

Effects of alternatives and public involvement to the quality of EIA reports for development cooperation projects

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Purposes

The purposes of the study are:

1. to clarify that alternatives and public involvement (PI) are determinants of EIA report quality;
2. To clarify the interaction between two processes and propose the guidance for satisfactory EIA reports; and
3. To verify the effects of two processes on report quality based on a causal model.

Introduction

1. Many factors (experience, size of projects, public pressure, etc.) influencing report quality are identified but their effects are not well known;
2. Alternatives and public involvement could be key factors for report quality (Kamijo and Huang 2016);
3. However, little is known about the effects of two processes to the report quality based on data analysis.

Data and methods

1. Samples of 160 EIA reports prepared by JICA – 10 per year for the years between 2001 and 2016 and the quality reviewed based on the Lee-Colley review package (Lee et al. 1999);
2. Statistical test to see the effects of 1) JICA guidelines, 2) size of project scales, 3) alternatives and PI, and 4) number of PI stages, alternatives and criteria to the report quality;

Data and methods

3. Cluster analysis and decision tree analysis to show alternatives and public involvement as determinants of the overall report quality;
4. Scatter diagrams to see the interaction between two processes and report quality; and
5. Covariance structure analysis to show a causal model between two processes and the report quality.

Assessment symbols of the Lee-Colley review package

Symbol	Explanation
A	Relevant tasks well performed, no important tasks left incomplete.
B	Generally satisfactory and complete, only minor omissions and inadequacies.
C	Can be considered just satisfactory despite omissions and/or inadequacies.
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies.
E	Not satisfactory, significant omissions or inadequacies.
F	Very unsatisfactory, important tasks poorly done or not attempted.
N/A	Not applicable. The review topic is not applicable or it is irrelevant in the context of the statement.

Source : Lee et al. 1999.

Report quality and three periods

Period	A	B	C	D	E	F	Total	A-C (%)	D-F (%)
2001-2004	0	0	9	26	5	0	40	23	77
2005-2010	0	10	12	30	8	0	60	37	63
2011-2016	0	11	19	24	6	0	60	50	50
Total	0	21	40	80	19	0	160	38	62

- * The p -value by Kruskal-Wallis test is .03*; and
- * The report quality is significantly improved by introduction of JICA guidelines in 2004 and 2010 (* $p < .05$).

Report quality and size of project scales

Report level	A	B	C	D	E	F	Total	A-C (%)	D-F (%)
EIA level	0	15	17	10	1	0	43	74%	26%
IEE level	0	6	23	70	18	0	117	25%	75%
Total	0	21	40	80	19	0	160	38%	62%

- * The p -value by Mann-Whitney's U test is $< .001^{**}$; and
- * The effect on report quality by size of project scale is recognized.

Report quality, and alternatives and public involvement

Groups	A	B	C	D	E	F	Total	A-C (%)	D-F (%)
Both processes	0	21	29	23	2	0	75	67%	33%
Only alternatives analysis	0	0	5	25	5	0	35	14%	86%
Only public involvement	0	0	3	15	4	0	22	14%	86%
Neither process	0	0	3	17	8	0	28	11%	89%
Total	0	21	40	80	19	0	160	38%	62%

- * The p -value by Kruskal-Wallis test is $< .001^{**}$; and
- * The effect on report quality by presence of alternatives and public involvement is recognized.

Report quality and number of Public involvement stages

Groups	A	B	C	D	E	F	Total	A-C (%)	D-F (%)
PI0	0	0	8	42	13	0	63	13%	87%
PI1	0	2	10	25	5	0	42	29%	71%
PI2	0	12	16	10	0	0	38	74%	26%
PI3	0	7	6	3	1	0	17	76%	24%
Total	0	21	40	80	19	0	160	38%	62%

- * The p -value by Kruskal-Wallis test is $< .001^{**}$; and
- * The effect on report quality by the number of public involvement stages is recognized.

Report quality and number of alternatives and criteria

Groups	A	B	C	D	E	F	Total	A-C (%)	D-F (%)
Alt0	0	0	6	32	12	0	50	12%	88%
Alt2-3	0	7	18	27	6	0	58	43%	57%
Alt4-5	0	9	13	15	1	0	38	58%	42%
Alt6<	0	5	3	6	0	0	14	57%	43%
Total	0	21	40	80	19	0	160	38%	62%
Crt0	0	1	12	46	14	0	73	18%	82%
Crt1-3	0	1	5	8	3	0	17	35%	65%
Crt4-6	0	7	16	18	2	0	43	53%	47%
Crt7<	0	12	7	8	0	0	27	70%	30%
Total	0	21	40	80	19	0	160	38%	62%

- * The p -value by Kruskal-Wallis test is $< .001^{**}$; and
- * The effect on report quality by the number of alternatives and criteria is recognized.

