Research on Intention Perception of Air Pollution Control Based on Text Analysis

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Abstract. In recent years, the issue of air pollution has attracted unprecedented attention, governments at all levels have issued intensive air pollution prevention and control policies to deal with air pollution¹, however, it is worth paying attention to how people perceive the intention of air pollution control and whether the effect can meet the actual demands of the public. This paper adopts text analysis method and uses the information of Micro Blog platform, especially the short text information, as the research object with the help of ROETCM tool to crawled the data related to air pollution control, so as to analyze the Internet users' perception of the effect of air pollution control, at the same time, it provides reference for better, more practical and more effective control of air pollution.

Keywords: Air pollution control; Air quality; Text analysis; Intention to perceive.

1. Introduction

Since 2014, most provincial governments have made it clear in their work reports that air pollution control should be a priority task. ¹² With the development of air pollution control work, China's air pollution control has also shown a certain effect. But how governance effect, not only to rely on government reports and data provided by the government as the only basis for standard, especially in the era of new media, citizens will through the media to present air pollution information to understand and interpret the atmospheric pollution around, and for research and development of the citizens' satisfaction is the key factor of affecting the behavior of the government.

At the same time, in the summary study of CNKI paper, it is found that the current China's atmospheric pollution control related research focus on the pollution type and material, pollution area, control measures, the pollution causes, etc., but for the effect of governance and citizen satisfaction research is less, and the literature review of related academic papers in lack of public data and interactive, and do not represent the visual evaluation, Internet users and the mass media information can satisfy the public right to know about the social life and guide the public to express and respond, so this paper selected the social network Micro Blog platform in the data, with the Internet users' perception of the effect of air pollution control, it is connected with the government management to provide reference for the government work.

2. Analysis Object, Analysis Method and Analysis Framework

2.1. Analysis Object

Based on the "Micro Blog" published on the application of Internet users’ Micro Blog essays as the research object, the content of this essay covers Internet users' concerns about air pollution control,
expressions of their emotional preferences, opinions and judgments, as well as images, videos, sounds, symbols, emoticons and so on. But because of choosing analysis tools have limitations, this paper still to crawl to the text data as the analysis object.

2.2. Analysis Method
In this paper, by means of content analysis and text analysis, the quantitative data of the Micro Blog posts made by Internet users on air pollution control were obtained, the non-quantitative Micro Blog materials were converted into quantitative research data, and visualization was carried out as the basis for text analysis. The specific quantitative data only selected two parts: word frequency statistics and emotion analysis. Text analysis is based on the data processed by content analysis. The text analysis method selected in this paper is to use the software analysis system ROSTCM6.0 (ROSTCM is currently the only large social computing platform in China developed by the research team of Wuhan University to assist the research of humanities and social sciences). In addition to ROSTCM6.0, this paper also uses the data assistant of Micro Blog to retrieve the information of Micro Blog database, enrich the analysis content, and capture more representative data.

2.3. Analysis Framework
The basic idea of this paper is to first analyze Internet users' impression of air quality in China, grasp Internet users' demand for air quality in social life, and from the analysis results, first understand Internet users' attitude toward government departments' participation in air pollution control, as a reference for subsequent analysis. With the help of a web crawler, respectively from the "Micro Blog" for "air quality", "air pollution" related to crawl Micro Blog in this essay, and then uses the word frequency analysis to process the data and sentiment analysis to get to, and visualization, at the end of the paper back to the "air pollution" a big topic, comprehensive analysis of the Internet users of atmospheric pollution control awareness and attitude, to provide reference to the government's other management work.

