Evaluation of General Aviation Industry Policy Service Quality Based on Cloud Model Evaluation

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Abstract. In view of the low service quality of China's general aviation industry policy, this paper combines the operational characteristics of the general aviation industry to construct a systematic and comprehensive evaluation system of general aviation industry policy service quality, and uses this index system to adopt the cloud model to general aviation industry policy service quality. Conduct an assessment and analyze the service quality of China's general aviation industry policy based on the results of the assessment, so as to provide a basis for policy formulation for general aviation industry.

1. Introduction

Since August 2010, the State Council and the Central Military Commission issued the "Opinions on Deepening the Management Reform of China's Low-altitude Airspace". Since then, relevant state departments have taken active actions and a series of policies and initiatives to promote the development of general aviation have come one after another. However, there are still many problems in the establishment of policy objectives or the management, implementation, and effects of policies. The structural reforms in the supply side of industrial development under the "new era" do not meet the requirements of industrial development efficiency. Therefore, General aviation industry policy service quality assessment is of great significance.

2. Construction of General Aviation Industry Policy Service Quality Evaluation Index System

2.1. Basic Ideas for Constructing General Aviation Industry Policy Service Quality Evaluation Index System

The prominent feature of the indicator system is that there are strong internal links among the indicators that make up the index system. The indicators are not arbitrarily stacked, but are grouped together according to a certain structural relationship. Therefore, the general aviation industry policy service quality evaluation index focuses on the evaluation of the general aviation industry policy implementation effect, and establishes a policy service quality performance evaluation index system that conforms to multiple perspectives and focuses on each.

Usually, we consider the quantitative indicators excessively during the process of designing the indicator system. For qualitative indicators, they are discarded because of lack of corresponding quantitative standards, but often the factors of these qualitative indicators are decisive. Therefore, in the process of constructing a general aviation industry policy service evaluation index system, it is necessary to add corresponding qualitative indicators as much as possible, and at the same time quantify the qualitative indicators in order to achieve quantitative management of qualitative indicators.

The descriptive indicator system is a basic part of the general aviation industry policy service quality assessment index system. Its purpose is to comprehensively and systematically record and describe the three processes and results of policy formulation quality, implementation effect and implementation effect, and to reflect the overall operation status of the policy. This is the basis for the service quality evaluation of general aviation industry policies. Only by doing a good job of this foundation can we establish an indicator system.

Table 1. General Aviation Industry Policy Service Quality Evaluation Index System

First-level indicators	Secondary indicators	Third-level indicators
Policy service quality	Policy enforcement agency efficiency	Policy implementation mechanism is scientific and rational
		Policy implementation support
		Policy implementation supervision and evaluation
		Other related departments' participation and promotion
	Policy service efficiency	Timeliness and convenience of policy implementation
		Policy implementation visibility and clarity
		Policy Implementation Performance Systematic and Reliability
	Policy Object Participation	Policy awareness and recognition
		Policy utilization and enforcement
		Policy recommendation

3. General Aviation Industry Policy Service Quality Cloud Assessment

3.1. Overview of Comprehensive Evaluation Model Based on Cloud Model
  (1) Build an evaluation index system
  Use Delphi expert scoring method and AHP (AHP) to determine the weight of each indicator.
  (2) Determine the evaluation criteria
  Determined evaluation criteria, "Very satisfied" is 90-100; "Compatible" is 80-89 points; "General satisfaction" is 60-79 points; "Not satisfied" is 40-59 points; "Very dissatisfied" is 0-39 points.
  (3) The actually obtained data is processed by the inverse cloud generator
 The single-factor cloud model and its digital signature calculation process are as follows:
 Input indicator: Sample point X_i (i=1, 2, 3, n)
 Output indicators: Three digital characteristics of the cloud model (Ex, En, He).
  The formula is:

 1) Calculate the average value $\overline{X} = \dfrac{1}{n}\sum_{i=1}^{n} x_i$ of each sample data x_i, the first-order general absolute

center moment $B = \dfrac{1}{n}\sum_{i=1}^{n} \left| x_i - \overline{X} \right|$, and the sample variance $S^2 = \dfrac{1}{n}\sum_{i=1}^{n} (x_i - \overline{X})^2$;

 2) $Ex = \overline{X}, En = \sqrt{\dfrac{\pi}{2}} \times \dfrac{1}{n}\sum_{i=1}^{n} \left| x_i - Ex \right|, He = \sqrt{S - En^2}$.

