

Construction of the Performance Appraisal and Evaluation System in the Cultural Industry Demonstration Zone

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Abstract—It is necessary to evaluate the performance of cultural industry demonstration zone, which is good for giving full play to its demonstrated and leading role, and making the cultural industry develop get healthy, effective and sustainable development. The principle of establishing evaluation system includes the objectively, orientation and balance. And indexes are set from five aspects, zone management and service, industrial development, total economic and social benefits, and zone enterprise operation and management. In addition, the index weight is arranged by means of analytic hierarchy process(AHP) and experts marking. After the establishment of indicator system, Tianjin Cultural Industry Clusters is taken as the example to make the empirical analysis and assess the rationality and feasibility of evaluation system.

Keywords—cultural industry; demonstration zone; performance appraisal; system construction

I. INTRODUCTION

The increasingly mature cultural industry in China has made cultural zone construct and develop in a rapid growth. However, the problem of blind and repeated construction also has appeared with the growing trend. So cultural industry demonstration zone is advocated and supported in China to give full play to the demonstrated and leading role of advanced cultural enterprises, as well as make the cultural industry develop more sound, effective and sustainable. The scientific and rational evaluation with zone can assess whether it can continue to keep advanced and leading, create economic and social benefit for locality, and achieve the rapid development of local cultural industry, which is very crucial. The performance appraisal and evaluation system is established through the survey with cultural industry demonstration zone in different regions and the design of corresponding indexes.

II. PRINCIPLES OF ESTABLISHING APPRAISAL SYSTEM

Principle of objectivity. The evaluation index setting and assessment should aim at objective reality, reducing the subjective indexes and judgment.

Principle of orientation. Evaluation indexes and standards are supposed to point out where the examinee should makes efforts, and give full play to the function of orientation at the

same time of giving assessment.

Principle of balance. During the process of arranging evaluation indexes and weight allocation, various indexes should be taken into consideration, such as economic benefit and social benefit, scale and speed, process and result, and performance and potential. In addition, the weight should be rationally allocated to give a comprehensive assessment to the examinee, and make them develop in a healthy and sustainable manner[1-2].

III. ESTABLISHMENT AND EXPLANATION OF EVALUATION INDICATOR SYSTEM

The evaluation with demonstration zone mainly consists of 5 first-class indicators, 15 second-class indicators, and 32 third-class indicators(Table1). And the first-class indicators include zone management service, industry development, total economic and social benefit, and zone enterprise operation and management. The first two indexes mainly assess the operation capability and result of zone, while the latter three evaluate those of enterprises in the zone. All of these are formed to the *Explanation of Evaluation Indexes in the Cultural Industry Demonstration Zone*[3-5].

The brief explanation is as follows:

A. Zone management and service

This index mainly aims at the capability and level of zone construction, service and management, including the regulation and implementation of industrial zone development planning, the input and perfect degree of infrastructure and supporting facilities, the capability and effect to provide service for enterprises within the zone, the result of management department attracting investment, and the enterprise management level of management sector.

B. Industrial development

This index is mainly to assess the clustering and developing level of cultural industry in demonstration zone, which consists of the concentrated level of cultural enterprises and resources, development level of cultural industry chain, real work and effect of cultural enterprises.

C. Total economic benefit

This indicator emphasizes the operating result and sustainability of the whole cultural enterprises in the zone,

Fund project: The Art Planning Project in Tianjin: Research on the Mechanism and Achieving Methods of Service Industry Transformation Driven by Cultural Projects Innovation(E16040)

which means the revenue, growth rate, earning, and profitability of their cultural business.

D. Total social benefit

This indicator is used to evaluate the capability and real effect of all cultural enterprises playing a demonstrated role in the zone. It refers to their social contribution and influence in the field, the condition of carrying forward the socialist core values by their products and service, and the popularity among the target audience and market.

E. Operation and management of enterprises in the zone

This indicator pays attention to assessing the capability of the whole cultural enterprises to continually provide their cultural product service and achieve economic and social benefits. It mainly includes the total input and actual achievements of all enterprises in the cultural products, service research, and talent development.

