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Stakeholders' manipulation of Environmental Impact Assessment

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ABSTRACT

Environmental Impact Assessment (EIA) is a process where several stakeholders take part, each with different interests, making bias unavoidable and a major cause of concern, but there is a big difference between inherent stakeholders' bias and manipulation, an illegitimate attempt to alter decisions for spurious interests. Although manipulation has usually been attributed to developers, any stakeholder may try to use it for self-benefit. In this paper we analyse manipulation possibilities, and how they can be used by stakeholders. While bias is unavoidable and should be reduced, understood and managed in EIA, manipulation is unacceptable and must be excluded.

1. Introduction

Environmental Impact Assessment (EIA) is a process where several stakeholders take part with different interests and expertise, which may lead to intentional or unintentional bias in their opinions; but the line between bias and manipulation may be unclear.

As a general concept, the definition of manipulation is to interfere unscrupulously in politics, in the market, in information, etc., with a distortion of truth or justice at the service of particular interests. In EIA, manipulation is a premeditated bias with spurious interests introduced in order to modify decisions for self-benefit; this includes both the intent to deceive and the actions needed to achieve the intent (bad practices), such as using false, exaggerated or altered information, or hiding it, with an illegitimate use of the EIA process through political pressures or by media manipulation, for example. An interest is spurious when it is not what it purports to be, is fake, or appears to be what is not. It is difficult to determine the reasons for bad practices, which may be an attempt to manipulate, or be due to professional bias, error or unskilled professionals, for example. What is really important is to avoid these bad practices in EIA, rather than discussing their origin; but to do that, it is necessary to know the motivations, such as manipulation, and its possible expression in each stakeholder, as a tool to help detect and eliminate them.

Williams and Dupuy (2017) use the term corruption when referring to EIA, associating it with conditions of secrecy and power imbalances exerted by powerful stakeholders such as developers or politicians. Corruption is the abuse of a public or private office for personal gain (OECD, 2008; World Bank, 1997), the misuse of entrusted power for private gain (Ministry of Foreign Affairs of Denmark, 2011; Transparency International, 2017), or the exercise of official powers without regard for public interest (Yingling, 2013). The last author differentiates conventional corruption, when government officials illegally abuse public office for private gain, and unconventional corruption, when elected officials make decisions without regard for public interest, in order to achieve re-election to public office. The Council of Europe and the United Nations Conventions establish various forms of corruption offences: bribery, extortion, facilitation payment, collusion, fraud, obstruction of justice, embezzlement, misappropriation, trading influence, abuse of function, illicit enrichment or money laundering (UNODC, 2012); manipulation is not included, although it may be associated with some of these offences. Most definitions associate corruption with public office; Etzioni-Halevy (1989) notes that anyone put into a position of power is tempted to use public office for personal gain and advantage.

Manipulation is a wider concept, not necessarily associated with an entrusted power or a public office; any stakeholder may try to manipulate EIA, so a broader vision is necessary regarding this concept. Williams and Dupuy (2017) include a literature review on corruption and EIA; but literature has undervalued some forms of manipulation in a biased (probably involuntary) way, focussing on developers. For example, their review includes as a corruption risk that the public is bribed to give their consent to projects, but not that the public itself bribes someone to change a project. However, our paper does not disagree with these authors' work, but complements it.

The possibilities of manipulation differ according to stakeholders. The public can and must objectively defend their interests; but using false information is unacceptable. Politicians should defend general interest, so to defend another interest is manipulation or corruption. Practitioners should make a great effort to be objective, minimize bias, and avoid manipulation; ethics and professionalism are essential. The

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integrity of the developer is also essential, because it is the agent whose interests and power make it more likely to take shortcuts through manipulation.

In this paper we make a systematic analysis of the different forms of manipulation and their possible use by stakeholders, including examples from Spanish EIA practice during the last two decades to illustrate the issues raised. The choice of these examples is based on their suitability to clarify the types of manipulation discussed, but not by their frequency or significance; from our experience, EIA in Spain is not very manipulated, but it is possible to find in it, as probably in any other country, examples of manipulation. The aim of the paper is to highlight the existence of a wide typology of manipulation attempts, and to help identify and exclude them from EIA.

The paper is not a systematic review but a joint work of literature review and professional practice. This structure has been chosen because an important limitation in analysing manipulation in EIA is the bias of academic literature, which tends to focus this practice on promoters and consultants, or at most in politicians, but not in other stakeholders such as public or even academics themselves. Consequently, a review of the literature, although interesting, does not provide a complete view of the problem, and it is necessary to incorporate opinions from professional experience, objectively raised, to address this topic, and to enrich the debate on EIA.

2. Forms of manipulation

In order to establish the possible forms of manipulation we have taken into account both the literature and the practice in EIA. Practical examples have been included to help understand the forms of manipulation cited, most of them based on the author's experience, sometimes supplemented by published references. Accusing anyone of manipulation is tricky, because it is a practice inherently subtle, hidden or not evident, difficult to prove; often, although its existence seems certain, there is a lack of evidence. For this reason, in the examples cited in the text we have avoided including detailed information about the projects, which, moreover, is not of particular interest for the purpose of this paper. Despite the lack of evidence, these are actual examples from EIA practice, and as such, we consider them to be interesting to illustrate the ways in which manipulation can be manifested.

2.1. False information

A clear case of EIA manipulation is the premeditated use of false information. False information may include, for example, fraudulent use of data, unreal prices to reduce or increase budgets, wrong references to laws in order to support opinions, or false viability judgments. The last case is not rare; an alternative may be considered not technically viable to discard it and exclude it from EIA. On a motorway in Northern Spain the developer indicated that an alternative was geotechnically non-viable, but during public information an expert demonstrated that this was false; it was viable, although more expensive than the other alternatives (see also Section 3.3). Flyvbjerg et al. (2002) indicate that cost underestimation in transportation infrastructure projects cannot be explained by error and is best explained by lying, a systematic fallacy (Flyvbjerg, 2013). Morgan (2012) notes the fear that the increased weight given to the financial viability of developments will further reduce the influence of EIA on decisions; if costs are manipulated, EIA can be too.

Sometimes false information is given about the objective of the project to facilitate approval; the restoration of a mill and the construction of a farm-school, both submitted to EIA, were actually hotels, although the Environmental Impact Statements (EISs) did not indicate it.

2.2. False alternatives or unnecessary elements

A practice not uncommon in EIA is to propose alternatives knowing in advance that they are unfeasible or very unfavourable, to compare them with the one that is intended to be chosen, and discarding them in an apparently objective process (Gregory et al., 1992). The EIA of roads in Spain is rich in these fake alternatives; a bad alternative may cease to be so when there are others that are worse.