  (4) Utilize a comprehensive algorithm in the cloud model. We combine evaluation cloud of each index into comprehensive evaluation cloud. The calculation process is as follows:

$$Ex = \frac{Ex_1 w_1 + Ex_2 w_2 + \mathrm{L} + Ex_n w_n}{w_1 + w_2 + \mathrm{L} + w_n}$$

$$En = \frac{w_1^2}{w_1^2 + w_2^2 + \mathrm{L} + w_n^2} En_1 + \frac{w_2^2}{w_1^2 + w_2^2 + \mathrm{L} + w_n^2} En_2 + \mathrm{L} + \frac{w_n^2}{w_1^2 + w_2^2 + \mathrm{L} + w_n^2} En_n$$

$$He = \frac{w_1^2}{w_1^2 + w_2^2 + \mathrm{L} + w_n^2} He_1 + \frac{w_2^2}{w_1^2 + w_2^2 + \mathrm{L} + w_n^2} He_2 + \mathrm{L} + \frac{w_n^2}{w_1^2 + w_2^2 + \mathrm{L} + w_n^2} He_n$$

(5) Draw a comprehensive analysis of the evaluation and model, Figure 1.
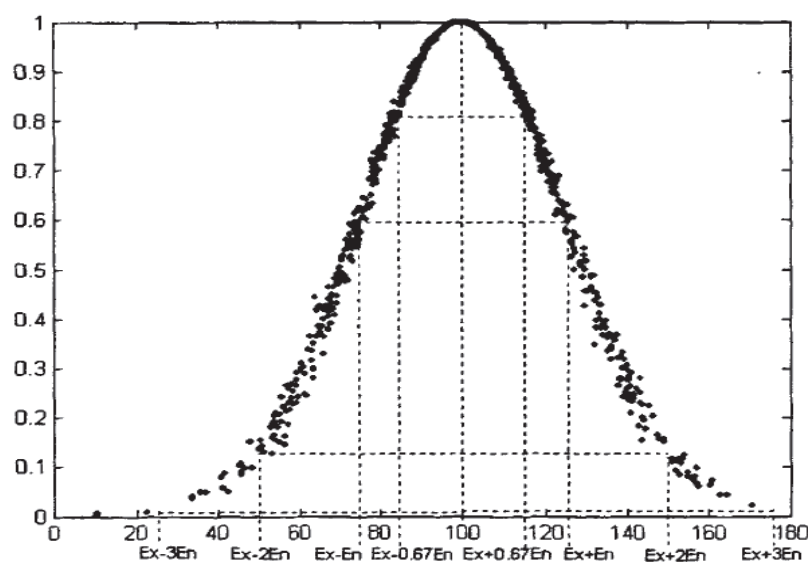
Figure 1. Comprehensive analysis of the evaluation and model

3.2. General Aviation Industry Policy Service Quality Cloud Assessments

(1) Establish a General Aviation Industry Policy Service Quality Assessment Standard

For the above evaluation index system, the evaluation criteria of each index correspond to the expert's experience knowledge, with a certain amount of fuzzy language values to represent a certain quantitative range of values, the cloud representation in the score field of the evaluation criteria for each indicator is as follows: "Quality is very excellent" is 90-00 points; " Quality is excellent " is 80-90 points; "Good quality" is 60-79 points; "General quality" is 40-59 points; "Low quality" is 0-39 points.

(2) Determine the index weight coefficient.

According to the expert's practical experience, establish the range of numerical values of the evaluation factors and the corresponding language description as shown in Table 2.

