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Disclosure on Request: A Programmatic Method for Government Environmental Information Disclosure

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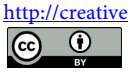

Abstract

The Open Government Information Regulation is the fundamental guarantee of the right to know for Chinese citizens. In particular, the opening windows for Disclosure on Request (DOR) attempts to initiate direct dialogue between the public and administrative departments. The annual reports on Government Environmental Information Disclosure (GEID) show the gradually strengthening relationship between the public and the government in environmental governance. However, the results of DOR and the difficulties encountered in the application process are still unclear. We analyzed the challenges the public faces when using programmatic methods like DOR to request the disclosure of environmental information that is not proactively made public. We further revealed the causes behind the responses of administrative departments and reinforced calls for policy design concerning the efficiency of DOR in the environmental and other public sectors.

Keywords

Disclosure on Request, Government Environmental Information Disclosure, Environmental Vertical Reform, Public Participation, Government Response

1. Introduction

Open Government Information Regulation (OGIR) is one of the Freedom of Information (FOI) laws under the Chinese model, which was approved in January 2007 and has been in force since May 1, 2008 (Zhang et al., 2010). Although OGIR and other FOI laws have different political backgrounds, the key issues surrounding the implementation of the regulations are similar (Piotrowski et al., 2009). Environmental FOI laws entered public view in the mid-20th century, derived

from the "right to know" (Bennear & Olmstead, 2008), along with the awakening of public awareness triggered by environmental issues such as the 1952 Great Smog in London caused by coal heating and the 1984 Bhopal gas leak disaster in India. The government was urged to proactively disclose environmental information. Therefore, environmental FOI laws are inevitable products of the intensifying contradictions between the ecological environment and human society since the Industrial Revolution, and are also options for the government to better perform its public service functions. Since 2007, the Chinese government has systematically established environmental information disclosure regulations, including the Regulations on the Disclosure of Government Information, Measures for the Disclosure of Environmental Information (Provisional), and the revised Environmental Protection Law, which mandate proactive disclosure of core environmental data such as air/water quality, pollution source monitoring, and emergency incidents. The 2014 revision of the Regulations on the Disclosure of Government Information further institutionalized the principle of "disclosure as the norm and non-disclosure as the exception". Additionally, the State Council annually releases the Report on the Work of Government Information Disclosure; by 2022, all 31 provincial governments had published environmental disclosure reports for 15 consecutive years, demonstrating a commitment to public transparency. This study is grounded in China's national efforts to advance environmental information disclosure.

The Chinese Ministry of Ecology and Environment (MEE) operationalized OGIR into a Government Environmental Information Disclosure (GEID) decree, which gave Chinese environmental governance a more transparent and "modern" system (Zhang et al., 2010). GEID aims to provide citizens with the basic legal right to request access to government records and information, which is different from traditional mandatory or market-driven policies (Yue et al., 2022). It is the first sectional system to operationalize the general OGIR (Zhang et al., 2010) that requires public participation. The research of Peters (2018), Nikiforova & Lnenicka (2021) and others has introduced in detail the GEID regulations successively launched by different countries. China recently adopted the Regulation (Open Government Information Regulation; details from https://www.gov.cn/) on GEID, which has applied to the Ecology and Environment Bureaus (EEBs).

Building a reasonable, fair, and legally effective GEID portal is an important guarantee for government transparency and citizens' right to know. With the construction of e-government portals, the government promotes environmental information disclosure and creates an interactive mechanism between proactive disclosure and disclosure on request (DOR). Citizens can make disclosure requests to the government in their personal capacity through DOR portals. DOR refers to the act of administrations disclosing government information to applicants in accordance with the law and their own functions and powers, upon application by citizens, legal persons, or other organizations. Lv (2012) argues that DOR is the core of the Regulation on GEID. That is, DOR empowers the general public with

the right to request GEID, regardless of whether they have a stake in the information requested.

However, it is not yet clear whether DOR is just "formalism", whether the response is timely and can clearly address the needs of applicants, and whether the government can deal with DOR well. In summary, the following research questions are raised:

RQ1: What are the relations between GEID portals, applicant, and administration?

RQ2: How should access to indirect public government information be programed?

RQ3: What is the public participation towards DOR?

RQ4: What kind of challenges will be encountered in practice and how should these be dealt with? A survey.

The following are the main contributions of our study. On the one hand, we combine the perspectives of environment and government to explore the process and outcomes of DOR in information disclosure, which has not been introduced in the previous literature. We make a small theoretical contribution to subsequent research on DOR. On the other hand, we provide an operational practical method for studying DOR. This offers a feasible reference for subsequent research on DOR and other GEID studies.

The structure of the remaining paper is as follows: In Section 2 we report the literature review. In Sections 3-4 we construct the theoretical framework and introduce the method used in this paper. We obtain the analysis results in Sections 5-6 based on the GRA-TOPSIS method and the Survey method. In Section 7 we discuss our findings and summarize the conclusions of the paper.

2. Literature Review

Building a healthy and transparent open government is a prerequisite for citizens' right to know to be guaranteed. In 2011, the G8 created the "open government partnership" in order to build an open government together (Tai, 2021). Government information covers diverse areas, like statistics, licenses, budget, geography, transportation, etc. (Gligorijević et al., 2021); environment is included also. Environmental information includes environmental policies held by government and content disclosed by enterprises according to law (Wu & Memon, 2022). In recent years, there has been a lot of literature on corporate EID (D'Amico et al., 2016; Garde-Sanchez et al., 2018; Lu et al., 2020; Wu et al., 2023; Shen et al., 2024), but relatively less literature on information disclosure from a governmental perspective.

A part of the literature provides a comprehensive review of GEID in the 21st century. Moon (2020) studied the differences between new open government and old open government from four dimensions, and proposed that the new open government focuses more on improving transparency based on open and reusable data; The priority of GEID may depend on the governance preferences of officials (Yang & Wu, 2021), or on the intent of citizen participation (Porumbescu et al.,

2020); GEID can be offline or online (Zhang, 2021). Lee and Kim (2018) found that citizens tend to be more active e-participants when they have greater trust in government and are weakly tied to offline social groups. Simultaneously, with the wide popularization of information and communication technology, online information disclosure has become more popular. Using e-participation gives citizens convenient access to information sources. These channels can be categorized into two main groups: government-led initiatives and citizen-led initiatives (Simonofski et al., 2021). DOR is one of the government-led initiatives in China. Lv (2012, 2014) reviewed DOR and clarified that the subjects of DOR are the applicant and the recipient, and pointed out the existing shortcomings in the implementation of DOR and the ways to address them. Dilemmas like the limited scope of applicants, the narrow scope of GEID, and ineffective supervision mechanisms exist (Lu, 2013). Wang and Yin (2014) take Anhui provincial government as an example to explore the challenges of local government information DOR and offer countermeasures. Peng et al. (2023) use the Pollution Information Transparency Index (PITI) to measure GEID, test the impact of GEID on corporate carbon performance, and propose policy strategies.

