A methodology to estimate the benefits and costs of stakeholder engagement in a transport decision-making process

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Abstract

Purpose – The objective of this paper is to propose a methodology to estimate the benefits and costs of stakeholder engagement (SE). Indeed, in the transport sector, it is consolidated that a good decision-making process foresees the involvement of the main stakeholders, but what are the benefits and costs of the SE? How to quantify these impacts and explicitly take them into account in a cost-benefit analysis? In this paper, an attempt to answer these questions is provided.

Design/methodology/approach – In this paper, a methodology is proposed to estimate the benefits and costs of SE. Moreover, the proposed methodology is applied to a case study with an attempt to identify direct and indirect cost and benefit drivers within the context.

Findings – A range of examples of the monetary costs and benefits of SE is provided through the case study of the high-speed rail corridor connecting Bari and Naples in Italy.

Research limitations/implications – Limits in quantifying all the aspects of engagement.

Practical implications – To be adopted by public administrations when deciding whether carrying out a project.

Social implications – Social inclusion is a must in any decision-making process concerning big projects affecting the community.

Originality/value – The original value of this paper is to provide a contribution to the current literature on the quantitative representation of the impacts of SE. Indeed, a methodology to quantify and monetize the costs and benefits of SE is proposed.

Keywords Stakeholders' engagement, Transportation decision-making process, Costs and benefits of SE, High-speed rail, Mega projects, Equity

Paper type Research paper

1. Introduction
Stakeholders engagement (SE) is a practice of involving stakeholders in the decision-making process, where shared communication offers space for information interchange and encourages relationships and discussions between stakeholders and decision-makers (Kelly *et al.*, 2004). The goal is to achieve transparent decision-making situations with robust involvement of the range of stakeholders in order to generate and authenticate the decision taken and endorse them.

The research objectives of this paper are to provide guidelines to measure and monetarize the costs and benefits of SE for transport projects, an activity which is often neglected in the appraisal phase of any transport decision-making process. This paper addresses to fill this gap, by providing an original contribution to the current literature. Indeed, there are many benefits to involving the public. It could result in fostering democracy, encouraging citizens' participation in politics (El Ansari and Andersson, 2011). In addition, in the current global atmosphere that aims to reduce social exclusion, social rupture and detachment, and promote inclusive participation of citizens in activities of the society (Silver, 1994; Ferreira *et al.*, 2020), SE seeks to foster relationships, cohesion, justice and equity. Through a collective decision-making process, individuals can participate in the final decisions (Edwards *et al.*, 2004). SE in decision making advocates a societal attitude shift with more individual autonomy and choice. SE has also an additional value in that it can motivate more cost-effective public services that meet community aspirations, hence presenting a platform for future growth and development (Cascetta and Pagliara, 2013). Likewise, SE can help stakeholders' acceptance of alternative courses of action (e.g. Ferreira *et al.*, 2020) and minimize the likelihood of barriers stemming from interactions among the involved parties during decision-making, as a consequence of differing institutional, legal and financial requisites of the parties (for example jurisdictional tensions between national and local establishments) (Cascetta and Pagliara, 2015). In a period of great uncertainty with respect to future forecasts of the mobility demand and of the supply (e.g. intended both as new technologies, such as smart mobility or autonomous vehicles and new energy vectors to reach the European targets of decarbonization of the transport sector) and of the socio-political context (e.g. the post-COVID period the world is experiencing, or the Russian-Ukrainian war, which is changing the socio-economic structure of all countries) the decision-making process is becoming even more complex (Cartenì *et al.*, 2022) and proposing a shared decision-making process with the major stakeholders can provide an increase of the probability of success of the decision-making process. A wide variety of individuals and agencies (known as stakeholders) wish to be engaged in the decision-making of a given project. Due to their interest in the project, their disagreement hampers progress. In transport projects, the wide spectrum of stakeholders are likely to hold diverging interests that needs acknowledgment and cautious dealings with as an integral element of engagement (Cascetta and Pagliara, 2013).

"Primary" stakeholders are parties with direct interest/s as for example transport institutions responsible for providing transportation services. "Secondary" stakeholders have more indirect interest/s and include local communities and unions/business associations. Stakeholders can be also categorized by extent of interest and power, suggesting different modes of engagement for different parties (Table 1) (Gardner *et al.*, 1986).

