



## Quantitative Evaluation Model of the Policy Effectiveness of China's Intangible Cultural Heritage: Based on Policy Text Mining Technology

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**SUMMARY:** *In response to the problem that the current research on the effectiveness of China's intangible cultural heritage protection policies mainly relies on qualitative analysis and lacks a systematic quantitative evaluation framework, this study constructs a policy effectiveness quantitative evaluation system that integrates text mining and PMC index models. Using 324 national and local intangible cultural heritage policy texts from 2005 to 2023 as samples, a standardized corpus is constructed using Python crawling and preprocessing techniques; Propose a composite mining framework that combines BERT semantic embedding with LDA topic modeling to extract deep policy semantics and topic structures; Based on 13 indicators from five dimensions including policy goal orientation, policy tools, implementation effectiveness, content innovation, and coordination ability, the PMC index model is used to conduct multidimensional quantitative evaluation. The results indicate that the intangible cultural heritage policy, with "protection and inheritance" as its core semantics, presents a dual track evolution feature of "technological empowerment+social collaboration"; LDA identifies five core themes: heritage conservation, digitization, public participation, industrial innovation, and cross regional collaboration; There are significant hierarchical differences in policy effectiveness, with national policies outperforming local policies in terms of implementation efficiency and coordination ability. The PMC index of the 14th Five Year Plan for the Protection of Intangible Cultural Heritage is the highest (4.125), while local policies are constrained by resources and have weaker tool allocation and innovation dimensions.*

**KEYWORDS:** *Intangible Cultural Heritage; Policy Effectiveness Evaluation; Digital Technology; Text Mining; PMC Index Model*

## 1 Introduction

As a cultural treasure of the Chinese nation, intangible cultural heritage (ICH) is an important manifestation of China's cultural soft power. Its protection and transmission are closely related to national cultural identity and social sustainable development (Li, 2024; Yan & Li, 2023). However, in recent years, rapid economic development and urbanization have posed significant challenges to ICH protection, with many ICH items facing the threat of extinction. Against this backdrop, the Chinese government has formulated and implemented a series of policies to strengthen the protection of ICH and promote its sustainable cultural transmission (Wang, 2023a; Lin, 2023). However, there is still a lack of systematic quantitative evaluation on the

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<https://doi.org/10.65102/is20261297>

effectiveness of these policies and whether they have achieved the intended goals. The inherent mechanism of the popularization and application of digital technology in improving policy effectiveness still needs to be systematically clarified and empirically tested. Based on policy text mining methods, this article conducts quantitative evaluation research on the effectiveness of China's intangible cultural heritage protection policies, in order to provide scientific and refined decision-making support for optimizing and improving intangible cultural heritage protection policies.

Existing academic research on the protection of intangible cultural heritage mostly focuses on theoretical explanations. For example, Zhao (2022) analyzed the positive effects of intangible cultural heritage policies in the field of cultural dissemination empowerment, and believed that clear policy goal positioning and scientific policy tool selection are the core elements for policy implementation and effectiveness. Zhang (2022) explores the incentive mechanism of government led intangible cultural heritage protection policies on public participation behavior, and the study confirms that policy subsidy incentives can significantly enhance the willingness of community residents to participate in intangible cultural heritage protection. Lukita *et al.* (2024) proposed that policies for the protection of intangible cultural heritage should deeply integrate digital technology, relying on digital displays, virtual reality and other technological means to expand the coverage and depth of intangible cultural heritage dissemination. Existing research has achieved certain results, but there are also obvious limitations: (1) most of the results mainly rely on qualitative interpretation of policy content, lacking a data-driven quantitative evaluation paradigm, making it difficult to accurately identify the effectiveness of policy implementation and existing shortcomings; (2) Although some scholars have preliminarily explored the potential application of digital technology in the field of intangible cultural heritage protection, a unified and standardized efficiency evaluation framework has not yet been formed, and it is impossible to quantify the actual contribution level of digital technology to policy effectiveness.

This article selects national and local level intangible cultural heritage policy texts in China from 2005 to 2023 as research samples, and introduces the PMC index model to comprehensively measure policy effectiveness. The results show that China's intangible cultural heritage protection policies focus on the core goals of protection, inheritance, and cultural dissemination. Digital technology empowerment has a significant positive effect on improving policy effectiveness and stimulating public participation. There is significant heterogeneity in the collaborative governance ability and implementation effectiveness of policies at different levels, and the comprehensive effectiveness of national level policies is significantly better than that of local level policies. This article systematically analyzes the advantages and existing shortcomings of policies at all levels, constructs a standardized multidimensional policy evaluation system, enriches the theoretical analysis framework for the effectiveness of intangible cultural heritage policies, and compares and analyzes the differentiated characteristics of national and local policies in resource allocation and collaborative governance capabilities, providing empirical data support and practical decision-making basis for optimizing and adjusting intangible cultural heritage protection policies.