Another part of the literature explores the factors that influence GEID. Through a study on the Portuguese government, Tejedo-Romero and Araujo (2021) determined that the influencing factors of information transparency are mainly composed of social, economic, and political aspects; Transparency in GEID is also related to citizens' Internet penetration, government size, and tax pressure (Tejedo-Romero & Araujo, 2018). The technical capacity and organizational arrangement of governments have direct positive effects on GEID implementation (Zhao & Fan, 2021). There is also a part of the literature that constructs indicators to assess GEID, which is used to explore the extent of government openness. Demir et al. (2023) proposed a reliable decision-making tool to assess the ranking of G20 countries in terms of GEID. García-García and Curto-Rodríguez (2018) used an index with weighting of the quality for data reutilization to analyze the extent of data disclosure of Spanish regional governments. Kosajan et al. (2018) established an evaluation system for EID developed for provincial EEBs to assess the status and changing trends of environmental quality. Xin et al. (2024) conducted a study on the spatial-temporal development trends and influencing factors of GEID with provincial panel data in China.

In general, there seems to be much discussion in the academic community about GEID and DOR, but the following limitations still exist at this point in time. First, there is a lot of literature on open information, but few studies combine government, environment, and open information for analysis, and there is even less research on the policy effects of GEID. Second, existing studies generally focus on the proactive disclosure of information, but for non-direct GEID that needs DOR, there is currently no literature on the disclosure procedures and subsequent feedback. Third, DOR is a disclosure method with Chinese characteristics. There is currently a lack of literature introducing this method to the world.

Based on this, in this paper we will introduce DOR by the Chinese government, explore the challenges existing in DOR through a survey, and provide suggestions.

3. Theoretical Framework

To answer RQ1 (i.e., What are the relations between GEID portals, applicant, and administration?), in this article we discuss the theoretical framework of this study, called the public proactive request-government passive response framework. In this framework, we propose two stakeholder roles—the administration and the applicant—and discuss how the two parties form a DOR loop based on the GEID portals. Below we provide a brief description of the participants in the framework.

3.1. GEID Portals

In modern environmental systems, information and communication technology plays a vital role in establishing a dynamic environmental collaboration space (Gessa & Sancha, 2019). The construction of an open and transparent (Feeney & Brown, 2017) government-public communication portal makes information disclosure more efficient and convenient, giving rise to GEID portals. GEID portals are described as official portals launched at the federal or local level (Kassen, 2013) to build reliable communication between the government and the public enabling the disclosure of available information to the community. In China, the GEID portals built by various administrations have become quite mature (https://www.gov.cn/). The addition of electronic portals means that GEID is no longer limited to traditional offline methods such as using citizen service windows. It provides citizens with a more convenient channel and a guarantee to exercise their right to know.

3.2. Administration

In September 2016, China launched an environmental vertical reform (EVR). A series of changes took place in the relationships between the governments and the Ecology and Environment Bureaus (EEBs). The specific reform route plans are shown in **Figure 1**. The provincial governments are responsible for the overall ecological environment of the local areas, and ensure the dual leadership of the provincial EEBs and the municipal governments over environmental protection agencies below the municipal level. The powers of appointment and removal, and the functions of environmental inspection and monitoring are taken up to the provincial level. The provincial EEBs uniformly supervise and manage the environmental protection work across the provinces (autonomous regions and municipalities): establishing and improving regional cooperation mechanisms, strengthening joint monitoring, joint law enforcement, and cross-regional law enforcement, and shifting the focus of environmental law enforcement downwards, standardizing and strengthening the responsibilities of local environmental protection agencies, and the construction of grassroots law enforcement teams.

Lengthways, we divide the administrative levels into three tiers: provincial, municipal, and county. Breadthwise, the administration is divided into two categories: local government and EEB. This forms the EVR plan shown in Figure 1.

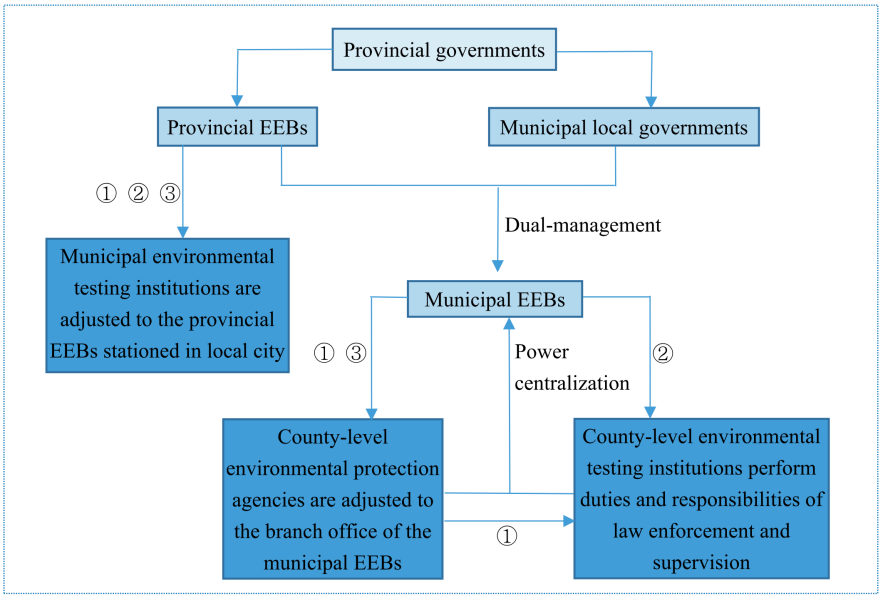

Figure 1. EVR plan of governments and EEBs. *Note*: 1) direct supervision; 2) unification of the management of staff, funds and properties; 3) power of appointment and removal.

3.3. Applicant

The development of information and communication technology makes citizens more inclined to choose the online method of using GEID portals when exercising their right to know from the government. The assumption behind GEID portals is essentially that information can be used by every citizen or organization (Nikiforova & Lnenicka, 2021), but information that is not proactively disclosed by the government needs to be provided on request in accordance with procedures. According to the GEID application form downloaded from the portal of the Ministry of Ecology and Environment of China (https://www.mee.gov.cn/), applicants should be citizens, legal representatives, or organizations.

The core part of this framework describes the closed-loop process of public proactive request-government passive response based on GEID portals like MEE of China, as shown in Figure 2. The applicant submits an online application form through a GEID portal and waits for the replies. This framework presents the information exchange relationship between the public and administrations, with the arrows representing the flow of DOR issues. In terms of the content of DOR, the governments respond more to policy-related issues, while the EEBs focus on environmental issues and can respond to environment-related issues such as corporate pollution emissions, urban air quality, water environment, etc. When applicants request that the government discloses environmental pollution issues, the government will transfer the issues to the corresponding EEB for a response.