Stakeholder engagement in decision-making is premised on three interlacing pillars, i.e. a rational approach as the basis of the decision-making process; an engagement activity where stakeholders are classified into five levels, and quantitative methods built on engineering and economics approaches (Cascetta *et al.*, 2015).

Quantitative analysis and methods assist rational decision-making in order to avoid the "planning fallacy" (overvaluing a project's benefits and/or underrating its achievement and maintenance costs). Specifically, it can bring a cognitive bias that describes peoples's tendency to underestimate the amount of time, costs and risks of future actions while overestimating the benefits of those actions. As soon as the objectives and constraints are specified, many quantitative methods can appraise and compare the social utility of public projects, e.g. cost-effectiveness

Power	Strong	Institutional stakeholders Example: Superintendents for architectural, landscape, historical and artistic heritage Approach: Kept informed and updated	Key stakeholders Example: Mayors Approach: Kept informed and also consulted on choice of alternatives and their potential impacts
	Weak	Marginal stakeholders Example: residents of neighboring municipalities not directly involved Approach: Require least effort	Operational stakeholders* Example: transport operators, citizens, travelers Approach: Engaged in the information dissemination steps
		Low Interest	High

Source(s): Gardner *et al.* (1986)

analysis, cost–benefit analysis (CBA), multi-criterion analysis (MCA), etc. Distinctive merits and limitations are present, hence there is no "best" method. CBA (Danon *et al.*, 2006; Harford, 2006; Chi *et al.*, 2017; Cartenì *et al.*, 2018, 2019; Dyr *et al.*, 2019) and MCA (Nogués and González-González, 2014; Awasthi *et al.*, 2018) have been employed in the transport sector to make choices. CBA is an analytical assessment of an investment decision and evaluation of the welfare attached to it. It enables efficient resource allocation of a given intervention over potential alternatives by allocating monetary values to all benefits and costs project impacts.

After lengthy institutional and non-institutional stakeholder consultations and considerations of European guidelines, Italy published the "Guidelines for Assessment of Investment Projects" (Henke and Bazzichelli, 2018) endorsing quantitative analyses. CBA recognizes investment priorities and appraises their viability by comparing their costs and benefits and ascertaining their outcomes over time.

CBA studies suffer challenges stemming from variations in stated vs actual construction project costs (Boardman *et al.*, 1994). This concept goes back to the issue of the planning fallacy above mentioned. Key concerns in CBA include the consistency of ex ante analysis for capital cost estimation, travel demand modeling and risk analysis (Kelly *et al.*, 2015). The quality of existing estimates for costs and benefits is often inadequate and many benefits are frequently overlooked. For the case study of the High-Speed Rail corridor Madrid-Seville, it was demonstrated, through an ex post CBA, a wrong estimation of the Value Of Time (VOT) (de Rus and Inglada, 1997).

Enhancing the CBA quality of rail projects is challenging (Van Wee, 2007). The current debate is on how to overtly account for SE in CBA, as non-consideration of SE or quantification of participatory activity, when appraising alternatives, risks an inaccurate estimation of the indicators employed in common economic analysis, for example the Net Present Value.

2. Examples of SE in cost benefit analysis of transport projects
From a literature review it emerged that several studies (e.g. Jenkins, 1999; Damart and Roy, 2009; Andersson *et al.*, 2011; Chambwera *et al.*, 2012; Ghassim and Bogers, 2019; Vignetti *et al.*, 2020) evaluated the link between CBA and SE within a decision making process. It is therefore demonstrated that the role of SE is fundamental in determining the success of economic and financial analyses.

