Construction of Weibo Operation Evaluation System for Energy Enterprises under the Background of Big Data

To cite this article: Wang Han et al 2018 IOP Conf. Ser.: Earth Environ. Sci. 199 032018
Construction of Weibo Operation Evaluation System for Energy Enterpris-es under the Background of Big Data

Wang Han 1,a, Xia Liyu 1 and Wang Youzi 1
1Researcher, State Grid Energy Research Institute Co.,Ltd., Beijing, China

Abstract. New media construction is an important part of the current energy enterprise brand building work, and its development has a great impact on the company's brand image. Constructing a new media influence and communication evaluation index system with the characteristics of energy enterprises is conducive to the realization of closed-loop management of the company's new media development, improving the level of lean management, and vigorously promoting the construction and dissemination of new media. This paper comb-bines the internal and external situations currently facing the energy enterprise brand building work, and innovatively builds a new media evaluation system to provide the basis and direction for the development of new media construction of energy enterprises.

1. Introduction
Weibo, short for MicroBlog, is a kind of blog, a broadcast-style social networking platform that shares short-lived information through a mechanism of attention. Weibo is a platform for sharing, disseminating and acquiring information based on user relationships. Users can set up a personal community through various clients such as WEB and WAP, and update information with 140 words (including punctuation marks), and realize instant sharing. In recent years, Weibo has become one of the important windows for the external promotion of energy companies, but its evaluation of communication effects has always been one of the problems that plague enterprises. Especially for large-scale energy enterprises, the evaluation of Weibo communication effect at all levels of units is not only related to the brand promotion effect of enterprises, but also plays an important role in promoting the construction and development of new media in various units.

2. Design Principle of Evaluation Index System
2.1 Formatting the title, authors and affiliations
Through the establishment of a clear and well-defined indicator system, the company will conduct a comprehensive evaluation of all aspects of the company's new media operations. In the design of the indicator system, due consideration should be given to the differences in the nature, geographical location and development stage of the respective units, and comprehensive coverage of the factors affecting the construction of new media such as the scope of communication, audience interaction and content quality, and overall consideration of the quality of new media construction and development. Multiple evaluation dimensions such as quantity and speed ensure that the indicator system can reflect the company's new media operations in all aspects and in multiple angles.
2.2 Guiding Principle
Clearly carry out the main purpose of the evaluation of the construction of the new media system, which will guide the development of new media construction in all units in the right direction. In the evaluation index system, it highlights problem diagnosis, highlights improvement and highlights, highlights innovation highlights, and focuses on guiding all units to find their own shortcomings, seeking improvement directions, encouraging active benchmarking of outstanding units, clarifying efforts and learning from advanced experience, so as to enhance new media. The purpose of the operational level of operation.

2.3 Systematic Principle
There should be a clear logical relationship between the indicators of the evaluation index system. It can not only reflect the dissemination, influence and guidance of new media of various units from different aspects, but also reflect the status and characteristics of the overall development of new media of various units. The indicators are independent of each other and are connected to each other to form an organic unity.

2.4 Reliability principle
In the selection of indicators, the indicators that can obtain objective data are mainly used, and the statistics and methods of data statistics are clearly defined in the definition of indicators, and the official back-ground statistics of each new media platform are fully utilized to reduce false reporting and fraudulent behavior in the process of data acquisition to ensure The authenticity and accuracy of the data.

3. Selection of indicators for evaluation index system
According to the functional positioning of the official Weibo of the energy enterprise, the characteristics of the Weibo platform dissemination, and the actual situation of the media communication work of each unit, considering the volume of each affiliated company and the stage characteristics of the development of the Weibo platform, the company's official Weibo evaluation system is set up. There are 6 lists in the list of communication power, popularity list, active list, diligence list, new list, and emergency response list.