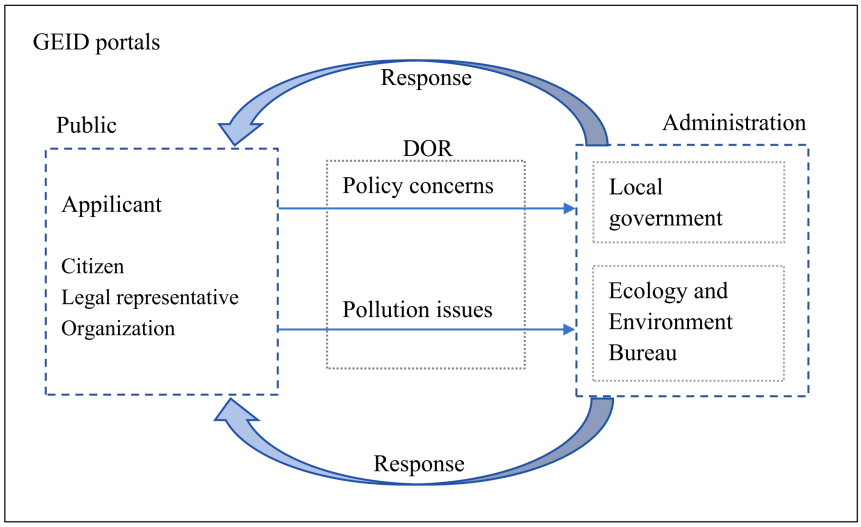

Figure 2. Public Proactive Request—Government Passive Response framework.

The premise on which the framework can be shaped depends on three points: public participation, portal perfection, and government transparency. Whether citizens are willing to participate in environmental governance through electronic portals depends not only on the development of information and communication technology, but also on factors such as citizens' trust in the government and citizens' sense of morality (Choi & Song, 2020). However, this is not the focus of this article. We only judge the degree of public participation by the quantity and quality of the DOR documents. A GEID portal was desired to help the public access government information effectively and efficiently (Huang et al., 2019). The better the portal is built, the more convenient it will be for citizens to exercise their right to know. Among the paradoxical and dilemmic circumstances of Government Transparency proposed by Adeoye and Ran (2023), the complex phenomenon at the organizational level and inter-organizational level is the focus of the issue. When the DOR documents are sent to the administration, how to respond and what kind of response will be made are the basis for examining government transparency.

4. Method

In order to examine the implementation of DOR in China from both temporal and regional dimensions, we employ two methods: GRA-TOPSIS and Survey. In terms of the time dimension, we extract the DOR section from the annual reports on GEID published by the Chinese MEE, and use the GRA-TOPSIS model to analyze and determine whether DOR has progressed over time. In terms of the regional dimension, we use the survey method to conduct DOR on the municipal EEB portals.

4.1. GRA-TOPSIS Method

Technique for order performance by similarity to ideal solution (TOPSIS; Lai et

al., 1994) is used to evaluate the relative merits of alternatives. In the process of TOPSIS, the performance ratings and the weights of the criteria are given as exact values (Ran & Wang, 2015). However, the Euclidean distance calculated through the TOPSIS method fails when a linear relationship prevails between the evaluation indicators (Zhang et al., 2023). Grey relational analysis (GRA) remedies this (Chen & Tzeng, 2004). The grey system reflects the multi-objective and multi-path decision-making with a flexible and agile handling attitude. We refer to Dai et al. (2010) in the literature to combine GRA and TOPSIS concepts to explore the importance that the public and the government attach to DOR in the temporal dimension.

The idea of the GRA-TOPSIS method is as follows. First, we construct the positive- and negative-ideal solution (PIS and NIS) and then calculate the Euclidean distance through the TOPSIS method. Second, we calculate the grey relational degree using the GRA method. Third, we calculate the comprehensive relative relational degree and rank the alternatives. The specific steps are as follows.

Step 1: Construction of the evaluation matrix. Initial evaluation matrix $X=\left(x_{ij}\right)_{m\times n}$ consisting of n evaluation indicators for m evaluation objects, evaluation matrix $Y=\left(y_{ij}\right)_{m\times n}$ obtained after standardization.

Step 2: Calculate the PIS and NIS of each decision attribute value in matrix Y.

$$z_j^+=\begin{cases}\max y_{ij}, j \text{ is a positive indicator}\\ \min y_{ij}, j \text{ is a negative indicator}\end{cases}$$

$$z_j^-=\begin{cases}\max y_{ij}, j \text{ is a negative indicator}\\ \min y_{ij}, j \text{ is a positive indicator}\end{cases}$$

Step 3: Calculate the GRA.

$$R_{ij}^+=\frac{\min\limits_i\min\limits_j\left|z_j^+-z_{ij}\right|+\delta\max\limits_i\max\limits_j\left|z_j^+-z_{ij}\right|}{\left|z_j^+-z_{ij}\right|+\delta\max\limits_i\max\limits_j\left|z_j^+-z_{ij}\right|}$$

$$R_{ij}^-=\frac{\min\limits_i\min\limits_j\left|z_j^--z_{ij}\right|+\delta\max\limits_i\max\limits_j\left|z_j^--z_{ij}\right|}{\left|z_j^--z_{ij}\right|+\delta\max\limits_i\max\limits_j\left|z_j^--z_{ij}\right|}$$

where δ is the distinguished coefficient ($\delta\in[0,1]$). Generally, we take $\delta=0.5$ (Kirubakaran & Ilangkumaran, 2016).

Step 4: Calculate the weights of the indicators and construct a weighted criteria evaluation matrix. The Entropy weighting method (Chen & Xia, 2007) was used to calculate the weights ω_j of the indicators, $W=\left\{\omega_j\right\}, j=1,2,\cdots,n$. The final grey correlation is obtained by multiplying R_{ij} with the weights ω_i and then accumulating them.

$$R_i^+=\sum_{j=1}^n R_{ij}^+\times\omega_j, i=1,2,\cdots,m; j=1,2,\cdots,n$$

$$R_i^-=\sum_{j=1}^n R_{ij}^-\times\omega_j, i=1,2,\cdots,m; j=1,2,\cdots,n$$

Step 5: Calculate the Euclidean distance between each evaluation object i and the ideal solution in the TOPSIS method.

$$D_i^+ = \sqrt{\sum_{j=1}^{n}\left(z_{ij} - z_j^+\right)^2}, D_i^- = \sqrt{\sum_{j=1}^{n}\left(z_{ij} - z_j^-\right)^2}$$

Step 6: Data normalization processing.

$$r_i^+ = \frac{R_i^+}{\max R_i^+}, r_i^- = \frac{R_i^-}{\max R_i^-}, d_i^+ = \frac{D_i^+}{\max D_i^+}, d_i^- = \frac{D_i^-}{\max D_i^-}$$

Step 7: Calculate the grey relative closeness degree K_i.

$$C_i^+ = \alpha r_i^+ + \beta d_i^-, C_i^- = \alpha r_i^- + \beta d_i^+, i = 1, 2, \cdots, m$$

where α and β both take the value of 0.5 (Wang et al., 2019).

$$K_i = \frac{C_i^+}{C_i^+ + C_i^-}, i = 1, 2, \cdots, m$$

A greater value of K_i indicates a higher priority of the alternative.