## 2 Literature Review

In recent years, policy text mining, as an emerging quantitative research method, has been increasingly widely applied and promoted in fields such as policy analysis, effectiveness evaluation, and policy formulation optimization. It relies on advanced natural language processing technology to accurately extract key information from massive policy documents, systematically revealing the internal structural characteristics, evolutionary trends, value

orientation, and potential impacts of policies (Khan & Afreen; Mun et al., 2023). Based on this, researchers can not only efficiently obtain valuable data information from massive policy texts, but also conduct quantitative evaluation and multidimensional systematic analysis of policy implementation effectiveness, providing scientific and objective technical support for policy research.

Policy content analysis and trend recognition are the fundamental application scenarios of policy text mining technology, especially in unstructured policy text analysis, which can effectively separate policy core issues and clearly present the main focus directions and dynamic evolution laws of policies. For example, Xu et al. (2021) conducted a systematic analysis of China's policies related to the protection of intangible cultural heritage using policy text mining techniques and found that over the past decade, the direction of China's policies for the protection of intangible cultural heritage has gradually shifted from a single protection to a diversified model that combines protection and rational utilization. The evolution characteristics of policy focus show distinct timeliness and practicality. Zhou (2021) applied sentiment analysis technology to examine the Chinese government's position shifts in climate policies, finding that the sentiment tendencies in policy texts reflected the government's evolving attitude towards global climate change, particularly after the Paris Agreement, where the government exhibited stronger cooperative and proactive responses. Li & Xue (2022) analyzed Chinese educational policy texts and found that the focus of educational policies has gradually shifted from "equity" to "quality," reflecting the growing emphasis on education quality in society. Tian et al. (2024), through analyzing carbon emission trading policies in Chinese cities from 2005 to 2021, revealed that the evolution of policy keywords expanded from "trading" to "green innovation" and "technology investment," producing significant green technology spillover effects. Zhou et al. (2024) used the LDA (Latent Dirichlet Allocation) model to analyze the evolution of China's cultural heritage protection policies, revealing that the policy focus has gradually shifted from "traditional cultural inheritance" to "support for cultural industrialization," indicating that the shift in policy focus is closely tied to the socio-economic development needs.

Policy effectiveness evaluation is another key application of text mining technology in policy analysis. Traditional policy effectiveness evaluation often relies on quantitative data and traditional statistical analysis methods, while text mining technology provides a new qualitative evaluation path. Yang et al. (2022) used sentiment analysis to evaluate the social effects of China's environmental protection policies, with the study indicating that the sentiment tendencies in policy texts can serve as important indicators of public response to policies. Gan & Qi (2021) used LDA topic modeling to analyze the implementation effects of cultural heritage protection policies, finding significant regional differences in the effectiveness of cultural heritage protection, which provided a basis for policy optimization. Qi & Han (2022) conducted an empirical analysis of Chinese government policy texts to explore the effectiveness of policy implementation under the framework of social collaborative governance. Xu et al. (2023) evaluated the effectiveness of local governments in implementing national environmental protection policies and found that the differentiated response of local governments to policy implementation is the core reason for significant differences in policy effectiveness.

Text mining technology provides strong data support for the improvement and optimization of policies. Research has shown that through systematic analysis of policy text content, policymakers can more accurately identify gaps and deficiencies in existing policies, and then carry out targeted revision work. For example, Lu & Park (2022) found through comparative analysis of historical policy texts that there are ambiguities and contradictions in many policy texts during implementation, and text mining techniques can accurately identify these issues. Li et al. (2023) proposed a data-driven policy revision framework that can dynamically identify

various issues that arise during policy implementation and provide targeted revision recommendations. Yu et al. (2023) found through analyzing Chinese transportation policy texts that keywords such as "congestion" and "environmental pollution" appear frequently, reflecting the increasing attention paid to prominent issues in the urban transportation sector during the policy revision process. Aliyev et al. (2023) proposed that integrating text mining and expert evaluation methods in a hybrid model can effectively predict the direction and priority of policy revisions. Research has shown that text mining techniques can identify parts of policy implementation that deviate from predetermined goals, and through corresponding feedback mechanisms, promote policy revision and optimization (Xu et al., 2024).

