Quantitative text analysis of discussion of alternatives

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Abstract: The purpose of this study is to clarify that the involvement of stakeholders interested in projects activates the discussion of alternatives and the discussion promotes to reach a consensus to select preferred alternatives. The discussion of alternatives is called the heart of environmental impact statement. Yet, the discussion of alternatives has been limited. The study examined the discussion of alternatives by applying quantitative text analysis (QTA) to the minutes of meetings of a railway project in Vietnam. QTA displayed the active discussion of alternatives, comparison of discussions, and the choice of preferred alternatives. The identification and involvement of stakeholders interested in projects could be key factors in the success of discussion of alternatives.

Key Words: Discussion of alternatives, quantitative text analysis, minutes of meetings, railway project, Vietnam

Introduction

The discussion of alternatives is called the heart of environmental impact statement. The main components of alternatives analysis are: (i) identification of reasonable alternatives, (ii) assessment and comparison of the reasonable alternatives, and (iii) explanation of the choice of preferred alternative (Glasson and Thérivel 2019). Public involvement functions better when the public influences alternatives analysis (Hoover and Stern 2014). Public involvement offers a new insight for alternatives (Rega and Baldizzone 2015). However, the discussion of alternatives has been limited (Gonzalez el al. 2015). Proposed solutions are public involvement at an early stage (Nadeem and Fischer 2011); and use of simulated spatial outcomes to help select alternative scenarios (Sainath and Rajan 2015).

This study analyzed the discussion of alternatives by applying quantitative text analysis (QTA) to the minute of meeting of the railway project in Vietnam. The minutes are very beneficial data to help understanding the actual discussion. The QTA analyzes the textual information contained in documents quantitatively.

1. Data and methods

1.1 Railway project in Vietnam

The north–south railway (from Hanoi to Hochi Minh, 1726 km) is the trunk line of a traffic network in Vietnam. The passenger travel demand and the freight transport demand per day will increase from 1 million and 1.4 million tons in 2010 to 2.7 million and 3.7 million tons in 2030, respectively. The slow railway operation due to single track, old bridges and tunnels, and short radii of curvatures, is the bottleneck to meet the future demands. The Vietnamese government planned the high-speed railway (HSR) project in the north section (Hanoi-Vinh, 283km) and the south section (Ho Chi Minh-Nha Trang, 366km) (JICA 2013). The four alternatives: no action (Alt0); newly proposed alignment in 2013 (Alt1); proposed alignment in 2009 (Alt2); and proposed alignment in 2007 (Alt3) were discussed (Table 1).

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Table 1. Four alternatives of alignment

Alternatives	Outline
Alt1: New alignment in 2013	HSR route is connected with the existing railway and station areas are developed (MCR=6000 meters, cost efficient balance of viaduct and embankment).
Alt2: Alignment in 2009	HSR route passes in urban areas but has no connenction with the existing railway (MCR=6000 meters, mainly viaducts (high cost)).
Alt3: Alignment in 2007	HSR route avoids the existing city areas and has no connection with the existing railway (MCR=5000 meters, mainly embankment (low cost)).
Alt0: no action	Passengers (80,000 per day) takes other modes of transportation (air, existing railway, car, and bus).

Source: JICA (2013), Note: HSR: high-speed railway, MCR: minimum curve radius

The points of difference between alternatives were: i) connection or no connection with the existing railway, ii) 5000 or 6000 meters of the minimum curve radius (MCR), and iii) viaducts or embankment as supporting structure. The multi criteria method using letters (A, B, C, and D) compared four criteria: i) convenience and integrated development; ii) environmental and social impacts (natural, living, and social environments); iii) high-speed services; and iv) economic efficiency. The project proponents selected the newly proposed alignment in 2013 (A1) after the public consultation.

The stakeholder meetings were held at three stages from December 2011 to September 2012 in Hanoi, Ho Chi Minh, and nine provinces along the HSR route, with more than 730 participants representing the government, the local governments of provinces, the city offices, business, academy, and others (Table 2). At the first stage, the project proponents (Vietnam Railway and Ministry of Transport) and Japan International Cooperation Agency (JICA) explained the HSR project, the public consultation process, the scope of environmental and social impact assessment, and alternatives. At the second stage, the project proponents and the representatives of nine provinces, the city offices of Hanoi and Ho Chi Minh discussed the alternatives. The provinces of Khanh Hoa, Ninh Thuan, Binh Thuan, and Dong Nai and Ho Chi Minh belong to the south section. The provinces of Nghe An, Thanh Hoa, Ninh Binh, Nam Dinh, and Ha Nam, and Hanoi belong to the north section. At the third stage, representatives from provinces belonging to the north and south sections gathered at Hanoi and Ho Chi Minh, and expressed their preferred alternatives.