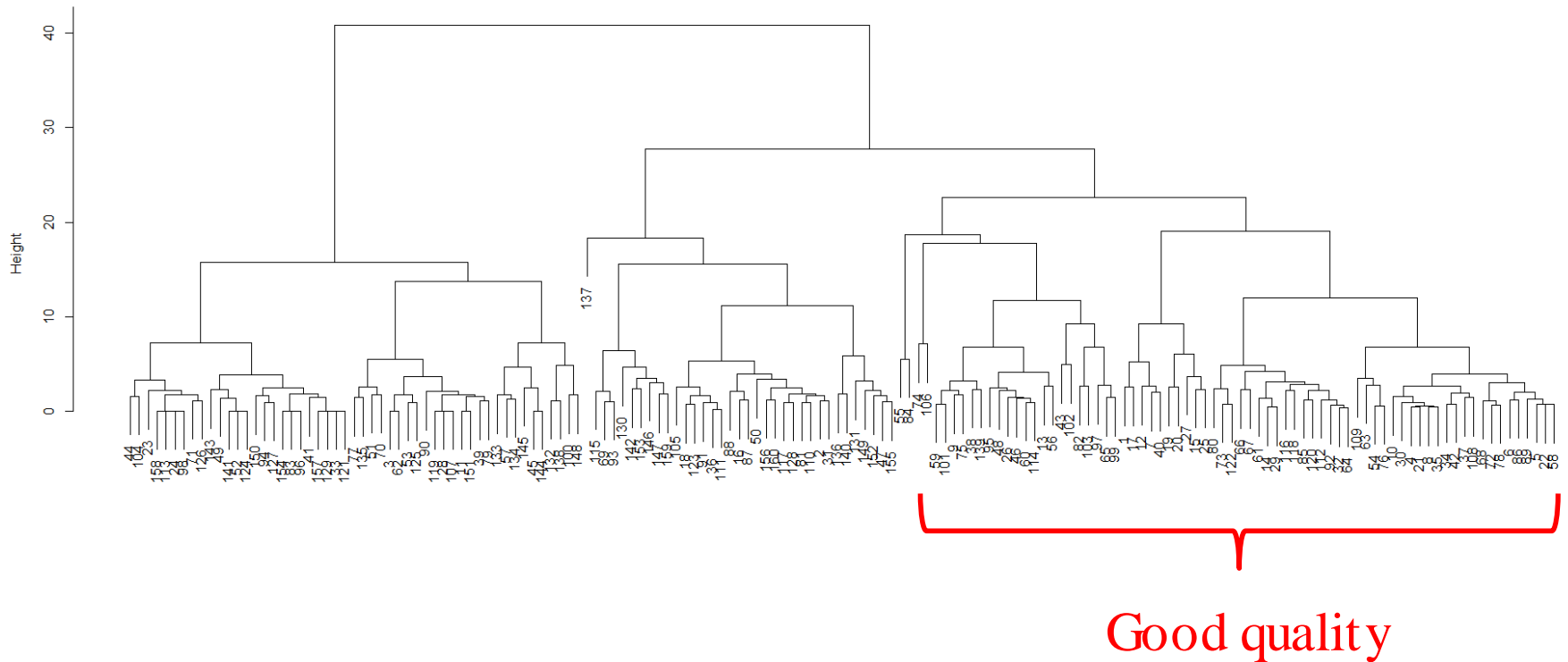
Data for cluster analysis and decision tree analysis

No.	Level	Alt	PI	No. Alt	No. Crt	No. PI	Area 1 grade	Area 2 grade	Area 3 grade	Area 4 grade	Overall quality
1	EIA	yes	yes	16	7	2	B	C	B	B	B
2	IEE	yes	yes	3	7	1	C	D	D	C	C
3	EIA	yes	no	2	0	0	D	D	D	D	D
4	IEE	yes	no	3	13	0	D	D	D	D	D
5	EIA	no	no	0	0	0	C	D	D	D	D