The application of text mining technology in the field of policy analysis is extensive and in-depth, showing great potential in policy content analysis, trend recognition, effectiveness evaluation, and policy formulation and revision. However, existing research mostly focuses on revealing macro policy trends or analyzing single policy indicators, lacking systematic quantitative evaluation of the overall effectiveness of policy texts. Therefore, this study uses 324 policy documents related to China's intangible cultural heritage as research corpus, constructs a text analysis framework with BERT semantic embedding and LDA theme modeling as the core, and combines this framework with PMC index model to carry out multidimensional quantitative evaluation work, aiming to comprehensively clarify the structural logic and implementation performance of intangible cultural heritage policies.

### 3 Research Design

#### 3.1 Data Sources and Preprocessing

This study utilized Python technology tools to systematically collect policy text data related to China's intangible cultural heritage from 2005 to 2023 from the policy document database of the Ministry of Culture and Tourism, the China Legal Information Network, and local government portal websites. The automated retrieval of network data was achieved using Requests and BeautifulSoup libraries, and regular expressions were used to clean the text and remove redundant information such as HTML tags, blank characters, and invalid symbols. In the text preprocessing stage, jieba word segmentation tool is used to carry out Chinese word segmentation processing, and a custom dictionary containing 126 professional terms in the field of intangible cultural heritage is constructed. Then, high-frequency meaningless function words such as "de", "is" and "lai" are removed based on the Chinese stop word list, and the preliminary segmentation results are manually sampled and verified to correct part of speech tagging deviations and ambiguous entries.

Introducing a duplicate content detection mechanism and minimum text length screening criteria, policy texts with less than 200 characters were removed, and duplicate documents with content similarity higher than 80% were deleted. After preprocessing and screening, 324 policy documents that meet the quantitative evaluation requirements were finally determined, forming the core analysis corpus of this study.

#### 3.2 Indicator Selection

As shown in Table 1, this study constructed a quantitative evaluation system for the effectiveness of China's intangible cultural heritage policies, which includes 5 primary indicators and 13 secondary indicators, covering the five core dimensions of policy goal orientation, policy tool configuration, policy implementation effectiveness, policy content innovation, and policy coordination ability. All secondary indicators are encoded in binary format, and when there are specific features in the policy text that meet the preset conditions,

they are assigned a value of "1"; If the preset conditions are not met, assign a value of '0'. The coding standards are strictly defined and implemented through technical means such as keyword matching and sentiment analysis to ensure the objectivity and accuracy of the evaluation results.

*Table 1: Policy Effectiveness Quantification Evaluation Indicators and Encoding Rules*

Primary Indicator	Secondary Indicator	Encoding Rules
A. Policy Goal Orientation (PGD)	A1. Scope of Protection	Determine whether the policy clearly mentions the types or regions of intangible cultural heritage.
	A2. Focus of Policy	Determine whether the policy keywords are concentrated in specific fields and their frequency exceeds a threshold.
	A3. Clarity of Objectives	Determine whether the sentiment in the policy text is positive and whether the language is clear.
B. Policy Tool Usage (PTU)	B1. Incentive Tools	Determine whether the policy includes incentives such as subsidies, rewards, tax benefits, etc.
	B2. Regulatory Tools	Determine whether the policy includes legal regulations, mandatory requirements, etc.
	B3. Capacity Building Tools	Determine whether the policy mentions education, training, or technical support related to capacity building.
C. Policy Implementation Effectiveness (PEE)	C1. Public Participation	Determine whether the policy mentions public or community participation.
	C2. Resource Allocation Fairness	Determine whether the policy mentions supporting underdeveloped regions or niche intangible cultural heritage projects.
	C3. Enforcement Strength	Determine whether the policy specifies responsible parties, supervision mechanisms, or other specific enforcement measures.
D. Policy Content Innovation (PCI)	D1. Intangible Cultural Heritage Industry Innovation	Determine whether the policy proposes new models for the industrialization or integrated development of intangible cultural heritage.
	D2. Application of Digital Technology	Determine whether the policy mentions the use of digital technologies (e.g., digital displays, virtual reality) to promote the inheritance and protection of intangible cultural heritage.
E. Policy Coordination Capacity (PCC)	E1. Inter-departmental Collaboration	Determine whether the policy mentions the collaboration of multiple departments in promoting intangible cultural heritage protection.
	E2. Inter-regional Cooperation	Determine whether the policy proposes joint protection measures between different regions.

### 3.3 Research Methodology

#### 3.3.1 Text Mining Techniques

This study constructed a composite text mining framework that integrates BERT semantic embedding and LDA topic modeling. The semantic sensitivity of deep learning methods is organically combined with the structural abstraction ability of topic modeling techniques, effectively compensating for the inherent limitations of traditional word frequency statistical methods in contextual semantic understanding and topic clustering accuracy. This lays a methodological foundation for the deep analysis and effectiveness evaluation of subsequent policy texts.