4.2. Survey Method

The specific operation process is: Log into a municipal EEB portal → Register for an account → Click on the EID column on the official portal → Find the DOR window → Click online application → Fill in the application form → Click submit. After successful submission, the webpage will generally automatically generate an inquiry code and password → Wait for the reply and check the status of application on the official portal after 20 working days. The process of DOR is shown in **Figure 3**. It answers RQ2 (i.e., How should access to indirect public government information be programmed?), which explains how DOR works as a new programmatic method.

The required content of the application form include: Select submitting departments (We chose EEBs in this survey); Type of applicants (citizens, legal representatives or organizations), application date, applicant name, ID number, study or work unit; Address for receiving reply materials, postal code, contact number, email; Description of the required GEID content. See footnote[1] for the optional content of the application form.

4.3. Level of DOR by GRA-TOPSIS Method

The numerical result in this section is used to examine the level of importance the public attaches to DOR each year, which answers RQ3 (i.e., What is the public participation towards DOR?). Data is extracted from relative reports about DOR from the annual reports on GEID published by the Chinese MEE, which mainly disclose: the total number of government information DOR received throughout the year and the application methods and application content. The application

[1]Optional content of the application form includes: The method of obtaining GEID, including mail, e-mail, fax, self-collection or reading and transcribing on the spot (we checked e-mail in this survey); The form of carrier of GEID, including paper documents, e-mail, etc. (we chose e-mail in this survey); The purpose of the DOR; Whether to apply for fee waivers.

methods include online and offline. The categories involved in the application content differ every year, overall including policies and regulations, science and technology standards, EIA projects, environmental monitoring, pollution prevention and control, ecological protection, emergencies, model creation, ecological environment quality, central ecological environmental protection supervision, environmental monitoring, and law enforcement supervision, etc. We statistically analyze the DOR information and data available for each year (see Figure 4).

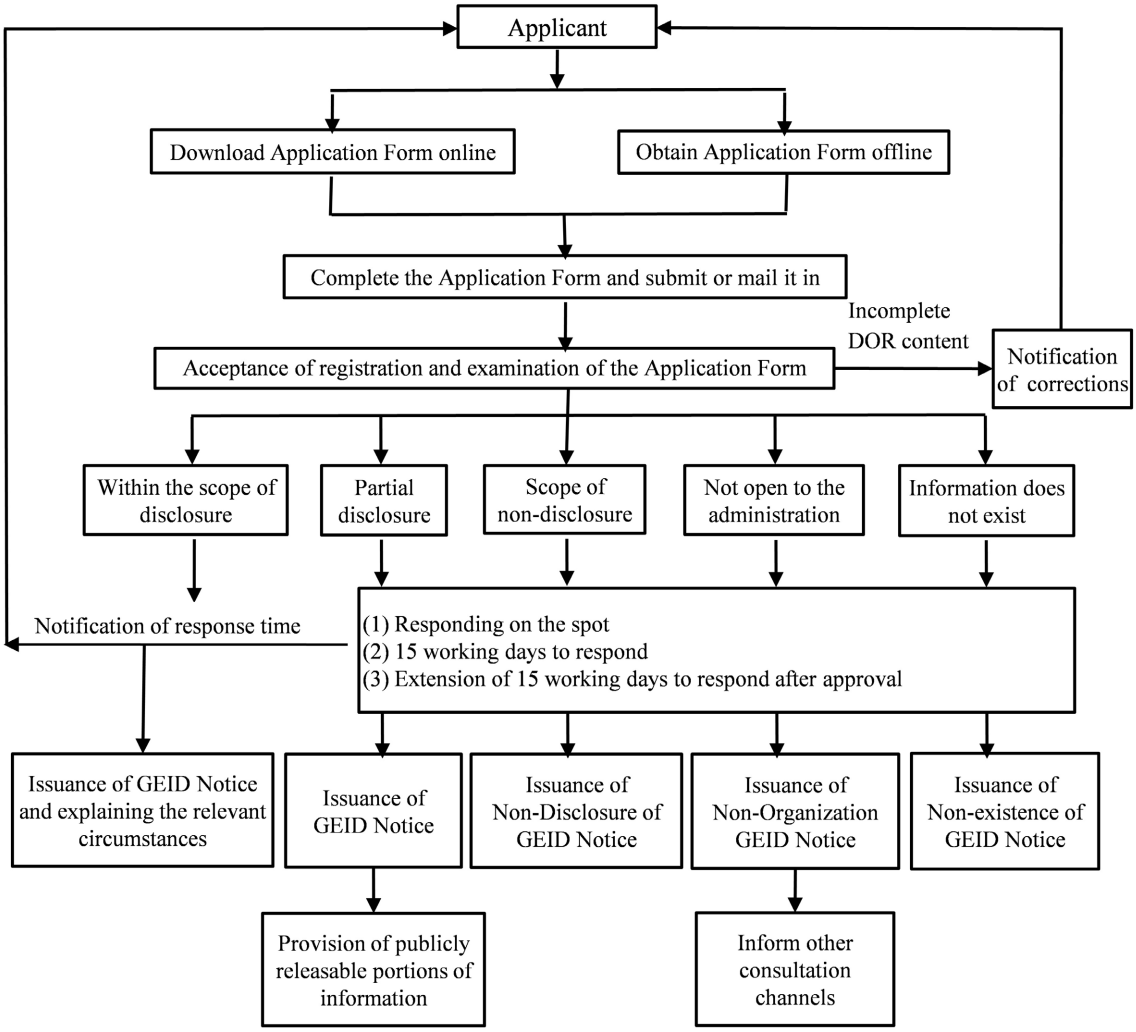

Figure 3. Flow chart of environmental DOR.

Since the distinction between DOR online and offline data in the annual reports on GEID were only made after 2012, our evaluation of the application methods starts from 2012. As can be seen from Figure 4, from 68 items in 2008 to 711 items in 2021, and from 46 items submitted online in 2012 to 618 items in 2021, the total number of DORs has increased year on year in the temporal dimension, and the proportion of online applications is also rising annually. This reflects that public participation has gradually increased and the awareness of obtaining information through DOR has also increased gradually. The GRA-TOPSIS model can more

accurately and convincingly reflect the changes in DOR over time. The data for 2013 is relatively abnormal, and the 2020 annual report on GEID lacks a DOR section, so 2013 and 2020 are excluded. The valid information extracted is shown in Table 1. Four indicators are formed: the number of DORs, online, offline, and public attention. Among them, online refers to the number of DORs submitted through EEB portals; offline refers to applications through other means, such as in-person, letters, telephone inquiries, etc.; we use the number of types of disclosed content in the annual reports on GEID to reflect public attention. For now we cannot obtain more relevant contents about DOR from the reports.

Table 1. Indicators on DORs extracted from the annual reports on GEID.