Note: Alt: alternatives, PI: public involvement, Crt: criteria

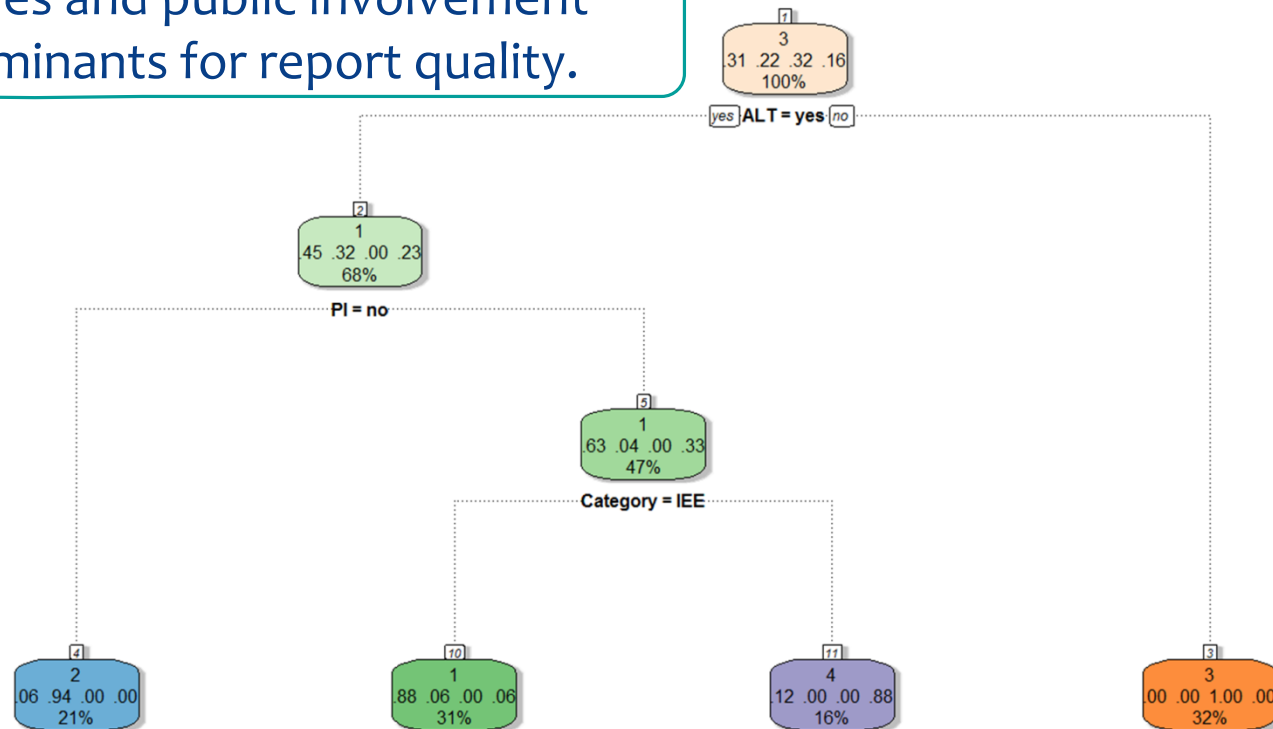
Qualitative variables like EIA or IEE, and yes or no, were converted into dummy variables. Ordinal scales from A to F were converted to rank scores like 6, 5, 4, 3, 2, and 1.

Cluster dendrogram (n=160)



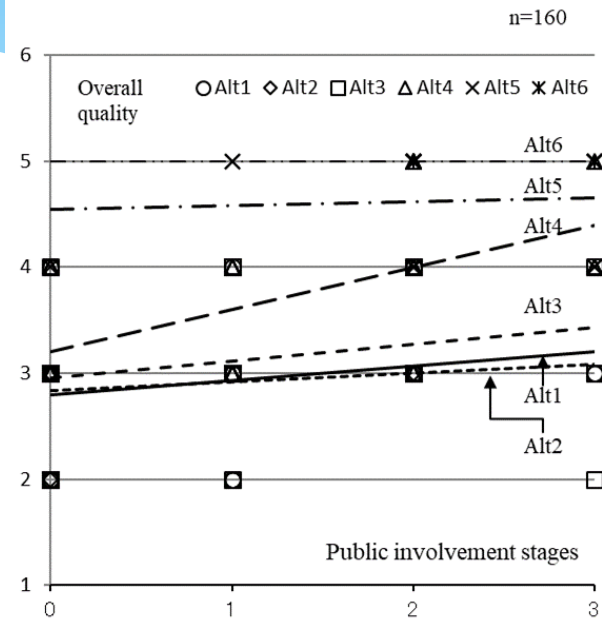
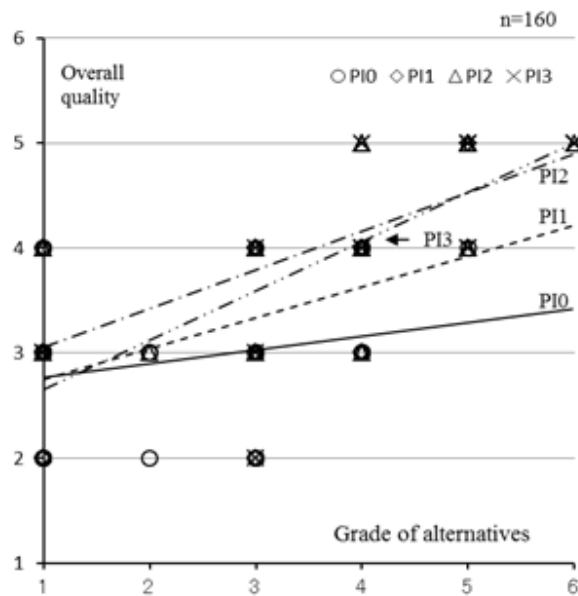
Decision tree of four clusters (n=160)

Alternatives and public involvement are determinants for report quality.