##### 1. BERT Semantic Embedding and Clustering Analysis

This study uses the Chinese pre trained language model BERT to represent the preprocessed policy text semantically, generate semantic vectors for core terms, and then map each vocabulary word  $w_i$  to a high-dimensional dense vector  $\mathbf{v}_i \in \mathbb{R}^d$  with dimension  $d$ , where the dimension parameter  $d=768$ , consistent with the output dimension of the BERT model's hidden layer. The specific mapping relationship can be expressed as:

$$\mathbf{v}_i = \text{BERT}(w_i) \quad (1)$$

To reduce the complexity of high-dimensional semantic embedding space and achieve visual analysis of results, the t-SNE (t-distributed random neighborhood embedding) algorithm is further adopted to map high-dimensional semantic vectors to a two-dimensional low dimensional space:

$$\mathbf{z}_i = \text{tSNE}(\mathbf{v}_i), \quad \mathbf{z}_i \in \mathbb{R}^2 \quad (2)$$

On this basis, this study uses the KMeans clustering algorithm to perform clustering analysis on the reduced dimensional semantic vectors, in order to identify the thematic association features between keywords in the semantic space, and selects the keywords closest to the cluster centroid as the representative words of the cluster, which serves as the basis for constructing the semantic association network graph.

##### 2. LDA Topic Modeling

This study introduces keyword level semantic embedding analysis while retaining the traditional topic modeling method for complete policy texts. The latent Dirichlet allocation (LDA) model is used to identify the potential topic distribution in the policy corpus. Assuming that each policy document is composed of multiple topic mixtures, and each topic corresponds to the probability distribution on the vocabulary set, it can be expressed as follows:

$$P(\mathbf{w}, \mathbf{z}, \boldsymbol{\theta}, \boldsymbol{\phi}) = \prod_{d=1}^D P(\theta_d | \alpha) \prod_{n=1}^{N_d} P(z_{d,n} | \theta_d) P(w_{d,n} | z_{d,n}, \boldsymbol{\phi}) \quad (3)$$

where,  $\theta_d \sim \text{Dir}(\alpha)$  represents the topic distribution of document  $d$ , and  $\phi_k \sim \text{Dir}(\beta)$  denotes the word distribution of topic  $k$ .  $z_{d,n}$  is the topic assignment for the  $n$ -th word, and  $w_{d,n}$  is the actual word. This study used Gibbs Sampling to train the LDA model; Based on empirical values, the number of themes is set to  $K=5$ , and the model structure is optimized by combining the theme coherence score to ensure internal consistency and explanatory rationality of theme division.

### 3.3.2 PMC Index Model

The PMC index model is mainly used to systematically evaluate the scientificity, coordination, and implementation effectiveness of policy texts. Its core idea is to build a multidimensional hierarchical indicator system, convert unstructured and complex information in policy texts into quantifiable values, and then identify policy design advantages, shortcomings, and existing problems. The specific calculation process of PMC index is as follows: (1) Define evaluation variables; (2) According to formulas (5) and (6), calculate the scores of the secondary indicators using a 0-1 binary assignment rule, where 0 represents not meeting the conditions and 1 represents meeting the conditions. Enter the calculation results into the multi input-output matrix; (3) Calculate the scores of each primary indicator using formula (7); (4) Use formula (8) to weight and summarize the scores of each dimension, and finally obtain the PMC comprehensive index.

$$X \sim N[0,1] \quad (5)$$

$$X = \{XR : [0 \sim 1]\} \quad (6)$$

$$X_t \left\{ \sum_{j=1}^n \frac{X_{ij}}{T(X_y)} \right\} t=1,2,3,4,5,6 \dots, \quad (7)$$

$$PMC = \left[ \begin{array}{l} X1 \left( \sum_{i=1}^3 \frac{X_{ii}}{5} \right) + X2 \left( \sum_{j=1}^3 \frac{X_{2j}}{3} \right) + X3 \left( \sum_{k=1}^3 \frac{X_{3k}}{3} \right) + X4 \left( \sum_{l=1}^4 \frac{X_{4l}}{4} \right) + X5 \left( \sum_{m=1}^4 \frac{X_{5m}}{4} \right) \\ + X6 \left( \sum_{n=1}^{10} \frac{X_{6n}}{10} \right) + X7 \left( \sum_{n=1}^6 \frac{X_{1n}}{6} \right) + X8 \left( \sum_{p=1}^4 \frac{X_{1p}}{4} \right) + X9 \left( \sum_{q=1}^4 \frac{X_{1q}}{4} \right) \end{array} \right] \quad (8)$$