Year	Number	Online	Offline	Attention
2012	305	46	259	8
2014	649	93	556	7
2015	682	121	561	7
2016	499	142	357	9
2017	606	451	155	10
2018	776	613	163	8
2019	765	448	317	5
2021	711	618	93	4

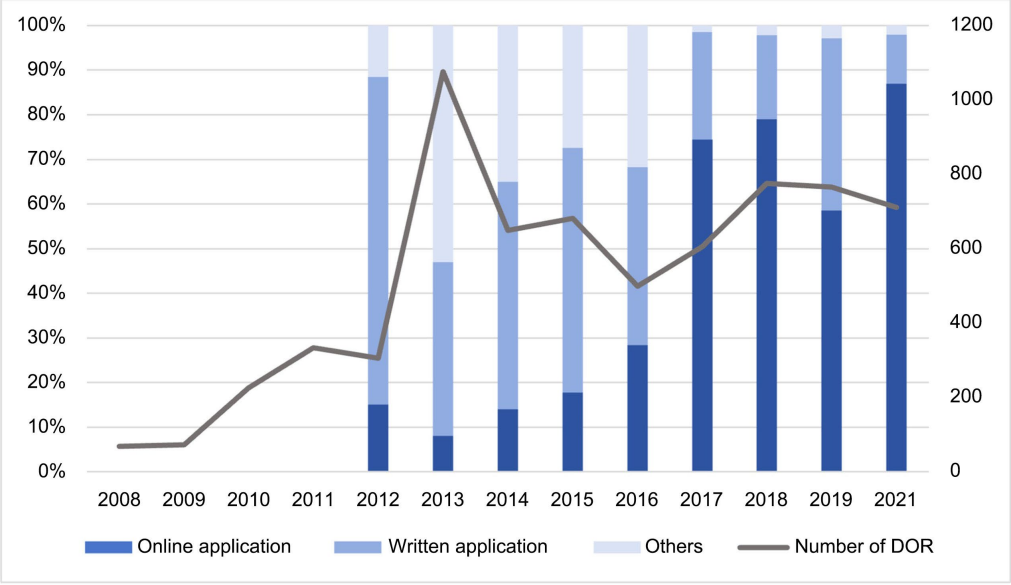

Figure 4. Number and proportions of DOR, 2008-2021.

The calculation steps are described in detail in the GRA-TOPSIS method in section 4.1. Calculate the weight of each indicator.

$$W = \{0.0634, 0.5649, 0.301, 0.0706\}$$

The evaluation calculations of the TOPSIS method are shown in Table 2. The

results of the GRA method are shown in Table 3.

The results of calculating the comprehensive relative closeness for the GRA-TOPSIS methodology are shown in Table 4.

Table 2. TOPSIS evaluation calculations.

Year	D_i^+	D_i^-	d_i^+	d_i^-
2012	337.003	49.967	1	0.154143967
2014	296.696	143.540	0.880395723	0.442808754
2015	280.828	149.035	0.833310089	0.459760364
2016	276.382	96.992	0.820117328	0.299212113
2017	154.762	230.345	0.459230333	0.710594833
2018	119.832	322.389	0.355581404	0.994542785
2019	120.904	238.686	0.358762385	0.736326113
2021	140.93	324.158	0.418186188	1

Table 3. GRA assessment results.

Year	Number	Online	Offline	Attention
2012	0.371	0.339	0.365	0.335
2014	0.425	0.344	0.409	0.334
2015	0.431	0.347	0.41	0.334
2016	0.399	0.35	0.378	0.334
2017	0.417	0.392	0.351	0.334
2018	0.448	0.418	0.352	0.334
2019	0.446	0.391	0.372	0.334
2021	0.435	0.418	0.343	0.333

Table 4. The comprehensive relative closeness K_i and rankings by year.

Year	C^-	C^+	K_I	Rank
2012	0.67625	0.253321983	0.27251465	8
2014	0.629197862	0.410404377	0.394770578	6
2015	0.606905045	0.420130182	0.409070859	5
2016	0.592683664	0.332231056	0.359201826	7
2017	0.416365167	0.542047417	0.565567926	4
2018	0.371790702	0.691271392	0.65026436	1
2019	0.372256192	0.561038056	0.601137377	3
2021	0.400218094	0.691125	0.633279309	2

From the final ranking results, it can be seen that the eight-year ranking of the

degree of DOR is 2018 > 2021 > 2019 > 2017 > 2015 > 2014 > 2016 > 2012. Overall, the rankings of 2017-2021 are significantly ahead, and 2012-2016 are behind. This intuitively reflects that DOR has gradually entered public view. In recent years, the number of public DORs and the degree of environmental participation have increased significantly. In addition, the proportion of exercising the right to know online has risen. These results answer RQ3. However, we cannot explore more possibilities when the public pay more attention to DOR in recent years based on the current limited information and data from the reports, let alone existing dilemmas of DOR. Specifically, we need to rely on survey methods to investigate possible challenges and reasons in the actual DOR process.

4.4. The Survey on DOR: Taking the Environmental Vertical Reform (EVR) as an Example

In order to answer RQ4 (i.e., What kind of challenges will be encountered in practice and how should these be dealt with? A survey.), we request disclosure on the relevant issues of the Environmental Vertical Reform (EVR) on municipal EEB portals, and explore the challenges during the DOR process and their causes.

On the one hand, the EVR can directly and objectively reflect the organizational structure between the local government and EEBs. Therefore, requesting the disclosure on EVR can not only present the relationships between the local governments and municipal EEBs (Fang, 2016), but also reflect the status quo and weaknesses of the DOR process. We selected EVR as the DOR research subject precisely due to its policy timeliness, as the EVR policy window (2016-2020) overlapped substantially with the DOR investigation period (2019-2020), ensuring that the study data could capture reform dynamics. EVR holds strategic significance in breaking local environmentalism and deterring collusion between the government and enterprises—issues prioritized by the central government, civil society organizations, and the public in monitoring policy implementation. On the other hand, EVR has issued policies in the municipal EEBs, and the related documents are non-proactively disclosed contents, which meets the prerequisite for investigating DOR. In addition, public social demand has become the main driving force for the gradual realization of GEID. The public is very concerned about the ecological environment and EVR, and hopes to obtain detailed documents on the EVR. Therefore, it is reasonable and convincing to request disclosure on the EVR.

Details of DOR survey: Unlike proactive disclosure, DOR provides the public with one-on-one personalized services. This approach not only reflects the government's attitude and ability to serve the people, but also the extent to which citizens have begun to participate in social governance. We investigate by logging into 158 municipal EEB portals nationwide and using their online DOR services.

Content of the request: In September 2016, the General Office of the CPC Central Committee and the General Office of the State Council issued the Circular on the Vertical Management System for Supervision, Inspection and Law Enforcement of Environmental Protection Agencies Below the Provincial Level, requiring

that by 2020, EEBs below the provincial level complete the adjustment work and operate efficiently according to the new system. Therefore, the content we chose to apply for from the municipal EEBs was: The issuance documents of the EVR enacted by the Municipal EEBs and the specific issuance time.

Application method: Due to the limited time and scope of the survey, we only used online application methods, including online application and email application, with priority given to online application. All disclosed responses have been publicly approved by the respondent concerned. Among the 158 prefecture-level cities, the plans of three can be publicly searched; two required on-site applications and were therefore not included in the scope of the DOR survey. This survey covered 153 prefecture-level cities in total.