It is also possible to introduce controversial and unnecessary elements, and later remove them to demonstrate goodwill (Sager, 2006). The tunnel of a high-speed railway in Central Spain supposedly needed an emergency exit, which affected a colony of black vultures. Although the EIS considered the impact acceptable, during the EIA the environmental agency indicated that it would be unacceptable; the railway department deleted it from the project, and finally the line was built without this exit, which was not really essential.

2.3. Exaggerated information

Sometimes part of the information that supports a project is not exactly false, but exaggerated. An example is traffic forecast in road planning; depending on assumptions (e.g. traffic growth rate) the results may support the feasibility of a project. During the 2000s, traffic forecasts in Spain were too optimistic, in part due to the strong traffic growth since the 1990s (truncated by the economic crisis), but also unreal predictions were made; the traffic forecast for a motorway in Northern Spain was manipulated until it reached an intensity that justified it, being an essential justification of the project in the EIS and the whole EIA process. Tennøy et al. (2006) indicate that predictions, data and assumptions were biased in order to make the Norwegian train-based transport system appear more economically sound than it really was. Flyvbjerg (2007) speaks about “optimism bias” or, as the same author indicates (Flyvbjerg et al., 2002), lies. During the 2000s, several toll roads and airports were designed, submitted to EIA and built in Spain based on very optimistic forecasts of utilization; at present, most are in bankruptcy.

Biased positive information increases the chance that an environmentally unfriendly alternative is chosen (Mostert, 1996); if it is premeditated it is manipulation. An example is the exaggerated emphasis on the economic advantages of some activities or infrastructures, without objective support; these arguments are frequent in the EIA of projects with strong social rejection (e.g. employment and regional or local economic advantages in mining).

2.4. Withhold information

A form of manipulation that is difficult to detect is to hide information or, as Sager (2006) calls it, withhold information. The definition of a project under EIA varies a lot, so it is not easy to know if some information is hidden, for example, about objectives or characteristics. The EIS of a river restoration project in Southern Spain hid that the real objective was channelling the streams to allow housing in the surroundings. EISs may hide environmental resources, especially if they are not widely known. Public or pressure groups sometimes hide their real interests during the EIA, or even lie about them.

2.5. Undervalue or overvalue impacts

The value of environmental resources or impacts is open to interpretation and it may be biased, or even manipulated by any stakeholder in order to support their interests. Manipulation occurs, for example, when a resource is undervalued to lessen the expected impact on it. Sometimes EISs use inconsistent criteria to undervalue impacts. The EISs of a power line and a pipeline in Spain, both crossing several rivers included in Natura 2000 Network, undervalue this impact indicating that the affected area is limited, without further analysis. The criterion

"small affected area" is frequently used to undervalue impacts, but some impacts on a reduced area may be critical. A frequently undervalued impact in many EIS is climate change contribution; it is considered that projects have little influence on climate change, and therefore the impact is not assessed (Smith, 2010). The same occurs with other cumulative impacts.

It is also possible to overvalue impacts without any objective reasons to justify alternatives that avoid them. Sometimes it is a "well-intentioned manipulation", for example when consultants or environmental agencies assign higher values than normal to some natural resources in order to avoid damage; although the objective may be laudable, the distance from well-intentioned to spurious manipulation is limited. During the screening phase of a nursery located in a cropland inside a Birds' Special Protection Area, the environmental agency stated that the project affected the integrity of the area without any justification, automatically leading to a negative EIA. Also, sometimes environmental NGOs overvalue natural resources during scoping or public participation in EIA processes to reinforce their opposition to a project; although well-intentioned, it may be manipulation if they know that the statement is exaggerated.

2.6. Confusing or complex information

It is difficult to define how information should be presented in EIA processes. Scientific and technical rigor requires the use of expert language and statements, but this may hinder the understanding of the study to a non-expert public, affecting public participation (Hartley and Wood, 2005; Sager, 2006; Eckerd, 2017). A common solution is to include non-technical summaries in the EIS, but this allows a manipulated management if it is sought to hamper the public participation.

2.7. Self-censorship

Probably the subtlest form of manipulation is to remain silent while having relevant information in order to avoid conflicts or reprisals. When the one who is silent is a normal citizen, it is understandable (heroicity cannot be demanded), but if it is a public agency, an association or even an academic institution, which should seek social interest, it is a manipulation by omission. The management of funds by politicians is a very powerful tool of control, which may promote silence.

2.8. Administrative manipulation of EIA process

There are several ways to manipulate EIA processes. In screening and scoping phases, the competent authority or EIA agency should decide who is consulted and this allows either bias in the decision or manipulation if someone is deliberately excluded. An undesirable (and not rare) practice is to submit an EIS to public information during holidays to reduce participation, especially from public or NGOs; if the coincidence of dates is not accidental, it is manipulation. This is more prone to occur in public projects where the developer and competent authority coincide. Also, the date of publication of announcements about public information in local press, or the media chosen, can be used in a manipulative way.

Another way of manipulation is related to the availability of information during public participation; if the consultation is difficult, the participation will be lower. Information technologies make it easier for the public to access information, but at the moment e-governance is used predominantly for sharing information but not for promoting dialogue (Sinclair et al., 2017).

As noted below (see Section 3.5) it is possible to manipulate EIA processes by requesting successive additional information, sometimes very complex and not really necessary.

The strongest manipulation of EIA is to circumvent it. This could be done for political reasons, for example, arguing that the project is vital (Lawrence, 2013). This has happened in two roads in Central Spain, both excluded of EIA through political decisions, and both ended in the courts due to the failure to comply with the European Union (EU) EIA Directive. In the first, the political objective was to accelerate the works, avoiding EIA; finally, an EIS was done with the works already completed. In the second, there were strong discrepancies in whether the project was necessary (accident reduction versus environmental damages), and the Regional Government exempts it from EIA; the EU Court ruled against this decision, resulting in a long judicial process.

Another way is to split up a project into homogeneous or heterogeneous parts in order to avoid reaching EIA thresholds, or to minimize the global impact (Enríquez-de-Salamanca, 2016). It is not rare in projects related to land use change, mining, livestock, dams, wind farms or roads. Thresholds favour projects that do not reach them (Glasson et al., 2012), and it is also possible to accommodate projects to case law; this can lead to manipulations (Enríquez-de-Salamanca, 2016) like "design under-thresholds" (e.g. livestock farms) and "splitting engineering" (e.g. wind farms).