TABLE I. PERFORMANCE ASSESSMENT INDICATORS OF DEMONSTRATION ZONE

First-class indicators(5)	Second-class indicators(15)	Third-class indicators(32)
Zone management and Service	Development planning	Regulation of zone development planning
		Implementation of zone development Planning
	Infrastructure	Accumulated growth rate of infrastructure Investment
		Perfect degree of infrastructure
	Public service	Industrial service capability and provision
		Perfect degree of zone management rules
		Property service capability
	Investment attraction	Actual amount and growth rate of investment and The growth rate
	Self-management	Standard degree of enterprise management
		Cooperation degree between industrial and Territorial management
Industrial development	Industry cluster	Quantity growth rate of settled cultural Enterprises
		Ratio of enterprises integrating culture with Technology
	Business incubation	The incubation capital invested by the zone Itself
		The number of cultural enterprises incubated by The zone itself
Total economic benefit	Capital scale	Total amount and growth rate of capital
	Revenue scale	Value-added
		Increase rate of main business revenue
	Profitability	Revenue ratio of cultural businesses
Total social benefit	Social influence	Operating profit
		Total tax payable and growth rate
		New-job growth
		Industry influence
	Political orientation	Participation in social public welfare
		The performance of party organizations
	Audience reflection	Content orientation of products and services
Operation and Management of Enterprises in the zone	Cultural creation, production And service	Market recognition of products and services
		R&D expenditure and growth rate
		The number and growth rate of independent Intellectual property rights
	Team construction	Output and proportion of new cultural products
		The proportion of certified cultural professionals
		The proportion of talents with middle or senior Professional titles
		Per capita cost of professional training in the Cultural field

IV. DETERMINATION OF INDICATOR WEIGHT

A. Principles and procedures of AHP

This paper adopted the method of AHP to determine indicator weight. Based on the problem and purpose, problems will be divided into different components as the indicator of appraisal or evaluation in this method. And they will be gathered and organized according to the correlation and subordination among indicators, forming a analytic structural model with various levels. At last, the problem will be concluded as the determination of relative important weight of

each decision indicator for the total target or the importance ranking[6]. The specific steps are as follows:

Step1: According to the *Definition of Indicator* and the standard principle of saaty9, compare the importance of indicators at various levels and form the pairwise matrix $M_{n \times n} = (a_{ij})_{n \times n}$.

Step2: Calculate the normalized feature vector and maximum eigenvalue.

$$M_i = \sqrt[n]{a_{i1} \cdot a_{i2} \cdot \dots \cdot a_{in}}$$

Figure vector X

$$\lambda_{\max} = \frac{M_i}{\sum_{i=1}^n M_i}$$

Maximum eigenvalue

$$\lambda_{\max} = \frac{1}{n} \sum_{i=1}^n \frac{M_i X}{X_i}$$

Step3: Check the consistency

Relative consistency index

$$CI = \frac{\lambda_{\max} - n}{n - 1}$$

Test coefficient

$$CR = \frac{CI}{RI}$$

When $CR \leq 0.1$, we can ensure that the judgment matrix satisfies the coordination of index importance, otherwise, we should readjust the judgement matrix. There is no need to check the consistency with the first- and second-order matrix. RI(the value of mean random consistency indicators) of the whole judgement matrix is as the following table:

TABLE II. THE VALUE OF MEAN RANDOM CONSISTENCY INDICATORS(RI) FROM ORDER 1 TO 9

Order	1	2	3	4	5	6	7	8	9
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45

B. Weight calculation of performance appraisal indicators in the cultural industry demonstration zone

1) Weight calculation of first-class indicator

There are five first-class indicators, which, according to experts' evaluation, can be divided into a five-order judgement matrix.