Application status: This survey was divided into two stages. The first stage was the survey of 110 prefecture-level cities from October to December 2019; the second stage was the survey of the remaining 50 prefecture-level cities from January 14 to 21, 2020 (there was overlap between the two stages). Each stage also contained two parts. The first part was the preliminary application stage; the second part was the feedback response stage. First, in the preliminary application stage, we chose the EEB portals of 153 prefecture-level cities in 28 administrative regions of China to conduct a survey on the availability of DOR services, covering major urban clusters (e.g., Yangtze River Delta, Pearl River Delta, Jing-Jin-Ji) and key central-western cities (e.g., Chengdu, Kunming), which basically containing major cities in China. Table 5 summarizes the preliminary online application status of prefecture-level cities in each province. We made successful applications for preliminary DOR to 114 prefecture-level cities, with an overall application submission success rate of 74% and applications to 39 prefectural-level cities being unsuccessful[2]. This reflected that China's "Internet plus government service" of DOR has achieved remarkable results, but there was still great room for improvement; as shown in Figure 5, in terms of the preliminary application submission success rate, the rate in eastern regions was generally higher than that in western regions. Some provinces such as Hebei, Hubei, Jiangsu, and Zhejiang have improved DOR services, and humanized, interactive portals, and other provinces should learn more from their experience. Regarding the application fee, none of the 153 prefecture-level cities surveyed charged applicants.

Combined with the above operational procedures, we summed up the results of the 39 prefectural-level cities to whom applications in the preliminary application stage of DOR was unsuccessful:

It can be seen from Figure 6 that among the six major categories of issues with online application, the most prominent obstacle for the public to operate DOR was the "lack of DOR windows" (accounting for 38%), followed by "submission

[2]The application submission success rate is equal to the number of successful applications divided by the number of prefecture-level cities selected by each province; online application submission success refers to the successful submission of the application form from visiting the official website; unsuccessful means that a problem occurred in one of the links when visiting the official portals to submit the application form, resulting in failure of the request.

failure" (21%), "EOGI portals issues" (18%), "email application issues" (10%), "registration/login issues" (8%), and "no feedback code generated" (5%). The top three accounted for a relatively large proportion, reflecting that EEBs did not pay enough attention to the construction of official portals, and service offerings were not comprehensive and clear enough, which needed to be improved.

Table 5. Summary sheet of preliminary application stage.

Province	Region	Numbers of municipalities selected	Successful submissions	Submission success rate
Shanghai	Eastern	1	1	100%
Tianjin	Eastern	1	1	100%
Beijing	Eastern	1	1	100%
Hebei	Eastern	11	11	100%
Inner Mongoria	Western	8	8	100%
Liaoning	Northeast	3	1	33%
Jilin	Northeast	3	2	67%
Heilongjiang	Northeast	3	3	100%
Jiangsu	Eastern	13	13	100%
Anhui	Central	4	3	75%
Fujian	Eastern	8	8	100%
Jiangxi	Central	11	10	91%
Shandong	Eastern	16	15	94%
Henan	Central	6	1	17%
Hubei	Central	10	10	100%
Hunan	Central	4	4	100%
Guangdong	Eastern	7	5	71%
Guangxi	Western	14	10	71%
Sichuan	Western	5	3	60%
Guizhou	Western	4	2	50%
Ningxia	Western	3	1	33%
Yunnan	Western	3	0	0%
Chongqing	Western	1	1	100%
Xinjiang	Western	2	0	0%
Shaanxi	Western	4	0	0%
Shanxi	Central	3	0	0%
Gansu	Western	3	0	0%
Qinghai	Western	1	0	0%
Total		153	114	74%

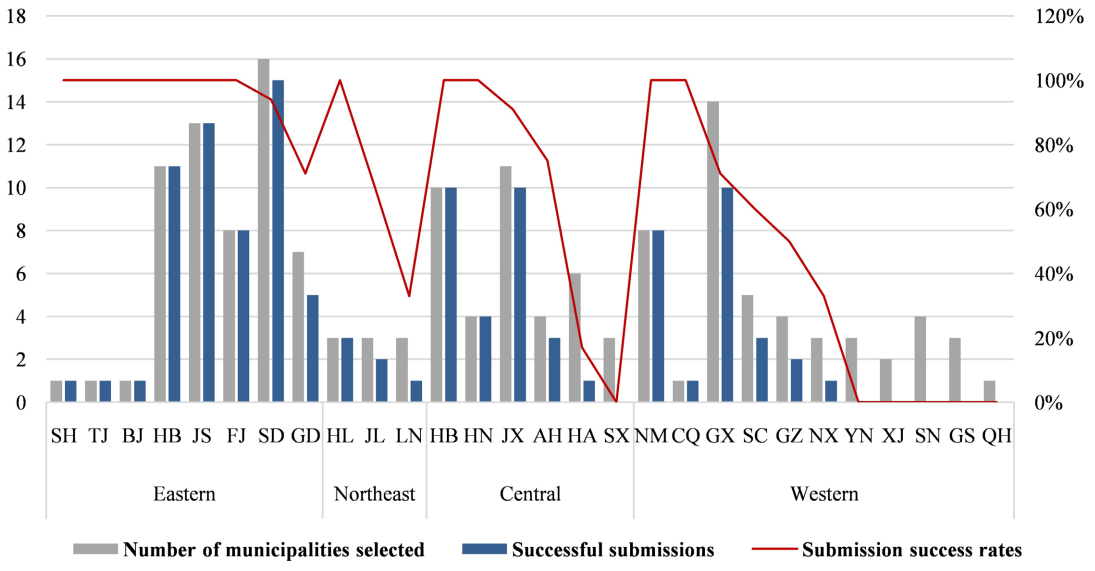

Figure 5. Summary chart of preliminary application stage.

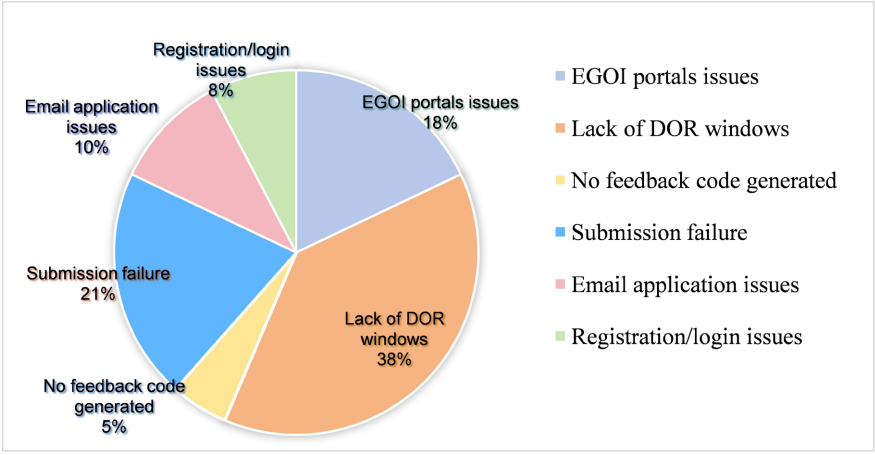

Figure 6. Causes of unsuccessful DOR in 39 prefecture-level cities.