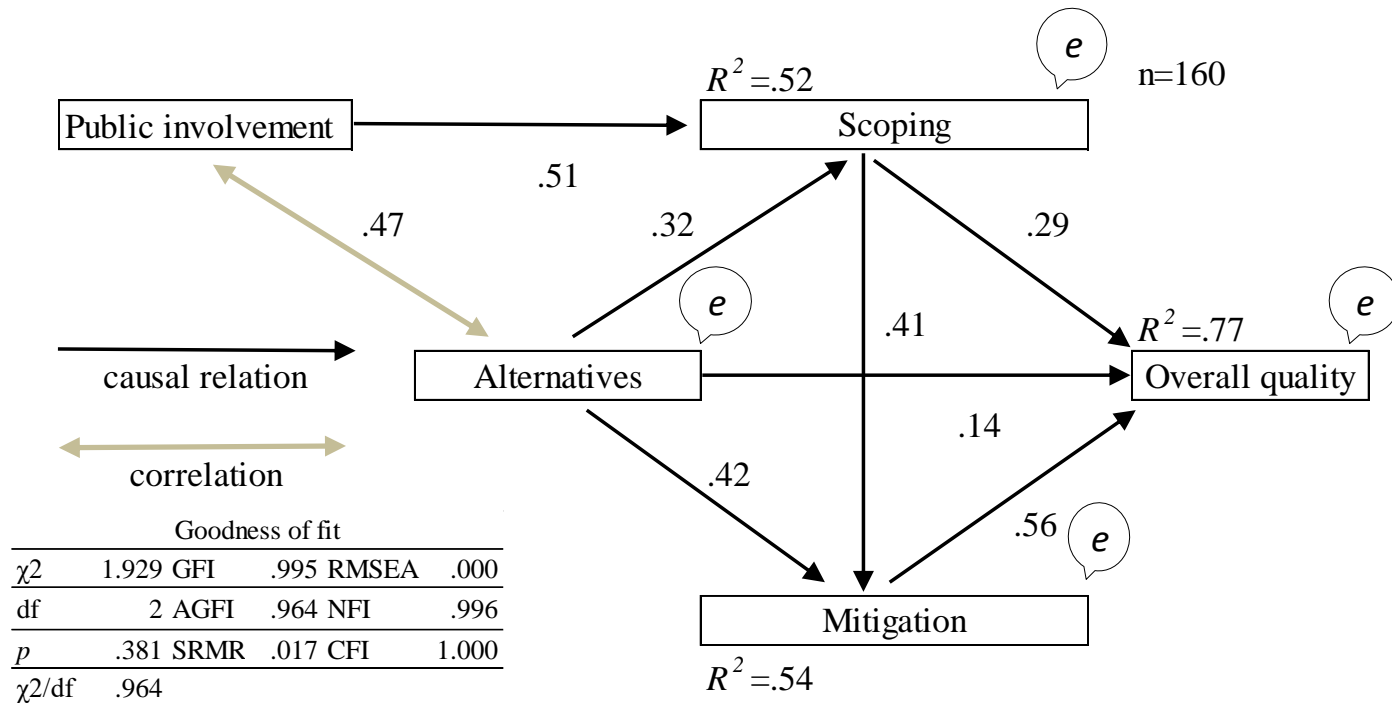
Good quality

Interaction between alternatives and public involvement, and report quality



The interaction effect is recognized. The intersection point of grade C of alternatives (Alt4) and the two times of public involvement (PI2), marks the point four (grade C) of overall report quality.

Causal model with path coefficients



Total effect of alternatives on the report quality is 0.54
 $(0.32 \times 0.29 + 0.42 \times 0.56 + 0.32 \times 0.41 \times 0.56 + 0.14)$ and total effect
of public involvement is 0.27 $(0.51 \times 0.29 + 0.51 \times 0.41 \times 0.56)$.

Why alternatives and public involvement are determinants?

1. The grades of alternatives could represent the will (environmental and social awareness) of project proponents;
2. The public involvement could represent the public or community pressure; and
3. The good will of proponents and public pressure could positively influence the report quality.

Conclusions

1. Alternatives and public involvement are the determinants of JICA EIA report quality;
2. The grade C (just satisfactory) of alternatives and two times of public involvement could be the guidance for satisfactory EIA reports; and
3. The effects of alternatives and public involvement is clarified based on the causal model.

Thank you for your attention.

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