**Priority Selection of Information Policy Plan Based on the Weighted Gray Target Decision Theory**

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**ABSTRACT:** Scientifically confirming the information policy programs is a premise for successfully implementing the information policy. How to choose the best programs in a variety of programs has become the key issue. This paper, based on the grey target theory, sorts the multiple programs according to the Off-Target distance and provides a theoretical basis for choosing the best program.

**KEYWORDS:** Information Policy Plan; Weighted Gray Target Theory; Off-Target distance; Priority Selection

1. **INTRODUCTION**

In the era of information explosion, the establishment of information production, distribution, exchange and consumption in all areas of information policy regulation is particularly important. The reference [1] divides the information policy into nine stages, respectively: risk assessment, policy development, policy approval, policy awareness and training, policy implementation, monitoring (audit and automation tools), policy enforcement, policy review, policy failure. How to select the optimal scheme in many schemes, to ensure the effective implementation of the policy has become an urgent problem to be solved. The grey target theory of grey system theory founded by Professor Deng Julong [2] can provide different project identification, selection excellent, classification sorting, and even this ordering is a classification result obtained after considered the indicators evaluated unit, this method is widely used in different areas. Therefore, the author have been constructed the index system through the letter Construct comprehensive evaluation model for information policy options and the index weight based on the theory of grey target in a better scheme for pattern optimization, the optimal scheme is obtained to ensure the efficient implementation of information policy.

2. **THE BASIC THEORY OF WEIGHTED GREY TARGET DECISION THEORY**

Grey target theory is a sequential pattern of grey relational analysis theory. Can be used for pattern recognition and patterns optimization, pattern classification, and the so-called pattern refers to the geometric model, scheme, evaluation object etc. Whereas, in practice, different indicators in different decision has different role, so the indexes of multi objective decision making be equally looked as are not in accord with the actual situation. Therefore, this paper deal with the known patterns based on the grey target theory by weighted method. Basic steps of Weighted grey target principle analysis are as follows:

2.1 List the effect of the program set A on the index set of sample matrix R, and R for non-dimensional treatment, get R'.

2.2 Determine the standard model

Index is usually divided into three kinds of maximum POL (max), the minimal value of POL (min) and moderate polarity POL(men). That is, when POLr(n)=POL(max), r0'(n)=maxri(n), ri(n) ∈ r(n); when POLr(n)=POL(min), r0'(n)=minri(n), ri(n) ∈ r(n); and when POLr(n)=POL(men) r0'(n)=u0(appointed value) or r0'(n)=avgri(n), ri(n) ∈ r(n), in this case the series r0'={r0 '(1),r0'(2),…,r0'(n)} is called as the standard state mode. Where i is the number of programs, n is the number of indicators.
2.3 The weight of the index

Because each index is different in the plan, so the weight vector $w_i, (i=1, 2, \cdots n)$ of each index is determined by the Delphi method or the AHP method.

2.4 Determine decision matrix and target through grey target transformation

Grey target transformation was carried out on the known index set $R'$, which was the grey target decision matrix $T$, namely, the new index sequence $r_i = (r_i(1), r_i(2), \cdots r_i(n))$, as the $T$ transform, the $r_i$ and $r_0'$ as the grey target transformation:

$$T ri(k) = \frac{\min \{r_i(k), r_i'(k)\}}{\max \{r_i(k), r_i'(k)\}}$$

If $T r0' = r0$, where $r0'$ is the standard model, $r0 = \{r0(1), r0(2), r0(3), \cdots r0(n)\} = \{1, 1, 1, \cdots, 1\}$, then $r0$ is called the grey target, referred to as the target center.

2.5 Calculate the distance to target center

$$\xi_i = |r_i - r0| = \sqrt{\sum_{i=1}^{n} w_i (r_i - r_0)^2}$$

Which is the distance of the effect vector $r_i$.

3. THE APPLICATION OF THE WEIGHTED GREY TARGET THEORY IN THE OPTIMIZATION OF INFORMATION POLICY

Weighted grey target decision theory is effective in less data and uncertain case particularly, and has the advantages of simple calculation. Therefore, it is more applicable in the study which cannot solve the small sample, multi index information policy scheme selection problems.

Related indexes and weights of the information policies had been determined in the comprehensive evaluation model for information policy scheme construction and experiment [10]. With further research, the author thinks that comparing the policy environment factors to aging factors. The former involves the wider scope, and more clear. Therefore, the aging factors can be replaced by the policy environment factors effectiveness in this index. That is the index set of the information policy include \{clear, innovation, scientific, normative, integrity, authority, the policy environment, cognitive degree, the degree of interest regulation, degree of implementation\}.