No results were returned when searching for the municipal EEBs of seven prefecture-level cities, such as Baoji and Xianyang of Shanxi Province, and Urumqi of Xinjiang Province had an official portal but it could not be accessed as it was unresponsive. We could not find the DOR entrance under the GEID column after entering the official portal of fifteen prefecture-level cities, such as Kaifeng of Henan Province, and Taiyuan of Shanxi Province. The basic reason for this situation was that the bureaus did not provide online application services. In the case of eight prefecture-level cities, the online application forms were filled out but submission failed. The causes included: unable to select required options, e.g., the submitting bureau for Anshun of Guizhou Province could not be selected, resulting in submission failure; unknown error displayed during submission, e.g., Zhuhai of Guangdong Province and Xi'an of Shanxi Province; no response after submission, e.g., Panzhihua of Sichuan Province. Three prefecture-level cities had

registration/login issues. Two of them required jumping to a third-party portal for registration and login before filling out the online application, but log in still failed after registration. Besides, in the case of Lanzhou of Gansu Province, an error pop-up window appeared during the online application, which led to failure accessing the site, thus resulting in the inability to fill out the form. In the case of another two prefecture-level cities, a feedback code failed to be generated after filling out the form. There were two situations here. One was that querying the processing status did not require a feedback code, such as in the case of Dalian of Liaoning Province—we were able to log in to our account immediately and lodge a query; the other was that the application status could not be queried, such as in the case of Yan'an of Shanxi Province. This also indicated that the government did not form a complete procedural chain in providing DOR services. The remaining four prefecture-level cities required application by email but had exceptional situations. Two of them provided application form downloads but did not specify a reply address; one had a downloadable Excel application form which contained garbled text; another did not provide application form downloads on its official portal.

Successful applications moved on to the second stage, the post-feedback response stage. The issues that arose at this stage are set out below:

Since in the preliminary application stage the applicant selected to receive government information by email, the replies were all in the form of emails, with a few replies being phone calls. A total of 114 applications were successfully submitted in the previous stage, and 90 email replies were received, with a reply rate of 78.9%. According to the Regulation, if the administration could not reply immediately, it should reply within 20 working days from the date of receiving the application. If an extension of the reply period is needed, the applicant should be notified. However, in actual applications, when the applicant called to inquire, the administration often refused to answer by making excuses like "the person in charge is away on business" or "the director is not here". There were also phenomena like "noisy phone connection" and "unable to get through on the phone", resulting in the applications disappearing into thin air.

As shown in **Figure 7**, among the 90 replies received after applications were successfully submitted, there were three possible situations: invalid replies, replies to only one question, and replies to both questions. Invalid replies referred to those where disclosure was refused for reasons like "documents cannot be disclosed because they are not produced by our bureau", "involves state secrets, not disclosed", "the document does not exist", "still in drafting process", etc.; neither documents nor document issuance dates were provided, that is, they were invalid replies. Replying to only one question means the administration only replied with the document or only provided the document issuance date. We received nine such replies, accounting for 10% of the total. Replying to both questions means the administration replied with both the document and its issuance date. Invalid replies accounted for a relatively large percentage, as shown in **Figure 7**, indicating that local governments exercised discretionary power over "disclosure" differ-

ently in the process of GEID. The promulgation of various documents on DOR was not sufficient for the administrative authorities to effectively guarantee every citizen's right to know. There is still a long way to go in implementing the principle of "disclosure as the norm and non-disclosure as the exception" stipulated in the Regulation. The current state of DOR still suffers from "formalism".

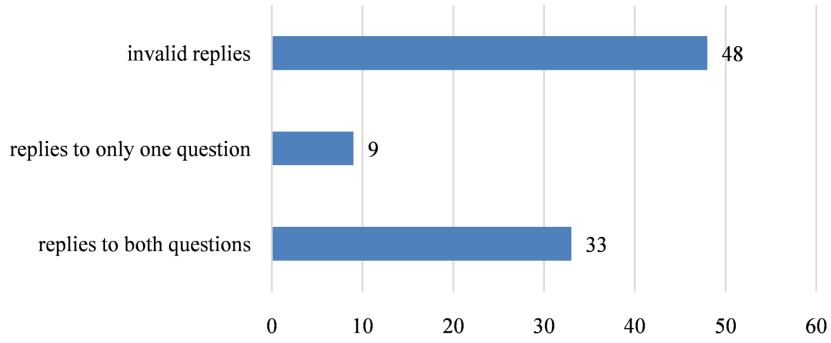

Figure 7. Number of the three kinds of responses.

In addition, since the prefecture-level cities carried out EVR at different paces, some still had issues like management confusion and unclear information ownership. The internal management systems have not been fully normalized either, so there still were considerable difficulties in direct communication between departments at different levels. If the documents whose disclosure was applied for involve cross-departmental processing, the bureaus needed to enquire about the position of relevant departments on the issue, which resulted in prolonged periods for document delivery and processing. It was difficult for the public to judge which department they should submit disclosure applications to during the DOR process. This resulted in disclosure applications being rejected for reasons like "this document is produced by other bureaus". The public had to apply repeatedly, which increased the cost of application and acceptance, but still failed to obtain satisfactory replies. The institutional provisions followed by local administrations in GEID also differ. During our investigation, when asking whether the EVR documents could be disclosed, the replies from local administrative personnel varied. Some replied "we need to seek the opinions of other departments before disclosing", while some stated directly that the documents could be disclosed.

We also found that some administrations' replies were not standardized and showed a strong sense of arbitrariness, which manifested in two ways. On the one hand, when replying to an applicant's email, some did not use official accounts but personal accounts. On the other hand, there were format errors in the GEID Notification (or Reply Letter) sent to applicants. A comprehensive notification should include: document title, document number, salutation, main text (including reply to questions, explanation of reasons, and information on administrative reconsiderations and litigation), issuing agency, date and stamp. However, some notifications lacked the abovementioned required contents. Overall, local govern-

ments and municipal EEBs had ambiguities in institutional provisions, division of responsibilities, and other macro-level issues, as well as a lack of standardized norms in work processes, administrative personnel services, and other micro-level aspects.

5. Causes

5.1. Subjective Factors

We consider subjective factors in two areas. One the one hand, the public lacks sufficient attention to and participation in GEID. They do not have a strong sense of responsibility and awareness of safeguarding their own right to know. They separate national affairs from personal affairs, failing to play a supervisory role and urge the government to continuously improve the information disclosure system. On the other hand, some administrative staff has a "bureaucratic" ideology. Their work attitude is not serious or responsible enough, resulting in excuses like "the person in charge is not here, so we cannot provide information", and "hanging up the phone and letting applicants find out themselves", to brush off responses. Applicants are therefore unable to obtain the information they need, which decreases satisfaction with government work. In summary, lack of participation and responsibility from the public and a lack of service-oriented concept from some administrative personnel have contributed to these issues.