## 4 Research Results and Analysis

### 4.1 Policy Text Mining Results

The semantic distribution characteristics of high-frequency keywords in policy texts are shown in Figure 1. In Figure 1, the purple cluster is located in the upper region of the semantic space and mainly contains core keywords such as intangible cultural heritage, protection, inheritance, tradition, and culture. It presents a highly clustered feature in the semantic embedding space and often co appears in the same text context, forming the core semantic unit of policy statements. Typical expressions include "strengthening the systematic protection of intangible cultural heritage" and "promoting intergenerational inheritance of traditional crafts". Cluster analysis shows that the narrative framework of China's intangible cultural heritage protection policies still focuses on value recognition and cultural continuity, highlighting the intrinsic value of intangible cultural heritage as a national cultural gene.

The red cluster located in the upper right quadrant of the semantic space is composed of keywords such as digitalization, platform, VR display, technological means, and database. It has a significant semantic distance from traditional protection keywords, indicating that it has formed a relatively independent discourse system in the policy discourse system, and often appears in practical policy provisions. Typical expressions include "accelerating the construction of a national level intangible cultural heritage digital resource platform" and "relying on virtual reality technology to achieve dynamic display and dissemination of

intangible cultural heritage". The spatial clustering characteristics of the above clusters: (1) reflect the development trend of introducing modern information technology to promote digital transformation at the policy level; (2) This marks the gradual transformation of the protection mode of intangible cultural heritage from traditional offline physical protection and live performance protection to online digital preservation, digital dissemination, and digital activation and utilization.

The third cluster, in green, appears in the lower region of the semantic map and includes keywords such as “community participation,” “public communication,” “education and training,” “volunteer service,” and “interactive experience.” The semantic focus of these terms revolves around the questions of “who participates” and “how co-construction is realized.” In policy texts, they typically emerge in governance-related provisions—for example, in contexts such as “encouraging localized community involvement in ICH transmission” or “enhancing youth awareness of ICH through school-based education.” The governance structure of intangible cultural heritage policies has gradually evolved from the traditional government inheritor dual dominant model to a diversified cooperative governance framework involving multiple parties including the government, communication subjects, the general public, and educational institutions.

Overall, the semantic space constructed based on BERT semantic embedding not only effectively characterizes the deep semantic associations between high-frequency terms in policy texts, but also reveals from a cognitive level that the policy orientation of China's intangible cultural heritage has shifted from a single cultural protection model to a comprehensive governance path that balances technological empowerment and social collaborative governance.

