

CONSOLIDATION OF CITIZENS' OPINIONS WITH THE AHP FOR PDCA CYCLE IN LOCAL GOVERNMENTS

Yoichi Iida
Suwa University of Science
Nagano, JAPAN
E-mail: youichi.iida@gmail.com

ABSTRACT

It is well-known that the Analytic Hierarchy Process is able to consolidate people's opinions and differentiate the evaluation of projects due to the Saaty's scale. One of the purposes of the paper is to present an actual example to show that this method is helpful and useful to do the PDCA cycle of activities with citizen participatory evaluation in local governments from the above features. This attempt was the result over three years. The other is to show that administrative officers can easily use this evaluation process because of the DX era.

Keywords: relative evaluation, citizen participatory evaluation, PDCA cycle.

1. Introduction

These days Japanese local governments have been trying to introduce an evidence-based policy making approach and utilize the PDCA (Plan, Do, Check, Act) cycle for making projects in the next year. Moreover, they are making the citizens' opinions more important. The issue here is that the results of an administrative evaluation of projects tend to become be similar and as a result, it difficult to determine which projects are needed by citizens. One of the purposes of the paper is to show that the Analytic Hierarchy Process (AHP) is helpful and useful to consolidate citizens' opinions and evaluate projects in local governments. The other is to show how city officers can use this method of evaluation in the age of DX.

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2. Literature Review

There are some kinds of literature about administrative evaluation using the AHP in local governments in Japan. Furthermore, a lot of books about policy evaluation or policy science pick up the AHP as a method of evaluation. It is well-known that the AHP is able to consolidate people's opinions and differentiate the evaluation of projects due to Saaty's scale (see (Saaty & Peniwati, 2007)). However, there is not any case to apply it to an evaluation of projects by the citizen, much less to the PDCA cycle of policies in local governments because an evaluation with AHP is subjective.

3. Hypotheses

One of the purposes of this paper is to show that the AHP is helpful and useful in the context of deciding the priority of projects in administrative activities with an actual case which was tied to the budget application by city officers. The other is to show that this method can be easily implemented by any city officers.

4. Research Design

I conducted the importance surveys in the commercial revitalization plan in Okaya city in Japan by the almost same questionnaire for all of the committee members, who were citizens once each year for three years. In addition, the fourth time, by automating data input and calculation of relative evaluation values with the cloud service and tablets, I verified whether administrative officers can use this method. The usefulness was verified by whether the city officers thought that it was useful for budget application.

5. Model Analysis

The relative evaluation of projects in the plan was ABC ratings of projects concerning a program. An A rating was the highest rate and was supposed to get special treatment when applying for a budget. Our purpose there was to determine which projects were A by the AHP technique. This is placed as a kind of apriori evaluation of projects.

Firstly, the committee reviews the results of the project this year and relative evaluation values are calculated using the group AHP technique after the importance survey, that is Check of PDCA. After that, they are to be compared with ABC evaluation of projects the previous year and actual projects this year, and a draft evaluation is determined for proposal to the conference by the responsible staff member and the committee chair, that is Act of PDCA. Finally, the committee determines and approves the final evaluation and new projects along with the reviewed activities of each project for the next year, that is Plan of PDCA. The committee meetings are held twice a year. This method ensures objectivity by comparing the results with those of the previous year.

The importance survey is used to determine the relative evaluation values of projects of an individual (see Appendix). After that we combine them to get the relative evaluation values as the committee, which means consolidation of citizens' opinions, using geometric means like the AHP (see (Iida, 2020) for more details). Finally, the candidates with an A rating are determined out of A, B, and C in the order of the highest value obtained.

6. Limitations

The committee held the meeting before all these surveys. The approach shown here may not work for people who do not fully understand the content of projects. The projects evaluated in this research were related to the same program. There is no way to evaluate two projects relatively related to different programs so far.

7. Conclusions

I showed that the AHP is useful for the PCDA cycle of projects in local governments. It is important to determine ABC ratings between projects related to the budget. I also showed that administrative officers can obtain relative evaluation values of projects based on citizens' opinions using ICT because of the DX era.