$$M_{5 \times 5} = \begin{pmatrix} 1 & 1/5 & 1/3 & 1/2 & 2 \\ 5 & 1 & 2 & 3 & 7 \\ 3 & 1/2 & 1 & 2 & 7 \\ 3 & 1/3 & 1/2 & 1 & 4 \\ 1/2 & 1/7 & 1/7 & 1/4 & 1 \end{pmatrix}$$

And the normalized feature vector is $X_{ABCDE} = (0.0857, 0.4294, 0.2709, 0.1693, 0.0446)^T$, in which the values are the weight allocation of first-class indicator. The maximum eigenvalue is $\lambda_{\max} = 5.1536$. $CR = 0.034 < 0.1$, passing the consistency test.

2) Weight calculation of second-class indicator

The weight, feature vector and consistency test of second-class indicators under the corresponding first-class indicators can be calculated with the same method. The weight vector of A1-A5, the second-class indicators of zone management and service,

is $X_{A_1 A_2 A_3 A_4 A_5} = (0.1443, 0.2513, 0.4718, 0.0777, 0.0549)^T$, and

the maximum eigenvalue is $\lambda_{\max} = 5.0625$. $CR = 0.014 < 0.1$, passing the consistency test. The weight vector of B1-B2, the second-class indicators of industrial development, is $X_{B_1 B_2} = (0.8, 0.2)^T$. There is no need to check the consistency. The weight vector of C1-C3, the second-class indicators of total economic benefit, is $X_{C_1 C_2 C_3} = (0.1429, 0.2857, 0.5714)^T$, and the maximum eigenvalue is $\lambda_{\max} = 3.0007$. $CR = 0.0006 < 0.1$, passing the consistency test. The weight vector of D1-D3, the second-class indicators of total social benefit, is $X_{D_1 D_2 D_3} = (0.6, 0.1, 0.3)^T$, and the maximum eigenvalue is $\lambda_{\max} = 3$, $CR = 0 < 0.1$, passing the consistency test. The weight vector of E1-E3, the second-class indicators of enterprise operation and management in the zone, is $X_{E_1 E_2} = (0.6667, 0.3333)^T$. There is no need to check the consistency.

3) Weight calculation of third-class indicator

The weight of third-class indicators under the respective second-class indicators can be calculated with the same method, and their multiplication is the weight coefficient of 31 specific indicators. And the ranking is shown in table3.

C. Result analysis

The performance appraisal indicator system of cultural industry demonstration zone in Tianjin can be built on the basis of AHP (as the table3). It can be seen that, according to the weight, the importance ranking in the first-class indicators is industrial development (42.94%), total economic benefit (27.09%), total social benefit (16.93%), zone management and service (8.57%), and operation and management of enterprises in the zone (4.46%). Obviously, the index of industrial development is the primary factor of assessing the performance of industrial clusters. And the next two are respectively the total economic benefit and total social benefit, economic and social indexes in the evaluation, which are helpful to make rational guiding and panning with zone development. The other two indicators aim at the management and service, also necessary to the whole performance appraisal.