5.2. Objective Factors

System construction: The systems are not yet fully developed and optimized, and information management in different departments lacks unified standards. The flow chart (**Figure 3**) indicates what the whole process is like for the public to DOR, but it does not show what the government needs to do after accepting public applications. It is precisely because some provisions in the Regulation have ambiguous boundaries that local understanding and implementation of GEID also differ, lacking a unified benchmark. The leeway to exercise discretionary power also varies across regions. The respondent government agencies have different formats and content requirements for the GEID Reply Letter. Some are relatively complete, while others lack key information like document numbers, signatures, and stamps.

Capital and technology input: There is a lack of capital and technology to build friendly and efficient government portals. The portal construction in eastern regions is generally better than that in western regions. Since government portals require a certain level of capital investment and technical support for both construction and daily operation, issues like "unable to find official portal" and "no DOR entrance" may be caused by insufficient capital investment and lagging information and communication technology research and development, resulting in inadequate software and hardware information infrastructure. In summary, there is a lack of capital and technology to build friendly and efficient government portals for DOR in some regions, especially underdeveloped ones.

Supervision and management: There is a lack of supervision, management, and effective evaluation mechanisms to ensure implementation of the DOR systems. The original intention of e-government should be leveraging the advantages of information technology to serve the public more conveniently and cost-effectively. But when the government simply sees it as building a portal, without prioritizing thoughtful operation, and fails to promptly identify and fix portal issues, the DOR function exists in name only. From this perspective, daily supervision and management of portal operation is lacking, and normal portal operation is not standardized. Portal operation efficiency has not been incorporated into performance evaluation mechanisms either. In addition, the lack of effective supervision and management also leads to lack of motivation among personnel and low work efficiency, causing issues like failure to reply to applicants within stipulated timeframes and slow government work report updates.

Personnel training: The government's training and implementation for administrative personnel is inadequate. Information is distorted in the transmission of layers of organizational structure, resulting in final information deviating from the original intent. Without proper training after the Regulation was introduced to accurately convey policy meaning, different interpretations by local administrations are inevitable. This fails to provide correct guidance for action, and final outcomes can deviate greatly from envisioned expectations. Therefore, shortcomings in ideological education, policy implementation, and professional training for administrative personnel have contributed to differences in GEID work. Moreover, violations of GEID work requirements are not reported and criticized according to the Regulation, which results in emerging dilemmas not being resolved.

Cross-department communication: There is a lack of information sharing mechanisms between government administrations. Each administrative department has its own database, forming separate "information islands" that are not interconnected with other departments. Hence cross-departmental communication and collaboration involves cumbersome procedures, resulting in longer turnaround times from application to feedback. There is a lack of dedicated personnel specialized in managing GEID. Open information is relatively passive and superficial.

6. Conclusion and Discussion

The GRA-TOPSIS method of DOR from the annual reports on GEID and the survey method of environmental government portals can highlight several issues in the DOR process.

The result of the GRA-TOPSIS method reflects a few trends. First, public awareness and concern regarding environmental protection continue to grow (Porumbescu et al., 2020). With worsening pollution, climate change, etc., people are more motivated to oversee corporations and governments on environmental impacts. Second, the development of information and communication technology allows more convenient online information applications (Zhao & Fan, 2021). The public is getting used to leveraging the convenience of online portals for various

services. Third, there is greater recognition of the public's right to environmental information. With environmental rights written into law, the public is more empowered to exercise their disclosure rights (Zhang et al., 2016).

From the results of our DOR survey, we can conclude that GEID has four shortcomings. First, GEID systems and standards are not yet unified and standardized across regions. Second, lack of capital and technology investment impedes the building of efficient GEID portals, especially in less developed areas. Third, insufficient personnel training contributes to shortcomings in GEID work—reply quality and efficiency need to be improved. Last, information silos across government departments hamper efficiency and timeliness of disclosure.

Based on the above summary, we make the following recommendations. From the citizens' perspective, strengthening education and publicity to nurture civic awareness are the key issues (Moradi et al., 2022). Producing science publicity videos or publishing environmental protection knowledge in magazines can urge more public attention on environmental information and inform people of ways to access more environmental information.

From the government's perspective, improving institutional supervision is important. Implementation rules consistent with the Regulation (Zhang et al., 2010) need to be formulated, which would be effective in clarifying ambiguous concepts like "state secrets, commercial secrets, and personal privacy". Administrative departments should list specific reasons for non-disclosure. The government can gradually expand the scope of open information and appropriately disclose procedural documents for personalized DOR services. For documents related to administrative departments but unavailable there, procedures should be established to obtain them from the relevant departments. Bureaucratic incentives matter (Kim et al., 2022). By using metrics like response rate, timeliness, public satisfaction, and real-time updates, government can improve the performance evaluation system for GEID. The creation of an "Information Manager" position would assist with system development and maintenance, evaluate disclosure results, and provide alternatives when the public is dissatisfied. In addition, through questionnaires, online assessments, mayor's mailboxes, etc., portal websites can implement social assessment mechanisms for GEID and consciously accept public supervision. To build user-friendly public service portal websites, ideally, governments should increase funding, and it is also feasible for all municipalities to adopt the same provincial portals. Departments with well-established portals could help departments without online capabilities to develop information and communication technology, or adopt a unified website model to facilitate coordination and reduce costs. This can also increase public participation and satisfaction.

To operationalize these recommendations, a multidimensional implementation framework integrating education, technology, and public engagement is proposed. Firstly, a tiered environmental education system should be established. Based on the Ten Guidelines for Citizen Ecological and Environmental Behavior, specialized EVR courses should be developed using blended online-offline teach-

ing models. Pilot programs such as the "Eco-Committee" system in vocational schools can integrate policy interpretation into hands-on training for environmental monitoring equipment operations, thereby bridging theoretical knowledge with reform implementation. Secondly, innovative digital incentive pathways for public engagement should be prioritized. By quantifying behavioral contributions, a government-certified "Eco-Ambassador" platform could be established. This platform would operationalize a closed-loop "behavior-points-benefits" feedback mechanism to reinforce positive civic participation. Thirdly, collaborative government-media communication efficacy must be strengthened. Short policy-explainer videos should be produced and disseminated through official new media matrices for scenario-based outreach. Concurrently, real-time environmental data comparisons should be visualized via public policy display screens to enhance transparency and public perception of policy outcomes.

Our study has limitations that can be addressed in future research. We studied DOR mainly from the environmental perspective, uncovering the common challenges of the public and administrative departments in the GEID process and the reasons behind such challenges; but information disclosure is also present in the land, justice, and other fields, which are not covered in this study. Due to varying requirements for DOR across different countries, there may be certain limitations in terms of generalization. We will expand the corresponding survey scopes in future to research more comprehensive information disclosure content. The DOR content involved in the annual reports on GEID is also relatively limited, which may result in some restrictions on the data capture of the study. In future research, we will look for more government reports and establish more detailed evaluation indicators to assess the level of DOR. Besides government portals, other online platforms such as entertainment websites, social media, and online forums are also worth our further research in future.

Authors' Contributions

The authors contributed equally to the conceptualization, analysis, and writing—reviewing and editing of this paper. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflicts of interest.

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