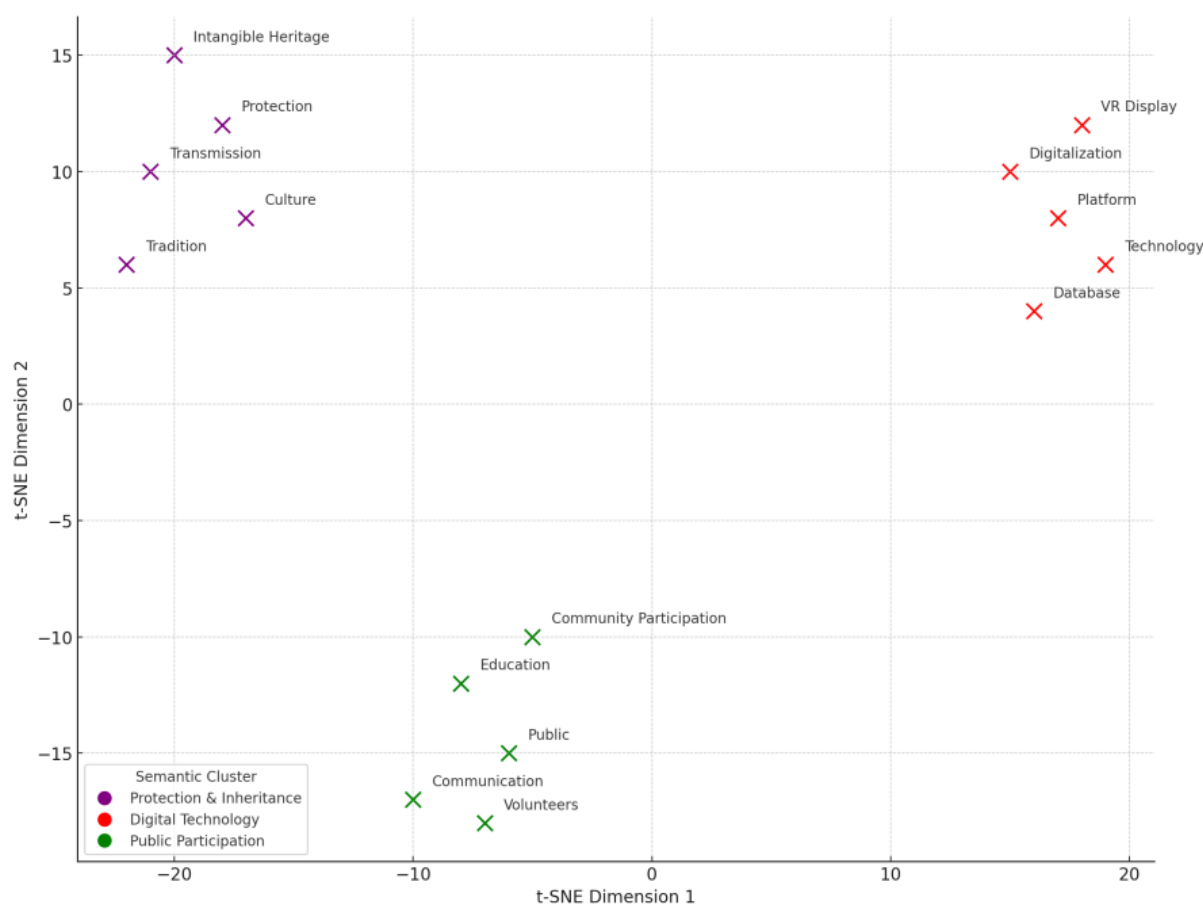


Figure 1: Semantic Clustering Map of Policy Keywords

According to the LDA thematic model analysis results shown in Table 2, (1) heritage protection and inheritance are the core policy issues, focusing on keywords such as intangible cultural heritage, protection, and inheritance, reflecting the high importance that policies attach to the preservation of intangible cultural heritage core values and intergenerational succession; (2) The theme of digitization and technological empowerment relies on keywords such as digitization and virtual reality, highlighting the important supporting role of modern information technology in the protection of intangible cultural heritage; (3) The policy focuses on promoting the construction of digital resource libraries and virtual exhibition halls, continuously expanding the coverage of intangible cultural heritage dissemination, and optimizing interactive experience effects; (4) The theme of public participation emphasizes the important value of community participation and cultural education, indicating that policies actively guide the public to establish a sense of responsibility for protection and further enhance the sustainable development capacity of intangible cultural heritage protection work; (5) The theme of policy innovation and industrialization development reflects the positive role of innovative governance mechanisms and integrated cultural tourism development models in enhancing protection efficiency and realizing the transformation of intangible cultural heritage economic value; (6) The theme of cross departmental and cross regional collaborative governance revolves around keywords such as departmental collaboration and regional linkage, reflecting the policy of optimizing resource allocation and strengthening multi-party linkage to enhance the overall effectiveness of intangible cultural heritage protection and governance.

*Table 2: LDA Topic Model Results*

Topic No.	Topic Name	High-Frequency Keywords
1	Heritage Protection and Inheritance	Intangible Cultural Heritage, Protection, Inheritance, Culture
2	Digitalization and Technical Support	Digitalization, Virtual Reality, Database, Exhibition
3	Public Participation	Community Participation, Public, Education, Dissemination
4	Policy Innovation and Industrialization	Innovation, Industrialization, Integration, Development
5	Cross-departmental and Regional Collaboration	Departmental Collaboration, Region, Union, Cooperation

## 4.2 PMC Index Calculation Results

This study selected five typical policies for PMC quantitative evaluation: the Ministry of Culture and Tourism issued the "14th Five Year Plan for the Protection of Intangible Cultural Heritage" (P1), the General Office of the State Council issued the "Opinions on Further Strengthening the Protection of Intangible Cultural Heritage" (P2), the People's Congress of Luoyang formulated the "Regulations on the Protection of Intangible Cultural Heritage in Luoyang City" (P3), and the People's Congress of Jiangxi Province formulated the "Regulations on the Protection of Intangible Cultural Heritage in Jiangxi Province". The specific calculation results are shown in Table 3. The calculation results show that, from the perspective of the overall PMC index, the effectiveness of national level policies is significantly better than that of local level policies, particularly evident in the two dimensions of policy implementation effectiveness (PEE) and policy synergy capability (PCC). The comprehensive score of policy P1 is the highest (PMC=4.125), with policy implementation effectiveness PEE reaching 0.881

and policy synergy capability PCC reaching 0.862, showing the best overall performance.

