Policy Effectiveness Measurement in the Cultural Industry of Chengdu City

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Abstract. The cultural industry has demonstrated a significant growth trend due to its crucial role in driving economic development and facilitating industrial restructuring. This paper conducts a systematic screening and coding of cultural industry policy documents, optimizes the quantification indicators of policy effectiveness within the "two-stage and three-dimensional" framework, and constructs a measurement model for the content effectiveness of cultural industry policies by incorporating the entropy weight method. The study measures and analyzes the effectiveness of cultural industry policies in Chengdu from 2009 to 2021, while proposing a series of optimization recommendations. These suggestions provide guidance for improving the policy environment of Chengdu's cultural industry and can be tailored to local conditions to promote high-quality development of the region's cultural sector.

Keywords: Cultural industry policies, Content effectiveness measurement, Entropy weight method

1 Introduction

In recent years, the cultural industry has demonstrated robust global growth momentum due to its prominent role in driving economic expansion and facilitating industrial transformation and upgrading. Concurrently, China's cultural sector has exhibited vigorous developmental vitality. On the one hand, its incremental contribution to gross domestic product (GDP) has been steadily increasing; on the other hand, it has also made a significant contribution to GDP growth. Presently, a broad consensus has been reached regarding the dual strategic significance of the cultural industry in fostering cultural prosperity and enhancing economic development.

The research on current cultural industry policies is quite extensive. Hedetake Yoshimatsu [1] suggests that when implementing industrial policies, governments should strengthen intellectual property protection, as this significantly enhances the innovative capacity of creative professionals and the overall innovation level of the cultural industry. Jiang Yicheng [2] pointed out that in response to the challenges faced by China's cultural industry during the implementation of fiscal policies, several improvement

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measures were proposed. These include establishing financing platforms for the cultural industry, optimizing the structure of fiscal funds, and innovating fiscal support methods, all aimed at enhancing the effectiveness of policy implementation. Hu Shaoyu et al. [3] examined fiscal policies for the cultural industry in foreign countries, highlighting proactive measures such as tax reduction, targeted fiscal support, and the implementation of scientific fiscal subsidies to promote the advancement of the cultural industry. Xiujuan Fan utilizes panel data from 30 provinces and municipalities in China spanning from 2017 to 2023. By employing the PMC index model and the DEA-Markowitz index method, it quantifies cultural industry policies and their efficiency levels. The findings demonstrate that cultural industry policies can effectively promote the development of the cultural sector. Moreover, the spillover effects of cultural industry policies on efficiency are positive, indicating that policies implemented in neighboring regions can enhance the efficiency of the local cultural industry [4]. Lu C et al. integrate both social and economic benefits, constructing an evaluation system for cultural industry policy effectiveness [5]. Ruzhong Cao et al. establish a "two-stage and three-dimensional" policy effectiveness measurement framework, where the first stage classifies policy tools and the second assesses effectiveness dimensions [6]. Their study quantifies the policy content effectiveness in fostering the integration of culture and technology, followed by a multiple regression analysis to evaluate policy influence on urban cultural and technological convergence.

The existing research focuses on constructing and analyzing evaluation indicator systems from the perspective of the broader effects of policy implementation. This, to some extent, leads to the neglect of the superposition effects of policies at different levels and the depth of policy impact. Moreover, after the establishment of the policy effectiveness indicator system, existing studies primarily measure policy effectiveness based on the logical relationships between indicators, overlooking the objective weighting of the multi-dimensional attributes of cultural industry policy effectiveness, which is not conducive to proposing targeted industrial policy optimization strategies.

Therefore, it is necessary to conduct relevant research, considering the multi-dimensional characteristics of policies and their macro implementation effects in combination, in order to provide more valuable optimization suggestions for relevant departments.

2 Definition

Based on the definitions of the cultural industry by UNESCO and the National Bureau of Statistics of China, the cultural industry can be interpreted as an economic system whose core lies in cultural creativity and innovation, primarily consisting of commercial activities that supply cultural products and related services.

The policy instruments of the cultural industry refer to the means or schemes adopted by the government or relevant agencies to achieve predetermined objectives. This paper classifies cultural industry policies based on their instrumentality, dividing them into

supply-side, demand-side, and environmental types. Supply-side and demand-side policy instruments complement each other, serving as direct policy tools, while environmental policies have an indirect impact on the development of the cultural industry.

The concept of policy effectiveness refers to the content conveyed by the policy text and its resulting impact [7], reflecting the intensity of policy implementation and the effects produced. The measurement of the effectiveness of cultural industry policies aims to test whether specific policies meet the needs of cultural industry development, and then establish comparable indicators and standards based on the policy goals. This article measures the effectiveness of cultural industry policies mainly in terms of the inherent constraints and compulsoriness of the industrial policies, which prompts the relevant entities to voluntarily follow and implement these policies.