2.9. Bribes and kickbacks

Williams and Dupuy (2017) include as corruption risks in EIA (referring to Albania) bribes and kickbacks in order to include some data or interpret it favourably, in procurement, to the public to give their consent to projects or to government officials. There are also references to bribes in order to have positive EIA resolutions in mining projects in Mongolia (IRIM et al., 2016) and Guatemala (Dougherty, 2015) and in construction in Malaysia (Abidin, 2010), for example. Another form of bribery is offering gifts; as Wei (1999) notes, culture shapes the difference between a bribe and a gift, but the line between courtesy and bribery is subtle. These practices are unfortunately not uncommon in public procurement, but there is no evidence that they affect EIA in Spain (albeit with some isolated suspicion); it could be critical if it affects evaluators.

As noted above, there are some isolated cases in Spain where the public tried to bribe developers or consultants in order to change projects. For example, in a motorway EIS a cattle farmer offered money to consultants to modify the layout and bypass his land. In another road project, submitted to EIA, there are suspicions (without evidence) of possible landowners' bribes to the regional road authority (or someone in it) in order to avoid passing through their properties.

2.10. Extortion

Williams and Dupuy (2017) also include extortion as a theoretical corruption risk, related to collecting data or interpreting it favourably. In a wider sense, any stakeholder that depends financially on another, directly (labour/trade contract) or indirectly (subsidies) can be threatened or extorted. National or regional governments can threaten local governments, especially small ones, with reducing investment in their territory if their position is contrary to a project.

3. Manipulation possibilities by stakeholders

3.1. Developers

Developers promote projects, and are obviously interested in their success. When these projects are subject to EIA the first stage for a successful development is to obtain a positive resolution in this process; consequently, developers have a personal interest in a favourable EIA, and will try to achieve it; manipulation is a tempting shortcut.

Developers carry out projects and their EIS, so the risk of bias and manipulation is clear but it depends on their integrity. In the next point, the role of EIA consultants is analysed; but their work is based on the project, so a manipulated project produces a manipulated EIS, although consultants may not be aware of this. There are several ways of

manipulation when drafting a project, such as using false or exaggerated information, or hiding data, some of them difficult to detect. A frequent way of manipulation is to exclude alternatives, or just select one of them, arguing engineering reasons, which are not totally true or even false, or to introduce fake alternatives. Other ways are hiding real objectives, or making optimistic (or false) predictions about use, costs or social advantages of the project.

Practitioners generally believe that EIA is beneficial to all stakeholders, but this message is not obvious outside this community (Morrison-Saunders et al., 2015). For example, developers do not usually favour public participation, because they do not see the positive side of this process (Glasson et al., 2012); as a result, they are likely to hide information, or not clearly state data that may be controversial.

3.2. EIA consultants

EIA is a process based on prediction (Glasson et al., 2012), anticipatory judgments about foreseeable impacts; it is not a pure science (Beattie, 1995), but an art and a science (Kennedy, 1988), or an applied or civic science (Cashmore, 2004). Predictions depend on practitioners' experience and expertise, which may lead to professional bias.

Developers are responsible for drafting EIS, directly or through external consultants. Consequently, EIA consultants work for developers, and this is a good-reported cause of concern about EIS independence; they have conflicts of interest that will make them particularly prone to abuse the EIA system (Williams and Dupuy, 2017). The risk of manipulation depends on developer's pressure and consultants' professionality; to prevent manipulation, the consultants should apply strict ethical standards (Mostert, 1996), such as those proposed by the International Association for Impact Assessment (IAIA, 2009). When the developer and competent authority coincide, consultants may work directly for the government; as noted by Richardson (2005), it is difficult to define the line between fact and bias when working for an authority that has built-up political momentum behind a particular project.

Although the role of consultants is essential in EIA, the paradigm “experts know best” has been losing credibility (Bond et al., 2004). Robinson and Bond (2003) found significant differences between the views of consultants and local residents in EIA. Chen (2009) proposes a framework in which scientists are responsible for the analysis of environmental impacts and stakeholders weigh subjectively their relative importance. However, this scheme does not consider the risks of stakeholders' manipulation, and presupposes a level of knowledge on them that rarely exists; if some stakeholders are not aware of the importance of an environmental resource they might consider it acceptable if this resource is affected.

Consultants' credibility does not depend solely on the accuracy of their predictions but also on the acceptability of the project (Kontic, 2000); if the experts' opinion is in accord with public interests, the credibility is high. Rigorous EISs sometimes are questioned in conflicting projects, while poor EIS are accepted if there is no social rejection; the casuistry on that in Spain is wide. Consequently, social perceptions of consultants' bias or even manipulation is not necessarily related to their ethics or professionalism.

3.3. Politicians

Projects distribute impacts and benefits, and are a legitimate focus of political debate in a democratic society (Beattie, 1995); selecting alternatives often involves making trade-offs that fail to satisfy one or more stakeholders (Kiker et al., 2005). Decision-making is a political action that should integrate social, economic and environmental aspects, and EIA is part of them, so it is highly politicized (Cashmore et al., 2010) or even political (Beattie, 1995). Decision-making pays greater attention to social, financial or environmental aspects depending on cases, with an unavoidable bias determined by the politicians' concept of general interest, but sometimes the criteria are purely political, for example to obtain votes or improve the government's image, manipulating the decision process; the key is whether the general interest is really sought or not.

Richardson (2005) notes that the information introduced into environmental assessment is conditioned by power when political support already exists for a particular project, citing a road where a single alternative was selected for political interests, but engineering reasons were argued (see also Section 2.2). Moon (1998) openly speaks of the political manipulation of EIA in Queensland, noting that the political desire to enhance the success of developmental projects has overwhelmed the stewardship responsibility for environmental management. Wachs (1990) considers violations of public trust some blatant attempts to manipulate public policy in order to promote certain interests at the expense of others. In 2002 an oil tanker shipwrecked on the Northwest coast of Spain, and the government's action was discussed. As a result, an ambitious regional investment plan was approved, including ports, motorways or railways; the origin of these actions was political, and consequently especially prone to manipulation during EIA processes.

Another manipulation risk occurs when local, regional and national governments from different political parties participate in an EIA process. Although general interest should prevail, there is a risk of political attacks at the expense of the EIA. In Eastern Spain, the State submitted a radioactive waste storage site to EIA; the Regional Government opposed, trying to include the area in the Natura 2000 Network, but the State blocked this attempt. The boundaries between environmental and political interests are unclear. Political manipulation is usually associated with government, but opposition parties may also use EIA to politically attack or to improve their image.