For example, Jenkins (1999) proposed an integrated financial, economic and distributive analysis and highlighted stakeholders' role as a key component for the determination of its successful implementation. Damart and Roy (2009) faced the issue between CBA and the

public debate, highlighting how CBA analyses can be useful in the different stages of SE. Moreover, the use of public debate is partly justified by the limits of the CBA in determining investment choices in line with the general public interest. Chambwera *et al.* (2012) defined a stakeholder-focused CBA as an extended form of CBA. An analytical framework was proposed. The activities considered included stakeholders' involvement in analyzing the costs/benefits of an intervention; assessing the weight that given stakeholder groups could place on different costs/benefits. Rangarajan *et al.* (2013) highlighted the role of SE in developing sustainable rail infrastructure systems in Missouri, USA. A SE process assessed the impact of stakeholders' needs, where data was collected through public meetings. Vignetti *et al.* (2020) proposed an ex post evaluation of ten transport projects located across 9 EU Member States. The ex post CBA estimated the projects costs and benefits, with the support of interviews with stakeholders with the objective of assessing wider non-effects, not easily quantifiable.

However, few studies have focused on the evaluation and economic estimation of the benefits and costs of the SE. On this topic it is useful to mention two important contributions by Andersson *et al.* (2011) and a more recent one by Anggraeni *et al.* (2019). Andersson *et al.* (2011) produced a report for Involve, the UK's leading public participation charity, where they proposed a Consumer Focus Toolkit to understand the value of engagement by providing a list of costs and benefits of SE. However, in this toolkit no transport project was presented. Anggraeni *et al.* (2019) presented a review of all the studies dealing with the costs and value of participation in different contexts, such as the public health context, e-participation marine ecosystems, agriculture and water governance. The main findings of this review recognized that participation has intangible benefits such as enhancing social and human capital but includes costs such as time spent, and issues related to trust and conflict. Intangible benefits are often simplified in the benefit-cost analysis and can be misleading.

Pagliara and Di Ruocco (2018) were among the first who provided a contribution to the literature by proposing un metodo per monetizzare I benefici e costi dello SE costs and benefits. An ex post evaluation CBA was carried out for the High Speed Rail project between Turin and Lyon, where they showed that if the costs and benefits of SE had been monetized and embedded in a CBA, it would have generated a different Net Present Value. In this context it is interesting to cite a recent research Ghassim and Bogers (2019) which deals with the importance of engagement for firms' financial performance (FP), therefore from the point of view of revenue and not of the economic benefit for the community (point of view considered in this research). The result shows that SE activities do not directly link to FP, and that the financial benefit begins to appear once a firm is able to transform the acquired knowledge from external stakeholders into innovative outputs.

The literature suggests that very little has been proposed on SE costs and benefits monetarization during the assessment of the technical/economic feasibility phase. This manuscript manages to fill this gap. The objectives are to:

(1) Provide guidelines for quantification of the costs and benefits of SE in transport projects, building on a framework adapted from Cascetta *et al.* (2015), where SE is represented in the transportation planning process;

(2) Illustrate a range of examples of costs and benefits of SE; and,

(3) Provide guidelines for measuring and monetarizing the direct and indirect costs and benefits of SE.

(4) Provide an application of monetarization of the costs and benefits of SE.
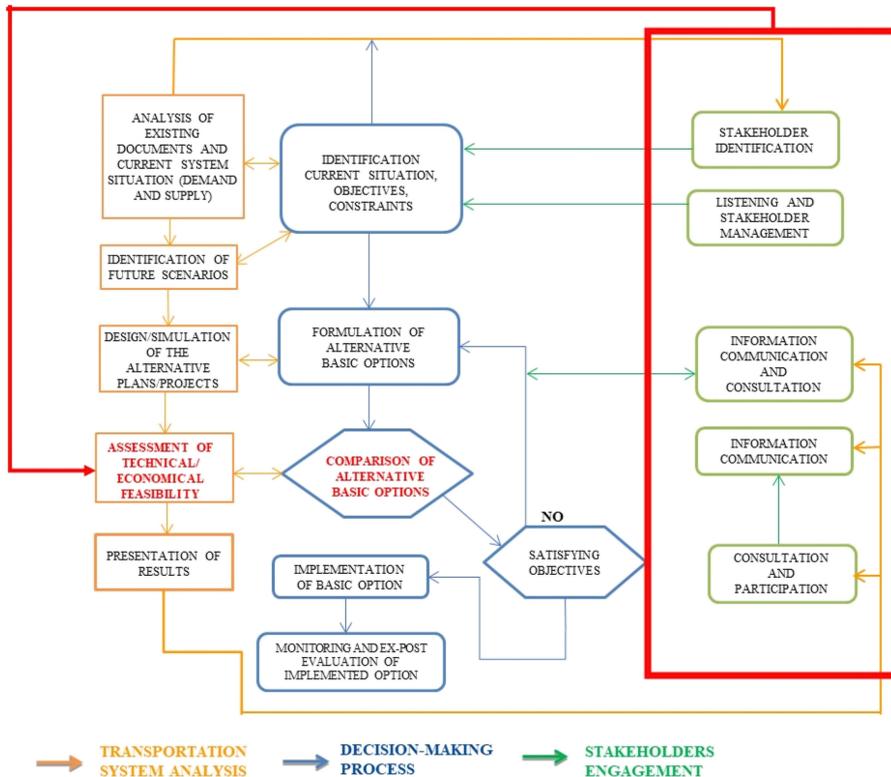
3. The conceptual framework

