

Determinants and benchmarks of EIA report quality for Japan's cooperation projects

2 May, 2019

Tetsuya Kamijo

JICA Research Institute, Tokyo, Japan

39th Annual Conference of the IAIA, Brisbane, Australia



Introduction

1. The low quality of EIA reports is one of constraints;
2. Many factors (experience, size of projects, funding, public involvement, etc.) influencing report quality are identified based on professional perspectives;
3. However, the effects of factors and the determinants of report quality are not well known.

Purposes

The purposes of the study are:

1. to examine the effects of factors on report quality;
2. to identify the determinants and the benchmarks of report quality; and
3. to verify the effects of the determinants on report quality.

Data and methods

1. Samples of 160 EIA reports prepared by JICA (10 per year from 2001 to 2016) randomly selected, and the quality reviewed based on the Lee-Colley review package (Lee et al. 1999);
2. Statistical test to see the effects of six factors to report quality (JICA guidelines, sector and regions, size of project scales, alternatives and public involvement (PI), and a number of PI stages, a number of alternatives and criteria);

Data and methods

3. Cluster analysis and decision tree analysis to identify determinants of the report quality;
4. Scatter diagrams to see the effects of determinants on the report quality; and
5. Covariance structure analysis to verify the effects of determinants on 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 JICA guidelines

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 0.03*; and
- * The report quality is significantly improved by introduction of JICA guidelines in 2004 and 2010 (* $p < 0.05$).

Report quality, and sector and region

Sector	A	B	C	D	E	F	Total	A-C (%)	D-F (%)	Region	A	B	C	D	E	F	Total	A-C (%)	D-F (%)
Transportation	0	11	13	29	7	0	60	40%	60%	Asia	0	13	28	47	8	0	96	43%	57%
Power	0	6	9	12	0	0	27	56%	44%	Africa	0	3	3	17	4	0	27	22%	78%
Water resource	0	1	6	17	3	0	27	26%	74%	Middle East	0	2	3	8	3	0	16	31%	69%
Regional development	0	2	4	14	5	0	25	24%	76%	South America	0	1	3	5	3	0	12	33%	67%
Pollution control	0	1	2	6	2	0	11	27%	74%	Europe	0	0	2	3	0	0	5	40%	60%
Agriculture	0	0	6	2	2	0	10	60%	40%	Pacific	0	2	1	0	1	0	4	75%	25%
Total	0	21	42	78	19	0	160	38%	62%	Total	0	21	40	80	19	0	160	38%	62%

- * The p -value by Kruskal-Wallis test is 0.10 and 0.31; and
- * The effect on report quality by sector and region is not recognized.

Report quality and project scale

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 $< 0.001^{**}$; and
- * The effect on report quality by 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 $< 0.001^{**}$; 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 $< 0.001^{**}$; 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 $< 0.001^{**}$; and
- * The effect on report quality by the number of alternatives and criteria is recognized.

