附錄二

Using the Delphi Technique to Explore Core Tasks in Government Organizational Reform

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ABSTRACT

In response to new challenges brought by global warming and climate change, the Taiwan Government is promoting organizational reform, planning the establishment of the Ministry of Environment and Natural Resources （MENR）, moving from the original concept of environmental protection to environmental resources management.

The MENR will merge six government agencies which oversee different management issues. In order to understand the views of various government agencies on the core tasks of the new MENR, the Delphi technique was used to conduct an investigation.

In this survey, we designed an open-ended questionnaire for the personnel of government agencies that will be incorporated into the MENR. The respondents provided 62 items that should be the core tasks of the MENR.

After adjusting similar and possible duplicate projects, there were 28 items. The results of the survey showed “the use of environmental resources and sustainable management” and “ecological conservation” had a high value and high degree of consistency.

In addition, the results also show the respondents’ expectations regarding the establishment of the basic data of environmental resources and the utilization of resources after the establishment of the MENR. The results of the survey can be used as important reference for the MENR.

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INTRODUCTION

The MENR will merge six government agencies and tasks related to resources of water, minerals, forests, and so on.

Through government reorganization, the MENR will integrate environmental decisions related to different government agencies to improve administrative efficiency and utilize government resources effectively.

The Delphi technique is a widely used and acceptable method for gathering data from respondents within their domain of expertise[1] - [3]. The technique is designed as a group communication process that aims to achieve a convergence of opinions on a specific issue.

Furthermore, the issues related to river-basin management, extreme weather disaster prevention and environmental quality protection are included in order to explore the core tasks of the MENR. This paper discusses this issue and gathers data from 12 officers in the respondent group, who come from the departments that will be integrated into the MENR.

The Delphi Process 2

For the second round of questionnaires, respondents were asked to rate the importance (from 1 to 10 points) of the 28 items above. The results are shown in table 1.

The average number of all tasks is greater than 6, indicating that the respondents believe that these tasks are important to the MENR. According to [4] and [5], when the expert group’s quartile difference of opinions on a task is less than 0.6, the task’s expert opinion is highly consistent; if it is between 0.6 and 1.0, with moderate consistency; if greater than 1.0, the table expert group's opinion on the task does not reach a consensus, it is analyzed in the consensus degree section as follows:

1. There are two items with a high degree of consistency:
(a) The use of environmental resources and sustainable management (item 3)
(b) Ecological conservation (item 17)
2. There are five items with moderate consistency:
(a) Promoting the investigation and assessment of non-biological resources in sea areas (Item 6)
(b) Meteorological observations, forecasts and service (item 12)
(c) Promoting green energy, energy conservation and carbon reduction (Item 15)
(d) Homeland Management, Nature, Wetlands, Cultural Landscape Conservation (Item 23)
(e) Geological disaster investigation (such as active faults, landslides, soil liquefaction, volcanoes and so on.) (Item 26)
3. With an average greater than 8 and an inter-quartile range less than 1, two tasks had results showing high degree of importance and high degree of consensus: “Survey and construction of environmental resources” and “Ecological conservation”.

RESULTS

The Delphi technique was developed by Dalkey and Helmer (1963) at the Rand Corporation in the 1950s[3].

The most appropriate number of people in the Delphi technique study should be more than 10, but when it exceeds 30 people, it is easy to result in difficult conclusions due to the large number of people [7].

In [6], the author explores the evaluation and deliberation mechanism of Taiwan's medium- and long-term individual projects with the Delphi technique. The primary and secondary factors of the assessment are made.

In [7], the author uses the Delphi technique to build indicators for the impacts of global governance on national public policy.

The modified Delphi technique was used to analyze of the work content of public health care workers [8].

In [9], the author also used the modified Delphi technique to explore the key factors of group buying behavior.

Tasks	Mode	Inter-quartile range	Average	Standard deviation
1.Survey and construction of environmental resources	8	2.25	8.33	**1.31**
2. Various environmental quality indicators	8	2.25	8.17	**1.28**
3. The use of environmental resources and sustainable management	8	0.25	8.25	**0.72**
4. Diversified exploitation of sand resources	7	1.25	6.92	**0.76**
5. Strengthening mining safety management	5	2.25	6.42	**1.32**
6. Promoting the investigation and assessment of non-biological resources in sea areas	7	1	7.42	**1.11**
7. River basin overall survey and integration management	10	2.25	8.42	**1.44**
8. Water resources management	10	2	8.75	**1.09**
9. Water regeneration development, application, management	7	2.25	8.08	**1.32**
10. Sewer management and construction	7	1.75	7.42	**1.71**
11. Soil and water conservation	7	1.25	7.92	**0.95**
12.Meteorological observations, forecasts and services	7	1	7.33	**1.37**
13. Natural disaster prevention	9	1.25	8.75	**0.92**
14. Climate change response	7	2	7.92	**1.26**
15. Promoting green energy, energy conservation and carbon reduction	8	1	7.50	**1.38**
16. Greenhouse gas reduction management	8	1.5	7.58	**1.61**
17. Ecological conservation	8	0.25	8.00	**1.08**
18. Watershed forest management	8	2.25	8.17	**1.28**
19. Ecological recreation and environmental education	6	1.25	6.92	**1.26**
20. Wildlife and habitat monitoring	7	1.25	7.58	**1.19**
21. Investigation and sustainable utilization of biodiversity resources	7	1.25	7.67	**1.11**
22. The policy of industrial development and environmental conservation	6	2.25	7.42	**1.50**
23.Homeland Management, Nature, Wetlands, Cultural Landscape Conservation	7	1	7.50	**1.12**
24. Delineation of geologically sensitive areas	8	2	7.42	**1.55**
25. Regional and resource geological survey (including minerals, ground water, and geothermal)	6	2	7.33	**1.55**
26. Geological disaster investigation (active faults, landslides, soil liquefaction, volcanoes, etc.)	8	1	7.75	**1.36**
27. Environmental protection	8	1.25	7.92	**1.04**
28. Resources for sustainable use	**8**	**1.25**	**8.50**	**1.04**

Table 1. Statistical results of surveys of core task

The Delphi Process 1

The first questionnaire contains open-ended questions. The contents of the first round of questionnaires are as follows:
(1) In the tasks of your agency, provide 1-3 items that you think should be the core tasks of the MENR.
(2) What do you imagine to be the core tasks of the MENR? Provide 1-3 items.

Respondents considered that there should be 62 items that should be included in the core business of MENR. After adjusting similar and possible duplicate items, 28 items left.

CONCLUSIONS

The Delphi technique asked experts to provide their professional knowledge, experience and opinions in order to agglomerate their consensus on specific topics. It can be applied to the task integration of new institutions. This paper gathered data from 12 officers from the departments that would be integrated to the MENR.

Maybe a consensus questionnaire was obtained after just two rounds of questionnaires because the experts had similar professional knowledge and experience, limiting the results of the investigation and analysis. In future research we can consider expanding the scope of respondents such as adding experts and scholars to cross-check differences.

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