Table 2. Evaluation Factors Weight Distribution Range and Qualitative Language Description

Weight range	0-0.05	0.05-0.1	0.1-0.15	0.15-0.2	0.2-0.25	0.25-0.3	0.3-0.35	0.35-0.4
power level	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
Expected value	0025	0.075	0.125	0.175	0.225	0.275	0.325	0.375

Experts are invited to score the intensity levels of various evaluation index systems. The following are the methods: In the first round of consultations with experts, the opinions of various experts are scattered, resulting in relatively large En and He. The resulting cloud droplets are more discrete, and the

cloud image is overall hazy. In the second round of solicitation of expert opinions, En and He gradually decreased. The cloud map at this time was more concentrated than the first time, indicating that the concept began to form; in the third round, En and He again decreased, and the cloud image at this time More cohesive, indicating that the concept has been formed. After the third round, the weights of general aviation industry policy service quality evaluation indicators were determined, and the results are shown in Table 3

Table 3. General Aviation Industry Policy Service Indicators Evaluation Index Weights

	First-level indicator weights	Second-level indicator weight (relative to the first-level indicator weight)	Secondary indicator weights (relative to total indicator weights)
Policy service quality	Policy enforcement agency efficiency(0.5139)	0.5121	0.3891
		0.2781	0.1688
		0.1091	0.0721
		0.0391	0.0301
	Policy service efficiency(0.2583)	0.1039	0.0285
		0.2721	0.0611
		0.6801	0.1581
	Policy Object Participation(0.2278)	0.2389	0.0171
		0.5891	0.0431
		0.0718	0.0081

(3) Qualitative quantitative transformation and comprehensive evaluation of evaluation indicators

Table 4. General aviation industry policy service quality evaluation index description

Factors	Factor	Reviews	Quantitative value
Policy enforcement agency efficiency	Science and Rationality of Policy Execution Mechanism	Good quality	75
	Support for policy implementation	Excellent quality	85
	Supervision and evaluation of policy implementation	Good quality	75
	Participation and promotion of other relevant departments	Good quality	75
Policy service efficiency	Timeliness and convenience of policy implementation	Excellent quality	85
	Publicity and clarity of policy implementation	Very excellent quality	93
	Systematic performance and reliability of policy execution performance	Excellent quality	85
Policy Object Participation	Policy awareness and recognition	Good quality	75
	Policy utilization and enforcement	Excellent quality	85
	Policy recommendation	Excellent quality	85

Table 4 is an evaluation questionnaire for general aviation industry policy service quality. According to the expert's knowledge and experience, the cloud model is used to describe each evaluation criterion of the evaluation index, and then the cloud generator is used to realize the qualitative and quantitative transformation of the specific indicators of the green evaluation, and the quantified values of each evaluation index are obtained.

According to the obtained quantified value and the weight coefficient of each index calculated above, the general principle of multi-factor comprehensive evaluation model is used to calculate the comprehensive score of general aviation industry policy service index. The formula is as follows:

Composite score $=\sum_{i=1}^{10} W_i F_i$ (i indicates the number of evaluation indexes, F_i is the quantization value of the i-th index, and W_i is the weight coefficient of the i-th index)=0.3891 *75+0.1688*85+0.0721*75+0.00301*75+0.0285*85+0.0611*93+0.1581*85+0.0171*75+0.0431*85+ 0.0081*85=78.3733. Therefore, we can see that the general aviation industry policy service quality is "good quality."

4. Analysis of General Aviation Industry Policy Service Quality Performance

4.1. Efficiency Analysis of General Aviation Industry Policy Implementation Agency

First, the organization and division of labor of the policy implementation organizations providing services are unreasonable. China's policy formulation and enforcement powers are highly centralized. The government has both policy and enforcement powers for related industrial management. China's general aviation industry started relatively late and is still in an important period of transformation and upgrading. Therefore, general aviation industry policy issuance and enforcement agencies still consist of functional departments such as the State Council, Civil Aviation Administration, and relevant ministries and commissions, which make China's general aviation industry policy. The executive body is relatively single and the coordination and cooperation between the executive organizations is not proper and the overall responsibility is unclear. The internal organs of the policy enforcement agency can only be configured to cross each other, and the specific policies are not clearly defined by which agencies are used alone or in coordination. This has led to the implementation of policies. The unreasonable division of labor arrangement makes the efficiency of policy implementation organizations inefficient, and various general aviation industry policies cannot be implemented quickly and effectively.

