable user satisfaction mean was 3.35. Neither overall nor dimension means reached 4, indicating that public digital cultural services perform poorly across the four supply-demand adaptability criteria, with considerable room for improvement.

5 Results and Conclusions

(1) Relevance Dimension. Path coefficients were relatively large for resources (0.724) and equipment (0.850), with mean scores of 3.29 and 3.59 respectively. This suggests public dissatisfaction with resources and equipment, and that optimizing their supply could significantly improve satisfaction. Although China has increased resource supply since the 21st century, problems remain: (a) Single supply source. While social participation has been advocated and implemented, government still dominates, with insufficient social engagement. (b) Inadequate content. Compared to abundant commercial digital cultural resources, public digital cultural resources are limited. Our research group previously investigated

digital resource construction in Hunan, finding insufficient supply, single types, and large gaps with public demand. (c) Fragmented supply. Despite calls for breaking institutional barriers and integrating resources across cultural institutions, achieving "one-stop" access remains challenging. Optimization should focus on: (i) Promoting multi-source supply by developing detailed regulations for social participation in resource collection, processing, storage, transmission, and promotion, with strengthened incentives. (ii) Enhancing content construction through region-specific planning, demand-oriented topic selection, and balanced resource type planning. (iii) Accelerating resource integration. While institutional barriers persist, technological advances may enable nationwide integration, especially with the January 2021 *National Cultural Big Data Standards System* providing classification and identification methods to facilitate cultural big database construction.

Public digital cultural equipment—including e-book borrowers, intelligent interactive terminals, smart speakers, and computers—has been upgraded nationwide, but imbalances persist: uneven investment between remote and eastern regions, serious idle equipment, and slow maintenance. Governments should rationally allocate equipment, prioritize support for remote areas, regularly inspect usage, and properly handle idle equipment. In the intelligent era, equipment should incorporate human-computer interaction, virtual reality, augmented reality, and 3D printing to enhance technological sophistication. For example, in 2019, the National Library introduced intelligent robots with facial recognition, guided tours, smart interaction, book retrieval, and library card inquiry functions.

(2) Accessibility Dimension. Path coefficients were relatively high for facility proximity (0.718) and free services (0.777), with mean scores of 3.39 and 3.76. China has initially established a public cultural facility network covering urban and rural areas, with 5,535 museums, 559 art galleries, 3,196 public libraries, 3,326 cultural centers, 40,747 cultural stations, and 564,277 grassroots comprehensive cultural service centers by the end of 2019. However, challenges remain: (a) Facilities concentrate at municipal and county levels, with incomplete branch service mechanisms at township and village levels; (b) Local finances cannot sustain facility maintenance and operation, creating "money to build but not to manage" situations; (c) Low utilization rates, with some facilities idle or repurposed as "window dressing." Solutions include rational facility planning based on development levels, population structure, and environmental conditions; clarifying central and local expenditure responsibilities; diversifying local funding channels; establishing asset reporting systems; and incorporating facility construction and operation into comprehensive target responsibility management.

To maintain publicness, services should be free or low-cost. China issued the *Opinions on Promoting Free Opening of National Art Museums, Public Libraries, and Cultural Centers (Stations)* in February 2011, and the *Public Cultural Service Guarantee Law* in March 2017 expanded free facilities to museums, science

and technology museums, memorial halls, sports venues, broadcasting facilities, and public digital cultural service points. To alleviate local fiscal pressure, the State Council issued a notice in June 2020 designating grassroots facility free/low-cost opening as a shared central-local fiscal responsibility. Future improvements should: (a) Expand free opening scope to workers' cultural palaces, youth palaces, and women's and children's activity centers; (b) Increase fixed subsidy amounts that have long remained unchanged; (c) Link free opening subsidies to service performance. Simultaneously, improve preferential systems for non-basic public cultural services.

(3) Quality Dimension. Path coefficients were substantial for personnel professionalism (0.723) and platform soundness (0.740), with low mean scores of 3.29 and 3.37. Public digital cultural service personnel must possess adequate professional capabilities. In 2019, national public libraries employed 57,796 staff (194 more than the previous year), with senior and intermediate titles accounting for 12.1% and 32.1% respectively; mass cultural institutions employed 190,068 staff, with senior and intermediate titles at 3.5% and 9.2%. High-quality personnel remain scarce. In recent years, training programs have been conducted nationwide, such as Sichuan's digital cultural personnel skills training in May 2021. However, most training is offline with limited participants (Sichuan's program had only about 80 trainees). Given the large workforce, remote training platforms should be established with online-offline integration, systematic curriculum development covering technology, law, and marketing, and training evaluation mechanisms.

