

A Review of Emission Reduction Policy Text Analysis under the Dual Carbon Context

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Abstract

Under the "Dual Carbon" context, China has issued a series of energy-saving, emission reduction, and low-carbon policies. These policies contain a wealth of valuable information, and many scholars have conducted research on the textual content of these policies. This article reviews the current state of research on emission reduction and related policy texts from the perspective of policy text analysis methods, providing references for relevant analyses and studies. Based on different analytical approaches to policy texts, the methods are categorized into qualitative and quantitative approaches. Given that qualitative methods are less frequently employed in this type of policy text analysis, they will not be elaborated upon. The quantitative methods are divided into policy measurement analysis, content analysis, and keyword analysis. A review of the relevant literature introduces the characteristics of each method and their applications in emission reduction policy texts. The study finds that quantitative methods are more widely used in the analysis of emission reduction policy texts, with content analysis being the most common, while keyword analysis is gradually gaining traction. Most studies emphasize the combination of methods. Future research could focus on the construction of corpora in the low-carbon policy field, better integration of Python data analysis libraries, and the design and development of specialized or general policy text analysis tools.

Keywords

Emission Reduction Policies, Text Analysis, Quantitative Analysis

1. Introduction

To address climate change, the Chinese government has proposed the "Dual Carbon" goals, namely "carbon peaking and carbon neutrality," aiming to peak carbon dioxide emissions before 2030 and achieve carbon neutrality by 2060. China's proactive commitment to these dual carbon targets marks a historic turning point in carbon emissions and is an inevitable choice for promoting the upgrading of the country's energy and industrial sectors, as well as achieving long-term sustainable economic development. To accelerate the realization of these dual carbon goals,

China has issued a series of energy-saving, emission reduction, and low-carbon policies. Scholars have conducted extensive research on emission reduction and low-carbon policies, with existing studies primarily focusing on empirical analyses of the implementation effects of emission reduction policies, optimization of policy pathways, the impacts and mechanisms of these policies, and text analyses of emission reduction policies. Compared to other types of research, articles analyzing the texts of emission reduction policies are relatively scarce; however, these policy documents contain a wealth of valuable information that can be utilized. Therefore, summarizing and analyzing the relevant literature on emission reduction policy text analysis can provide direction and references for future research.

2. Concepts Related to Policy Text

2.1. Definition of Policy Text

Policy texts refer to the records and documents produced by policy activities, including not only official documents such as laws, regulations, and rules promulgated by the state and local authorities or administrative organs in the form of documents, but also official documents and archives such as research, consultation, hearings, or resolutions formed by policymakers or political leaders in the process of policy formulation, as well as policy public opinion texts formed by debates, speeches, reports, and comments in the process of policy activities, which have always been important tools and carriers for policy research (Chilton P A, 2002). The policy text is the materialized carrier of policy thought, the true reflection and behavioral imprint of the government's handling of public affairs, and the objective, accessible, and traceable written record of the policy system and policy process (Li, 2010). Therefore, the study of policy texts is an important way to trace and observe the policy process. In recent years, with the openness of government information and the rapid development of the Internet, scholars have been able to obtain a large amount of policy text data for research, which is large and abundant.

2.2. Definition of Text Analysis

Currently, policy analysis primarily includes qualitative and quantitative analysis. Qualitative analysis is more subjective, relying heavily on the researcher's experience and judgment, and emphasizes a macro and holistic understanding of policy content, ideas, and structure. As the quantity of policy texts has surged, qualitative analysis requires more manpower, leading to increased labor costs and challenges in controlling the quality of analysis. In contrast, quantitative analysis mitigates this subjectivity by transforming textual content into a format recognizable by computers, thereby reducing labor costs and enhancing the readability and comprehensibility of results through numerical and networked expressions.

2.3. Steps in Quantitative Research of Policy Text

The quantification of policy texts is usually divided into four steps(Gent zkow M,2019): first, the text data needs to be obtained and preprocessed; In order to facilitate analysis, the data needs to be quantified and transformed into a machine-recognizable form; The data are then processed and analyzed to obtain quantitative results. Finally, the results were tested, and descriptive statistical analysis and causal analysis were generally used. Based on the characteristics of these methods, the current quantitative methods of policy texts can be divided into three categories: policy econometric analysis, content analysis and effective word analysis.

