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Theorising EIA effectiveness: A contribution based on the Danish system

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ABSTRACT

Considerable attention has been given to the effectiveness of environmental impact assessment (EIA) since the 1970s. Relatively few research studies, however, have approached EIA as an instrument of environmental governance, and have explored the mechanisms through which EIA influences the behaviour of actors involved in planning processes. Consequently, theory in this area is underspecified. In this paper we contribute to theory-building by analysing the effectiveness of a unique EIA system: the Danish system. In this system the competent authority, instead of the project proponent, undertakes EIA reporting. Additionally, the public, rather than experts, play a central role in quality control and the Danish EIA community is relatively small which influences community dynamics in particular ways. A nation-wide survey and expert interviews were undertaken in order to examine the views of actors involved in EIA on the effectiveness of this anomalous system. The empirical data are compared with similar studies on governance mechanisms in other countries, especially the United Kingdom and the Netherlands, as well as with earlier evaluations of EIA effectiveness in Denmark. The results indicate that the more extensive role attributed to the competent authority may lead to higher EIA effectiveness when this aligns with their interests; the influence of the public is amplified by a powerful complaints system; and, the size of the EIA community appears to have no substantial influence on EIA effectiveness. We discuss how the research findings might enhance our theoretical understanding of the operation and effectiveness of governance mechanisms in EIA.

1. Introduction

The effectiveness of environmental impact assessment (EIA) has received considerable attention since the 1970s (e.g. European Commission, 2009; Cashmore et al., 2010). Historically, many EIA evaluation studies focused on what has been labelled the 'procedural' effectiveness of EIA: that is, the extent to which EIAs are conducted in line with legal frameworks or international principles of best practises (e.g. Cashmore et al., 2004; Sadler, 1996; Zobaidul Kabir and Momtaz, 2013). The 'substantive' effectiveness of EIA – the extent to which EIA practises achieve the substantive objectives of this policy tool – has received much less attention (Arts et al., 2012; Cashmore et al., 2004).

Substantive effectiveness encompasses two important research topics. The first is the measurement of the effectiveness of EIA practises through an assessment of its outcomes. The second involves developing knowledge on the causal mechanisms through which these effects occur and the mediation of its effects by contextual variables (Runhaar and Driessen, 2007; Arts et al., 2012). For instance, EIA legislation, in part, is believed to steer decision-making through the provision of 'rational' information, although the effectiveness of this causal mechanism has been extensively critiqued (Kørnøv and Thissen, 2000). Other governance mechanisms in EIA operate more subtly, such as its effects on public awareness and on promoting learning (Arts et al., 2012).

In this paper we contribute to theory-development on the substantive effectiveness of EIA based upon a point of departure in a model developed by Arts et al. (2012). We apply this model to the Danish EIA system,[1] which has some interesting features from a governance perspective. Firstly, whereas in almost all EU Member States project proponents are ultimately responsible for preparing the EIA report (Graggaber and Pistecky, 2012), in the Danish EIA system it is the competent authority that produces these reports and has done so for decades. Secondly, quality control is highly reliant on an active polity.

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[1] Inspired by Kolhoff et al. (2009), we define 'system' as the regulatory framework and the capacities of the involved organisations.

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Thirdly, the EIA professional community is relatively small.[2] The Danish system is currently being reformed, partly in response to the new EIA Directive (The European Parliament and the Council, 2014). By 2016 the Danish system will resemble that of most other EU member states: more formalised quality control measures are to be institutionalised and the project proponent will become responsible for preparing the EIA report. This article, therefore, may constitute the last opportunity to analyse this distinctive system.

With our analysis of the Danish system, we seek rich knowledge on how EIA works in a scientifically underexplored governance system. We are particularly interested in how the operation of governance mechanisms relate to the specific context in which an EIA system operates. For instance, the evaluation of EIA in the UK and the Netherlands indicated that although effectiveness is considered broadly similar by actors, the causes in terms of governance mechanisms and contextual influences probably differ between countries (Arts et al., 2012). Many authors have argued that EIA systems should be adapted to their specific context, yet little is known about which contextual factors matter, why and how much (e.g. Boyle, 1998; Marara et al., 2011; Zhang et al., 2013).

The research questions that guide the paper are:

- How effective (from a substantive perspective) is the Danish EIA system?
- How can the substantive effectiveness of the Danish system be explained by an established model of governance mechanisms?
- What influence, if any, do the unique characteristics of the Danish system have on its substantive effectiveness?
- How do the empirical findings contribute to theoretical understanding of the relationship between the effectiveness of governance mechanisms and context?

The paper is structured as follows. Firstly, we present a conceptual understanding of the effectiveness of EIA governance mechanisms that are based primarily on the model developed by Arts et al. (2012) and relate this to the elements that make the Danish system unique. This is followed by a presentation of the methodology. The empirical findings on the substantive effectiveness of the Danish system are then presented and compared with similar studies in the UK and the Netherlands. The paper concludes with a discussion of the implications of the research and its theoretical contribution.

2. Conceptual framework: substantive effectiveness and governance mechanisms

Our conceptualisation of the interrelations between substantive effectiveness, governance mechanisms, and context has a point of departure in the theoretical model developed by Arts et al. (2012) (the original version of this model is reproduced in Fig. 1). Effectiveness in the model is interpreted as the extent to which environmental issues are considered in decision-making and the extent to which EIA contributes to environmental awareness among the actors involved. Although this can be considered a rather narrow interpretation of substantive effectiveness (for instance, learning and the bio-physical outcomes of projects subject to EIA are excluded), the indicators constitute the core variables for what is most commonly considered to constitute the substantive effectiveness of environmental assessment[3] (see, for example, Bond and Morrison-Saunders, 2013; Sadler, 1996).