Public digital cultural service platforms are primary service venues. Since the 21st century, China has implemented cultural benefit projects like the National Cultural Information Resources Sharing Project, yet platform functions remain inadequate. Research on the National Digital Culture Network revealed issues with complex page design, unstable performance, and poor user interaction. Our investigation of provincial sub-centers found similar problems. For instance, Hunan's sub-center has a cluttered interface with unclear sections and lacks user feedback functions. Platforms should streamline navigation, deepen resource retrieval functions, and enhance user interaction through strengthened consultation modules, manual consultation windows, comment sections, and user forums.

Targeted content design based on public demand characteristics is essential. In 2016, Shanghai launched the first provincial public digital cultural service platform, "Wenhua Shanghai Cloud," which automatically records user behaviors to analyze preferences for targeted service design. Similar platforms exist in Chongqing, Tianjin, Beijing, and Shanxi, but most concentrate at municipal/district levels, with slow provincial and county-level development due to technical difficulties, financial pressure, or insufficient motivation. Few institutions, especially in remote and poor areas, use big data to mine public needs. Solutions include establishing demand-ordering and delivery platforms for free public expression of needs and encouraging cooperation between enterprises and

cultural institutions to master big data technology and internet platform operation.

(4) Appropriateness Dimension. Path coefficients were large for content targeting (0.748) and vulnerable group care (0.861). Data analysis shows appropriateness most strongly influences user satisfaction but performs poorly. As material living standards improve, public cultural consumption needs become increasingly diverse, personalized, and hierarchical. Public digital cultural services must adapt accordingly. Vulnerable groups include farmers/migrant workers, unemployed individuals, children, people with disabilities, and the elderly. Services should help each group integrate into the digital cultural environment and meet their spiritual and cultural needs. While rural cultural service system construction has received attention, other vulnerable groups need more support. For example, urban cultural exchange activities can help migrant workers gain urban life identity and participation; vocational skills training and education can be organized for migrant workers and the unemployed; children need knowledge-rich, interesting, and interactive activities co-hosted with schools; accessible equipment and regular cultural assistance should be provided for people with disabilities; and the elderly need information literacy education and convenient service access through book circulation points at senior universities and nursing homes or community cultural activities.

Beyond these dimensions, the supply side should strengthen relevance, accessibility, quality, and appropriateness to comprehensively improve overall public satisfaction with supply-demand adaptability.

Conclusion

To assess public satisfaction with supply-demand adaptability of public digital cultural services, this study designed evaluation indicators and a model based on the four criteria of supply-demand adaptability theory: relevance, accessibility, quality, and appropriateness. Through questionnaire distribution and empirical testing, results show all four criteria significantly impact user satisfaction, yet mean scores remain low, indicating unsatisfactory performance. Based on these findings, we discussed future optimization directions for China's public digital cultural service supply.

Limitations include: (1) Limited application of supply-demand adaptability theory in China's public digital cultural service field raises questions about the scientificity, feasibility, and universality of our evaluation indicators and model, requiring further validation. (2) The questionnaire method, constrained by sample size and respondent subjectivity, may not fully reflect actual satisfaction. (3) Without in-depth supply-demand analysis, the objectivity and rationality of our adaptation strategies based solely on questionnaire results require further examination. These limitations warrant improvement in future research.

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Research on Satisfaction of Public Digital Cultural Services from the Perspective of Supply-Demand Adaptability Theory

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Abstract: [Purpose/Significance] This paper studies satisfaction with public digital cultural services to promote better alignment between the service supply side and demand side. [Method/Process] Based on the four standards of supply-demand adaptability theory, we constructed a satisfaction evaluation model for public digital cultural services. Data were collected through scale questionnaires and tested using confirmatory factor analysis and path analysis, with statistical analysis of scale results. [Result/Conclusion] Research shows that the four indicators of supply-demand adaptability theory—relevance, accessibility, quality, and appropriateness—all have significant positive effects on user satisfaction, yet scores for all four indicators are low, indicating considerable room for improvement in supply-demand adaptability of public digital cultural services.

Keywords: public digital cultural services; supply-demand adaptation; satisfaction

Note: Figure translations are in progress. See original paper for figures.