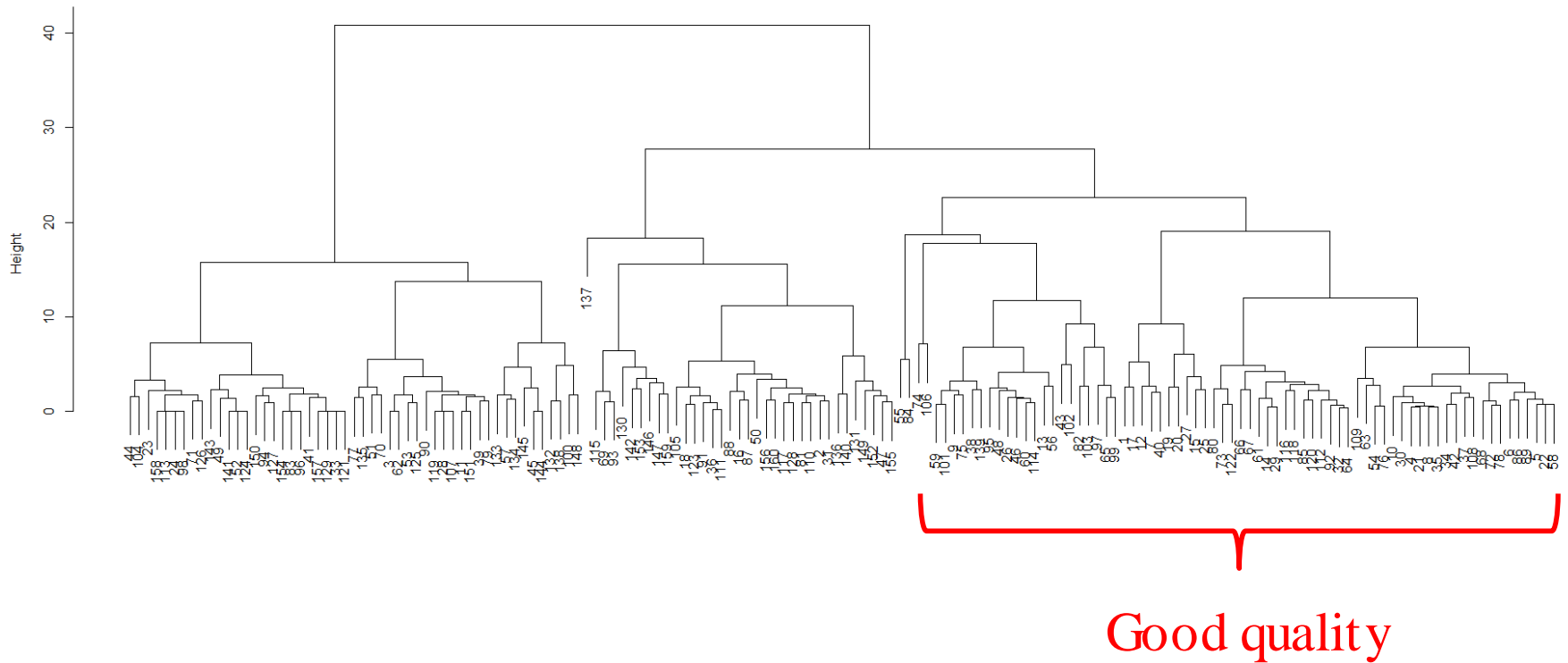
Data for cluster analysis and decision tree analysis