The term governance mechanisms is used in referring to the roles and responsibilities assigned to particular actors (e.g. to proponents and competent authorities) and the rules that are prescribed in EIA legislation (e.g. the requirement to develop alternatives and mitigation measures). These mechanisms aim to steer actors towards greater environmental awareness and the incorporation of environmental concerns into development proposals (Arts et al., 2012). A pertinent governance mechanism is the provision of information about environmental effects prior to decision-making, which should raise awareness and influence design choices. A more subtle mechanism is the so-called preventative effect: anticipating that a project will be subject to EIA, proponents are expected to proactively take environmental values into account in advance of the consent decision in order to avoid criticism and/or objections (Heuvelhof and Nauta, 1997). For a comprehensive review of governance mechanisms in EIA the reader is referred to Arts et al. (2012).

The model also includes contextual factors. The literature suggests that the substantive effectiveness of environmental assessment is context-specific (Marsden, 1998; Fischer, 2005; Fischer and Gazzola, 2006; Runhaar and Driessen, 2007; Hilding-Rydevik and Bjarnadóttir, 2007; Zhang et al., 2013). Arts et al. (2012) identify four groups of what can be interpreted as contextual factors that mediate the influence of governance mechanisms on the substantive effectiveness of environmental assessment: procedures and practises, the decision making context, actor involvement, and the results of the environmental assessment (particularly in relation to the interests of those actors involved in a decision-making process).

The analysis of the Danish EIA system is used to refine the Arts et al. (2012) model by exploring the unique features of the Danish system which were succinctly presented in Section 1. This entails revisiting and deepening the understanding of EIA governance mechanisms and context in the model. The features of the Danish system are investigated by comparing them against the Dutch and UK EIA systems,[4] which were used to empirically ground the model developed by Arts et al. (2012). In short, the Dutch EIA system can be characterised as the 'Rolls Royce' of EIA systems; the UK system is adapted to a conflict oriented administrative culture; and, the Danish system includes substantial roles for the competent authority and the public (see Arts et al., 2012; Lyhne et al., 2015b).

Regarding governance mechanisms, the proponents are not responsible for drafting the EIS in the Danish system, in contrast to many other countries. This could result in a lower level of ownership and internalisation of environmental values in comparison to the Netherlands and the UK. The Danish authorities, in contrast, may be more ambitious in their use of EIA given that they might have, for instance, better opportunities to adapt EIA to fit decision-making processes and the decision-makers' needs. In addition, the dominant role of the competent authority may create less interaction and dialogue between the proponent and the competent authority — whereas Christensen et al. (2005) found that the substantive effectiveness of EIA (in terms of changes of the proposed project in favour of environmental protection) is highly dependent on such interactions. On the other hand, in Denmark the public is more actively involved in EIA than in the UK and the Netherlands, but what does that mean for effectiveness? Stakeholders and the public might be perceived to have a more profound role in the process, including analytical components, compared to other countries. Finally, the Danish EIA community of project proponents, competent authorities, and consultants is relatively small (about 300 people working mainly on environmental assessment according to available estimates[i]). The small size of this community may result in more 'groupthink' concerning, for example, the purposes of EIA (see Runhaar et al., 2013). Interactions in Danish EIA processes, and the attendant implications for substantive effectiveness, hence may

[2] The history and characteristics of the Danish system are reported by Lyhne et al. (2015b). They involve a strong tradition for an active public and a tradition of implementation of EU Directives on environmental assessment that rarely goes beyond the minimum requirements established by the EU. Based on information provided by what was then the Danish Ministry of Environment, it is estimated that there are 300 practitioners working primarily with EA. Additional people are involved in EA processes in minor roles.

[3] The term 'environmental assessment' is used as to collectively describe EIA and Strategic Environmental Assessment (SEA).

[4] See Arts et al. (2012) for a thorough introduction to the EIA systems in the UK and in the Netherlands.

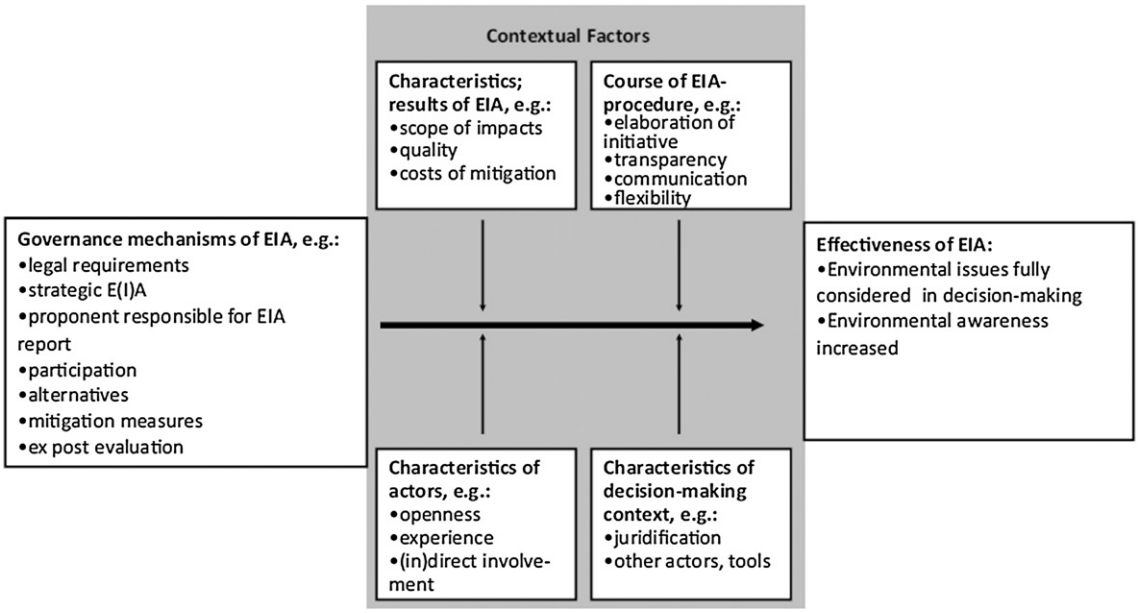

Fig. 1. Governance mechanisms, contextual factors, and the effectiveness of EIA. (Reproduced from Arts et al. (2012)).

be different from those occurring in other countries. These characteristics make the Danish system an interesting case study.