To implement a policy of information, select four better alternatives, respectively A1, A2, A3, A4, and transform the fuzzy evaluation to scores. Each component value index score in the range of [90,100], is very good, [80,89] is good, [70,79] is relatively good, general and poor were [60,69], [0,59]. The author takes the following algorithm to simulate experts scoring: first step: $i=0$; and randomly generated 10 numbers in the range of 70~79, and stored the sum in the first element of their $s[i]$ of the array $s$. The second step: the 10 random numbers and their output and $i=i+1$, third steps: randomly generated 10 values in the number range between 70~79, and they will be stored in $s[i]$. The fourth step: if $f= s[0]$, output the 10 random number and $s[i]$; $i=i+1$; otherwise go to step third. The fifth step: if $I$ is less than or equal to 4, to over.

Algorithm is a function of [70,79] interval randomly generated four groups of the sum of the same data, and the each group consisted of 10 values, representing ten measured index scores. With Java program carry out the algorithm, to score results for 746 random data as an example, the effect of sample values are shown in Table 1, determine the optimal scheme.

<table>
<thead>
<tr>
<th>Index</th>
<th>Clear</th>
<th>Innovation</th>
<th>Scientific</th>
<th>Normative</th>
<th>Integrity</th>
<th>Authority</th>
<th>Policy Environment</th>
<th>Cognitive Degree</th>
<th>The degree of interest regulation</th>
<th>Degree Of Implementation</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>78</td>
<td>74</td>
<td>72</td>
<td>78</td>
<td>73</td>
<td>74</td>
<td>75</td>
<td>72</td>
<td>75</td>
<td>75</td>
<td>746</td>
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<tr>
<td>A2</td>
<td>73</td>
<td>73</td>
<td>74</td>
<td>78</td>
<td>76</td>
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<td>77</td>
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<td>A3</td>
<td>78</td>
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<td>79</td>
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<td>71</td>
<td>70</td>
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<td>72</td>
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<tr>
<td>A4</td>
<td>70</td>
<td>74</td>
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<td>79</td>
<td>70</td>
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<td>77</td>
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<td>746</td>
</tr>
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</table>

By using the weighted grey target decision theory, the optimal scheme is selected, and the specific steps are as follows:

(1) Because the index value of this plan is a hundred percent system value, the units are united, so it does not need to carry on the non dimensional...
transformation. The effect of the scheme set on the index set is \( R \).

(2) As a result of the program indicators are linear indicators, the greater the value of the better, that is, the greater the score, the more close to the satisfaction of the indicators, so the maximum polarity is best choice, that is when \( \text{POL}_r(k) = \text{POL}(\text{max}) \), the best choice is \( r^*(k) = \text{max}_{i} r_i(k) \in r(k) \).

(3) In the comprehensive evaluation model construction and simulation experiment of the information policy plan, we can know the index weight is:

\[
\begin{align*}
&w_1=0.194, \quad w_2=0.037, \quad w_3=0.136, \quad w_4=0.026, \\
&w_5=0.042, \quad w_6=0.128, \quad w_7=0.157, \quad w_8=0.082, \quad w_9=0.084, \\
&w_{10}=0.114.
\end{align*}
\]

(4) According to the grey target transformation formula \( \text{Tr}_r(k) = \frac{\min \{r_i(k), r^*_r(k)\}}{\max \{r_i(k), r^*_r(k)\}} \), the target center \( r_0 = \{1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \} \), the grey target decision matrix \( T \) can be calculated as

\[
\begin{bmatrix}
1 & 0.9367 & 0.9114 & 0.9873 & 0.9605 & 0.9737 & 0.9740 & 0.9351 & 0.9494 & 0.9494 \\
0.9359 & 0.9241 & 0.9367 & 0.9873 & 1 & 0.9474 & 1 & 0.9481 & 1 & 0.8987 \\
0.8974 & 0.9367 & 1 & 1 & 1 & 1 & 1 & 1 & 0.9114 & 0.9494 \\
0.8974 & 0.9367 & 1 & 1 & 0.9211 & 1 & 1 & 0.9091 & 0.9114 & 1
\end{bmatrix}
\]

(5) Computing the target distance of every scheme from the standard scheme

\[
\xi_i = |r_i - r_0| = \sqrt{\sum_{i=1}^{n} w_i (r_i - r_0)^2} = \sqrt{w_1 [r_1(1) - r_0(1)]^2 + w_2 [r_2(1) - r_0(2)]^2 + \cdots + w_n [r_n(1) - r_0(n)]^2}
\]

Get \( \xi_1 = 0.048306646, \quad \xi_2 = 0.057484346, \quad \xi_3 = 0.068278168, \quad \xi_4 = 0.06154628 \) that is \( \xi_1 < \xi_2 < \xi_4 < \xi_3 \).

It can be seen from the theory, the smaller \( \xi_i \) the closer scheme \( i \) from the target center, the primer the scheme is. Through the above calculation it is clear that A1 program for the optimal solution. then the rest orders are A2, A4, A3.

4. CONCLUSIONS

Because the samples are all the better schemes and the total score are same, it cannot measure the optimal scheme. The author attempts introducing weight vector, based on the grey target theory, the weighted grey target decision theory is introduced for the first time into information policy scheme optimization, using the theory of treatment and four schemes were calculated and selected the optimal scheme that the method in dealing with such problems is feasible, and has the value of popularization.

REFERENCES