A decision-making process to be good should be rational and shared. Rational decision-making is based on technical analysis and quantitative methods to select the solution that best meets the set objectives subject to existing constraints. By shared, it is meant a decision-making process in which SE is present from the initial phase of the identification of the current situation, lasts throughout the process and conditions the final choices.

Cascetta *et al.* (2015) developed a "three legs" decision-making process, where the interaction between SE, cognitive decision-making process and quantitative analysis is represented. Starting with this model, we propose a simplified framework, where the role of the SE is better emphasized and integrated (Figure 1, highlighted in red). In Figure 1, the three decision-processes are color coded: technical activities (orange), decision-making process (blue) and SE activities (green).

The initial phase is represented by analysis of the current situation, based on exchange of information between the design technicians (orange), that through the analysis of supply and demand documents, provide information for the decision-making process and for the definition of existing objectives and constraints.

The first phase consists in identifying the stakeholders that should be involved within the decision-making process. This is a very delicate phase of the SE process, since excluding stakeholders could jeopardize the outcomes of the decision-making process (the excluded

Source(s): Adapted from Cascetta *et al.* (2015) and extended y the Authors

ones could disagree with the decisions taken by creating barriers to the choices reached). On the other hand, engaging many stakeholders involves an increase in the costs of the SE. It should be considered that the stakeholders have different objectives, often in conflict with each other, therefore increasing the number of stakeholders increases the costs for the realization of the SE. Furthermore, as demonstrated (e.g. Giordano *et al.*, 2020) as the stakeholders involved in the process vary, the weights attributed to the various objectives change and the most satisfactory final choice may vary.

After identifying the key stakeholders, listening to and involving them in this phase allows defining shared objectives and avoids the risks of not considering existing constraints that prejudice the achievement of the final decision. This level is key to ascertain the preferences of involved parties to the predefined solutions designed to solve their problems. The design engineer supports and contributes to the identification of the different solutions, by developing and implementing plans/projects.

The contribution of this paper is that while in Cascetta *et al.*'s model (2015), SE *indirectly* influences the quantitative analysis; in the model we propose, SE is present *directly* through the estimation of its benefits and costs. The whole block concerning SE (highlighted in red) directly interacts with the assessment of the technical/economic feasibility phase (Figure 1). The results of the quantitative analysis determine and condition the next phase or that of choosing the final decision.

In the framework proposed in this paper, quantitative methods play a significant role (Figure 1).

Specifically, technical analyses support the decision by analyzing the actual performances of the system and formulating and evaluating alternative interventions. However, the definition and quantification of the benefits and costs related to the SE is certainly not a well-known phase among transport analysts. The European guidelines propose a standard and consolidated method for processing the CBAs, defining the methodology for calculating the benefits and costs (European Commission, 2014). However, the European guidelines do not explicitly take into account, and therefore do not provide a methodology to estimate the benefits and costs related to SE. In professional practice, SE is considered only indirectly, in a phase prior to the evaluation analysis, or in the choice of alternative options. Indeed, engaging and listening to stakeholders' influence the definition of costs and benefits of SE. Figure 1 also shows that the technical activities are also influenced by SE (orange arrow between technical activities and SE). The following section provides guidelines to explicitly enumerate and consider the direct (monetary) and indirect (non-monetary) of SE within a transportation decision-making process that is rational and participated and shared.