3.4. Competent authority

A competent authority is the government (local, regional or national) department responsible for project authorization, usually in charge of EIA processing (excluding the EIA agency resolution). It has attributions on the project subject, and is usually more sensitized to that subject than to EIA, so bias may be inherent. The step between bias and manipulation depends on the interests at stake, and political or lobby pressures. If the energy authority wants to promote renewable, it can be openly favourable to new wind farms, with a positive predisposition in the EIA before an assessment of effects on birds or protected areas, for example.

In private projects, the competent authority is an intermediate agent between developers and EIA agencies and it is independent (although it is related with the project subject), so bias risk is smaller, but in some public investments developer and competent authority may be the same agent (e.g. transport infrastructure), and has a personal interest in the success of the project. This implies greater bias, and sometimes manipulation due to political interests, for example bureaucratic manipulation of EIA processes.

3.5. EIA agencies (evaluators)

EIA agencies are public, with politicians as leaders, and thus open to political manipulation. The independence of evaluators depends on their professionalism and ethics, but also on the criteria for the assignment of positions; the greater the political influence in the designation of positions (e.g. trust positions), the less independent the agencies are. There are also non-environmental factors that may influence decisions, such as pressure from stakeholders, successive negative resolutions or delays in processes; these criteria may be an administrative manipulation. The pressure over EIA agencies is greater when developers depend on the same government, with capacity for political pressure, or when they are local governments of the same political party.

Sometimes EIA agencies delay the process when they oppose the project, but do not want to report it, for example, making successive requests for additional information to the developer; in some cases, the information requested is practically impossible to produce, or would take years of study. Williams and Dupuy (2017) include some examples of developer's kickbacks or influences on EIA agencies in China, Peru and India; there is no evidence of this in Spain, beyond political pressures.

3.6. Government departments and agencies

The participation in EIA of public agencies with attributions on affected subjects (culture, water, wildlife, agriculture…) is essential, but each agency tends to focus on its attributions, so their opinions may be biased. Sometimes attributions compete in the same territory; during a road EIA process in Northwest Spain some rainfed crops were considered essential for steppe birds by the environmental agency and desirable for irrigation transformation by the agriculture agency, both incompatible uses. This kind of bias is inherent in public agencies, but political interests may introduce a manipulated bias.

As noted by Leknes (2001), without consensus between administrative participants' decisions will become politicized, and the role of EIA reduced. A conflict between the Ministries of Environment and Development about the EIA of a toll motorway in Central Spain led to be approved by the Council of Ministers, instead of following the ordinary process.

3.7. Public

Public participation is a key part in EIA, but also a possible way for manipulation, which may lead to questionable decisions. There is a multiplicity of public types, each one with specific views (Glasson et al., 2012); just between the rural and urban/suburban public it is possible to find some differences in views related to EIA (Robinson and Bond, 2003). Frequently the public look for particular interests more than for environmental or general ones; for example, land expropriation usually involves greater social response than damages to habitats or species.

Population density also has a great influence on social response; highly populated areas have a greater response to projects than lower populated areas, but frequently the higher natural values are on the less populated areas. The socioeconomic level of the population is also related to public participation; the higher the level is the higher the response, independent of the environmental impacts. The EIS of a high-speed railway in Central Spain included two alternatives, the first, crossing a densely populated and high-income area, and the second crossing an area with lower population and wealth; the social mobilization in the first was greater, and finally this alternative was discarded, although environmental impacts were smaller. In this sense, Morrison-Saunders and Fischer (2006) note an elevation of socioeconomic considerations in assessments, inconsistent with sustainability goals.

It is possible to achieve social mobilization if there is a leader or pressure group; preparing collective allegations, for example, may add a large amount of people for, or against a project, independently of its environmental effects. The lack of public participation due to passive attitudes, low capacity, lack of time or low technical, educational or financial resources (Wiklund, 2011; Glasson et al., 2012; Chi et al., 2013) may allow mobilized groups to monopolize public response, although not representing the majority opinion. Fischer (2016) relates the BREXIT referendum with impact assessment, noting that emotions may be more important than substantiated evidence.

Social mobilization is not always proportional to the project's impacts. In the early 1990s, many motorways were built in Madrid; one of them, which affected an emblematic holm oak forest, was adopted as a flag by environmental NGOs, and aroused much social rejection, and even a new EIA process including less impactful alternatives, but at the same time other road sections with similar or greater impacts were submitted to EIA, approved and built without any social rejection.

A big support or opposition to a project does not necessarily mean that it is environmentally or socially preferable, nor that it has a major social acceptance or rejection; sometimes it implies that some groups or lobbies, for or against the project, are more mobilized than the rest of the population, and this mobilization may defend general or private interests, and also may be objective or biased, and even manipulated. This is not an excuse to reduce public participation. On the contrary, a greater public participation reduces the risk of manipulation from collectives with private interests, but it is important not to idealize public participation, because many opinions exposed during this process are individual and even spurious, not necessarily related to environmental concerns, and when so, may not be accurate or even false.

3.8. Public affected or concerned

Some EIA legislation (e.g. EU, 2011) differentiate between public and public concerned; while the first is all the society, the second includes the public affected, likely to be affected or with an interest in the environmental decision-making of a project. The main difference for EIA is a reinforced role of the later in public participation. Glasson et al. (2012) differentiate two groups of people concerned, voluntary groups, quasi-statutory bodies or pressure groups and people living near the proposed development.

The most common in the first group are environmental NGOs, with interests in environmental conservation and supposedly independent, but their independence may be influenced by the funding sources; if a NGO depends on funding by a public agency, its independence to allege against it may be questioned. Palerm (1999a, 1999b) thinks that greater resources should be directed to local NGOs in order to expand their capacities, but this dependence on funding may be a way for control or self-censorship. A Spanish NGO that used to protest in scoping phases of development projects stopped doing so after a collaboration agreement with the main developer (and competent authority) of the State.

The second group includes most of the people with personal interests affected by the project. Salomons and Hoberg (2014) note that restricting participation in the environmental assessment to those who are directly affected, typically due to direct material concerns such as property rights, safety concerns or financial costs, implies a significant amount of bias. People affected by the project tend to use all possible ways to defend their interests, not always objectively, and sometimes even with fake arguments. During the public participation phase of the EIA processes of a railway in Central Spain and a motorway in Northern Spain, the neighbours affected alleged in both cases the presence of endangered wildlife species to defend their properties, which was actually false.

There is an important difference between peoples' concerns for environmental damages or quality of life, and the concern due to land expropriation. In both cases it is reasonable to allege, but in the first, a common interest is defended while in the second it is a private one, and attempts of manipulation may be greater. The EIS of a motorway in Northern Spain included two alternatives, the first crossing *Eucalyptus* plantations and the second, a coastal plain with natural habitats. Although the former had a greater visual incidence, the EIS concluded that it was less environmentally aggressive; municipalities were mobilized against this option, and finally the second one was chosen, with greater social acceptance, but also higher environmental damage. Local interest (visual incidence on villages) prevailed over general interest (habitat conservation).