8. Key References

Iida, Yoichi. (2020). Analytic hierarchy process for evidence-based policy making, the proceedings of International Symposium on the Analytic Hierarchy Process 2020, online. DOI: <https://doi.org/10.13033/isahp.y2020.014>

Saaty, T.L., & Peniwati, K. (2007). *Group decision-making: Drawing out and reconciling differences*. Pittsburgh, PA: RWS Publications.

9. Appendices

I provide specific data from this research. The purpose of relative evaluation there is to determine which projects are rated A. Evaluation A is the highest rated and is supposed to get special treatment when applying for a budget (see Section 5). The final results in each year are tables in 9-5.

9-1. Questions to obtain the relative values in the AHP

Write a project name in order of most importance from the top cell in the second column. After that, select the most appropriate adjective in the cell in the third column.

Table 1.

Ranking	Project's name	Select the most appropriate adjective
The most important		<A little more / More / Much more> important than the project immediately below
2		<A little more / More / Much more> important than the project immediately below
3		<A little more / More / Much more> important than the project immediately below
4		<A little more / More / Much more> important than the project immediately below
5		<A little more / More / Much more> important than the project immediately below
6		---

9-2. Calculation of the relative values as the committee

I used the fundamental scale in Table 2 to change the values in the third column of Table 1 into numerical values. Intensity 1 which means equal importance was not used because the main purpose of this evaluation was to find projects which were rated A.

Table 2. The fundamental scale

Definition of importance	Intensity
A little more importance	3
More importance	5
Much more importance	7

9-3. The relative evaluation values transition over three years

The followings are relative evaluation values of six projects concerning a certain program over three years from 2019 to 2021. To ensure consistency, rankings by the number of times chosen as the most important project were also included in reports. It can be seen that the more projects are selected as the most important, the higher the relative evaluation value.

Table 3. Magnitudes of importance and urgency of projects in 2019.

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	Total
Importance	0.296	0.552	0.026	0.005	0.081	0.040	1
Urgency	0.097	0.784	0.028	0.004	0.051	0.036	1

Table 4. The number of times chosen as the most important or urgent project in 2019.

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	Total
Importance	4	4	0	0	3	0	11
Urgency	2	7	0	0	1	1	11

Table 5. Magnitudes of importance and urgency of projects in 2020.

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	Total
Importance	0.712	0.144	0.015	0.005	0.006	0.118	1
Urgency	0.087	0.354	0.040	0.007	0.035	0.478	1

Table 6. The number of times chosen as the most important or urgent project in 2020.

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	Total
Importance	8	2	1	0	0	2	13
Urgency	1	3	1	0	2	6	13

Table 7. Magnitudes of importance and urgency of projects in 2021.

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	Total
Importance	0.547	0.289	0.031	0.003	0.014	0.117	1
Urgency	0.288	0.447	0.021	0.013	0.059	0.173	1

Table 8. The number of times chosen as the most important or urgent project in 2021

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	Total
Importance	6	1	0	0	1	3	11
Urgency	4	1	0	1	1	4	11

9-4. ABC evaluation transition over three years

The followings are ABC ratings of six projects over three years from 2019 to 2021. These tables correspond to Tables 3, 5, and 7, resp. There are two tables in 2020. One is for the Check of PCDA and the other Action (see Section 5).

Table 9. Magnitudes of importance and urgency of projects in 2019.

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆
Importance	A	A	B	B	A	B
Urgency	B	A	B	B	A	B

Table 10. The number of times chosen as the most important or urgent project in 2019.

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆
Importance	A	A	B	B	B	A
Urgency	B	A	B	B	B	A

Table 11. Magnitudes of importance and urgency of projects in 2020 (Check).

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆
Importance	A	A	B	B	B	B
Urgency	A	A	B	B	B	A

Table 12. Magnitudes of importance and urgency of projects in 2020 (Action).

Project	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆
Importance	A	A	B	B	B	B
Urgency	A	B	A	B	A	A

9-5. Automation of the method proposed after three years

A series of the system was constructed on the Google Cloud Platform. The survey was in the same format as that by paper to compare afterward. These were outsourced. On the other hand, tablets with 10.3-inch displays were prepared for respondents and the city sent them by mail due to personal information protection issues. After the completion of the response, the respondents brought their tablets to the Okaya chamber of commerce. Anyone to know the password can see the results online.