4. Guidelines for measuring and monetarizing the direct and indirect costs and benefits of SE

This section focuses on the analysis and definition of benefits and costs in CBA of SE.

The European guidelines (European Commission, 2014) define the methodology for estimating the benefits and costs related to the construction of a new work. On the other hand, little attention has been devoted to the definition and standardization of the benefits and costs of the SE.

There has been very limited economic assessment of SE. Many reasons contribute to such lack, among them are the complexity of the engagement process and the lack of appropriate data. In this manuscript, starting from the state-of-the-art reported in section 2 and from the report INVOLVE (2005), the costs and benefits relative to SE have been computed (see Table 2).

Table 3 depicts some guidelines for measuring and monetarizing the direct and indirect costs and benefits of SE.

Costs	Direct	1.	*Staff costs:* Costs of internal [a] and external [b] staff; Travel costs incurred by internal staff; staff overnight accommodation costs during SE activities; staff recruitment costs of hiring SE staff; staff training costs; Travel subsistence: cost of meals during the stay
		2.	*Event costs:* Exhibition and public meeting costs; concertation tables costs to encourage integration between different actors; Trade unions and associations in defining project ideas (Cascetta *et al.*, 2015), Citizen jury: cost of participatory action; Technical table cost; stakeholders conference costs to pay for place where decision-makers and stakeholders meet
		3.	*Communications costs:* Communicating the engagement. Costs deal with advertising SE. Also costs of sending invitations to stakeholders, advertising seminars, printing posters and creating website
		4.	*Participant costs:* Costs incurred for training of participants in development of know-how in participation, in addition, participants must be periodically informed about activities and decisions
	Indirect	1.	*Financial risks:* those due to delays
		2.	*Performance risks:* can provide new information that could change the original plans and objectives and also can discover, at an early stage, unexpected risks that can therefore be avoided
		3.	*Reputational and opportunity risks:* can improve the organization's reputation but can also raise audience expectations to unrealistic levels; can highlight new opportunities for the public and suppliers but can also generate adverse opinions in poorly informed people
Benefits	Direct	1.	*New resources to be created/accessed [c]:* volunteer work fostering; public awareness of public services increase: improving staff awareness and activities related to problems arising during the SE activity
		2.	*Improvement to uptake of services:* Include implementation of some fundamental aspects: impact on health (reduction of mortality and health-related quality of life over time); reduced crime levels; environmental improvements; homicides (value entered is that of human life in event of death); serious and less serious wounding (value entered is that of human life in event of serious or less serious injuries)
		3.	*Improvement to quality of services:* Less time spent on administration; Increased consumer satisfaction
	Indirect		Learning and skills development among participants; increased social capital, social cohesion, inclusion; presence of a more representative group of participants in decision-making process; listening: represents the well-being expected by participants as regards participation in meetings and events, indicates how conversation with stakeholders is useful to participants and can positively influence them

Note(s): [A]Internal staff: directly involved in project implementation, their cost is spread over total duration of the assignment; [b]support staff (administration, communications), their cost is that of an external figure working alongside internal personnel to provide support during some phases of the process; [c]refers to complaint teams dealing with complaints from participants, protests, or complaints of stakeholders/citizens. Includes: First complaints team: 2 people (communication/public relations expert and sociologist) who interact with demonstrators, intervene in meetings; Second complaints team: 3 professionals, who deal with most serious and most dangerous protests; Third complaints team: 2 professionals (communication manager and an assistant) who deal with serious conflicts

Table 2.
Stakeholder engagement: costs and benefits

Specifically, Table 2 shows that in SE, costs include direct costs, which are monetary costs associated with organizing and carrying out participation meetings with stakeholders; and indirect costs (INVOLVE, 2005), comprising non-monetary costs associated with risks rather than inputs and are the risks and non-monetary costs for the participants. Four categories of risk should be identified (National Audit Office, 2009). Monetary costs are usually considered higher than the non-monetary ones (often difficult to quantify). Among the monetary costs, participant's costs represent an important share to be considered, followed by staff costs and