3.9. The media

The media are essential for public information, and may have an important role in EIA. Publicity in media about projects under EIA allows greater knowledge and increased public participation. But depending on how information is shown, it is possible to manipulate it.

The media should be independent and objective, but they usually have a political tendency, and may inform about a project under EIA with greater or lower support or aggressiveness depending on the relationship with the developer or government that promotes it. As UN (2004) indicates, in an ideal world the media have integrity, but in reality, in many countries the media are effectively "for sale" to the highest bidder.

Usually journalists interview experts to prepare news; depending on who is chosen and how they are interviewed the approach may be very different. If the decision on how to expose the information or who is interviewed is premeditated, it may be manipulation. In a wind farm the focus should be quite different if the opinion chosen is that of an expert in ornithology, climate change or energy.

The media have an important role in opinion making; manipulation on information produces manipulation on public opinion, although recipients may be not conscious. Different press headlines about a uranium mine in Western Spain, submitted to EIA, transmit messages for or against the project, some of them sensationalist ("an almost perfect crime", "holm oaks weep").

3.10. Academics

Huesemann (2002) defines three types of bias in environmental research, personal, institutional and socio-cultural. Possible reasons for personal bias with scientists are ideology or greater interest in credit for their work rather than in objective research findings (Huesemann, 2002); also for economic reasons. Sometimes companies pay off experts in order to use their name in their EIS (Williams and Dupuy, 2017). This may be acceptable if experts guarantee the quality of the EIS, or on the contrary be a simple bribe; EIA practice in Spain has some examples of both types of behaviour among academics.

Although academics recognize bias in stakeholders, they also may have biased visions. Kirchherr et al. (2016) analyse the social impacts of dams concluding that there is a bias in terms of whose views are included by scholars, with those of developers rarely examined. However, there is no manipulation unless there are hidden interests.

Academic institutions may direct their activities to the perpetuation of their own power (Huesemann, 2002), and there is a politic influence on them (Van den Hove, 2007); as a result, they may avoid getting into discussions on controversial projects. Sometimes they work as EIA consultants for developers, with the manipulation risks previously noted being applicable. Academic-business research agreements, although not directly related to projects under EIA, may generate sympathies towards developers (who fund the research) and even self-censorship.

4. Conclusions and possible ways forward

4.1. Conclusions

Bias is a frequent concern related with EIA; but there is a big difference between stakeholders' bias, which is unavoidable and due to different interests and expertise, and manipulation, an unacceptable bias to defend hidden or spurious interests.

The literature on EIA frequently used the term bias, and more rarely manipulation or corruption, but tend to associate it with developers, or EIA consultants (by pressures from developers), while the public is considered to bring objectivity. Some literature on planning and decision-making use the concept manipulation, and frequently include politicians, but any stakeholder may try to manipulate EIA, from developers to public, or from politicians to academics (Table 1).

The risk of bias and manipulation is inherent to processes open to a wide number of stakeholders, such as EIA, and does not invalidate them, but it is necessary to take them into account, and not fall into simplistic views. It is necessary to avoid topics, and to analyse in an objective way which are the possible biases and manipulations in each EIA process.

Although all stakeholders may try to manipulate EIA, the risk or frequency is not the same, nor the possibilities of detecting or avoiding it. Probably the greater risk of manipulation is associated with developers, and by extension to agents that depend on them such as consultants. It is logical because developers have personal interests in the projects they promote, and therefore a greater propensity to use all possible means to make them happen. Also, individuals are prone to manipulate to defend their properties or interests, although with a much more limited means and scope. Political manipulation may appear in projects of great magnitude and social repercussion, which can influence the image of a government or party.

The border between legitimate actions, bad practices and manipulation may be diffuse. Manipulation is a premeditated distortion of truth for spurious purposes, but it is not easy to determine when the truth is being distorted, when it is being done in bad faith and not by a partial or sectoral view, or when the interest is spurious. For this reason, a certain degree of interpretation about what is and what is not manipulation is inevitable. In any case, the important thing is to detect bad practices in EIA; being aware of the risk of manipulation is necessary in order to detect these bad practices, but it does not become a purpose in itself, which would end up transforming EIA processes into judicial proceedings.

Depending on the type of project, some or other forms of manipulation are foreseeable. In private projects, the risk of manipulation by the developer is greater, as well as the pressures on the consultants, because costs are a determining factor. On the contrary, in public projects, cost is not such a determining factor, and consultants are generally under less or no pressure. However, in large public works there is a risk of political pressures and manipulations.

In conclusion, stakeholders' bias is unavoidable, and practitioners should try to reduce, understand and manage it properly in EIA processes. Manipulation is unacceptable, an illegitimate attempt to alter decisions for hidden and spurious interests, and must be excluded from EIA.

4.2. Possible ways forward

Some forms of manipulation are easy to detect, while others may go unnoticed. The use of false information to defend interests may be contrasted and detected. However, it is difficult to detect hidden information; this is the case of projects with hidden interests, or undefined actions that can be discovered after the EIA process.

Also, the possibilities to combat manipulation vary according to the typology and agents involved. When a developer or consultant tries to manipulate with a private interest, it usually faces a majority of stakeholders, both state agencies and the public, which makes it easier to detect and neutralize those attempts. However, when manipulation is political, it can impregnate the main stakeholders, such as competent or environmental authorities, and it is difficult to eradicate, because there is no a non-politicized supervisory board.

Although all stakeholders should avoid manipulation, responsibilities for prevention vary. It is inevitable that individuals make every effort to defend their interests or properties; rather than requiring more ethical behaviour, it is necessary to make an objective analysis of their arguments, to separate objective and spurious motives. Developers should make a much greater effort in transparency as they concentrate the majority of complaints about manipulation or bias. One aspect often deficient in EISs is the justification of the projects. Frequently projects are necessary in themselves, without a detailed justification of their usefulness and necessity, and the EIS is limited to assessing foreseeable impacts. It is also necessary that EISs collect all the main and secondary actions associated with the project, to avoid incomplete projects or hidden actions being submitted to EIA. Environmental consultants must follow strict ethical codes in their studies, such as those of the IAIA. The documents associated with EIA must always be signed, as already

Table 1
Manipulation possibilities in EIA.