3. Methodology

Three methods were applied to investigate the effectiveness of the Danish system: a nation-wide survey of actors involved in EIA, interviews, and a literature review. The application of these methods facilitated triangulation of the data and thereby increased the validity and reliability of the findings. The nation-wide survey was employed to obtain data on actors' perceptions of effectiveness in Denmark, whereas the interviews and the literature primarily served to provide explanations for the findings from the survey.

The first two research questions on the substantive effectiveness of the Danish EIA system and explanations for the level of effectiveness achieved were investigated using a survey methodology. The survey was based on a standardised questionnaire, which was developed in accordance with the model in Fig. 1 and has previously been applied to survey practitioner communities in the Netherlands and the UK (Runhaar et al., 2013; Arts et al., 2012). The questionnaire contained questions about actors' perceptions of EIA effectiveness, the factors they perceive to account for the level of effectiveness achieved, and questions about their background. The full list of survey questions were presented elsewhere (Lyhne et al., 2015b). The extent to which EIA influences decisions and the extent to which EIA contributes to environmental awareness were employed in the survey as indicators for substantive effectiveness. The reader is referred to Arts et al. (2012) for further information on the operationalisation of the variables in the questionnaire.

The survey was employed to collect data on the subjective perceptions of members of the Danish practitioner community on effectiveness. These data on perceptions may not fully correspond to the actual effectiveness of EIA because memories are cognitively filtered and personal beliefs and experiences among the respondents may affect their responses to the survey questions (Lyhne and Kørnøv, 2013). As an example, the study by Arts et al. (2012) showed that more experienced stakeholders are more positive about the quality of EIA reports than other respondents. Other factors, such as different roles in EIA and experience from different policy sectors, did not generate significant differences among actors in the Dutch study (Arts et al., 2012).

The survey in Denmark was carried out in 2012 and was distributed to 270 practitioners. The survey yielded 100 responses which amounts to approximately 30% of all practitioners working primarily with environmental assessment in Denmark[ii] and a response rate of 37%. Competent authorities dominated the Danish sample (63% of respondents), with consultants (14%) and research/interest groups (10%) constituted the majority of the other groups of actors present in the sample. The representativeness of the different groups of practitioners is probably somewhat biased as consultants appear underrepresented and competent authorities are overrepresented. On the other hand, we expect that there are fewer consultants who specialise in EIA than competent authority employees responsible for EIA. This is a reflection of the fact that there are 5 to 6 large consultancy companies with a high profile in EIA in Denmark, whereas there are 98 municipalities (the competent authorities), each of which needs to have one or more EIA-competent staff. The study data were analysed through descriptive statistics that involved validation of the Danish data set and critical attention was given to the possibilities for comparing the Danish data with existing Dutch and UK data sets. Some of the responses to the Danish survey were incomplete and in section four we state, therefore, the number of responses obtained for each of the statistical analyses.

The third research question on the influence of the distinctive characteristics of the Danish system on the substantive effectiveness of EIA was explored via survey data and in-depth interviews. Four in-depth interviews were undertaken with representatives of the competent authority (1), research organisations (1), and consultancies (2). For a number of years these four interviewees have held divergent views upon the effectiveness of the Danish system. They were regarded, therefore, as representatives of disparate views on effectiveness and governance mechanisms in Denmark. This purposeful selection of the interviewees, combined with the small size of the national environmental assessment community, meant that a relatively small number of interviews were considered sufficient to achieve theoretical saturation. The interviews were conducted between 2013 and 2015 and were used to explore to what extent causal relationships existed between the variables from the questionnaire. This was important because the survey data could only be used for correlation analysis, not causal tests. Furthermore, the interviews entailed follow-up questions about the role of contextual factors that were not included in the survey. The interviewees were also asked about their personal views upon effectiveness in EIA and the relationship between EIA effectiveness and the

Table 1
Survey respondents' responses to the statement, "In practise, the main effect of EIA on decision-making has been…".

	Frequency	Valid percentage*
There was no effect on decision-making	4	5.5
The explicit consideration of environmental values, without changing the decision of a project	18	24.7
Changing a project to a limited extent	37	50.7
Changing a project more extensively	6	8.2
Choosing the most environmentally friendly alternative	8	11.0
Sub-total	73	100.0
Missing a response	24	
Total	97	

* Excluding missing data.

effectiveness of the broader planning process. A semi-structured interview protocol was used and all interviews were recorded. The average duration of the interviews was 1.5 h.

4. Findings on the Danish system

The findings on the Danish system are presented below and compared with studies on effectiveness in the UK and the Netherlands. First, data on the survey respondents' perceptions of effectiveness are presented. Then we explain trends in perceptions of effectiveness in terms of the governance mechanisms and contextual factors, also based on the survey data. Next, the relative importance of each of the three unique characteristics of the Danish system is explored based primarily on the interview data.