Costs	Direct	1. *Staff costs* Internal and external staff cost (average monthly salary * number of working days), Cost of staff training (cost of paper material/creation of website for training of participants + cost of meetings + cost of refreshments + equipment cost + travel cost for participants), Recruitment (number of human relations consultants * salary), Travel costs (round trip cost * number of people * number of meetings), Staff overnight accommodation costs (average cost of one night per person * number of nights * number of people), Cost of meals during travel (cost of meal * number of meals * number of participants)
		2. *Event costs* Events in person (cost of renting the venue + cost of equipment + cost of refreshments + overheads), Online events (domain name registration + hosting fees + website construction cost), Concertation table (remuneration for each member * number of staff), City juries (number of jury members * cost of time for volunteers), Technical round table (number of team members * monthly salary + refreshments cost + table coordinator cost + equipment cost)
		3. *Communications costs* Costs of advertising + invitations + designing and printing posters + creating a website + sending newsletters + interviews and surveys (cost of investigation staff)
		4. *Participant costs* Periodic sending of brochures to inform citizens of activities and decisions
	Indirect	1. *Financial risks* Cost of internal staff related to events and communication for another 2 months
		2. *Performance risks* Calculation of monetary time saved (wages * number of days saved) for discovery of unexpected risks in initial stages of the project
		3. *Reputational and opportunity risks* Calculation of positive and negative opinions regarding the project through, for example, newspaper articles
Benefits	Direct	1. *New resources created/accessed* Number of volunteers * number of working hours/weeks * salary, Cost of any market research (remuneration of the PR * number of working hours necessary to improve relations between participants), Increased awareness of public services (average daily wages * number of working days of a person in charge of public relations)
		2. *Improvement to uptake of services* Measurement of satisfaction level of stakeholders and citizens. Comparison of health risks, level of crime, time spent on complaints with statistical levels and crime data recorded by the police Impacts of crime: number of murders * value of human life in the event of death; number of serious injuries * value of human life in case of serious injuries
		3. *Improvement to quality of services* Costs related to monitoring (10% of the total SE); Costs of legal battles; Cost of marketing campaign (9% of the total cost of SE); Costs spent on security
	Indirect	Listening to participants (duration of conversation with a broker * monetary value of the conversation)

Table 3.
Guidelines for measuring and monetarizing the direct and indirect costs and benefits of SE[#]

Note(s): [#]All costs in €; based on INVOLVE (2005), Pagliara and Di Ruocco (2018), *multiplied by

the costs of the event are the least expensive. As regards non-monetary costs, the highest are those relating to financial risk (Table 2).

Likewise, the benefits of SE can also be classified into direct and indirect benefits. Direct benefits of SE comprise three categories (Table 2) (INVOLVE, 2005). The indirect (non-monetary) benefits of SE are difficult to quantify. Monetary benefits are greater than the non-monetary ones. As for the former, the improvement in the quality of services is the one with the greatest impact.

5. The case study: CBA of SE for the High Speed Rail (HSR) corridor Napoli-Bari (Italy)

The methodology proposed in Section 4 was applied to a real case study, i.e. the HSR line Napoli-Bari [1].

The new High Speed Rail (HSR) section between Naples and Bari represents a strategic project for Italy since it will connect the South of Italy with an existing HSR network. The latter is 1,467 km long and connects Salerno to central-northern part of the country (see Figure 2).

The story of this line goes back to the year 2004 and it is not finished yet. The main reason is due to changes in the government's decisions while the regions interested, i.e. Campania and Puglia, have always considered it an important work to carry out.

The total length of the line is approximately 150 km, it will be a High-Speed/High-Capacity line that will be used by both High-Speed trains that will reach a maximum speed of 250 km/h and traditional trains. At the end of the construction work, the travel time between Naples and Bari will be 2 h (saving of 1 h and 40 min), while that between Rome and Bari will be only 3 h (saving of 1 h).

In this context the direct and indirect benefits relative to the SE of this project have been estimated.

The computation of the some of the costs and benefits of SE, according to the guidelines reported in Section 5, has been carried out for the case study under analysis. Results are summarized in Table 4 and Table 5 respectively.