Type	Who	How	Why
False information	Developers	False alternative discarding	Justify pre-selected alternatives
		False project objectives	Facilitate approval
	EIA Consultants	Manipulated information	Satisfy developer's objectives
	Politicians	Unreal costs or predictions	Justify projects
	Public	False data or arguments	Defend self-interest
False alternatives or unnecessary elements	Developers	Non-viable alternatives	Justify pre-selected alternatives
		Unnecessary elements	Negotiation; demonstrate goodwill
Exaggerated information	Developers	Exaggerated project advantages	Justify projects
		Exaggerated data	Justify projects
	Politicians	Exaggerated project advantages	Justify projects
	Government agencies	Exaggerated pros/cons	Reinforce opinions/defend attributions
	Public	Exaggerated pros/cons	Defend self-interest
	Public concerned	Exaggerated pros/cons	Justify opinions
	Media	Sensationalist or impactful news	Political attack/support; sensationalism
Hide information	Developers	Avoid project understanding	Hinder public debate
		Hide conflictive subjects	Hinder public debate
		Hide real objectives	Hinder public debate/facilitate approval
	EIA Consultants	Hide significant impacts	Support developer's interest
	Politicians	Hide real costs	Support decisions
		Hide lobby interests	Avoid society rejection
	Government agencies	No participation/hide information	Avoid administrative/politic conflicts
	Public	Hide or lie real interest	Avoid disqualification
	Media	Do not publish some information	Political attack/support
Undervalue or overvalue impacts	EIA Consultants	Undervalue impacts	Support alternatives
		Overvalue impacts	Well-intentioned environmental defence
	EIA agencies	Undervalue impacts	Support alternatives
		Overvalue impacts	Well-intentioned environmental defence
	Public	Over/under value impacts	Defend self-interest
	Public concerned	Overvalue impacts	Well-intentioned environmental defence
Confuse/complex information	Developers	Confuse/complex projects	Hinder public participation
	EIA Consultants	Confuse/complex EIS	Hinder public participation
Self-censorship	EIA Consultants	Soft EIS writing	Avoid conflicts with the developer
	Public concerned	No or soft participation in EIA	Funding or other interest conflicts
	Media	Avoid publishing conflictive news	Closeness to government or developer
	Academics	No or soft participation in EIA	Funding conflicts; avoid reprisals
EIA process manipulation	Competent Authority	Selection criteria in screening	Avoid opposing stakeholders
		Public information on holidays	Reduce public participation
	EIA agencies	Delay EIA process	Avoid administrative/politic conflicts
Bribes and kickbacks	Developers	Overpay to EIA consultants	EIS promoting developer's interests
		Pay to experts/academics	Use their good name in EIS
		Pay to government officials	Positive resolutions or reports
	Public	Pay to consultants/developers	Avoid affecting their interests
Extortion	Developers	Threats to consultants	EIS promoting developer's interests
	Competent Authority	Threats to local governments	Avoiding opposition to a project/option
		Funding threats to NGO/other	Avoiding opposition to a project/option

required by some EIA rules (as Spanish). The existence of civil liability, as in the case of engineering projects, can help to reinforce the rigor in the documents.

One way to improve transparency in EIA processes and decision making is to incorporate uncertainty and sensitivity analysis into EISs. In the first case, it is necessary to establish information gaps and uncertain effects, and how these uncertainties can affect decision making. In the second, different assessment scenarios should be established, with greater or lesser focus on natural or social environment, for example, comparing the robustness of the conclusions.

Manipulation is inherent to any process with multiple stakeholders with different interests, as EIA, so it can raise questions like who should determine if there is manipulation, act against it or provide the resources to avoid it. Despite its political dependence, the agent less prone to manipulation seems to be the EIA agency. These agencies should ensure the transparency and objectivity of EIA processes. To do that, it is necessary to guarantee a solvent and non-politicized body of evaluators. Resources for this must come from governments, who are the guarantors of the protection of the environment. It would not be a bad idea to include an assessment of the risks of bias and manipulation of each stakeholder during the EIA process, which would be the responsibility of the EIA agency, and to make this information public to ensure that it is carried out objectively.

The public can act as manipulator or as manipulation detector. It is important to reinforce their participation, being aware of this double facet. The incorporation of public hearing sessions during the public information phase, more or less extensively depending on the project, is highly recommended to capture public opinion and detect hidden interests of manipulation attempts. EIA regulations should incorporate these public hearings, which are already being developed in many countries (Parenteau, 1988; Sinclair and Diduck, 1995; Sadar and Stolte, 1996; Richardson et al., 1998; Palerm, 1999a, 1999b; Ogunlana et al., 2001; Appah-Sampong, 2003; Fitzpatrick and Sinclair, 2003; Heather and Koontz, 2004; Nadeem and Fischer, 2011; Ngouana et al., 2013; Sánchez and André, 2013; Sainath and Rajan, 2015; Brombal et al., 2017). However, its effectiveness depends on the real will of public participation in the EIA. For example, Bawole (2013) indicates that in Ghana public hearings were cosmetic to meeting legal requirements rather than a purposeful interest in eliciting inputs from local stakeholders; Ogunlana et al. (2001) found that it was too late to make any significant change to the project after the hearing was held; and Sinclair et al. (2012) found that a certain hearing process did not meet many of the key requirements of meaningful participation and left some public participants feeling disrespected and marginalized.

Sometimes manipulation by the public or concerned persons arise from the idea that the deck is stacked against them, and they have a

disadvantage vis-à-vis with the developer, which leads them to use exaggerated or fake information to reinforce their opinions. Greater transparency in public participation processes, such public hearings noted above or individualized and reasoned response to all allegations, may lead stakeholders to the understanding that their opinions are really considered in decision making, reducing feeling of defencelessness and the tendency to use manipulation as a response. It should also be ensured that any information related with EIA processes is made public, both the main documents (as EIS) and any additional documentation that may be requested throughout the process, which, if presented after public information, may not reach all stakeholders (Carrasco and Enríquez-de-Salamanca, 2011).

Also, the use of the power of technology to build dynamic and continuous exchanges between stakeholders allows a greater transparency in EIA processes; in fact, this is one of the ten ways to fight corruption proposed by the World Bank.

Manipulation may take place inside or outside EIA, from the beginning of the conception of a project. In pre-EIA phases, manipulation is associated with agents involved in designing the project, such as developers or politicians. The relationships of major developers with governments, that transcend EIA, may have influence over decisions. Political manipulation can be very powerful, affecting EIA processes, and difficult to avoid if a government is unethical. In this sense, it is desirable to approach EIA evaluators with judges, both public servants, without political influence. Another possibility is to establish an independent auditing in EIA and decision-making processes, but there is no real guarantee of independence in any stakeholder, so it seems preferable to focus the efforts on ensuring independence of EIA agencies.