4.1. Perceived effectiveness of EIA in Denmark

The Danish respondents perceive the main effects of EIA to be modest; EIA primarily results in minor changes in the decisions at stake (see Table 1). Only 6% of the respondents considered EIA to have no effect at all, whereas 8% stated that EIA changes the project more extensively and 11% stated that EIA made them choose the most environmentally friendly alternative. The relatively high level of agreement that EIA alters decisions (albeit minor ones) is supported by an evaluation of EIA in Denmark from 2003 which showed that changes[5] in favour of the environment were made in 86% of projects as a consequence of the EIA process (Christensen et al., 2003).

Based on the work of Arts et al. (2012) we estimate the percentages for the Netherlands and the UK[6] and compare these with the Danish results (see Table 2). The comparison indicates that the Danish environmental assessment community's perceptions are comparable to their Dutch and UK counterparts, with a slightly higher percentage choosing the most environmentally friendly alternative in Denmark than in the UK.

The second measure of effectiveness employed in the Arts et al. (2012) model is the extent to which EIA contributes to environmental awareness (Table 3). In Denmark the contribution to environmental awareness is widespread as regards the competent authorities (67.7% stated it occurred often or always), whereas this effect is less prominent for project proponents (48.6% stated often or always).

[5] Out of 36 cases, Christensen et al. (2005) found five projects without changes and for the remaining projects: 54 instances of minor changes (often more than one change per case), 4 instances of considerable changes, and 2 instances of radical changes.

[6] Arts et al. (2012) indicate that the Dutch survey includes 443 respondents and that the UK survey includes a total of 181 respondents. We do not have access to the number of missing data per question for both countries.

Table 2
Perceived main effect of EIA on decision-making in Denmark, the Netherlands and the UK.

	Denmark	Netherlands	UK
No effect	6%	7%	4%
The explicit consideration of environmental values, without changing the consent decision	25%	30%	30%
Changing a project to a limited extent	51%	45%	44%
Changing a project more extensively	8%	9%	18%
Choosing the most environmentally friendly alternative	11%	9%	4%

EIA contributes more frequently to the environmental awareness of competent authorities in Denmark (see Table 4) than in the Netherlands and the UK, whereas the perceived effect on the environmental awareness of project proponents is lower than in the UK and higher than in the Netherlands (Table 5).

To conclude, the analyses of the Danish survey data and a comparison of these with data for the UK and the Netherlands suggest that:

- The Danish EIA system leads more frequently to the adoption of the most environmentally friendly alternative, especially in comparison to the UK;
- The effect of EIA on the environmental awareness of competent authorities is most pronounced in Denmark;
- The effect of EIA on the environmental awareness of the project proponent is more pronounced in Denmark compared to the Netherlands, but less pronounced than in the UK.

4.2. Explaining the perceived effectiveness

The extent to which the perceived effectiveness of the Danish system can be explained by the governance mechanisms and contextual factors in the Arts et al. (2012) model is discussed below. We do not include all aspects of the model, but focus on the most important explanatory factors in terms of governance mechanisms and contextual factors.

4.3. Governance mechanisms

Legal requirements were perceived by the Danish respondents to be among the important factor for effectiveness (see Table 10). The survey also showed that the preventative effect of EIA is highly influential in Denmark, with only three percent of respondents stating that it never occurs. The preventative effect has been institutionalised in intensive animal farming as government software encourages the proponent to alter their projects to find out what element, or elements, triggers the need for EIA (COWI, 2009). Earlier research showed that in some cases, however, the preventative effect leads to 'salami slicing' of the

Table 3
Survey respondents' answers to the statement, "EIA contributes to the environmental awareness of the competent authority" and "EIA contributes to the environmental awareness of the proponent".

	The awareness of the competent authority		The awareness of the proponent	
	Frequency	Valid percentage	Frequency	Valid percentage
Never	1	1.4	1	1.4
Hardly ever	4	5.6	10	13.9
Sometimes	18	25.4	26	36.1
Often	32	45.1	29	40.3
Always	16	22.5	6	8.3
Sub-total	71	100.0	72	100.0
Missing	26		25	
Total	97		97	

Table 4
Perceived effect of EIA on environmental awareness of competent authorities in Denmark, the Netherlands and the UK.

	Denmark	Netherlands	UK
EIA contributes to the environmental awareness of the competent authority: often or always	68%	41%	60%
EIA contributes to the environmental awareness of the competent authority: never or hardly ever	7%	16%	20%

project (Christensen, 2006). The findings on the preventative effect are similar to those of an earlier study of the Danish screening system which found that about half of all project changes were made during the screening process (Nielsen et al., 2005). The high number of changes made during screening is based on an understanding in Denmark that the purpose of the screening is partly to ensure that a project is adapted and changed so that a full EIA process is rendered unnecessary (Nielsen et al., 2005). The Danish results on the preventative effect are comparable with the survey results in the UK and the Netherlands (see Arts et al., 2012).

Interestingly, the perceived importance of legal requirements can be contrasted with the finding that only 30% of survey respondents agree that the Danish regulations on EIA are precise and understandable. According to one of the interviewees this may be a function of the fact that Denmark has different EIA regulations for different sectors (e.g. offshore activities, agriculture, spatial planning) (Kjellerup, 1999). Other research shows that the administration of EIA and SEA legislation is characterised by confusion over regulative requirements (Lyhne, 2011; Kørnøv and Wejs, 2013). The perceived importance of legal requirements may thus be related to ideas about unexploited potential. Nonetheless, the preventative effect still occurs and plays a role in terms of effectiveness.