Table 1. Weibo evaluation system indicators.( Level 1)

| List Name               | Level 1 Indicator          |
|------------------------|---------------------------|
| Communication power list| Original Weibo communication power |
|                        | Forward Weibo power        |
|                        | Peak Weibo power           |
| Popularity list        |                           |
| Active list            | Original Weibo activity    |
|                        | Forward Weibo activity     |
| Diligent list          | Original Weibo diligence   |
|                        | Forward Weibo diligence    |
| New list               |                           |
| Emergency response list|                           |
| New list          | - |
|-------------------|---|
| Emergency response list | - |

| Level 2 Indicator                  | Indicator Description                                                                 |
|-----------------------------------|----------------------------------------------------------------------------------------|
| Original Weibo reading            | Daily average readings of all original Weibo during the evaluation period               |
| Original Weibo forward volume     | Daily average forwarding number of all original Weibo during the evaluation period      |
| Forward Weibo readings            | Daily average readings of all forwarded Weibo during the evaluation period              |
| Maximum reading volume            | The highest number of Weibo readings issued during the evaluation period                |
| Fans volume                       | Average number of fans per day during the evaluation period                             |
| Fans stickiness                   | Average number of fans per day during the evaluation period                             |
| Likes of original Weibo           | Average daily praise of all original Weibo during the evaluation period                 |
| Original Weibo comment volume     | Daily average comments for all original Weibo during the evaluation period             |
| Likes of forward Weibo            | Average daily praise of all forwarded Weibo during the evaluation period                |
| Forward Weibo comment volume      | Average daily praise of all forwarded Weibo during the evaluation period                |
| Number of original Weibo          | The total number of original Weibo during the evaluation period                        |
| Original Weibo time distribution  | The number of coefficients of variation of the original Weibo daily average during the evaluation period |
| Number of Forward Weibo           | Total number of forwarded Weibo during the evaluation period                           |
| Reading growth rate               | Daily average readings during the evaluation period compared to the previous evaluation period |
| Like growth rate                  | The average daily praise rate during the evaluation period is higher than the growth rate of the previous evaluation period |
| Forwarding growth rate            | The average daily forwarding volume during the evaluation period is higher than the growth rate of the previous evaluation period |
| Fans growth rate                  | Average daily fans volume during the evaluation period compared to the previous evaluation period growth rate |
| Number of emergency events posted on Weibo | Number of emergency events posted on Weibo |
| Media Weibo forwarding            | The initial microblog of the emergency event was forwarded by the media microblog at the city level or above |
| Government Weibo forwarding       | The initial microblog of the emergency incident was forwarded by the government microblog at the municipal level or above |

4. Index System Data Processing Method

4.1 Weight calculation method
The weight of the indicator in the principal component analysis is determined, that is, the weighted average normalization process of the coefficient in the linear combination of the principal components is the weight of the variance of the principal component.

The first step: using the correlation coefficient matrix, using the maximum variance method for principal component analysis, to obtain the total variance and component matrix of the interpretation, it is recommended to retain the principal component with the eigenvalue greater than 1.

The second step: dividing the coefficient $\beta$ of each principal component by the square root of the corresponding eigenvalue $\lambda$, and weighting the variance contribution $\gamma$ to solve the weight initial value $\omega$ of the corresponding index. That is, assuming that there are $P$ variables and $p$ principal components are selected, the coefficient corresponding to the $j$ index of the $i$ principal component becomes:

$$\beta_{ij}^* = \frac{\beta_{ij}}{\sqrt{\lambda_i}}$$

(1)

The weight of the $j$th indicator is:

$$\omega_j = \frac{\sum_{i=1}^{p} \beta_{ij}^* \times \gamma_i}{\sum_{i=1}^{p} \gamma_i}$$

(2)

The third step: normalize the initial weight value to get the final weight value $w$:

$$w_j = \frac{\omega_j}{\sum_{i=1}^{p} \omega_i}$$

(3)

4.2 Data homogenization method

The per capita treatment of indicators is mainly to reduce the impact of factors such as unit volume and location on Weibo and WeChat communication power, communication effects and activity, and use the original indicators and population indicators to form strength relative indicators. The value of each relevant evaluation index is converted into a value measured by the number of customers using electricity, that is, the value of the total amount of the indicator is divided by the number of customers, so as to eliminate the influence of the difference in scale.