3 Methodology

3.1 Policy Texts

First, this paper systematically collates cultural industry policy documents within the research region and employs textual coding to achieve fine-grained classification. To preserve the core propositions of policy texts effectively, we establish coding criteria through analysis of keywords and critical information to evaluate the relevance of texts to the cultural industry. For systematic organization and statistical analysis of coded content, a tripartite "X-Y-Z" identifier is adopted to denote text provenance, where: X represents the administrative hierarchy (1 = provincial, 2 = municipal, 3 = district/county-level); Y indicates the chronological order of policy issuance within the study period; Z designates the sequential number of the specific policy clause.

For instance, the code "1-2-1" refers to:1, Provincial-level policy;2, The second policy issued chronologically within the study period; 1, The first clause of said policy.

This structured coding framework ensures traceability and facilitates quantitative analysis of policy content across administrative levels and temporal dimensions.

3.2 Policy Effectiveness Indicators

The quantification of cultural industry policy effectiveness refers to the quantification of effectiveness for each policy text. Therefore, before measuring the effectiveness of cultural industry policies, policy texts should be screened, and then the effectiveness of the screened policy texts should be measured.

Currently, the "three-dimensional" effectiveness measurement indicator system, which includes policy intensity, policy objectives, and policy systematicity, is widely applied. Policy intensity characterizes the administrative level of the policy, policy objectives characterize the clarity of the policy's issuance purpose, and policy systematicity characterizes the synergy of policy implementation across different levels. Existing research has further refined and improved the "three-dimensional" measurement system for cultural industry policies, proposing a "two-stage and three-dimensional" measurement indicator system, as shown in Figure 1. Firstly, policy instrumentality is its primary characteristic, serving as the means to achieve policy objectives and the carrier

for implementing policy intensity, with the logical relationship of policy instruments taking precedence over the internal three-dimensional characteristics of the policy; secondly, cultural industry policies rely on the formulation of policies at various levels. Generally, higher-level policies (such as provincial-level) have greater intensity but less specific objectives, while lower-level policies (municipal, district/county-level) are the concretization of higher-level policies, with limited intensity but clear objectives. Overall, the exertion of policy effectiveness is the result of the systematic superposition of policies at different levels.

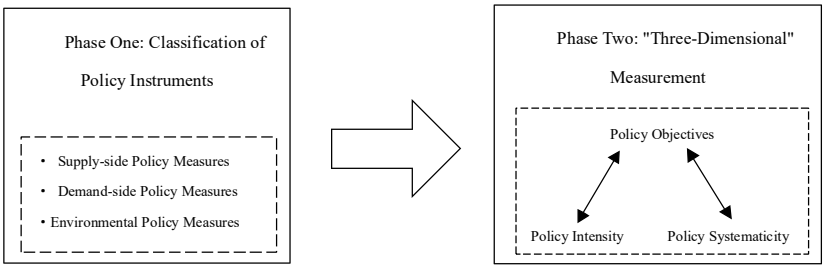

Fig. 1. Measurement Indicators of "Two Stages and Three Dimensions" for Cultural Industry Policies.

In the first stage, this paper decomposes a certain policy text into different policy instruments, including supply-side policies, demand-side policies, and environmental policies, with each dimension rated on a scale from 5 to 1.

In the second phase, employing text analysis, scores are assigned to the three dimensions of policy intensity, policy objectives, and policy systematicity for different policy instrument measures, with each dimension rated on a scale from 5 to 1.

3.3 Measurement Models of Policy Effectiveness

3.3.1 Measurement Model of Policy Content Effectiveness.

Based on the "two-stage and three-dimensional" measurement indicator system for cultural industry policies as shown in Figure 1, this paper combines the entropy weight method to depict the logical relationship of the "three-dimensional" scoring and incorporates the measurement process of the "two-stage" scoring. The measurement model of cultural industry policy content effectiveness constructed in this paper is demonstrated in steps 1 through 6.

Step 1: Classify cultural industry policies into supply-side, demand-side, and environmental types based on the annual policy instrument categorization, and score the instrumentality of each category to obtain the measurement results of the three types of policy instrumentality $\upsilon_{th}^{g}, \upsilon_{tq}^{x}, \upsilon_{tr}^{h}$

Step 2: Following the "three-dimensional" concept, score the policy intensity, policy objectives, and policy systematicity of various policy instruments, obtaining the policy

intensity score l_{th}^{g}, policy objectives score m_{th}^{g} and policy systematicity score s_{th}^{g} for supply-side policies, the policy intensity score l_{tq}^{x}, policy objectives score m_{tq}^{x} and policy systematicity score s_{tq}^{x} for demand-side policies, and the policy intensity score l_{tr}^{h}, policy objectives score m_{tr}^{h} and policy systematicity score s_{tr}^{h} for environmental policies.