According to the respondents, competent authorities in Denmark often go beyond the legal requirements and use EIA and/or SEA as an active instrument to effectively protect the environment (see Table 6), in contrast to project proponents (see Table 7). However, these data may be biased as a result of the overrepresentation of competent authorities in the survey sample. Arts et al. (2012) suggest that the role of competent authorities is appreciated more by these authorities themselves than by other EIA actors. The four interviewees do, however, recognise the different actors' use of EIA and the perceived use are in line with the earlier study of EIA practise in Denmark (Christensen et al., 2003). The more passive approach of seeking only to meet minimum legal requirements may have a notable influence on effectiveness, since the preventative effect is reported to lead to substantive changes in projects (Nielsen et al., 2005).

Besides governance mechanisms related to the legal requirements, 45% of the survey respondents perceive that the participation of stakeholders in environmental assessment is important or very important for its substantive effectiveness. Almost 60% of the respondents regard providing the best possible overview of impacts from alternatives as among the most important goals of environmental assessment. However, the survey respondents stated that only realistic alternatives should be considered. The consideration of mitigation measures is viewed as important, although the associated cost is perceived to limit EIA effectiveness. The follow-up phase is also viewed as important, with 30% of the respondents stating that it is among the most important elements of environmental assessment.

Table 5
Perceived effect of EIA on environmental awareness of project proponents in Denmark, the Netherlands and the UK.

	Denmark	Netherlands	UK
EIA contributes to the environmental awareness of the proponent/developer: often or always	49%	37%	58%
EIA contributes to the environmental awareness of the proponent/developer: never or hardly ever	15%	16%	15%

Table 6
Responses to the statement "Competent Authorities have used EIA and/or SEA mainly to."

	Frequency	Valid percentage
− (meet the minimum legal requirements of environmental regulations)	10	13.7
−	8	11.0
−/+	21	28.8
+	25	34.2
++ (effectively protect the environment)	9	12.3
Sub-Total	73	100.0
Missing	24	
Total	97	

In other words, EIAs are conducted and contribute to environmental awareness and the revision of projects primarily because of the legal provisions and the willingness of competent authorities to go beyond regulatory requirements.

Compared to other countries, Danish competent authorities appear more active than their Dutch counterparts, according to the survey respondents, and a bit more active than their British colleagues (see Table 8). Proponents in Denmark appear more active than Dutch developers, but less so than their British equivalents (see Table 9). These distributions are, however, based on three very different survey samples in the three countries, which may bias the findings. The extent to which the differences in Denmark concerning the approach to EIA of competent authorities and project proponents are a consequence of the former being responsible for preparing the EIA report is discussed in Section 4.3.

Compared to the Netherlands and the UK, the preventative effect and adaptation at the screening phase appears to be very important in the Danish system. The extent to which this can be explained by the unique features of the Danish EIA system is analysed in Section 4.3.

4.4. Contextual factors

The quality of the environmental assessment report is widely perceived to be important for effectiveness: 69% of survey respondents expressed a belief that the quality of environmental assessment reports is central to substantive effectiveness. Only three percent of survey respondents fully agree and 38% somewhat agree that the quality of environmental assessment reports is generally good in Denmark. 59% of the respondents stated that the scope of environmental assessments is too broad. This might indicate that the respondents believe that due to the relatively low quality of environmental assessments in Denmark the potential for it to affect decision-making is not being realised.

The characteristics of the actors centrally involved in EIA are perceived to be very important determinants of effectiveness. 81% of

Table 7
Responses to the statement "Proponents have mainly used EIA and/or SEA as an instrument to."

	Frequency	Valid percentage
− (meet the minimum legal requirements of environmental regulations)	21	29.6
−	14	19.7
−/+	30	42.3
+	5	7.0
++ (effectively protect the environment)	1	1.4
Sub-total	71	100.0
Missing	26	
Total	97	

Table 8
The approach of competent authorities to EIA and SEA.

	Denmark	Netherlands	UK
Competent authorities have mainly used EIA/SEA as an instrument to meet the minimal legal requirements (−) or slightly more (−) (passive)	24.7%	28%	21%
Competent authorities have mainly used EIA/SEA as an instrument to actively protect the environment ("+" or "++") (proactive)	46.5%	38%	35%

the respondents stated that the willingness of the proponent and the competent authority to take environmental values into account was of high or very high importance for the substantive effectiveness of EIA. 60% of the respondents stated that organisations with low capacity have problems in ensuring environmental assessments are of adequate quality.

The way in which environmental assessment procedures are conducted is perceived to be important for effectiveness, especially in regards to communication, transparency, and assessment methods. The way in which the results were communicated to the proponents, competent authority and other parties was perceived by 66% of the respondents to be of high or very high importance for effectiveness. 73% of survey respondents believed that the quality of research methods used is of high or very high importance, whereas 58% thought that transparency in approach and methods were of high or very high importance.

The characteristics of the decision-making context are perceived to be somewhat important for effectiveness. 41% of the respondents felt that environmental assessment reports are a result of negotiations, whereas 30% of the respondents believed that environmental assessments almost never have an influence on controversial decisions. Other research on EIA in Denmark found that competent authorities are "less concerned with the time and resources that go into EIA screening" than their counterparts in other European countries (Lund-Iversen and Mete, 2013) as screening is perceived to be a cost-effective governance mechanism (Christensen et al., 2005).