3. Research Methods for Policy Text

3.1. Qualitative Analysis Methods

Qualitative analysis mainly focuses on public policy as a discursive expression, and uses the basic principles of semantics to analyze public policy Zhang(2016). Based on qualitative methods, the relevant research on emission reduction policy texts started relatively early, mainly including the structural analysis of policy texts and the analysis from a systemic perspective. Based on the structure of the policy text, Li and Huang(2010) analyzed China's low-carbon economic policy as a two-tier low-carbon economic policy chain structure composed of horizontal and vertical policy chains, and combined with the problems and reasons of China's low-carbon economic development policy, they believed that China's low-carbon economic policy should be improved from six aspects: low-carbon energy policy, low-carbon industrial policy, low-carbon market policy, low-carbon consumption policy, low-carbon technology policy, and low-carbon management policy. Based on the perspective of the policy system, Qian and Zhang(2011) planned China's low-carbon policy, analyzed the policy subsystem in the transition of low-carbon economy from three aspects: policy actors, policy tools, and policy changes, and proposed that China's government's low-carbon policy planning should be based on the system operation model analysis of the interaction between various subsystems. Using Shanghai as an example, Peng and Bai^[7] selected and analysed 186 relevant policies, supplemented by interviews with government stakeholders, and developed an analytical framework using systems innovation theory and sustainability experiments to examine how low-carbon policies arise and evolve, as well as the corresponding enabling mechanisms. Cheng et al(2022) used two typical qualitative research methods, background theory and institutional grammar tools, to interpret and analyze 23 policy texts related to the achievement of the goals of the Central Committee of the Communist Party of China, the State Council, relevant ministries and provinces, outlined the basic structure and functional outline of China's carbon peak and carbon neutrality policy pathways, and clarified the group structure and regulatory intensity of different policy pathways. Based on grounded theory, it has

been found that these pathways are very comprehensive and complete. Gong and Sun(2021) used the fuzzy set qualitative comparative analysis method to explore the impact mechanism of six subdivided tools in the regulatory, economic and social energy conservation and emission reduction policy tools, namely normative policy texts, industrial structure adjustment, fiscal expenditure, carbon emission trading, energy conservation and emission reduction patents, and social organization participation, on carbon intensity reduction. In the research of existing scholars, there are few purely qualitative analysis articles on carbon emission reduction, low-carbon and other policy texts, and most of them use a combination of qualitative and quantitative methods. For example, Hasan, M.A(2020)used multi-criteria analysis techniques to understand how experts perceive the costs, benefits, emission reduction potential, and ethical priorities of New Zealand's transport policy. A total of 26 policy options were identified and grouped into six mitigation policy pathways. Seek and aggregate expert perspectives to compare and evaluate mitigation policy pathways and policy options using simple additive weighting techniques. Mohsen Motiei(2023) examined 38 national comprehensive policies of Iran from a qualitative research perspective, explored the policy statements, and obtained basic themes and organizational themes through open coding and classification through thematic analysis methods. Then, in the form of soft research methods, the topics are extracted by using the method of explanatory structural modeling, and the analytic hierarchy process is carried out on the financing policies of science and technology entrepreneurship in Iran.

Qualitative research on textual analysis of low-carbon policies is mainly conducted from a holistic and systemic perspective. Since qualitative analysis relies more on the experience and subjective judgment of researchers, scholars mostly use a combination of qualitative and quantitative methods.

3.2. Quantitative analysis methods

3.2.1 Policy Measurement Methodology

Policy bibliometrics is a structural method that quantitatively analyzes the policy attributes of policy literature, which introduces bibliometric, sociology, mathematics, statistics and other disciplines into policy analysis to reveal policy themes, objectives and impacts, cooperation patterns of policy subjects, and the structure and evolution of policy systems. It is different from the traditional policy research paradigm, which focuses on the content of policy literature, and focuses more on the quantitative analysis of large sample sizes, structured or semi-structured policy texts Li(2015). The main steps of policy econometric analysis are as follows: firstly, relevant policy texts are collected through keyword search; Then, the policy text is preprocessed and structured. Then, social network analysis and bibliometrics were used to analyze the processed texts. Policy texts have similar structural elements as scientific and technological liter-

ature, such as the issuing authority, publication date, language, subject headings, etc. The quantitative analysis of emission reduction policies is usually based on the basic structural elements of the policy text, and analyzes the temporal change characteristics of emission reduction policies, the changes in subject headings, and the distribution of languages.