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

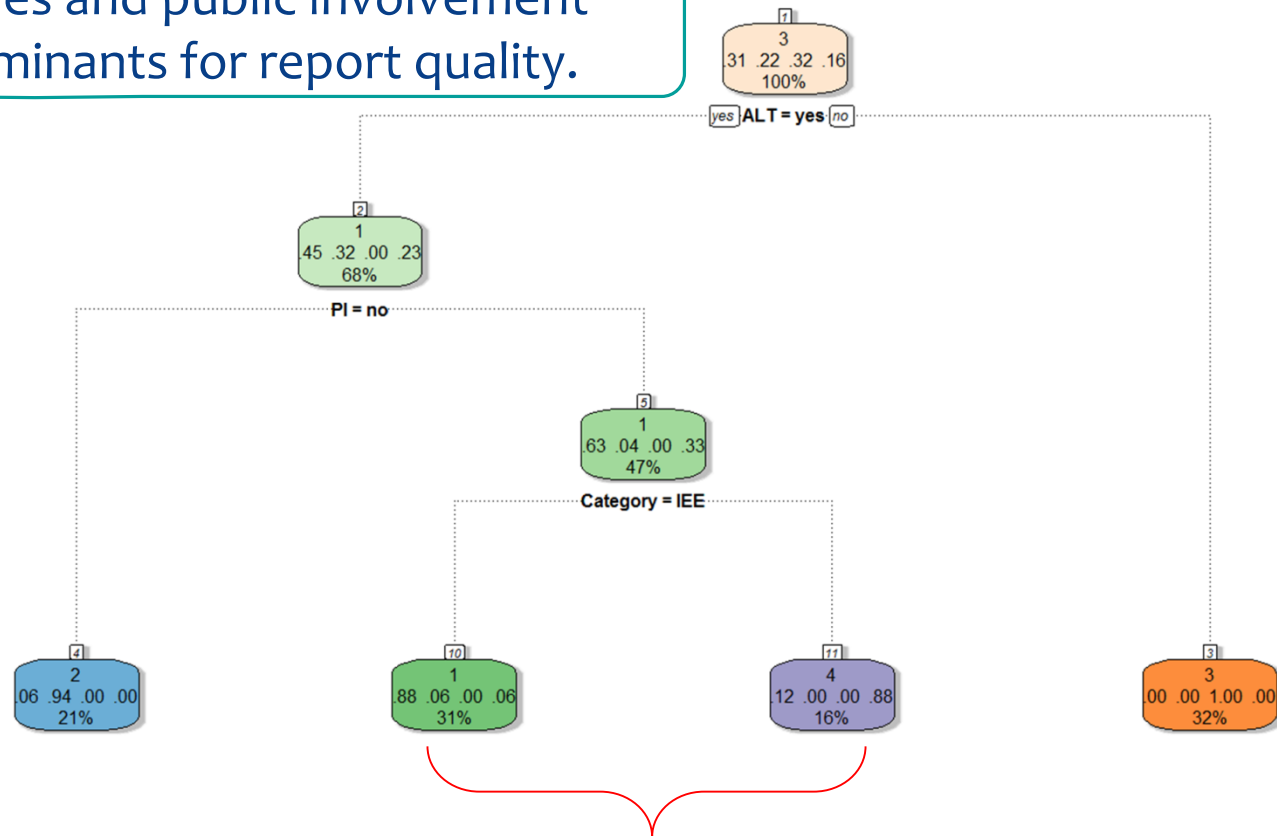
Qualitative variables like EIA or IEE, and yes or no, were converted into dummy variables. Ordinal scales from A to F were converted to rank scores like 6, 5, 4, 3, 2, and 1.

Cluster dendrogram (n=160)



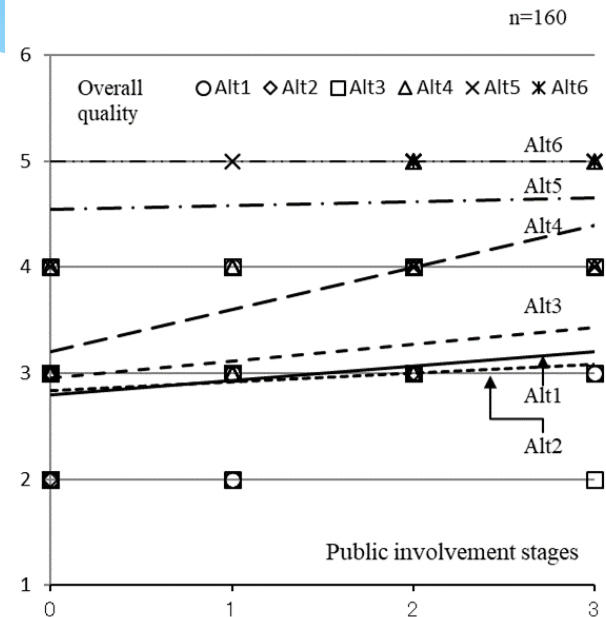
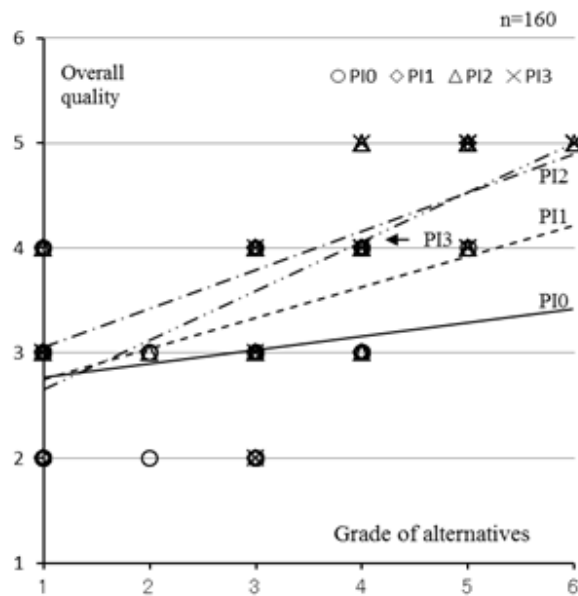
Decision tree of four clusters ($n=160$)