Table 2. Overview of stakeholder meetings

Stage	Date and place	Agenda	Attendance and stakeholders
1st stage	Dec. 9, 2011 Hanoi	Outline of the project and alternatives	76 (VR: Vietnam Railway, MOT: Ministry of Transport, University, Business, JICA: Japan International Cooperation Agency)
2nd stage	July 9, 2012 Khanh Hoa	Discussion of alternatives (Alt1, Alt2, Alt3, and Alt0)	54 (VR, DOT: Department of Transport, PC: People's Committee, DOC: Department of Construction, JICA)
	July 11, 2012 Ninh Thuan		43 (VR, TM: Transport Management, Business, JICA)
	July 12, 2012 Binh Thuan		23 (VR, DOT, PC, JICA)
	July 13, 2012, Dong Nai		29 (VR, DOT, PC, JICA)
	July 23, 2012 Nghe An		52 (VR, DOT, PC, Tourism, Railway company, Academy, JICA)
	July 24, 2012 Thanh Hoa		36 (VR, DOT, DOC, JICA)
	July 25, 2012 Ninh Binh		21 (VR, DOT, DOE: Department of Environment, Industry, DOC, JICA)
	July 26, 2012 Nam Dinh		55 (VR, DOT, PC, DOE, Railway Police, JICA)
	July 27, 2012 Ha Nam		34 (VR, DOT, PC, DOE, Tourism, Commerce, Social department, Youth, JICA)
	Jul. 30, 2012 Hanoi		44 (VR, MOT, DOT, DOE, City office, Business, University, JICA)
	Aug. 10, 2012 Ho Chi Minh		49 (VR, DOT, PC, University, JICA)
3rd stage	Sep. 14, 2012 Hanoi	Selected alternatives and opinions from provinces	109 (VR, MOT, Nghe An, Thanh Hoa, Ninh Binh, Nam Dinh, Ha Nam, JICA)
	Sep. 17, 2012 Hochi Minh		105 (MOT, Khanh Hoa, Ninh Thuan, Binh Thuan, Dong Nai, Hochi Minh, University, JICA)
Total			Over 730

Source: JICA (2013)

1.2 Quantitative text analysis

The minutes of meeting were analyzed using QTA via KH Coder, free analytical software (Higuchi 2014). The QTA is a method of content analysis that organizes or analyzes text data using quantitative analysis method. The QTA has benefits of (i) providing a quantitative overview of text data, (ii) searching data and counting the frequency, that are overlooked or hardly noticed during a normal reading of the documents, and (iii) comparing text data with others by using the appearance ratio (dividing the number of relevant paragraphs by the total number of all paragraphs). The number of paragraph corresponding to alternatives (Alternative, Alt1, Alt2, Alt3, and Alt0) was counted according to each stakeholder and the appearance ratios were calculated. The stakeholders were then divided into two groups (project proponents and participating stakeholders) and the number of paragraphs was compared between two groups by three alternatives (Alt1, Alt2, and Alt3) in mosaic figures

(project proponents: white and participating stakeholders: black). The project proponent were relevant government agencies in charge of the HSR project and JICA. The participating stakeholders were the remaining stakeholders excluding the project proponents.

2. Results

2.1 Number of paragraphs and appearance ratio of alternatives

The number of paragraphs and the appearance ratio of alternatives is shown in Table 3. The number of paragraphs and the appearance ratio of alternatives, Alt1, Alt2, and Alt3 was 50 and 27%, 49 and 26%, 30 and 16%, and 32 and 17%, respectively and the number of stakeholders was 17. The participating stakeholder actively discussed three alternatives (Alt1, Alt2, and Alt3).

Table 3. Number of paragraphs and appearance ratio by stakeholders

Stakeholders	Alternative		Alt1		Alt2		Alt3		Paragraphs
Project proponents									
JICA	10	29%	4	12%	2	6%	1	3%	34
Vietnam Railway	8	19%	3	7%	3	7%	2	5%	42
Ministry of Transport	1	13%	0	0%	0	0%	0	0%	8
Participating stakeholders									
Department of Transport	8	24%	14	42%	4	12%	11	33%	33
People's Committee	10	36%	8	29%	8	29%	5	18%	28
Department of Construction	3	60%	4	80%	4	80%	3	60%	5
Department of Environment	2	40%	5	100%	3	60%	3	60%	5
Academy	1	9%	4	36%	1	9%	1	9%	11
Trasnport Management	1	25%	2	50%	2	50%	2	50%	4
Business	3	38%	1	13%	1	13%	0	0%	8
Department of Industry	1	100%	1	100%	0	0%	1	100%	1
Department of Science and Technology	0	0%	1	50%	0	0%	1	50%	2
Department of Social Affairs	0	0%	1	100%	1	100%	0	0%	1
Railway Police	0	0%	1	100%	1	100%	0	0%	1
Citizens	1	50%	0	0%	0	0%	0	0%	2
Department of Tourism	0	0%	0	0%	0	0%	1	50%	2
Youth Union	1	100%	0	0%	0	0%	1	100%	1
Total	50	27%	49	26%	30	16%	32	17%	188