Zhang(2016) constructed an analytical framework of "context-expression-outcome", combining qualitative analysis and quantitative analysis to conduct text mining on seven "five-year plans" and emission reduction policies from 1981 to 2015. Quantitative analysis mainly uses bibliometric methods, based on keyword frequency calculation, or through keyword co-occurrence to form a cluster and time zone view to show policy hotspots in a certain period, or through emergent term analysis to form a list of mutant words to show the sudden change of emerging trends in a certain period. Chen(2022) constructed a strategic triangle model of policy analysis, used grounded and social network analysis methods to conduct a quantitative study on green and low-carbon policies, collected 1445 policy text documents, and analyzed the time distribution of policies, the proportion of policy network governance subjects, and the interactive evolution of policy target areas and policy governance tools. Based on the green policy texts issued by various ministries and commissions in China from 2001 to 2021, Li(2023) analyzed the temporal evolution of policy content coordination, policy department coordination, and policy type coordination, and further studied the pollution reduction effect of policy coordination. Based on the research theory of the DIIS think tank, Li(2021) used the policy text mining method to conduct a quantitative and objective analysis of the types, high-frequency words, networking, and small groups of the selected 38 policy texts, and analyzed the commonality, individual characteristics and future development trends of carbon neutrality actions of various countries through analogy analysis and other methods. Li and He(2023) used text analysis to directly construct the national, provincial, and prefecture-level EPUI in China, analyzed the distribution and fluctuation trend of EPUI, and used the two-way fixed-effect model of panel data to study the impact of environmental policy uncertainty on environmental pollutant emissions at the city level. Lu et al. (2020) examined the main energy indicators used in official strategies and policies through textual analysis and divided them into ten categories. The study found that both countries value renewable energy as a solution to the energy transition, although in China, "non-fossil energy" appears more frequently in political documents, while "nuclear energy" is seen as an important source. In Germany, short-, medium- and long-term indicators are clearly defined and are consistent over time and across documents. Tan et al. (2022) sorted out and analyzed 168 low-carbon policy texts since the 11th Five-Year Plan, found out the overall situation of China's low-carbon policies, as well as the characteristics, such as the number, effectiveness and means of policies, and clarified the

gaps in the current low-carbon policies. On this basis, focusing on the phased characteristics of the realization of the "dual carbon" goal, the policy framework for carbon peak and carbon neutrality in China in the future is drawn. Li Sinan et al. (2022) conducted a grounded analysis of 120 green consumption policy texts promulgated by the central government of China from 1994 to 2020, and constructed a green consumption policy change model through three-level coding. The analysis found the composition structure, policy change process and policy evolution logic of green consumption policy.

A large number of scholars have introduced the theory of policy instruments into the quantitative analysis of emission reduction policy texts, and classified policies or constructed multi-dimensional analysis models based on policy instrument standards on the basis of econometric analysis. For example, Zhu (2021) sorted out the low-carbon policy texts promulgated by each low-carbon pilot province since the pilot work was carried out from the perspectives of the main body and the type of language, compared and analyzed the high-frequency characteristic words of the low-carbon policy texts in the low-carbon pilot provinces, and divided the types of policy instruments according to three categories, including command and control, economic incentives, and social participation, and used the social network analysis method to analyze the text content of the low-carbon policies of each low-carbon pilot province. Wang and Chang(2014) analyzed the key policies of China's low-carbon governance from the five aspects of energy conservation, new energy development, reforestation, circular economy development, and industrial structure adjustment, combined with three policy tools: laws and regulations, industry standards, and fiscal and taxation, and made suggestions for policy formulation and law enforcement based on each policy tool. Based on the policy instrument theory and the polycentric governance theory, Chu (2023) conducted a text quantitative analysis of 33 policies closely related to rural green development from 2015 to the present from the two dimensions of policy instrumentality and synergy with the help of Nvivo12 qualitative data analysis software, according to the steps of analysis framework construction, policy text coding, and frequency statistical analysis. Starting from the structural nature of the policy, Fu Lin et al. (2023) conducted a quantitative analysis of the policy content, divided the emission reduction policy into supply-oriented, environmental-oriented and demand-oriented according to the classification of policy instruments, and conducted a two-dimensional analysis of China's carbon emission reduction policy in combination with the four major emission areas of construction, energy, industry and transportation. With the continuous advancement and innovation of research, the dimension of the analytical framework has gradually developed from 2D to 3D. For example, in order to analyze China's decarbonization policies, Chen et al. (2023) collected nearly 900 policy texts published from 2006 to 2021, quantitatively analyzed the policy

texts, and constructed a three-dimensional policy analysis framework of policy classification, policy tools, and policy stages. On the basis of the existing research on the analytical framework of policy instruments, Huang(2023) focused on the policy documents of low-carbon eco-city development, comprehensively used bibliometric and content analysis methods to creatively construct a three-dimensional analytical framework of China's low-carbon eco-city development policy from three dimensions: policy tools, policy domains, and policy objectives, and found that the distribution of policy instruments in different policy fields showed obvious differences. Wu Ruxin et al. (2023) took the energy-saving policy texts issued by the central government from 1978 to 2021 as the research object, constructed an analytical framework from three dimensions: attention intensity, attention breadth and cooperation degree of the issuing subject, described the stage characteristics of the attention change of China's energy-saving policy through text measurement, used the PMC index model to evaluate the four sampled policy texts, and analyzed their attention change characteristics.