Alternatives and public involvement
are determinants for report quality.



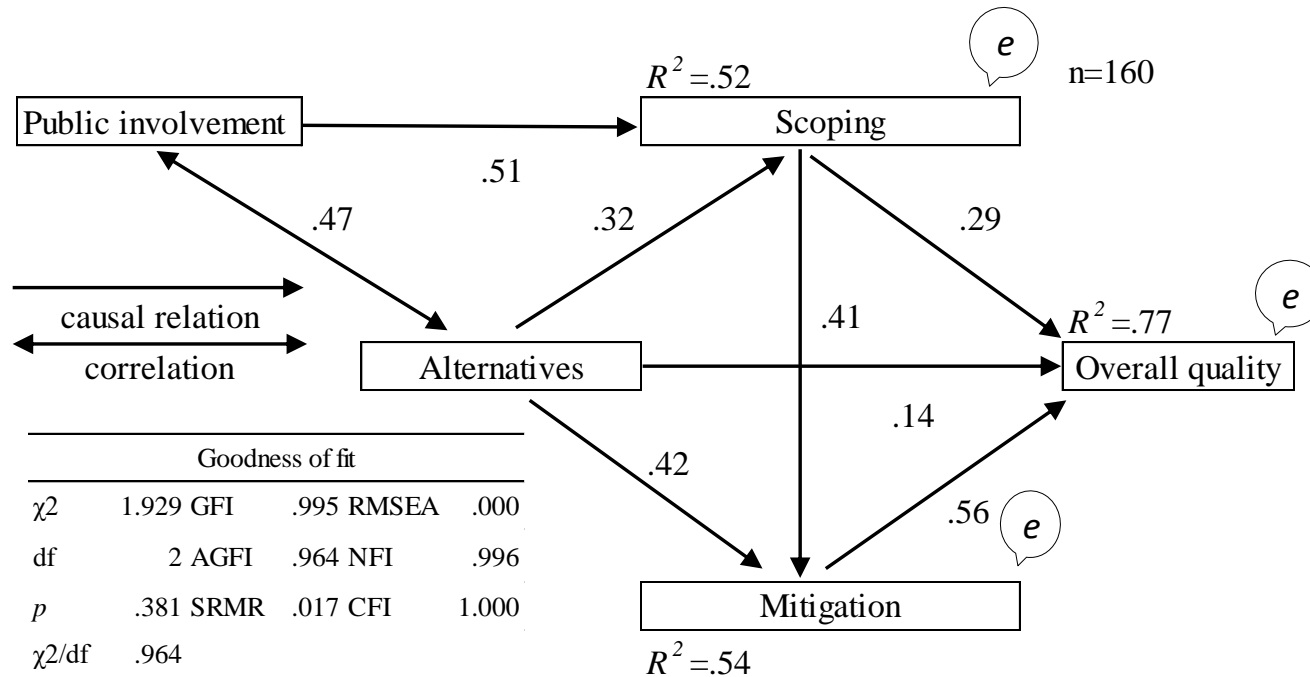
Good quality

Correlation between alternatives and public involvement, and report quality



The effects of PI2 and Alt4 are large. 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 of project proponents;
2. The public involvement could represent the public pressure; and
3. The good will of proponents, when combines with public pressure could positively influence the report quality.

Conclusions

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

Thank you for your attention.

Tetsuya Kamijo (Kamijo.Tetsuya@jica.go.jp)