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References

Abidin, N.Z., 2010. Environmental Concerns in Malaysian Construction Industry. Penerbit Universiti Sains Malaysia, Pulau Pinang.
Appah-Sampong, E., 2003. Public hearing within the environmental impact assessment review process. In: McCabe, M., Sadler, B. (Eds.), Studies of EIA Practice in Developing Countries. UNEP, Geneva, pp. 85–91.
Bawole, J.N., 2013. Public hearing or 'hearing public'? An evaluation of the participation of local stakeholders in environmental impact assessment of Ghana's Jubilee oil fields. Environ. Manag. 52 (2), 385–397.
Beattie, R.B., 1995. Everything you already know about EIA (but don't often admit). Environ. Impact Assess. Rev. 15, 109–114.
Bond, A., Palerm, J., Haigh, P., 2004. Public participation in EIA of nuclear power plant decommissioning projects: a case study analysis. Environ. Impact Assess. Rev. 24, 617–641.
Brombal, D., Moriggi, A., Marcomini, A., 2017. Evaluating public participation in Chinese EIA. An integrated public participation index and its application to the case of the New Beijing Airport. Environ. Impact Assess. Rev. 62, 49–60.
Carrasco, M.J., Enríquez-de-Salamanca, A., 2011. Documentación adicional en la evaluación de impacto ambiental. Problemática y encuadre legal y procedimental. In: MARM (Ed.), Evaluación de impacto ambiental: Responsabilidad, vigilancia y eficacia. Libro de actas del VI Congreso Nacional de Evaluación de Impacto Ambiental. Ministerio de Medio Ambiente y Medio Rural y Marino, Madrid, pp. 53–57.
Cashmore, M., 2004. The role of science in environmental impact assessment: process and procedure versus purpose in the development of theory. Environ. Impact Assess. Rev. 24, 403–426.
Cashmore, M., Richardson, T., Hilding-Ryedvik, T., Emmelin, L., 2010. Evaluating the effectiveness of impact assessment instruments: theorising the nature and implications of their political constitution. Environ. Impact Assess. Rev. 30, 371–379.
Chen, C.C., 2009. Environmental impact assessment framework by integrating scientific analysis and subjective perception. Int. J. Environ. Sci. Technol. 6 (4), 605–618.
Chi, C.S.F., Xu, J., Xue, L., 2013. Public participation in environmental impact assessment for public projects: a case of non-participation. J. Environ. Plan. Manag. 57 (9), 1422–1440.
Dougherty, M.L., 2015. By the Gun or by the Bribe: Firm Size, Environmental Governance and Corruption Among Mining Companies in Guatemala. U4 Anti-Corruption Resource Centre 17. http://www.u4.no/publications/by-the-gun-or-by-the-bribe-firm-size-environmental-governance-and-corruption-among-mining-companies-in-guatemala (accessed 3.9.2017).
Eckerd, A., 2017. Citizen language and administrative response: participation in environmental impact assessment. Adm. Soc. 49 (3), 348–373.
Enríquez-de-Salamanca, A., 2016. Project splitting in environmental impact assessment. Impact Assess. Proj. Apprais. 34 (2), 152–159.
Etzioni-Halevy, E., 1989. Elite power, manipulation and corruption: a demo-elite perspective. Gov. Oppos. 24 (2), 215–231.
EU, 2011. Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the Assessment of the Effects of Certain Public and Private Projects on the Environment. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32011L0092 (accessed 7.7.2017).
Fischer, T.B., 2016. Lessons for impact assessment from the UK referendum on BREXIT. Impact Assess. Proj. Apprais. 34 (3), 183–185.
Fitzpatrick, P., Sinclair, J., 2003. Learning through public involvement in environmental assessment hearings. J. Environ. Manag. 67, 161–174.
Flyvbjerg, B., 2007. Policy and planning for large-infrastructure projects: problems, causes, cures. Environ. Plann. B 34 (4), 578–597.
Flyvbjerg, B., 2013. Quality control and due diligence in project management: getting decisions right by taking the outside view. Int. J. Proj. Manag. 31, 760–774.
Flyvbjerg, B., Holm, J.S., Buhl, S., 2002. Underestimating costs in public works projects: error or lie? J. Am. Plan. Assoc. 68 (3), 279–295.
Glasson, J., Therivel, R., Chadwick, A., 2012. Introduction to Environmental Impact Assessment, 4th edition. Routledge, Abingdon.
Gregory, R., Keeney, R., Von Winterfeldt, D., 1992. Adapting the environmental impact statement process to inform decision makers. J. Policy Anal. Manag. 11 (1), 58–75.
Hartley, N., Wood, C., 2005. Public participation in environmental impact assessment–implementing the Aarhus Convention. Environ. Impact Assess. Rev. 25, 319–340.
Heather, L.A., Koontz, T.M., 2004. Public hearings for EIAs in postcommunist Bulgaria: do they work? Environ. Impact Assess. Rev. 24, 473–493.
Huesemann, M.H., 2002. The inherent biases in environmental research and their effects on public policy. Futures 34, 621–633.
IAIA, 2009. Vision, mission, values, professional code of conduct, and ethical responsibilities. http://www.iaia.org/pdf/Code-of-Ethics.pdf (accessed 10.8.2017).
IRIM, IAACM, UNDP, 2016. Corruption risk assessment in mining sector of Mongolia. In: Independent Research Institute of Mongolia, Independent Authority Against Corruption of Mongolia, United Nations Development Programme, . http://www.mn.undp.org/content/dam/mongolia/Publications/DemGov/20160603_MiningCorruptionStudy/Corruption risk assessment_Mining_Eng.pdf (web archive link, 09 March 2017)(accessed 3.9.2017).
Kennedy, W.V., 1988. Environmental impact assessment in North America, Western Europe: what has worked where, how and why? Int. Environ. Rep. 11, 257–262.
Kiker, G.A., Bridges, T.S., Varghese, A., Seager, T.P., Linkov, I., 2005. Application of multicriteria decision analysis in environmental decision making. Integr. Environ. Assess. Manag. 1 (2), 95–108.
Kirchherr, J., Pohlner, H., Charles, K.J., 2016. Cleaning up the big muddy: a meta-synthesis of the research on the social impact of dams. Environ. Impact Assess. Rev. 60, 115–125.
Kontic, B., 2000. Why are some experts more credible than others? Environ. Impact Assess. Rev. 20, 427–434.
Lawrence, P., 2013. Impact Assessment: Practical Solutions to Recurrent Problems and Contemporary Challenges, 2nd edition. Wiley, Hoboken.
Leknes, E., 2001. The roles of EIA in the decision-making process. Environ. Impact Assess. Rev. 21, 309–334.
Ministry of Foreign Affairs of Denmark, 2011. Anti-corruption policy. http://um.dk/en/danida-en/results/anti-corruption//~/media/UM/English-site/Documents/Danida/Results/Anti-corruption/Anti-corruption policy-english version 20141024.pdf (accessed 1.9.2017).
Moon, B., 1998. Environmental impact assessment in Queensland, Australia: a governmental massacre!. Impact Assess. Proj. Apprais. 16 (1), 33–47.
Morgan, R.K., 2012. Environmental impact assessment: the state of the art. Impact Assess. Proj. Apprais. 30 (1), 5–14.
Morrison-Saunders, A., Fischer, T.B., 2006. What is wrong with EIA and SEA anyway? A sceptic's perspective on sustainability assessment. J. Environ. Assess. Pol. Manage 8 (1), 19–39.
Morrison-Saunders, A., Bond, A., Pope, J., Retief, F., 2015. Demonstrating the benefits of impact assessment for proponents. Impact Assess. Proj. Apprais. 33 (2), 108–115.
Mostert, E., 1996. Subjective environmental impacts assessment: causes, problems, solutions. Impact Assess. 14 (2), 191–213.
Nadeem, O., Fischer, T.B., 2011. An evaluation framework for effective public participation in EIA in Pakistan. Environ. Impact Assess. Rev. 31, 36–47.
Ngouana, C.V., Menang, S.E., Bitondo, D., 2013. Public hearings in environmental and social impact assessment for energy sector projects in Cameroon. Impact Assess. Proj. Apprais. 31, 64–73.
OECD, 2008. Corruption. A glossary of international standards in criminal law. http://www.oecd.org/daf/anti-bribery/41194428.pdf (accessed 1.9.2017).
Ogunlana, S., Yotsinsak, T., Yisa, S., 2001. An assessment of people's satisfaction with the public hearing on the Yadana natural gas pipeline project. Environ. Monit. Assess. 72, 207–225.
Palerm, J.R., 1999a. Public participation in EIA in Hungary: analysis through three case studies. Environ. Impact Assess. Rev. 19, 201–220.
Palerm, J.R., 1999b. Public participation in environmental impact assessment in Spain: three case studies evaluating national, Catalan and Balearic legislation. Impact Assess. Proj. Apprais. 17 (4), 259–271.
Parenteau, R., 1988. Public Participation in Environmental Decision Making. Minister of Supply and Services Canada, Ottawa.
Richardson, T., 2005. Environmental assessment and planning theory: four short stories