Policy econometric analysis integrates bibliometrics and social network analysis, which is helpful to grasp the macro level of policies, such as the structure and evolution of emission reduction policies, and the sectoral coordination of policy subjects. However, there are some problems, such as some low-frequency but useful words may be ignored, and the deeper semantic analysis of policies relies on manual interpretation.

3.2.2 Content analysis

Content analysis is a scientific research method that systematically and objectively analyzes the content of literature, mainly to analyze the appearance or absence of specific words or concepts in multiple text sets, or the meaning of specific words and their interconnections. Content analysis transforms textual, non-quantitative, and valuable information in the media into quantitative data, establishes meaningful taxonomies and criteria to break down the content of policy literature, and analyzes certain characteristics of the information. The purpose of this paper is to convert the documents expressed in words into data expressed in quantity, so as to reveal the tacit information content unique to the documents and make intelligence predictions about the development of things (Zhao,2012). The core steps of content analysis are to determine the analysis unit and coding standard, as well as to encode the text content and perform statistical operations such as percentage, average, correlation analysis, regression analysis, etc.

Content analysis is a commonly used analysis method in the current research on carbon emission reduction and low-carbon policy texts, and the existing research is also combined with policy tools to construct a multi-dimensional analysis framework. For example, based on the content of the policy text, Cai Lingxi et al. (2013) used the content analysis method to propose three classification

standards for energy conservation and emission reduction policies applicable to cities from three aspects: the formal characteristics of public policies, the definition of energy conservation and emission reduction, and the national strategic planning of energy conservation and emission reduction. Based on the content analysis method, Li et al. (2013) sorted out, judged and classified the roles of 33 low-carbon policies in supply, environment, demand and low-carbon competitiveness by dividing the basic policy tools and low-carbon competitiveness dimensions, constructed a two-dimensional analysis framework of low-carbon policies, analyzed China's low-carbon policies according to the corresponding frequency distribution and percentage, and finally put forward corresponding suggestions based on different policy tools. Luo and Zhu (2014) divided low-carbon policy instruments into three categories: regulatory, economic incentive, and social. The content analysis method was used to statistically analyze the number and frequency of low-carbon policy tools in China in the past 22 years. The study finds that there is a lack of flexibility and too many regulatory policy tools in China. Wei et al. (2019) used content analysis to sort out and select the relevant policy texts of the carbon market regulation mechanism, and analyzed the two paths of the Chinese government's regulation of the carbon market, namely quantity regulation and price regulation, through the two dimensions of carbon market regulation policy tools and carbon emission reduction. The results show that the carbon emission adjustment measures are specific and comprehensive, while the carbon emission price adjustment measures are relatively general and scarce. He et al. (2023) examined the evolution of China's 1083 GB policy in the past two decades from the perspectives of policy objectives, policy content, and policy tools through text mining and content analysis, filling the research gap. The results show that the GB policy objectives are gradually being quantified and formulated, and the focus is shifting from innovation incentives and evaluation to energy-saving renovation and prefabrication. Zhang(2021) used the content analysis method to identify and process policy concepts through the analysis unit that reflects the mapping relationship between policy semantics and words, and constructed a coding standard from the analysis unit to the numerical value and a policy analysis framework from the policy text to the policy semantics. On the basis of the theory of policy tools, combined with the three key technical areas in the process of achieving the carbon neutrality goal, and considering the policy objects, a three-in-one analytical framework of "action areas, policy tools, and policy objects" is constructed to comprehensively analyze the carbon neutrality policy system at the national level. Song and Long(2022) constructed a three-dimensional research and analysis framework based on policy tools, strategic goals of carbon peaking and carbon neutrality, and policy-driven subjects. The content analysis method is used as a research method to analyze the distribution and use of policy tools for carbon peak and carbon neutrality through pol-

policy tool classification, text content coding, statistical description, and multi-dimensional interactive analysis. Si and Wang(2018) took 20 No. 1 documents issued from 1982 to 2018 as the research object, and used the method of policy text quantification to analyze the text content and policy tools of the rural development policies in the No. 1 document of the central government, and explore the evolution law and characteristics of rural green development policies. Stefan et al. (2019) analysed a set of different policies in three areas where consumption-based emissions are particularly high in Austria: building construction, public health, and transport. To capture the substitution possibilities triggered by these policies and the emission reductions induced across the global supply chain, computable general equilibrium is combined with multi-regional input-output models.