Source(s): Authors' elaborations

Direct costs		€
	Staff Costs	*133,570*
	Internal and external staff	98,275
	General expenditures	5,000
	Recruitment	5,726
	Concertations Tables	24,569
	Events costs	*52,260*
	Events in Person	48,760
	Online Events	3,500
	Communication costs	*20,462*
	Participant costs	169,650
Tot direct costs		375,943
Indirect costs	Financial risk	75,268
	Performance risk	
	Reputational and opportunity risk	
Total indirect costs		75,268

Specifically, for the estimation of direct costs, it was considered the Italian Prime Ministerial Decree No. 76 of 10 May 2018 which governs the methods of carrying out the types and size thresholds of the works subject to public debate in Italy. In this Decree the way in which the public debate should be carried out is described; the experts who should participate in the debate as well as the way in which to advertise the meetings to allow stakeholders to be informed on the dates and place of the meetings are reported.

Finally, it is foreseen (again in the Decree) that the public debate phase should last 4 months.

Taking into account these directives, the direct costs of the SE were estimated and in particular the costs of the staff of the public debate (also considering the presence of expert technicians in the sector as envisaged in the Decree);

$$\text{Cost of Staff} = \text{Internal and external staff} + \text{Recruitment} + \text{Concertation's Tables} + \text{General Expenditures}$$

Internal and external staff

$$\text{Internal and external staff} = \text{number of months of duration of the debate} * \text{number of experts} * \text{average monthly salary}$$

where:

(1) Number of months of duration of the debate equal to 4 as established by decree No. 76 of 10 May 2018;

(2) 7 experts involved in the debate: Transport Engineer, Structural Engineer, Geologist, Health and Environment Researcher, Lawyer, Environmental Expert, Responsible of the provincial directorate;

(3) Average monthly salary in Italy for the 7 experts involved in the SE

(4) Recruitment

$$\text{Recruitment} = \text{Number of human resources hired monthly salary}$$

where:

(1) Number of human resources hired equal to 2;

(2) Monthly salary considering 8 working hours

(3) Concertations Tables

$$\text{Concertations Tables} = \text{number of persons} * \text{monthly salary}$$

where:

(1) Number of persons equal to 7;

(2) Monthly salary for the categories involved

General Expenditures

$$\text{General Expenditures} = \text{travel expenditures}$$

where:

(1) Travel expenditures equal to 5.000 euro per person. This value was assumed by imagining the average travel, food and overnight expenses.

The cost of the events (considering 10 public meetings during the 4 months of debate)

$$\text{Events Costs} = \text{Events in Person} + \text{Online Events}$$

$$\text{Events in Person} = \text{Cost for the rental of the location venue} + \text{Cost of refreshments}$$
$$+ \text{General expenses}$$

Where the different cost items have been hypothesized from the analysis of events organized in the area.

Online Events

$$\text{Online Events} = \text{expenses for the website}$$

The monetary cost to build a website has been assumed from the analysis of the costs incurred to build a website and the cost of communication (considering, for example, the costs of designing and printing the posters, the website, the interviews and surveys to be carried out during the communication campaign).

Cost of Communication: Cost for Advertising + Cost for Invitations + Website Creation + Cost for Interviews and Surveys. These costs have been hypothesized from the analysis of the costs incurred for communication in similar events.

Participant costs

$$\text{Participant costs} = \text{Number of persons} * \text{Total number of hours} * \text{hourly wage}$$

where:

(1) Number of persons equal to 500;

(2) Total number of hours 50;

(3) Hourly salary appropriate to the professional figures for the case study.

With regard to the estimate of the indirect costs, the financial risk was estimated as Cost of internal staff related to events and communication for other 2 months. As regards the

benefits, they were estimated considering the methodology shown in Table 3 and taking into account past experiences for similar works in Italy (e.g. number of injuries that occurred in the past due to opposition events of major works in Italy).

Financial Risk

$$\text{Financial Risk} = (\text{Events Costs}/2) + (\text{Internal and external staff}/2)$$

New Resources

$$\text{New Resources} = \text{Volunteers} + \text{New relations} + \text{New Information}$$
$$+ \text{Increased awareness of public services}$$

Volunteers (Nuove risorse volontarie)

$$\text{Volunteers} = \text{Number of participants} * \text{Number of hours} * \text{Number of meetings}$$
$$* \text{hourly salary}$$

where:

(1) Number of participants equal to 50;

(2) Number of hours equal to 5;

(3) Number of meetings equal to 10;

(4) Hourly salary.