Step 3: Determine the calculation weights for the three dimensions of policy intensity, policy objectives, and policy systematicity through the entropy weight method.

1) Score the policies for policy intensity, policy objectives, and policy systematicity, as follows: $v_i\left(c_p\right), p \in (l,m,x)$.

2) Normalize the calculated three-dimensional characteristic data to obtain the proportion of the *p* characteristic value of the *i* policy, denoted as $\sigma_{ip}^{'}$. In the formula, σ_{ip} is the value before the normalization of the indicator value proportion.

$$\sigma_{ip} = v_i\left(c_p\right) / \sqrt{\sum_{i=1}^{N}\left(v_i\left(c_p\right)\right)^2} \tag{1}$$

$$\sigma_{ip}^{'} = \sigma_{ip} \Big/ \sum_{i=1}^{N} \sigma_{ip} \tag{2}$$

3) Calculate the entropy value λ_p of the p characteristic based on the proportion of characteristic values.

$$\lambda_p = -\frac{1}{\ln N} \sum_{i=1}^{N} \sigma_{ip}^{'} \ln \sigma_{ip}^{'} \tag{3}$$

4) Calculate the entropy weight μ_p of the p characteristic based on the entropy value.

$$\mu_p = \frac{1-\lambda_p}{\sum_{p}\left(1-\lambda_p\right)} \tag{4}$$

Among them, $\mu_l + \mu_m + \mu_x = 1$.

Step 4: After weighting and summing the internal three-dimensional characteristic scores of the policy, obtain the internal characteristic measurement result δ_{th}^{g} of the *h* supply-side policy in the *t* year, the internal characteristic measurement result δ_{tq}^{x} of the *q* demand-side policy in the *t* year, the internal characteristic measurement result δ_{tr}^{h} of the *r* environmental policy in the *t* year.

$$\begin{aligned}
\delta_{th}^{g} &= \mu_l \times l_{th}^{g} + \mu_m \times m_{th}^{g} + \mu_x \times s_{th}^{g} \\
\delta_{tq}^{x} &= \mu_l \times l_{tq}^{x} + \mu_m \times m_{tq}^{x} + \mu_x \times s_{tq}^{x} \\
\delta_{tr}^{h} &= \mu_l \times l_{tr}^{h} + \mu_m \times m_{tr}^{h} + \mu_x \times s_{tr}^{h}
\end{aligned} \tag{5}$$

Step 5: In accordance with the "two-stage" concept, multiply the policy instrumentality measurement results by the internal characteristic measurement results to obtain the content effectiveness measurement result G_t of supply-side policies in the *t* year, the content effectiveness measurement result X_t of demand-side policies in the *t* year, and the content effectiveness measurement result H_t of environmental policies in the *t* year.

$$\begin{aligned} G_t &= \sum_{h=1}^{H} \upsilon_{th}^{g} \delta_{th}^{g} \\ X_t &= \sum_{q=1}^{Q} \upsilon_{tq}^{x} \delta_{tq}^{x} \\ H_t &= \sum_{r=1}^{R} \upsilon_{tr}^{h} \delta_{tr}^{h} \end{aligned} \tag{6}$$

Step 6: Sum or average the content effectiveness measurement results of various policy instruments for the year to obtain the total and average effectiveness of the annual policy content.

$$TPV_t = \left(G_t + X_t + H_t\right) \tag{7}$$

In the formula: TPV_t represents the total content effectiveness of policies in the *t* year. G_t, X_t and H_t represent the number of supply-side policies, demand-side policies, and environmental policies in the *t* year.

4 Application and Results

This paper screened 110 cultural industry policies promulgated in Chengdu from 2009 to 2021, obtaining 478 policy texts. According to the entropy weight method, the weights of policy intensity, policy objectives, and policy systematicity are calculated as 0.14, 0.78, and 0.08, respectively, following equations (1) to (4) in step 3, indicating that policy objectives have the greatest impact among the three major dimensions of policy. Based on steps 4 to 6, the content effectiveness of Chengdu's cultural industry policy texts from 2009 to 2021 has been measured.

The characteristics of the total effectiveness of different policy instruments in terms of quantity and content are shown in Figure 2. From 2009 to 2018, environmental policies for Chengdu's cultural industry were the most numerous and the most effective, followed by supply-side policies, with demand-side policies being the least. In 2018, Chengdu's cultural industry development entered a transformation and upgrading phase, proposing a policy plan to build a "World Cultural and Creative City" with a focus on strengthening top-level design and policy support for the development of the cultural industry. Therefore, in 2019, the quantity and effectiveness of supply-side policy instruments surpassed those of environmental policy instruments; affected by the COVID-19 pandemic, Chengdu introduced special policy in 2019, and various districts and counties successively implemented multiple policies to support the cultural industry, actively promoting the development of cultural industry policies. As a result, from

2020 to 2021, the quantity and effectiveness of supply-side policy instruments rapidly increased, far exceeding those of environmental policy instruments.