In order to improve the efficiency of text analysis of emission reduction policies, some scholars have adopted some qualitative analysis software to simplify the text encoding. Xu et al. (2021) used the content analysis method to quantitatively analyze 83 environmental policy texts and regulations issued at the central level from the three specific elements of policy subjects, policy tools and technologies, and normative orientation, and outlined the overall picture and evolution of China's environmental information quality assurance system. Ran Lian(2020) used the content analysis method to construct a three-dimensional analysis framework of the value level, the time level and the content level, analyzed the policy texts of 52 Government Work Reports from 1949 to 2020 through Nvivo software, and summarized the basic experience of policy change and development. Zhang et al.(2022) collected the CE emission reduction policy texts at the national level in China from 2007 to 2021 as the research object, and used content analysis and NVivo software to establish a three-dimensional analysis framework of "policy tools-development stage-policy implementation objects" on the basis of policy tool theory, and conducted research. Finally, the empirical analysis method is used to code the CE emission reduction policy language line by line, and 725 reference points are obtained. Chen and Li (2022) constructed a two-dimensional policy analysis framework based on policy tools and product life cycle perspectives, and used NVivo11 Plus software to code and analyze 105 policy texts related to green consumption formulated during the 13th Five-Year Plan period (2016-2020) in 31 provinces and cities in China with the help of NVivo11 Plus software. Li Hongmei and Liu(2021) analyzed 259 national-level policy texts since the reform and opening up, based on the two-dimensional analytical framework of "Policy Evolution-Policy Tools", combined with Nvivo software to analyze the evolution characteristics and change logic of China's ecological civilization policies. Wang and Zhou(2021) took the provincial emission trading policy text as the object of investigation, and used QSR Nvivo 12 qualitative analysis software to encode the text content, and then analyzed the promotion

mechanism and policy characteristics of the emission trading pilot.

The content analysis method encodes the policy text from a semantic perspective, and uses statistical indicators and PMC index models to calculate and analyze the coding results, which has the characteristics of strong operability and wide applicability. However, in the process of analysis, it is necessary to pay attention to the rationality of the design and the coding scheme. With the increase of analysis dimensions, more labor costs are inevitably required, so corresponding analysis tools for policy texts can be developed to improve the efficiency of text analysis.

3.2.3. Validity word analysis

Derived from natural language processing (NLP), effective word analysis refers to the decomposition of text into processable basic units through text representation models (Webster, 1992). This method uses a text representation model to represent the meaningful content of policy texts, which can quantify and analyze large text sets from a semantic perspective, and provides an opportunity for in-depth analysis of large sample size policy texts. Automated text analysis can be implemented to the greatest extent, which is the biggest difference between this method and the previous methods (Grimmer, 2013). At present, the effective word analysis method is gradually widely used at home and abroad, which not only promotes the innovation of policy text research methods, but also provides a new perspective for the quantitative analysis of policy texts. According to the different granularity of semantic expression, text representation is often divided into word level, sentence level and article level, among which words are the most fine-grained expression of semantics. Combined with the attention to semantics in policy text research, the effective word analysis method is usually based on the bag-of-words model to represent the text, such as the TF-IDF algorithm. In order to improve the accuracy of semantic representation, researchers also use text distributed representation methods, such as the Skip-Gram model (Zheng, 2021). After the text effect is processed by text mining tools or methods, it is necessary to select appropriate algorithms for calculation and analysis according to the research problem, such as topic model (Yang, 2016), text similarity algorithm (Zhang, 2020), recurrent neural network (Alschner, 2016b).

The effective word analysis method can realize the in-depth mining and analysis of large samples and the policy text with a long time span. Among them, the natural processing language and text mining technology for text analysis can effectively improve the efficiency of text analysis and reduce costs, which to a certain extent makes up for the lack of depth of policy econometric analysis and the limitation of sample size of content analysis method. However, the machine learning and other algorithms used are easy to cause the problem of overfitting, and due to the differences in different fields, it is not enough to analyze and study emission reduction policies through only general models.

4. Summary and outlook

At home and abroad, active exploration and research have been carried out in the text analysis of emission reduction policies, and some research results have been obtained. In terms of research methods, most of them use a combination of methods to conduct research, and continue to integrate across disciplines, introducing new tools such as natural language processing, machine learning, and text mining. In the textual quantification of emission reduction policies, domestic scholars often use textual measurement methods and content analysis methods, while foreign scholars tend to explore new methods such as word analysis. Most of the domestic scholars focus on using mature text analysis tools or using different aspects of the same method. For policy research on emission reduction, low-carbon, and green development, large-scale text quantitative analysis is both an opportunity and a challenge. Future analysis of such policy texts can be carried out from the following three aspects. Since most of the existing studies use a common corpus, which may affect the effect of text preprocessing, we can pay attention to the construction of policy text corpora in the field of emission reduction in the future. In the data processing phase of policy text quantification, researchers currently use a variety of methods, but they are all statistical models in nature. Therefore, it can be analyzed with the help of Python language and currently commonly used data analysis tools; Most of the tools used by scholars for policy text analysis are general-purpose tools, but the use of any one tool depends on the specific research question. The ability to identify common problems in policy text analysis allows researchers to share solutions to problems, and to identify domain gaps on the basis of common problems, so as to develop and design policy text analysis tools suitable for different fields.