Second, the implementation mechanism of policy enforcement agencies needs to be strengthened and improved. As far as China's current general aviation industry policy is concerned, prior to the implementation of various policies, the lack of corresponding material preparation and organizational preparations has failed to provide favorable guarantees for the good implementation of policies; it lacks a specific policy dissemination mechanism and policy publicity is not in place; After the implementation of the policy, there is no strict procedural supervision, which makes many policy central and local levels inconsistent, and the communication between departments and departments is not smooth, resulting in two results of a policy or in the implementation of the policy is not limited to the implementation of the policy Individuals understand that the implementation of policy is the starting point.

4.2. Analysis of General Aviation Industry Policy Service Efficiency

First, the timeliness of policy services is insufficient. After questioning the operation of general aviation companies in issuing questionnaire surveys, more than half of the enterprises reported that the current "General Aviation Mission Approval and Management Regulations" have a long and good time for the approval of missions. Because the time limit for approval is not clear, some general aviation companies have undertaken the mission of flying operations. However, due to the delay in approval, the mission of flight operations cannot be normally carried out, which has seriously affected the economic benefits of the company and restricted the development momentum of the company.

Second, policy service procedures are more complicated. In June 2016, the Civil Aviation Administration promulgated and implemented the new "General Aviation Business License Management Regulations" as an example. The new version simplifies the process of applying for the approval of the general aviation company's business license and cancels the original preparation and approval procedures so that the general aviation company can obtain operational qualifications from the previous three steps. Go into two steps: business license, running qualified. However, after calculation, business license + operation certification still requires about 3-5 centralized review meetings, personnel meeting arrangements, accommodation, vehicles, aircraft transportation, fuel, airspace, etc. There is still

a certain gap between this declaration service procedure and the current need for high-efficiency policy service support in the development of the general aviation industry at the current stage. The manpower cost, time cost and capital cost are still burdensome for general aviation companies.

4.3. General Aviation Industry Policy Object Participation Analysis

First, the policy object participation mechanism needs to be improved. Taking the development of small and medium-sized general aviation enterprises as an example, the ability of technological innovation is the key to the survival and development of such enterprises. However, subject to the constraint of cost constraints, such enterprises cannot invest too much money in technological research and development and innovation. In response to this problem, the Civil Aviation Administration annually has related financial support policies to encourage and guide enterprises in technological innovation. Of the more than 50 general aviation companies surveyed, less than 10% knew about such policies. The reason for this is mainly due to the imperfection of the policy publicity mechanism and the policy information disclosure mechanism, which makes it impossible for all types of general aviation companies to fully understand the formulation, content, implementation progress, and implementation results of a certain policy, making general aviation objects of all types less knowledgeable about policies.

Second, policy participants' awareness of participation is weak. Constrained by the influence of traditional concepts and the absence of existing systems, for a long time, the subjects of various general aviation policy subjects have a certain degree of passiveness in the formulation and implementation of policies. Through research, we found that there are two main aspects. First, subjectively speaking, some of the research participants have a higher level of enthusiasm for policy formulation and strong desires to raise demands. They believe that the quality of policies can actually affect their own. The development is subject to the lack of channels for advice and advice, and the proposal does not receive due attention. In the long run, it abandoned the participation. Second, the object of policy implementation is weak in the opinions and suggestions on relevant policies. A considerable part of the target groups are unwilling to participate. The proposal and improvement of various policy advisory opinions promulgated by the CAAC have been proposed. It is believed that this will increase extra time and labor costs, affect the economic efficiency of the enterprise, and it is difficult to truly enjoy the benefits of the policy.

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