4.3 Data normalization method

Investigating the distribution characteristics of the index values, it can be found that the data distribution of most indicators is not uniform, showing the characteristics of “there are a number of maximal outliers, but there are significant differences in the maximal outliers.” According to the traditional normalization method, it will reduce the difference between the data, so that the evaluation results can not objectively reflect the true situation of the data, and also affect the fairness of the evaluation. Therefore, based on the characteristics of Weibo data, this topic proposes the following method.

If the data distribution is not uniform, the index value score is normalized to the interval of $[0, 100]$ by using the maximum value and the minimum value.

$$Z_i = \log_{\alpha}[1 + \frac{X_i - X_{\min}}{X_{\max} - X_{\min}} \times (\alpha - 1)] \times 100$$

(4)

If there is an abnormal value for the maximum value and the minimum value for the entire data set, the maximum value and the minimum value of the excluded abnormal value are normalized. The corresponding maximum abnormal value is 100, and the minimum abnormal value is 0.

$$Z_i = \begin{cases} 0, & X_i < X_{\min} \\ \log_{\alpha}[1 + \frac{X_i - X_{\min}}{X_{\max} - X_{\min}}] \times (\alpha - 1)] \times 100, & X_{\min} \leq X_i \leq X_{\max}^* \\ 100, & X_i \geq X_{\max}^* \end{cases}$$

(5)
In the selection of the logarithm base $\alpha$, the square of the median of the index is used, so that the normalized value of the median is 50, and the stability of the median is used to reduce the influence of the abnormal value on the normalized value. In addition, in order to further optimize the effect of data normalization, through multiple trial calculations, this topic proposes to adjust the entire set of data in the same proportion to ensure that the logarithm base $\alpha$ is greater than 0.01.

4.4 List comprehensive score calculation method
The comprehensive score of the indicator is obtained by weighting the scores of the indicators at all levels. It is the comprehensive evaluation result of the company's new media operations.

For the secondary index comprehensive score,

Secondary indicator composite score = normalized score

For the first-level indicator composite score

For the firstly index comprehensive score,

First-level indicator comprehensive score = $\sum$Secondary index comprehensive score $\times$ corresponding secondary index weight

For the overall score of the list,

List comprehensive score = $\sum$Level indicator comprehensive score $\times$ corresponding level indicator weight

The comprehensive score of the list can be used to calculate the ranking of each unit in the list. The higher the overall score of the list, the higher the ranking. The comprehensive scores of the first-level indicators and the comprehensive scores of the second-level indicators under each list can evaluate the performance of each unit's new media operations in the corresponding aspects, and find the focus of improving the effectiveness of new media operations.

5. Conclusions
The comprehensive score of the indicator is obtained by weighting the scores of the indicators at all levels. It is the comprehensive evaluation result of the company's new media operations. The comprehensive score of the list can be used to calculate the ranking of each unit in the list. The higher the overall score of the list, the higher the ranking. The comprehensive scores of the first-level indicators and the comprehensive scores of the second-level indicators under each list can evaluate the performance of each unit's new media operations in the corresponding aspects, and find the focus of improving the effectiveness of new media operations.

References
[1] R. Liu, Editor of Friends 1, 46-51+92 (2016)
[2] Y. Hu, J. Zhang, Young Reporter 04, 11-13 (2018)
[3] F. Xu, Chinese Publishing 10,39-42(2018)
[4] M. Xiao, Advertiser 11,179(2008)
[5] L. Xiao, Art Review 7, 79-82+67(2009)