References

- [1] Chilton, P. A., & Schffner, C. (2002). *Politics as Text and Talk: Analytic Approaches to Political Discourse*. John Benjamins Publishing.
- [2] Li, W. L. (2010). *Research on Several Legal Issues of Government Red-Head Documents* [Master's thesis]. Shandong University, Jinan.
- [3] Gentzkow, M., Kelly, B., & Taddy, M. (2019). Text as Data. *Journal of Economic Literature*, 57(3), 535-574.
- [4] Zhang, Y. N., Li, H., Cong, N., & Luan, J. Y. (2016). "Context-Expression-Outcome" Framework for the Evolution and Reflection of China's Emission Reduction Policies: A Text Mining Approach Based on the "Five-Year Plan". *Science and Technology Progress and Policy*, 33(20), 109-114.
- [5] Li, W. J., & Huang, B. N. (2010). Research on the Paradigm of China's Low-Carbon Economic Policy Chain. *China Population Resources and Environment*, (10), 19-22.
- [6] Qian, J., & Zhang, Q. (2011). Systematic Analysis of Low-Carbon Economic Transition and Policy Planning in China. *China Soft Science*, (4), 22-28.
- [7] Peng, Y., & Bai, X. (2018). Experimenting Towards a Low-Carbon City: Policy Evolution and Nested Structure of Innovation. *Journal of Cleaner Production*, 174, 201-212.
- [8] Zhou, C., & Qian, Z. (2022). Pathways of China's Carbon Peak and Carbon Neutrality Policies: A Dual Analysis Using Grounded Theory and the Institutional Grammar Tool. *China Population Resources & Environment*, 32(11), 19-29.

- [9] Gong, X. C., & Sun, T. (2021). Research on the Impact Mechanism of Energy-Saving and Emission Reduction Policy Tools on Carbon Intensity: A Fuzzy Set Qualitative Comparative Analysis Based on Data from 30 Provinces (Municipalities and Autonomous Regions). *Urban Problems*, (07), 23-32.
- [10] Hasan, M. A., Chapman, R., & Frame, D. J. (2020). Acceptability of Transport Emissions Reduction Policies: A Multi-Criteria Analysis. *Renewable & Sustainable Energy Reviews*, 133, 110298.
- [11] Mohsen Motiei. (2023). Explanation and Classification of Technological Entrepreneurship Financing Policies: Lessons from Iran. *International Journal of Islamic and Middle Eastern Finance and Management*, 16(2), 274-290.
- [12] Li, J., Liu, Y. H., Huang, C., & Su, J. (2015). Restructuring Policy Text Data Analysis Using Bibliometric Research: Origins, Migration, and Methodological Innovations in Policy Literature Bibliometrics. *Journal of Public Administration*, 12(02), 138-144+159.
- [13] Chen, X. M., Zhang, R. C., & Qi, J. (2022). Quantitative Research on China's Green and Low-Carbon Policy Texts from the Perspective of "Dual Carbon" Governance. *Economic System Reform*, (4), 178-185.
- [14] Chuang, L., Xia, W., & Wang, L. (2023). Synergies of Green Policies and Their Pollution Reduction Effects: Quantitative Analysis of China's Green Policy Texts. *Journal of Cleaner Production*, 412, 137360.
- [15] Li, L. C., Chen, W., Guo, K. M., Yue, F., & Tang, Y. (2021). Analysis of Carbon Neutrality Strategic Action Policies in Developed Countries from the Perspective of Policy Tools and Implications for China. *Journal of Intelligence*, 40(12), 63-71.
- [16] Rongda, L., & Jing, H. (2023). Impacts of Environmental Policy Uncertainty on Urban Environmental Pollutant Emissions in China: A Study Based on Textual Analysis. *Frontiers in Environmental Science*, 11.
- [17] Yu, L., Xue, B., Stückerad, S., Thomas, H., & Cai, G. (2020). Indicators for Energy Transition Targets in China and Germany: A Text Analysis. *Ecological Indicators*, 111, 106012.
- [18] Tan, X. C., Guo, W., Fan, J., et al. (2022). Research on the Policy Framework and Technological Innovation Policies for Carbon Peak and Carbon Neutrality. *Bulletin of the Chinese Academy of Sciences*, 37(04), 435-443.
- [19] Li, S. N., Sheng, Y. Y., & Chen, K. (2022). The Evolution and Logic of China's Green Consumption Policies: A Grounded Theory Study Based on Multiple Policy Texts. *Resource Development and Market*, 38(04), 413-419.
- [20] Zhu, Y. Q. (2021). Analysis of the Text Content and Carbon Reduction Effects of Low-Carbon Policies in Pilot Provinces. [Master's thesis]. Fuzhou University.
- [21] Wang, N., & Chang, Y. C. (2014). The Development of Policy Instruments in Supporting Low-Carbon Governance in China. *Renewable and Sustainable Energy Reviews*, 35, 126-135.
- [22] Chu, D. J. (2021). Analysis of Rural Green Development Policy Texts: Based on Dimensions of Instrumentality and Synergy. *Journal of Zhengzhou University (Philosophy and Social Science Edition)*, 54(02), 14-21+126.
- [23] Fu, L., Zhang, D. Y., Yan, H. B., & Cao, Y. (2023). Research on China's Carbon Reduction Policy Instruments Based on Policy Text Analysis. *Studies in Science of Science*, 41(03), 435-443.
- [24] Chen, R. D., Xu, P. P., & Yao, H. N. (2023). How Will China Achieve Net-Zero? A Policy Text Analysis of Chinese Decarbonization Policies. *Energy Research & Social Science*, 99, 103051.
- [25] Huang, X. P., Gao, J., & Gao, J. (2023). Low-Carbon Eco-City Development Policy in China: A Bibliometric Analysis of Policy Documents. *Kybernetes*, 52(2), 601-624.
- [26] Wu, R. X., Huang, M., & Lang, Y. H. (2023). Research on the Attention Shift of China's Energy-Saving Policies: A Quantitative Analysis Based on Central Policy Texts. *Resource Science*, 45(01), 91-104.
- [27] Zhao, J. G. (2012). Introduction to Communication Studies. Zhengzhou: Zhengzhou University.