Explanatory factors for trends in effectiveness in Denmark are compared to the findings from the Dutch and UK surveys in Table 10. This comparison indicates that legal requirements play a less important role in Denmark, which might explain why the approach of competent authorities and project proponents is considered to be more important in Denmark compared to the Netherlands (but not the UK). The importance of legal requirements in the UK may be explained by the conflict oriented administrative culture, whereas its importance in the Netherlands may be explained by the role of the Commission for Environmental Assessment (NCEA) (Arts et al., 2012; Lyhne et al., 2015b). Interestingly, participation of stakeholders in the EIA study apparently is of less importance in Denmark than the other two countries. This observation is investigated further in Section 4.4. Finally, the extent to which a proposal has been elaborated is perceived to be of higher importance in Denmark than the other two countries, which might allow for a higher level of EIA effectiveness (e.g. by avoiding foreclosure (Arts et al., 2012)). Early elaboration of the project concept might be related to screening practises in Denmark. A study on quality control mechanisms in Denmark and the Netherlands showed that despite quality control being better institutionalised and quality being higher in the Netherlands than in Denmark, effectiveness is similar in the two countries (Lyhne et al., 2015b).

4.5. Exploring the importance of the distinctive characteristics of the Danish EIA system

4.5.1. The effects of the competent authority undertaking EIA reporting

This section explores to what extent the effectiveness of the EIA governance mechanisms in Denmark outlined in the previous sections can be ascribed to the undertaking of EIA reporting by the competent authority. The previous sections showed that EIA results in greater environmental awareness among Danish competent authorities and that they are perceived to use EIA more actively than their Dutch counterparts and slightly more actively than their British colleagues. This is not surprising given their more prominent role in EIA. This section aims to unfold the influence on substantive effectiveness of the competent authority being responsible for producing the EIA report. It is mainly based on the four expert interviews.

In contrast to the survey results on the positive role of Danish competent authorities, the interviewed consultant and civil servant are more critical about the extent to which the authorities actively protect the environment. According to three respondents from the survey (who made additional notes) and the two interviewees, the Danish authorities have tended to manipulate EIA to fit their needs. This assertion is, in part, supported by the perception of more than half of the Danish respondents that agreements on project proposals settled before the environmental assessment are conducted exert an important or very important influence on the effectiveness of EIA. That the competent authority is responsible for undertaking EIA reporting might mean that it is easier to disguise adjustments to the formulations in the EIA. One researcher went as far as to argue that: "Authorities are the biggest bandits when it comes to cutting corners". Such practises are facilitated institutionally, to a degree, because it is only possible to complain about procedural infringements to the Nature and Environment Complaints Board (which receives most complaints about EIA) and not about the quality or correctness of the information in the EIA report.[7] The competent authority, therefore, is protected against all but procedural complaints, which might make it somewhat easier to accommodate political biases within, or despite, an EIA.

Another implication of the competent authority being responsible for preparing the EIA report, according to the interviewed consultant and civil servant, is that there is confusion among actors about the sources and causes of bad practise. If data is incorrect or misleading, for example, is it because the project proponent provided inappropriate information or did the competent authority manipulate it because they had an interest in realising the project? The two interviewees thus emphasise that although competent authorities are generally perceived to actively protect the environment, their role is not unproblematic and it certainly does not solve some of the quality concerns associated with proponent-led EIA processes. Furthermore, in the case of other interests than environmental ones, the competent authority has considerable opportunities to manufacture an alignment of purposes in the EIA. The Danish guidance on SEA seems to try to counter this type of 'political environmental assessment' by emphasising that reporting is a technical exercise that should leave the political judgement to politicians (Cashmore et al., 2015), but it is not known to what extent this guidance is influential.

The extended role of the competent authority in Denmark may also lead to an expectation that there will be better opportunities for aligning EIA with decision-making, which may enable a more profound level of effectiveness. The 'preventative effect' outlined in Section 4.2

[7] Danish EIA processes are conducted within the remit of the spatial planning legislation. Under these procedures there is an opportunity to file a complaint to the Nature and Environment Board of Complaint. According to section 58 in the Act on Spatial Planning no. 587 of 27/05/2013, it is only possible to file a complaint in relation to instances where legal procedures are said to have been infringed.

Table 9
The approach of proponents to EIA and SEA.

	Denmark	Netherlands	UK
Proponents have mainly used EIA/SEA as an instrument to meet the minimal legal requirements (−) or slightly more (−) (passive)	49.3%	56%	41%
Proponents have mainly used EIA/SEA as an instrument to actively protect the environment ("+" or "++") (proactive)	8.4%	13%	11%

may reflect a better alignment with decision-making in the sense that the competent authority has the central role in coordinating the proponent's decisions on adaptation with the authority's judgements about significant impacts. Despite this role, the preventative effect is not significantly more widespread in Denmark than in the Netherlands. As another indicator of the level of process alignment, only 13% of the Danish respondents stated that environmental assessment processes result in unacceptable delays. This finding may indicate that better alignment of EIA with decision-making promotes timely rearrangement of project activities and thereby avoid overruns. Furthermore, 54% of the Danish respondents state that it is important or very important for the contribution of EIA to align with the dynamics of the decision-making process. This may reflect positive experiences among the large number of competent authority employees.

Interestingly, the prominent role of the competent authority does not seem to influence the perception of administrative burdens upon authorities, as the Dutch and Danish data survey results are comparable on this issue. This may indicate the system in Denmark is more cost-effective and that it places fewer burdens on the involved actors. Alternatively, it may indicate acclimatisation among the respondents to the system they are working within. It may also be explained by the fact that after the so-called structural reform in Denmark in 2007 (see Vrangbæk, 2010) EIAs, according to the four interviewees, are often largely produced by consultants in Denmark through the outsourcing of work by the competent authority. The workload for the competent authority, therefore, may not be significantly different in practise to the situation when it is consultants contracted by the project proponent who prepare the report.