New relations (Better Relations between Participants and communication activities)

$$\text{New relations} = \text{Number of months of debate} * \text{Monthly salary PR}$$

where:

(1) Number of months of debate equal to 4;

(2) PR monthly salary considering 8 working hours per day

New Information

$$\text{New Information} = 0,11 * \text{total costs}$$

where:

(1) Total costs equal to the sum of total direct costs and total indirect costs.

Increased awareness of public services (Raise awareness of public services)

$$\text{Increased awareness of public services} = \text{Number of days} * \text{PR manager daily pay}$$

where:

(1) Number of days equal to 20;

(2) PR manager daily salary.

(3) Increased awareness of public services.

Impacts of Crime

$$\text{Impacts of Crime} = \text{Homicides} + \text{Serious Injuries} + \text{Injured}$$

By multiplying the average social accident costs ([European Commission, 2019](#)) by fatality and sever injury and slight injury by the number of deaths and injuries that on average occurred in Italy due to opposition to similar projects, the impacts of crime were monetized.

Quality of Services

$$\text{Quality Of Services} = \text{Monitoring Costs} + \text{Cost of Marketing campaign}$$
$$+ \text{Costs of Legal Battles} + \text{Costs spent on security}$$

Monitoring Costs

$$\text{Monitoring Costs} = 0, 1 * \text{Total indirect costs}$$

Cost of Marketing campaign

$$\text{Cost of Marketing campaign} = 0, 09 * \text{Total Indirect costs}$$

For the costs of legal Battles and cost spent on security they were assumed analyzing the costs borne for similar projects in the Italian territory.

[Table 4](#) and [Table 5](#) show the estimated monetary values and it is easy to see that the benefits of the SE, for the case study considered, are about double the costs of the SE.

6. Conclusions and further perspectives

In the scientific literature of the transport sector, it is established that one of the characteristics of a good decision-making process is that in the whole process there is the participation of the main subjects that will be affected by a given intervention, i.e. the stakeholders. But how much does the SE cost? What are the benefits and costs of SE? In this article, authors have tried to answer these questions by proposing a sort of guidelines for the quantification of the costs and benefits of SE in transport projects, built on an existing framework, where SE was already embedded within the general transportation decision-making process. Moreover, we have illustrated a range of examples of the monetary and non-monetary costs and benefits of SE. Finally, the current paper has contributed to the measurement and monetarization of the direct and indirect costs and benefits of SE. For the case study of the High Speed Rail corridor connecting Bari and Naples in Italy a Cost Benefits

Direct benefits		€
	New resources	80.866
	Volunteers	16.975
	New information	49.633
	New relations	12.221
	Increased awareness of public services	2.037
	Improvement services	2.751.039
	Impacts of crime	2.751.039
	Omicidi	1.692.411
	Lesioni Gravi	124.248
	Feriti	934.380
	Quality of services	1.196.705.689
	Monitoring costs	45.121
	Cost of marketing campaign	40.609
	Costs of legal battles	1.619.960
	Costs spent on security	1.195.000.000
Total		1.199.537.594

Table 5.
Benefits of SE

Analysis was implemented introducing the items of benefits and costs of the SE. The cost of the public debate has been estimated by assuming that a public debate is set up in accordance with the current Italian legislation (DPCM No. 76 OF 2018) which regulates the stages and methods of public debate in Italy. It is interesting to note that for the case study considered, the result of the analysis shows that the benefits are about double the costs of the SE.

The policy implications of this study are extremely important. Embedding this analysis in any evaluation method can result in a significant impact on the whole transport decision-making process, and thus on the comparison of the different options. These guidelines are specifically aimed at those managing, designing, delivering and planning SE transport projects, representing a useful tool for understanding and making the case of SE in economic analysis. These guidelines are applicable to all kinds of SE, from small scale projects (Limited Traffic Zones in a given town borough), to major exercises ones such as metro lines or to wider transport projects (HSR line crossing a country).

If SE is to move forward as a scientific field, then a broader and more analytical set of frameworks are necessary.

Note

1. For details see the project https://www.fsitaliane.it/

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