versity Press.

- [28] Cai, L. X., Fan, L. L., & Xian, Y. H. (2013). A Classification Study of Urban Energy-Saving and Emission Reduction Policies Based on Content Analysis. *Ecological Economy*, (12), 49-53.
- [29] Li, J., Gao, Y., & Li, X. F. (2013). Research Framework for China's Low-Carbon Policy from the Perspective of Policy Tools. *Science and Technology Progress and Policy*, 30(21), 112-117.
- [30] Luo, M., & Zhu, X. Z. (2014). Quantitative Research on China's Low-Carbon Policy Texts Based on Policy Tools. *Journal of Intelligence*, 33(04), 12-16.
- [31] Wei, Q., Li, L. J., & Lin, J. L. (2019). Policy Research on China's Carbon Market Regulation Mechanism. In 2019 International Conference on Power, Energy, Environment and Material Science (PEEMS 2019).
- [32] He, Q., Wu, Z., Li, S., Li, H., & Wang, Y. (2023). Two Decades of the Evolution of China's Green Building Policy: Insights from Text Mining. *Building Research & Information*, 51(2), 158-178.
- [33] Zhang, Y. K., Wang, Y. J., Yang, C., & Xiang, J. Y. (2021). Research on China's Carbon Neutrality Policy System Based on a Three-Dimensional Analysis Framework. *Global Energy Internet*, 4(06), 549-559.
- [34] Song, M., & Long, Y. (2022). Analysis of China's Carbon Peak and Carbon Neutrality Policy Texts from the Perspective of Policy Tools. *Reform*, (06), 145-155.
- [35] Si, L. J., & Wang, J. L. (2018). Policy Text Analysis and Empirical Study of Policy Performance for Rural Green Development. *Journal of Lanzhou University (Social Sciences Edition)*, 46(06), 148-157.
- [36] Nabernegg, S., Bednar-Friedl, B., Muñoz, P., Titz, M., & Vogel, J. (2019). National Policies for Global Emission Reductions: Effectiveness of Carbon Emission Reductions in International Supply Chains. *Ecological Economics*, 158(1), 146-157.
- [37] Xu, Y. Q., Cao, L., & Mao, J. T. (2021). The Evolutionary Context and Improvement Directions of Environmental Information Quality Assurance Systems in China: An Analysis Based on 83 Regulations and Policy Texts. *Journal of Beijing Administrative College*, (2), 53-62.
- [38] Ran, L. (2020). Analysis of Government Green Governance Policy Texts in China from 1949 to 2020: Change Logic and Basic Experience. *Journal of Shenzhen University (Humanities and Social Sciences Edition)*, 37(4), 46-55.
- [39] Zhang, W. Y., Zhang, C. Y., Wei, S. B., Zhang, Q., Rehman, A., & Shah, A. (2022). Characteristics and Evolution of China's Carbon Emission Reduction Measures: Leading Towards Environmental Sustainability. *Frontiers in Environmental Science*, 10.
- [40] Chen, K., & Li, S. N. (2022). Analysis of Green Consumption Policy Texts Based on Policy Tools and Product Life Cycle. *Journal of Nanjing University of Technology (Social Science Edition)*, 21(01), 96-110+112.
- [41] Li, H. M., & Liu, Y. X. (2021). Policy Text Analysis in the Evolution of China's Ecological Civilization Policies. *Leadership Science*, (24), 105-109.
- [42] Wang, Z. X., & Zhou, J. G. (2021). Promotion Mechanisms and Policy Characteristics of Emission Trading Pilots: An Analysis Based on Provincial Policy Texts. *Hubei Social Sciences*, No. 417(09), 25-33.
- [43] Webster, J. J., & Kit, C. (1992). Tokenization as the Initial Phase in NLP.
- [44] Grimmer, J., & Stewart, B. M. (2013). Text as Data: The Promise and Pitfalls of Automatic Content Analysis Methods for Political Texts. *Political Analysis*, 21(3), 267-297.
- [45] Zheng, X. M., & Dong, Y. (2021). A Review and Prospect of Quantitative Research on Policy Texts. *Modern Information*, 41(02), 168-177.
- [46] Yang, H., & Yang, J. L. (2016). Quantitative Analysis of Policy Texts Integrating LDA Model: An Empirical Study in the International Climate Field. *Modern Information*, 36(5), 71-81.