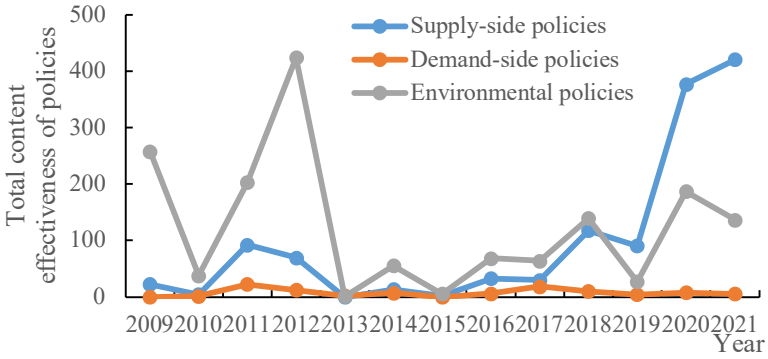

Fig. 2. Evolution Characteristics of the Total Content Effectiveness of Different Policy Instruments.

According to the "three-dimensional" assignment criteria, the comparative results of the scores for the three dimensions of Chengdu's cultural industry policy texts from 2009 to 2021 can be obtained, as shown in Figure 3.

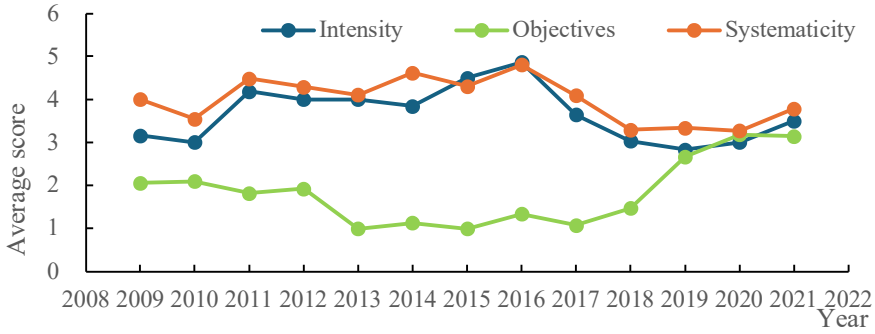

Fig. 3. Comparison of Scores for the Three Dimensions of Policy Texts from 2009 to 2021.

From the trend of changes in policy intensity, the intensity of Chengdu's cultural industry policies showed an upward trend from 2009 to 2016. In 2016, the policy intensity score reached a peak for that period, followed by a certain degree of decline between 2017 and 2019. During the period from 2020 to 2021, the policy intensity score began to rise again, indicating that to mitigate the adverse effects of the COVID-19 pandemic on the cultural industry, administrative departments at all levels introduced more relevant regulations and policies, significantly increasing the level of intervention.

From the trend of changes in policy objectives, the threshold for Chengdu's cultural industry policy objectives remained at a low level from 2009 to 2018, with an average

score consistently between 1 and 2 points. Since 2019, the objectives of Chengdu's cultural industry policies have achieved a significant rebound, showing a relatively stable and higher level between 2019 and 2021, indicating that the direction and objectives of the policies have become increasingly clear.

From the trend of changes in policy systematicity, the policy scores for Chengdu in the cultural industry are relatively high, with the overall level maintained above 3.5 points. This indicates that from 2009 to 2021, the superposition effect of Chengdu's cultural industry policies was good, and the conflicts between policies at different levels were not prominent.

5 Conclusion

The overall application ratio of policy instruments in Chengdu is imbalanced. The total number of environmental policy instruments for the cultural industry accounts for the largest proportion, exceeding half, while the total number of demand-side policy instruments accounts for the smallest proportion. Additionally, there is a structural deficiency in the subdivision of policy instruments.

From the perspective of the three-dimensional characteristics of policy, the weights of policy intensity, policy objectives, and policy systematicity are 0.14, 0.78, and 0.08, respectively, indicating that policy objectives have the greatest impact among the three major dimensions of policy. The threshold of policy objectives for Chengdu's cultural industry has consistently remained at a low level, suggesting that the policy objectives are not clear enough and lack measurability. The trend in policy intensity changes shows that the involvement of provincial-led policies has gradually decreased, while the trend of municipal and district/county policies leading industrial development is relatively clear. To mitigate the impact of the COVID-19 pandemic, the number of policies and regulations issued by governments at all levels has increased, and the level of involvement has risen again. From the trend in policy systematicity, Chengdu's cultural industry policies demonstrate a good superposition effect, with relatively few conflicts among provincial, municipal, and district-level policies.

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