3. Perception Analysis of Air Pollution Control Intention
3.1. Internet Users' Perception of "Air Quality"

3.1.1. Analyze the word frequency of "air quality". After the crawling information is entered into ROSTCM6.0 through word segmentation, only the first 50 words are set to be extracted, and these data are visualized for analysis.

| Table 1. Word frequency table of "Air Quality" text data. |
|---------------------------------------------------------|
| Air quality       | Influence | Data | Measures | Improvement |  |
| Pollution        | 182       | Fireworks | Building | Xi’an | 25       | Process | 22     |
| Beijing          | 98        | Cubic meters | Discharge | Forecasts | 25       | Diffusion | 21     |
| Weather          | 83        | Firecrackers | Condition | Monitor | 25       | Cold air | 21     |
| Air              | 81        | Severe | Fine | Cannon vehicles | 25       | The whole city | 21     |
| Concentration    | 62        | Area | China | This year | 24       | Ranks | 20     |
| Environment      | 60        | Blue sky | Annual | Temperature | 24       | Ice sculpture | 20     |
| National         | 47        | Improve | Alert | To last | 24       | Our city | 20     |
| Compared to      | 44        | Environment Protection | Region | Forecast | 23       | Ministry of Environmental Protection | 20     |
| Falling          | 44        | Epb | Obvious | Pollutants | 23       | Period | 19     |

Source: According to Micro Blog data extraction
We can see from the table 1, in the retrieved data in the text of "air quality", Internet users mentioned most often in addition to retrieve the word "air quality", is "pollution", occurrences for 182 times, that Internet users in the perception of "air quality" "pollution" is an important point of cognition, among them, "concentration" and "severity" are mostly used to describe PM2.5, which is also an indicator to judge haze, which indicates that in the perception of Internet users, haze is also an important cognitive point; "Discharge" and "pollutants" are the source factors of solid pollutants, so Internet users are also concerned about solid pollutants that affect air quality. [3]

The following words also appeared in the table: Environmental Protection Bureau, early warning, measures, ministry of Environmental Protection, etc. These words have something in common, they are related to government functional departments and government management measures, which indicates that Internet users are very concerned about the efforts and work made by the government on air quality. But the data in the Internet appeared only focus on the functions of the government department of environmental protection, environmental protection bureau, it also suggests that in regulating the air quality issues, participate in the government's functional departments have limitations, not actively mobilize the government at all levels and all relevant departments of the engagement, thus unable to perceive the role of other government departments.

There are also several words related to change in the table: decline, improve, good, compared to the last, improvement, etc., which have accounted for most of the positive emotional words and it reflects the Internet users affirmed the current air quality improvement, combined with relevant government words frequency, also from the side reflects the users not only focus on the work done by government also affirmed the work of the government, the government in the past work is part of the success, the government can summarize effective governance from previous work experience.

### 3.1.2. An emotional analysis of the "air quality" data text.

According to ROSTCM6.0, after analyzing the word segmentation data of "air quality", the emotional tendency results are shown in Figure 1.

**Figure 1.** Emotional analysis of air quality.

![Emotional analysis of air quality](source)

From figure 1, you can directly see, Micro Blog essay in this information, reflects the tendency of Internet users mood is 77% positive emotions, 22% are negative emotions, 7% is neutral, this also directly reflects that most Internet users have a positive attitude towards the current air quality situation in China, but there are also some people are not satisfied with the current air quality status, refer to the word frequency statistics in table 1, presumably, the current atmospheric pollution situation is still severe, the pollution of governance is the important factors that affect Internet users on air quality perception.
3.2. Internet Users' Intention Perception of "Air Pollution Control"

3.2.1. The text word frequency analysis of "air pollution control" data

Table 2. Word frequency table of text data of "Air Pollution Control".

| Pollutants | 218 | Enterprises | 35 | Volatile | 20 | Committed to | 17 | Energy | 15 |
|------------|-----|-------------|----|----------|----|--------------|----|--------|----|
| Air        | 188 | Country     | 33 | City     | 20 | Our city     | 16 | Area    | 15 |
| Administer | 122 | Task        | 27 | Provincial government | 19 | Construction | 16 | Organization | 15 |
| Environment| 72  | Hebei       | 26 | Organic matter | 19 | Complete    | 16 | Clean   | 14 |
| Prevention and control | 64 | Key         | 25 | Fireworks | 19 | Jin-Ji      | 16 | Emission | 14 |
| crucial    | 50  | Project     | 23 | Experts   | 19 | Air quality | 16 | Ban     | 14 |
| Environmental protection | 43 | To convene | 22 | Convene | 19 | Growth      | 16 | Epb     | 14 |
| Action     | 42  | Plan        | 21 | Advances  | 18 | Period      | 16 | Improvement | 14 |
| Comprehensive treatment | 42 | Spring Festival | 21 | Discharge | 17 | Our province | 16 | Problem | 13 |
| Autumn winter | 38 | Firecrackers | 20 | Meeting | 17 | Measures    | 15 | Industry | 13 |