about power, multiple rationality, and ethics. Environ. Impact Assess. Rev. 25, 341–365.
Richardson, T., Dusik, J., Jindrova, P., 1998. Parallel public participation: an answer to inertia in decision-making. Environ. Impact Assess. Rev. 18, 201–216.
Robinson, M., Bond, A., 2003. Investigation of different stakeholder views of local resident involvement during environmental impact assessments in the UK. J. Environ. Assess. Pol. Manage 5 (1), 45.
Sadar, M.H., Stolte, W.J., 1996. An overview of the Canadian experience in environmental impact assessment (EIA). Impact Assess. 14, 215–228.
Sager, T., 2006. The logic of critical communicative planning: transaction cost alteration. Plan. Theor. 5, 223–254.
Sainath, N.V., Rajan, K.S., 2015. Meta-analysis of EIA public hearings in the state of Gujarat, India: its role versus the goal of environmental management. Impact Assess. Proj. Apprais. 33 (2), 148–153.
Salomons, G.H., Hoberg, G., 2014. Setting boundaries of participation in environmental impact assessment. Environ. Impact Assess. Rev. 45, 69–75.
Sánchez, L.E., André, P., 2013. Knowledge management in environmental impact assessment agencies: a study in Québec, Canada. J. Environ. Assess. Pol. Manage. 15, 1350015.
Sinclair, A.J., Diduck, A.P., 1995. Public education: an undervalued component of the environmental assessment public involvement process. Environ. Impact Assess. Rev. 15, 219–240.
Sinclair, A.J., Schneider, G., Mitchell, L., 2012. Environmental impact assessment process substitution: experiences of public participants. Impact Assess. Proj. Apprais. 30 (2), 85–93.
Sinclair, A.J., Peirson-Smith, T.J., Boerchers, M., 2017. Environmental assessments in the internet age: the role of e-governance and social media in creating platforms for meaningful participation. Impact Assess. Proj. Apprais. 35 (2), 148–157.
Smith, M.D., 2010. US climate change and the National Environmental Policy Act (NEPA). In: IAIA Symposium on Climate Change and Impact Assessment, November 15–16, Washington DC, US.
Tennøy, A., Kværner, J., Gjerstad, K.I., 2006. Uncertainty in environmental impact assessment predictions: the need for better communication and more transparency. Impact Assess. Proj. Apprais. 24 (1), 45–56.
Transparency International, 2017. What is corruption? https://www.transparency.org/what-is-corruption/#define (accessed 1.9.2017).
UN, 2004. United Nations Handbook on Practical Anti-Corruption Measures for Prosecutors and Investigators. Vienna. https://www.unodc.org/pdf/crime/corruption/Handbook.pdf (accessed 4.9.2017).
UNODC, 2012. Defining corruption. In: United Nations Office on Drugs and Crime, . http://www.track.unodc.org/Academia/Documents/IBA Defining corruption.pdf (web archive link, 09 April 2017)(accessed 4.9.2017).
Van den Hove, S., 2007. A rationale for science–policy interfaces. Futures 39, 807–826.
Wachs, M., 1990. Ethics and advocacy in forecasting for public policy. Bus. Prof. Ethics. J. 9 (1–2), 141–157.
Wei, S.J., 1999. Corruption in economic development - beneficial grease, minor annoyance, or major obstacle? World Bank, Washington, DC (Policy Research working paper; no. WPS 2048, accessed 1.9.2017). http://documents.worldbank.org/curated/en/175291468765621959/pdf/multi-page.pdf.
Wiklund, H., 2011. Why high participatory ideals fail in practice: a bottom-up approach to public nonparticipation in EIA. J. Environ. Assess. Pol. Manage. 13 (2), 159.
Williams, A., Dupuy, K., 2017. Deciding over nature: corruption and nvironmental impact assessments. Environ. Impact Assess. Rev. 65, 118–124.
World Bank, 1997. Helping Countries Combat Corruption: The Role of the World Bank. World Bank, Washington, DC.
Yingling, M.P., 2013. Conventional and unconventional corruption. Duquesne Law Rev. 51, 263–320.

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