2.2 Discussion of three alternatives

The number of paragraphs in three alternatives (Alt1, Alt2, and Alt3) by project proponents (P) and participating stakeholders (S) was indicated at the second and third stages. They did not discuss no action alternative (Alt0) or three alternatives at the first stage. The area of black and white squares represents the number of paragraphs (n=111). The project proponents and participating stakeholders discussed three alternatives at the second stage but at the third stage, participating stakeholders discussed only alternative 1 and 3 and project proponents did not discuss any alternative.

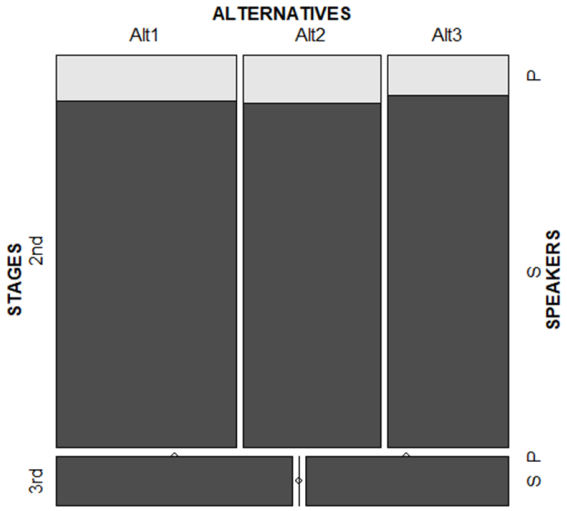

Figure 1. Three alternatives and speakers at the second and third stages

3. Discussion

3.1 Active discussion of alternatives

The participating stakeholders discussed alternatives more actively than project proponents (Table 3 and Figure 1). On the side of project proponents, the JICA and the Vietnam Railway explained the alternatives and answered the comments. On the side of participating stakeholders, the three departments (Transport, Construction, and Environment) and the People's Committee actively expressed their opinions in provinces. The reason of active discussion is that this project was a large-scale project across provinces and had significant effects on the operation of these departments and commission. For example, The Departments of Transport and Construction、and the People's Committee had to coordinate with related transport plans and projects in provinces. The Department of Environment would review the EIA report of the HSR project and had to show judgment regarding whether to approve the report.

3.2 Selection of preferred alternatives

The three alternatives were narrowed down to two alternatives when the stage proceeded. At the second stage, participating stakeholders expressed their preferable alternatives. The number of provinces that preferred Alt1, Alt2, and Alt 3 was 8, 4, and 4, respectively (some stakeholders expressed two alternatives). At the third stage, the Department of Transport attended the meeting as a representative of each province and expressed the preferable alternative. The number of provinces that preferred Alt1 and Alt3 was 7 and 3. In the end, the project proponents selected Alt1.

Ninh Thuan province changed preferred alternative from Alt2 to Alt1. At the second stage, the Transport Management preferred Alt2 because Alt1 required a large-scale land acquisition in residential areas. On the other hand, the Department of Transport agreed with Alt1 at the third stage because the scale of land acquisition was reduced by revising the alignment and location of stations, and construction of viaducts in residential areas.

Ha Nam province also changed preferred alternatives from Alt3 to a combination of Alt1 and Alt3. At the second stage, seven stakeholders (the Department of Construction, the People's Committee, the Department of Transport, the Department of Environment, the Department of Social Affairs, the Department of Science and Technology, and the Youth Union) preferred Alt3. Because Alt3 had advantages such as good access to the station, avoidance of urban areas, small-scale land acquisition, minimum impact on the environment, compliance with the upper plan, low impact on residential areas, and low construction cost. However, at the third stage the Department of Transport (the same speaker) supported Alt1 proposed by the project proponents and suggested that the one section should be followed by the alignment of Alt3. The reason for the change was the revision of alignment and location of stations of Alt1 by reflecting the discussions and comments at the second stage.

Conclusions

Participation of stakeholders who have interests in projects could activate the discussion of alternatives. The public consultation is beneficial in reaching a consensus to select preferred alternatives, because they were revised by reflecting the comments of participating stakeholders. The study verified that the identification and involvement of stakeholders interested in projects could be key factors in the success of discussion of alternatives.

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