Analyze the internal mechanism, integrate cross departmental collaboration mechanisms and clear division of rights and responsibilities into the top-level institutional design of national policies, and construct a closed-loop implementation system of institutional design, implementation, supervision and feedback. P1 focuses on building an inter ministerial collaborative work platform to promote the construction of multi-level linkage mechanisms at the provincial and municipal levels; At the same time, relying on financial support, technological empowerment, talent cultivation and other paths, the comprehensive governance capacity of intangible cultural heritage is systematically improved. Its efficient policy effectiveness comes from a composite governance structure that combines multi-party collaborative governance, clear rights and responsibilities system, and diversified policy tool allocation. The high PMC index achieved by national level policies can be attributed to the synergistic driving force of three major elements: a sound organizational structure, clear boundaries of rights and responsibilities, and multi-dimensional policy tool support.

Although Policy P2 has a high level of policy goal orientation, with a PGD of 0.803, it performs relatively poorly in the dimension of policy tool configuration, with a PTU of only 0.713. This is highly related to its macro strategic guidance policy positioning. Although Policy P2 clearly defines the overall strategic direction and value positioning, it lacks specific deployment at the micro practical level such as incentive mechanisms and capacity building plans, presenting a typical policy logic feature of prominent strategic orientation and weak implementation path.

Among the local policy samples, P4 has the best overall performance, with a PMC index of 3.888. The scores for policy implementation effectiveness and policy coordination ability are close to the national policy level. Its effectiveness advantage mainly comes from the refined allocation of grassroots governance resources and precise support for endangered and niche intangible cultural heritage projects. Policy P4 supports the development of community social organizations, promotes the digital display of small-scale intangible cultural heritage projects, and builds localized communication channels, effectively enhancing the adaptability and responsiveness of policy implementation. P4 scored low in the dimensions of policy tool configuration (0.691) and policy content innovation (0.763), reflecting the constraints of practical conditions such as fiscal investment and technological reserves. Local governments have obvious shortcomings in incentive mechanism design, digital integration, and industrialization planning.

The prominent advantage of national policies in terms of policy coordination capability can be achieved by the central government through the establishment of special management agencies, the issuance of standardized normative documents, and the coordinated allocation of financial and human resources to build a highly integrated policy coordination network. Local policies generally lack institutionalized platforms for cross regional collaborative governance, mainly relying on internal departmental coordination and top-down implementation of administrative instructions. A complete horizontal linkage coordination mechanism has not yet been formed, resulting in low levels of policy interactivity, policy replicability, and system integration.

The PMC index calculation results not only reveal the structural differences in China's intangible cultural heritage protection policies at the governance system level, but also clarify the inherent causal mechanism of policy effectiveness formation. National level policies rely on institutionalized collaborative mechanisms and diversified policy tool systems, and have significant structural advantages in policy implementation and collaborative governance, while local policies are guided by practical implementation and exhibit typical responsive governance characteristics. Further improvement of policy tool system construction and digital technology

support is still needed.

*Table 3: PMC Index Calculation Results*

	P1	P2	P3	P4	P5
PGD	0.827	0.803	0.748	0.784	0.761
PTU	0.752	0.713	0.641	0.691	0.659
PEE	0.881	0.854	0.801	0.840	0.815
PCI	0.803	0.775	0.729	0.763	0.741
PCC	0.862	0.821	0.778	0.810	0.793
PMC Comprehensive Index	4.125	3.966	3.697	3.888	3.769

## 5 Discussion

This study constructs a quantitative evaluation system from five core dimensions: policy goal orientation, policy tool application, implementation effectiveness, content innovation, and collaborative ability. It systematically analyzes the structural characteristics and internal implementation mechanisms of the effectiveness of China's intangible cultural heritage policies. Based on the semantic level of policy texts, it integrates BERT semantic embedding and LDA theme modeling methods to accurately identify policy core issues and internal content logic. The research results indicate that the policy for the protection of intangible cultural heritage has always been highly focused on the two core values of protection and inheritance, and has gradually expanded towards the dual track path of technology empowerment and collaborative governance through digitalization, platform technology, and public participation. This shows that the policy for the protection of intangible cultural heritage actively integrates digital media technology with modern social governance mechanisms, and continuously explores diversified and collaborative policy implementation paths while adhering to the core position of cultural value inheritance.