Project proponents in Denmark have a considerably more passive approach to EIA compared to their Dutch and UK counterparts based on the survey data. The interviewees also argued that proponents play a limited role and leave their part in the process to consultancy companies. This might be expected given their modest role in comparison to the competent authority. A relatively passive approach by the project proponent to much of the EIA process is also supported by observations on the importance of the screening stage in Denmark for adapting the project proposal to avoid the need for EIA (Christensen et al., 2005).

The preparation of EIA reports by the competent authority may lead to expectations of better quality EIA documentation. 69% of the respondents state that the quality of the environmental assessment report is crucial for effectiveness, while 41% of the respondents consider that the quality of environmental assessment reports is good in Denmark. The perception that EIA reports are generally of a low quality might reflect spatial variations in the experience of competent authorities: according to the interviewed civil servant and consultant, EIA reports produced by authorities in jurisdictions where a low number of EIAs are undertaken are likely to be of lower quality than in jurisdictions where EIA occurs more frequently. Lyhne et al. (2015b) and Christensen et al. (2003) have also highlighted a range of other determinants of the quality of EIA reports.

Table 10
The importance of selected factors for the contribution of EIA to more environmentally sustainable decision-making (Percentage "very important" or "important").

	DK	NL	UK
Legal requirements	57%	71%	75%
Quality of the research underlying environmental assessments (i.e. in terms of its validity and comprehensiveness)	64%	69%	88%
Transparency of the EIA process	59%	62%	80%
Extent to which the initiator as well as the competent authority were willing to take into account environmental values	81%	58%	83%
The costs of mitigation measures	57%	56%	69%
The way the results of the EIA were communicated to the proponent, competent authority and stakeholders	67%	53%	80%
Participation of stakeholders in the EIA	46%	51%	74%
Extent to which the EIA process was connected with the dynamics of the decision-making process	52%	49%	86%
Extent to which the project was elaborated before the EIA was conducted	53%	44%	37%

To summarise, in respect to the influence of the prominent role of the competent authority in Denmark, the analysis of Danish survey results and an international comparison with the UK and the Netherlands suggest that:

- Danish competent authorities have a more active role than their Dutch and British counterparts and this appears to lead to a slightly more proactive attitude, especially in comparison with the UK. The interviewees indicated, however, that the more substantial role for the competent authority provides opportunities for them to manipulate the process and results;
- An argument could be made that 'crowding out' occurs: the more proactive attitude of competent authorities may discourage project proponents (who are believed to have a more passive attitude towards EIA than their British counterparts) from taking the initiative;
- The prominent role of the competent authority makes it easier to align EIA with the dynamics of decision-making and thus enables a higher level of effectiveness to be achieved.

Based on our analysis, we suggest the following hypotheses are added to the Arts et al. model:

- The relatively large degree of freedom that the competent authority enjoys in Denmark may result in more environmentally friendly decisions (because of a better alignment of EIA and decision-making processes and higher ambitions), but only when this aligns with their interests.
- Greater responsibility for EIA for the competent authority provides a negative incentive for the project proponent to use EIA proactively as a tool to enhance the environmental performance of projects.

4.5.2. The effects of a key role for the public in quality control

As described in Lyhne et al. (2015b), Danish citizens are granted a considerable role in ensuring that the EIA process runs as Danish society thinks it ought to. The active participation of the public in EIA is based on a strong tradition of a prominent role for the public in planning processes. This tradition was cemented by reforms of the planning system which took place in the 1970s (Gaardmand, 1993).

In the survey, 46% of the respondents state that the participation of stakeholders in environmental assessment research is of high or very high importance for the effectiveness of environmental assessment. This is comparable with the perceived influences of public participation on planning in general, as shown in a recent survey (Lyhne et al., 2015a). An important source of leverage for the public is the right to lodge complaints which may stop or delay the project or plan from being developed. The interviewed consultant and civil servant explained how authorities and proponents are fearful of the potential for formal complaints to result in significant delays. The public participation governance mechanism, therefore, potentially has a direct

influence upon EIA effectiveness for it provides a powerful opportunity for the public to exert an influence, most notably through the complaints procedure.

The effects of an engaged polity on quality control are outlined in Lyhne et al. (2015b). They compare the expert focused quality control system in the Netherlands with the Danish public involvement focused quality control system. They show that the active participation of the public in the Danish system focuses attention on the most important issues for society. In this way, EIA and decision-making processes may be more democratic than expert oriented quality control system. Other research has shown that the prominent role of the public can lead to improved reporting of environmental issues (Kørnøv et al., 2005).

In analysing the influence of different actors on the quality of EIA, the Danish respondents state that the public are perceived to have less influence than consultants, authorities and proponents. In explaining this relatively low level of influence, the interviewed researcher and consultant and a number of respondents to the survey note that, in many instances, public consultation on the EIA report takes place after the main decisions have been made. As an example, the screening stage does not involve public consultation and as previously noted screening is a critical stage for decisions on project design in Denmark. Furthermore, larger projects frequently attract intense political attention and there is considerable political pressure to implement them; in these cases, the public is less influential, respondents argue.

This leads us to formulate the following two hypotheses. Firstly, the influence of stakeholders on the substantive effectiveness of EIA may be considerable, but it depends on when, during the decision-making process, public participation takes place. Secondly, the influence of the public and other actors is amplified by a formal (and affordable/accessible) complaints system.

4.5.3. The effects of a small community

The interviewee from a Danish Ministry argued that the low number of practitioners within the field of environmental assessment in Denmark makes it easier to coordinate EIA practises in Denmark in comparison to, for example, the larger community of practise in the Netherlands. As a specific example, the interviewed expert consultant argued that the relatively rapid adoption of what they deem to be acceptable SEA practises may have been facilitated by the relatively small number of people to be trained. The Danish Centre for Environmental Assessment conducts annual conferences which attract some 130–150 practitioners primarily from municipalities and consultancy companies. This is a relatively large number given the estimated number of practitioners working primarily with environmental assessment (i.e. approximately 300). These conferences seem to play a prominent role in knowledge building among practitioners and the national planning agency uses the conference to disseminate new developments.