Source: According to Micro Blog data extraction

You can see this in Table 2 above, and the search object "atmospheric pollution governance" crawl to Micro Blog data in the text, The frequency of the word "pollution" is higher than that of the search words "atmosphere" and "governance", and the frequency of the word "governance" is less. By contrast, it can be concluded that the Internet users' are still paying attention to the current situation of air pollution, governance did not follow the status quo, from another angle, shows that government involvement in pollution control and didn't get the affirmation, Internet users or effect is not obvious didn't get more.

The relevant participants in Table 2 include the government, enterprises, organizations, experts, etc., which also indicates that Internet users believe that the main body of air pollution control is not only the government but also all sectors of society. Therefore, it is necessary for the government and all sectors of society to cooperate with each other and jointly promote the governance.

In addition, the words related to seasons in Table 2 also appear frequently, such as autumn and winter, Spring Festival and setting off firecrackers, etc., this also shows that Internet users pay special attention to air pollution control in autumn and winter, it also accord with our general understanding, but there is still a need for the government to pay more attention to the peculiarities of this season in order to deal with air pollution earlier and better in the period of hot attention.

3.2.2. Emotional analysis of the data text of "Air Pollution Control"

| Emotional analysis of air pollution control |
|-------------------------------------------|
| Positive emotions: 112                   |
| Positive emotions: 29                    |
| Positive emotions: 6                     |
| 2% 5%                                    |
| 93%                                      |

Source: According to Micro Blog data extraction

Figure 2. Emotional analysis of air pollution control.
As can be seen from the graph of emotion analysis in Figure 2, the positive emotions of Internet users on air pollution control account for 93%, while only 5% of Internet users are dissatisfied with the current situation of air pollution control. It shows that China's air pollution control policies and implementation are effective. On this basis, experience is summarized and more reasonable and efficient schemes are formulated. With the further improvement of the governance, more Internet users will trust.

4. Conclusion
First of all Internet users have very high attention to atmospheric pollution, from the above analysis, we can see whether the government main body and the government governance measures are Internet users widely mentioned and attention, in the form of sentiment analysis results, users of the government's governance has showed high positive emotions, so the government should draw lessons from past policies and measures, formulate more reasonable and efficient plans, further promote air pollution control, optimize air quality, and improve citizens' satisfaction.
Secondly, Internet users pay attention to the government's governance measures, and the focus of Internet users' attention to the government's work is still the governance measures. Although these measures have a certain preventive effect, they are still measures to treat the symptoms rather than the root causes. Comprehensive analysis shows that Internet users also pay great attention to the work of the government. Therefore, it is necessary for the government to promote economic transformation and upgrading more reasonably and effectively, increase publicity, pay attention to the real-time follow-up and summary of governance effects, grasp the perception of citizens' intentions, and fundamentally regulate the causes of air pollution.
The final policy implementing subject has certain limitations, after comprehensive analysis, we can see to deal with the problem of air pollution, the environmental protection bureau, environmental protection, as well as individual provinces more voices on the Internet, but in other provinces and very little voice, some local governments, organizations results in order to make the management more efficient, comprehensive, need to mobilize all levels of active participation. At the same time, more social entities should be called upon to take part.
In this study, bias in data selection and lack of solidification of emotional tendency analysis were found. In the future research, first of all, more comprehensive data selection should be done as far as possible, more reliable and convincing data should be crawled, and data integrity and comprehensiveness should be improved. Secondly, make more accurate emotional analysis as far as possible, correctly grasp the emotional tendency of network words, and scientifically classify and summarize the emotions of all Internet users, so as to improve the analysis results as strictly and comprehensively as possible.

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