- [47] Zhang, T., Ma, H. Q., & Yi, Y. (2020). Comparative Study of China's Big Data Policies from the Perspective of Text Similarity. *Library and Information Work*, 64(12), 26-37.
- [48] Alschner, W., & Skougarevskiy, D. (2016). Can Robots Write Treaties? Using Recurrent Neural Networks to Draft International Investment Agreements. In Bex, F., & Villata, S. (Eds.), *Legal Knowledge and Information Systems*.
- [49] Zhao, L. X., & Tang, J. (2018). Quantitative Evaluation of China's Carbon Reduction Policies. *China Science and Technology Forum*, (1), 116-122, 172.
- [50] Du, H., Guo, Y., Lin, Z., Qiu, Y., & Xiao, X. (2021). Effects of the Joint Prevention and Control of Atmospheric Pollution Policy on Air Pollutants: A Quantitative Analysis of Chinese Policy Texts. *Journal of Environmental Management*, 300, 113721.
- [51] Deng, X., & Peng, J. (2023). Quantitative Assessment of Low-Carbon Pilot Policies Based on Text Mining. *Resource Science*, 45(03), 652-667.
- [52] Hsu, A., & Rauber, R. (2021). Diverse Climate Actors Show Limited Coordination in a Large-Scale Text Analysis of Strategy Documents. *Communications Earth & Environment*, 2.
- [53] Zhong, L. J., & Xiang, Y. R. (2022). Research on the Progress of Urban Biodiversity Governance in China Based on Policy Text Analysis. *Chinese Landscape Architecture*, 38(09), 51-56.
- [54] Liao, Z. J., & Xiang, Y. R. (2020). Changes and Trends in China's Green Consumption Policies: An Analysis Based on Policy Texts from 1994 to 2018. *Business Economics Research*, (14), 58-61.
- [55] Zhang, G. X., Li, J. X., & Guan, X. (2019). Evolutionary Analysis of Inter-Ministerial Energy-Saving and Emission Reduction Policy Game and Synergy Relationship. *Management Review*, 31(12), 250-263.
- [56] Chen, Q. H., & Zhang, Y. Y. (2022). Evolution of Carbon Reduction Policies in China's Animal Husbandry: An Analysis Based on 452 Policy Texts. *Journal of Huazhong Agricultural University (Social Science Edition)*, (1), 10-23.
- [57] Zhao, X. C., Wu, Z. J., Sun, Q., & Zhou, Y. (2023). Evaluation of China's Carbon Emission Policies Under the Dual Carbon Goals. *Statistics and Decision*, 39(02), 167-172.
- [58] Guo, L., & Zhao, Y. M. (2023). Evolution of Consumption Reduction Policies in China: 2003-2021. *China Population (Resources and Environment)*, 33(1), 186-196.