There are indications that the relatively small size of the practise community leads to groupthink on certain issues. The interviewed consultant describes an instance of groupthink from the 1990s, wherein a perception became established that very low quality EA reports were acceptable practise in Denmark. The reports were, in the words of the interviewed consultant, “mere chitchat”. A decision by the Nature and Environment Complaints Board to overrule a specific competent authority's EIA shocked the community and led to the realisation that the quality of their work at that time was not good enough. A related instance of groupthink pointed out by all interviewees is that many Danish practitioners perceive Denmark to be in the elite in the EU when it comes to public administration and protection of the environment, although there are many observations that contradict this (e.g. problematic implementation of EU legislation on SEA). In the interviewed consultant and researcher's opinion the Nature and Environment Complaints Board has an important role to play in addressing groupthink. However, the board can only react to complaints and there are no assurances that low quality reports will be the subject of complaints.

All interviewees agree that despite possible influences from the small size of the community of practise these are heavily overshadowed by other factors that influence EIA effectiveness, including the perceived complexity of the legal framework and historical resistance towards EIA within Denmark.

In view of the above, we suggest the following hypothesis: the size of the EIA community does not have a substantial influence on EIA effectiveness.

5. Conclusions and discussion

In this paper we have evaluated the substantive effectiveness of the Danish EIA system. We have used the same theoretical and methodological approaches as earlier evaluations of EIA in the Netherlands and the UK (Runhaar et al., 2013; Arts et al., 2012). This has enabled us to compare perceptions of EIA effectiveness in three European member states, but also explore the consequences of the distinctive characteristics of the Danish system in order to contribute to theory on EIA effectiveness. The limitations of using the survey are that it is based on a particular and single measure of effectiveness (i.e. actors' perceptions) that only indirectly allows for establishing causal relationships between effectiveness, governance mechanisms, and contextual factors. Another limitation is that competent authorities are overrepresented in the survey sample, which may have biased the results.

Our survey indicates that Danish practitioners rate the substantive effectiveness of EIA effectiveness more highly than their Dutch and the UK counterparts. This finding applies to both the influence of EIA on decisions and the contribution it makes to the environmental awareness of the competent authority.

The contribution made by governance mechanisms and contextual factors seems to differ to some extent in the three countries. Our analysis suggests that the extended role attributed to the competent authority in the Danish EIA system makes the legal requirement to conduct EIAs less important for EIA effectiveness. At the same time the substantial role of the competent authority appears to make EIA effectiveness more dependent upon the willingness of competent authority and the project proponent to go beyond regulatory requirements. Taking the limitations into account, these findings provide provisional insights into how the different governance mechanisms and contextual factors from the Arts et al. (2012) model may interact and influence one other.

The analysis of three unique characteristics of the Danish EIA system – the competent authority instead of the proponent undertaking EIA reporting; the prominent role of the public in the EIA process; and, the relatively small size of the EIA community – has generated the following hypotheses on contextual factors, to add to the Arts et al. model:

- The relatively large degree of freedom that the competent authority enjoys in Denmark may result in more environmentally friendly decisions (because of a better alignment of EIA and decision-making processes and higher ambitions), but only when this aligns with their interests.
- Greater responsibility for EIA for the competent authority provides a negative incentive for the project proponent to use EIA proactively as a tool to enhance the environmental performance of projects.
- The influence of stakeholders on the substantive effectiveness of EIA may be considerable, but it depends on when, during the decision-making process, public participation takes place.
- The influence of the public and other actors is amplified by a formal (and affordable/accessible) complaints system. The influence of stakeholders on the substantive effectiveness of EIA may be considerable, but it depends on when in the decision-making process public participation is scheduled.
- The size of the EIA community does not have a substantial influence on EIA effectiveness.

Our methodology (survey and in-depth interviews) has not allowed us to analyse the influence of more structural factors on EIA effectiveness. We encourage other researchers to further explore this subject. Inspiration can be found in related literature on SEA, which focuses on policies, programmes and plans rather than projects, and literature on other forms of policy appraisal and assessment. For instance, Bina (2007) in a study of SEA argues for attention to be given to "broader social, cultural and political values", which are only indirectly included in the model. Inspired by analyses of other aspects of governance, factors such as systems of knowledge transfer, norms and incentive structures (Turnpenny et al., 2008) and styles of government guidance (Cashmore et al., 2015) could be elaborated upon in more detail. Jasanoff (2011) argues for attention to political culture defined as the "systematic means by which a political community makes binding collective choices", which includes institutionally sanctioned modes of action, unwritten codes and practises, knowledge production routines, institutionalised approaches to reasoning and deliberation, and cultural commitments to forms of legitimation (Mason, 2012; Jasanoff, 2011). Within the field of environmental assessment, Gazzola et al. (2011) has emphasised the importance of planning traditions and trends in these (see also Knieling and Othengrafen, 2009).

With the introduction of new legislation, two of the three unique features of the Danish system are about to vanish. For the Danish system this means that the effectiveness of the system will depend on other governance mechanisms, which need to be adjusted to the Danish context. For the EIA community it means that we will lose the opportunity to analyse an alternative model for the design of EIA systems. We encourage other researchers to further explore the governance mechanisms associated with unique features of EIA systems as a means to continuously reflect upon institutional provisions for, and practises of, EIA.

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