TABLE III. INDICATOR WEIGHTS OF PERFORMANCE APPRAISAL IN THE DEMONSTRATION ZONE

First-class indicators (5)	Weight %	Second-class indicators	Weight %	Third-class indicators(32)	Weight %	Weight Coefficient %	Importance ranking
Zone management and service	8.57	Development planning	14.43	Regulation of zone development planning	50.00	0.62	22
				Implementation of zone development planning	50.00	0.62	23
		Infrastructure	25.13	Accumulated growth rate of infrastructure investment	20.00	0.43	26
				Perfect degree of infrastructure	80.00	1.72	15
		Public service	47.18	Industrial service capability and provision	66.67	2.70	11
				Perfect degree of zone management rules	22.22	0.90	19
				property service capability	11.11	0.45	25
		Investment attraction	7.77	Actual amount and growth rate of Investment and The growth rate	1.00	0.66	21
		Self-management	5.49	Standard degree of enterprise management	66.67	0.31	30
				Cooperation degree between industrial and territorial management	33.33	0.16	32
Industrial development	42.94	Industry cluster	80.00	Quantity growth rate of settled cultural enterprises	25.00	8.59	3
				Ratio of enterprises integrating culture with technology	75.00	25.76	1
		Business incubation	20.00	The incubation capital invested by the zone itself	33.33	2.86	10
				The number of cultural enterprises incubated by the zone itself	66.67	5.72	4
Total economic benefit	27.09	Capital scale	14.29	Total amount and growth rate of capital	1.00	3.87	7
		Revenue scale	28.57	Value-added	57.14	4.42	6
				Increase rate of main business revenue	14.29	1.11	17
				Revenue ratio of cultural businesses	28.57	2.21	12
Profitability	57.14	Operating profit	1.00	15.48	2		
Total social benefit	16.93	Social influence	60.00	Total tax payable and growth rate	36.84	3.74	8
				New-job growth	36.84	3.74	8
				Industry influence	19.28	1.96	14
				Participation in social public welfare	7.04	0.72	20
		Political orientation	10.00	The performance of party organizations	33.33	0.56	24
				Content orientation of products and services	66.67	1.13	16
Audience Reflection	30.00	Market recognition of products and services	1.00	5.08	5		
Operation and management of enterprises in the zone	4.46	Cultural creation, production and service	80.00	R&D expenditure and growth rate	10.95	0.39	27
				The number and growth rate of independent intellectual property rights	58.15	2.07	13
				Output and proportion of new cultural products	30.90	1.10	18
		Team construction	20.00	The proportion of certified cultural professionals	40.00	0.36	28
				The proportion of talents with middle or senior professional titles	40.00	0.36	29
				Per capita cost of professional training in the cultural field	20.00	0.18	31

Given the specific weight coefficient and ranking, we can observe that the significant indicators include the ratio of enterprises integrating culture with technology(25.76%), operating profit(15.48%), quantity growth rate of settled cultural enterprises(8.59%), the number of cultural enterprises incubated by the zone itself(5.72%), and market recognition of products and services(5.08%). These indicators mainly aim at the growth of zone economic and social benefits, and the innovation, services and development levels of cultural enterprises. They point out the correct direction for the government to make rational assessment, guidance and planning with the clusters.

V. EXAMPLE VERIFICATION

According to the weight coefficient of each indicator and the four-stage scoring system, we can confirm the scoring standards of qualitative indicators and some quantitative indicators, set the indicator score, and regulate the corresponding rule of score coefficient and percentile interval. Before the score assessment, corresponding score coefficient should be confirmed based on the principle, and compute the score as the following formula: the score of qualitative indicators is equal to the score of this indicator times its score efficient. The testing objects are China's Tianjin Press and Publication Technology Industrial Park, The Sixth Creative Industrial Park and Tianming Creative Industrial Park. According to the specifications of the indicators, their scores are respectively 601, 504 and 433. And converted by a percent system, they are respectively 84.6, 71 and 61. The evaluation with industrial clusters is also supposed to be based on the appraisal indicator assessment, considering some particularly distinct behaviors or facts to give additional bonus or disciplinary deduction. And then the comprehensive assessment can be made in the end. The real development condition can be basically reflected through the evaluation method, which is rational and feasible to use this indicator

system for the performance appraisal of cultural industry demonstration zone.

VI. CONCLUSION

This paper, starting with the characteristics of the cultural industry demonstration zone, designed a indicator system oriented with focus on economic and social indexes, confirmed and analyzed the weight of all indicators by means of AHP, and formed a set of referential indicators for assessing the cultural industry demonstration zone. We can draw two conclusions from it: 1) The evaluation with social benefits should also be emphasized at the same time of considering the economic benefit so that they can give full play to their demonstration, guidance and service for developing industrial zone. 2) It is important for cultural enterprises to focus on the integration with innovation and technology, establish a platform for cultural, scientific and technological innovation, and garner the related professional talents. In addition, its capability and quality of business incubation can get promoted through the platform.

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