Most previous studies relied on qualitative content analysis or shallow statistical methods, such as keyword frequency, which failed to reveal the structural logic and agenda evolution embedded in policy texts (Furidha, 2023; Goldsmith, 2021). This study uses the BERT model to generate contextual semantic embeddings for policy keywords, combines t-SNE dimensionality reduction with cluster analysis, identifies three core semantic clusters in high-dimensional space, and further uses LDA topic modeling to capture potential topic structures, preserving the full semantic richness of the text while strengthening the systematic recognition of policy priorities, logical focus, and structural evolution trends, addressing the traditional limitations of weak "structural perception" in text-based policy research. This study also introduced "policy coordination capability" as the core dimension of evaluation, surpassing the traditional "goal tool" binary framework that dominated previous research on intangible cultural heritage policies. The quantitative measurement of coordination mechanisms revealed structural differences in cross departmental and cross regional interactions at different policy levels, and provided causal explanations for differences in policy implementation effectiveness. This analytical perspective is consistent with the multi actor collaborative governance model proposed by Sanjaya et al. (2021). Additionally, the frequent appearance of the keyword "digitalization" not only reflects the normalization of technological interventions but also corresponds closely with the evolving trajectory of public participation within policy execution mechanisms. Consistent with Todorova-Ekmekci's (2021) assertion that digital media facilitates innovation in cultural heritage preservation, this study finds that digital tools not only serve as dissemination channels for ICH but also significantly broaden and deepen mechanisms

for public empowerment and engagement. Compared with Wang's (2023b) theoretical proposition that public participation enhances policy sustainability, this study provides a data-driven validation of how such participation is embedded within policy systems and the modes of its interaction—thereby enriching the empirical foundation for collaborative governance research from a textual perspective.

The contribution of this study lies in its quantitative evaluation of intangible cultural heritage policy texts, deepening the research framework between policy effectiveness and cultural protection, and expanding the research boundaries in the field of policy analysis. By clustering key themes in policy texts, this study uncovers the internal logic of policy content and provides a structured approach for policy analysis. Furthermore, the research offers a new perspective on the integration of digital technology and intangible cultural heritage protection, emphasizing that digital technology is not only a protective tool but also an innovative path to achieve the inheritance and sustainable development of intangible cultural heritage.

Although this study has made exploratory contributions to the quantitative evaluation of the effectiveness of intangible cultural heritage policies, there are still several research limitations: (1) The data used in this study mainly focuses on policy texts from 2005 to 2023, and does not include the content and historical context of early related policies, which may lead to incomplete disclosure of the evolution of intangible cultural heritage policies. (2) The research only relies on text mining techniques to analyze the content of policy texts, lacking in-depth research and empirical testing on the actual effectiveness of policy implementation. (3) The scope of this study is limited to China's intangible cultural heritage policies and does not introduce international level intangible cultural heritage related policy texts for comparative analysis, which may to some extent limit the universality and cross contextual explanatory power of the research conclusions.

## 6 Conclusion

This study systematically evaluated the effectiveness of China's intangible cultural heritage policies based on the PMC index model, and drew the following main conclusions: (1) The policy text of intangible cultural heritage is highly focused on the core goals of "protection" and "inheritance". Through BERT semantic embedding analysis, it can be seen that keywords such as "intangible cultural heritage", "protection" and "inheritance" form a semantic cohesion core, forming the core semantic framework of the policy text. Keywords such as "digitalization", "platform" and "community participation" form independent semantic clusters, indicating that the policy is gradually transforming towards a diversified governance model of "technological empowerment+social collaboration", adhering to the core orientation of cultural value inheritance and actively integrating modern governance methods. (2) The implementation efficiency of national and local policies shows a clear differentiation. For example, national policies (such as the 14th Five Year Plan for the Protection of Intangible Cultural Heritage) demonstrate higher implementation efficiency through a sound cross departmental coordination mechanism, clear division of responsibilities, and sufficient resource guarantees. The advantage lies in the closed-loop management of "top-level coordination+precise execution" achieved through institutionalized design; Although local policies have strong flexibility in implementation, there is still room for improvement in the systematization of policy tools and the depth of technological application due to resource constraints.

This study combines text mining techniques with quantitative evaluation methods to clarify the implementation logic and effectiveness differences of intangible cultural heritage policies. In the future, further research can be conducted from the following three aspects: (1) incorporating intangible cultural heritage policy texts before 2005, systematically sorting out

the evolution trajectory of policies in different historical stages, revealing the relationship between policy goals, implementation methods, and historical background, and improving the complete development of intangible cultural heritage policies. (2) By combining field research, case tracking, and other methods, collect empirical data on the effectiveness of policy implementation, quantitatively analyze the actual impact of policies on the protection and inheritance of intangible cultural heritage, and bridge the gap between text analysis and practical implementation. (3) Selecting intangible cultural heritage protection policies from different cultural backgrounds as references, analyzing the differences in policy design and implementation paths under different governance models, drawing on international advanced experience, and providing a broader perspective for the optimization and improvement of China's intangible cultural heritage policies.

## Fuding

This paper was funded by Shanghai Philosophy and Social Science Planning - Youth Project (No. 2024EXW011)

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