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Governing public–private partnerships for sustainability An analysis of procurement and governance practices of PPP infrastructure projects

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Abstract

There is a recognized need to incorporate sustainability considerations in infrastructure projects delivered through public–private partnerships (PPPs). The aim of this study is to explore how such incorporation can be encouraged. The research is based on a documentary analysis of 25 Flemish PPP infrastructure projects and two follow-up single-case studies. The findings show that sustainability considerations currently play only a limited role, and that the social dimensions of sustainability are largely neglected. It seems likely that this neglect is due to the difficulties encountered in formulating measurable social sustainability criteria. Based on case studies, several governance instruments are presented that might stimulate more consideration for sustainability. This study should, therefore, be of value to practitioners who wish to procure sustainable PPP projects. However, it must be noted that a "strong" sustainability perspective seems inherently incompatible with the contractual PPP project structure, which requires measurable and enforceable performance indicators.

Keywords: Sustainability; Public–private partnerships; DBFM; Public procurement; Governance; Project management; Infrastructure; Construction

1. Executive summary

Public–private partnerships (PPPs) are long-term integrated contracts that are used for the provision of public infrastructure. The main goal of the current study is to determine to what degree and in what way governments incorporate sustainability considerations in PPP infrastructure projects and how such incorporation can be stimulated. This article shows that steps towards sustainability may benefit from a governance approach. The findings of a document analysis and case studies suggest several courses of action for policy-makers and practitioners. First of all, in the preparatory stage, questions should be addressed such as which stakeholders to involve and whether it is necessary to build new infrastructure. Second, it is recommended that sustainability ambitions will be incorporated into the project definition. Furthermore, although it is under certain circumstances possible to set requirements regarding past experience with sustainability in the selection criteria, it is important to act carefully, because selection criteria that are too high can undermine competition and threaten small- and medium-sized enterprises. Moreover, we found that many sustainability criteria are not measurable or enforceable. Measurability issues might be addressed by referring to sustainability standards and instruments set by external organizations, but this method may still exclude social criteria that are not so easy to measure. Another important governance option is to include sustainability considerations in the award criteria and to evaluate them with a substantial weighting. Setting a minimum score for individual sustainability award criteria might help to reduce strategic bidding behaviour. The focus on quality aspects also seems important, but further

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research should be undertaken to investigate whether practices that are used to let bidders compete on quality aspects alone (e.g., a "fixed price") are worthwhile. The effectiveness of specific incentives such as bonuses for sustainability should also be considered in future research. These recommendations are further clarified in Section 5.2.

2. Introduction

Sustainable development is one of the greatest global challenges of our time. Not surprisingly, the importance of sustainability is increasingly recognized in the area of public procurement, as can be witnessed by various EU policies such as the Europe 2020 strategy, the 2011 Commission Green paper (Edler and Uyarra, 2013, p. 224) and international policies on "green" and "social" public procurement (e.g., European Commission, 2010, 2011; Public Services and Procurement Canada, 2016; United States Environmental Protection Agency (EPA), 2017). At lower governmental levels, similar trends can be observed. For example, consider the ambition of the Flemish government to have 100% sustainable public procurement in 2020 (Department of Public Governance, 2013). This article discusses the role of public–private partnerships (PPPs) in achieving sustainability goals with a specific focus on the procurement and governance practices of PPP infrastructure projects in Flanders, Belgium.

Following the definition of Grimsey and Lewis (2004, p. 2), public–private partnerships are broadly defined as follows:

> *Public–private partnerships are arrangements whereby private parties participate in, or provide support for, the provision of infrastructure, and a PPP project results in a contract for a private entity to deliver public infrastructure-based services.*

Infrastructure in this definition is asset-based and refers to both economic infrastructure (e.g., motorways, railways and bridges) and social infrastructure (e.g., schools, social housing, hospitals and prisons) (Grimsey and Lewis, 2004, pp. 7, 21). Some typical characteristics that distinguish PPPs from traditional public procurements include the use of long-term infrastructure contracts (LTICs) (Hodge and Greve, 2007), the transfer of certain risks to the private sector, a focus on the specification of project outputs rather than project inputs, and the integration or "bundling" of different functions into a single contract such as design, construction, financing, maintenance and/or operation (EPEC, 2011; Grimsey and Lewis, 2004).

Public–private partnerships are sometimes mentioned as a potential vehicle for achieving sustainability goals (Grimsey and Lewis, 2004; Hodge et al., 2010; Lenferink et al., 2013; Yescombe, 2007). For example, the bundling of various functions into one long-term contract could make it in the interest of private partners to take life-cycle costs into account, since it provides an incentive to think, "beyond the design stage and build in energy-reducing and waste-minimizing features that may cost more initially but result later in lower operating and running costs, and so deliver cost effectiveness over time" (Grimsey and Lewis, 2004, p. 1). However, although it may create economic benefits for companies to consider some sustainability principles in projects (Gareis et al., 2011), it is not necessarily in a company's self-interest to consider all sustainability measures. Yet it is doubtful whether private partners in PPPs are sufficiently willing to address and capable of addressing such measures on a voluntary basis. We believe that, in this respect, the role of the public procurer is essential. For example, Lenferink et al. (2013, p. 624) find that public–private partnerships can help to achieve "sustainable synergies", but that "this might be obstructed in practice by detailed inflexible procurement, which limits freedom in adjusting scope". In a similar vein, Van den Hurk and Hueskes (2017) find that, in order to deliver PPP projects that go beyond mere financial added value, a strong coordinating role by the public sector client is required.

Sustainability increasingly receives attention not only in procurement and PPP literature but also in the field of project management (see e.g. Silvius et al., 2012). What remains unknown, however, is how public procurers currently deal with sustainability when procuring PPPs and how the incorporation of sustainability considerations can be stimulated. Furthermore, to our knowledge, existing studies on sustainable project management, public–private partnerships and public procurement depart from a triple bottom line approach to sustainability (Elkington, 1999), whereas we believe that elements of a "strong" sustainability perspective should also be included (Neumayer, 2003) (see also Section 3.1).

The central research questions we examine in this article are the following: (1) To what degree and in what way do governments incorporate sustainability considerations when procuring PPP infrastructure projects? (2) How can the incorporation of sustainability considerations in these PPP infrastructure projects be stimulated? It is not our objective to compare PPP infrastructure projects with the delivery of traditionally procured infrastructure projects. Our focus is rather on the governance instruments within PPPs. Our empirical research focuses on public–private partnership projects in Flanders (Belgium) and is based on an analysis of the tender documents of twenty-five PPPs and case studies of two PPP projects.

The remainder of this article is structured as follows: Section 3 explains how sustainability can be understood in the context of PPP infrastructure projects. Moreover, we identify the governance options (theoretically) available in PPPs to stimulate sustainability. Subsequently, Section 4 describes the research methods. Section 5 continues with the findings of the document analysis and the case studies, and offers recommendations for stimulating sustainability in PPPs. Finally, Section 6 discusses the conclusions and limitations of the research.

3. Conceptual framework

3.1. Understanding sustainability in the context of PPPs

3.1.1. Defining sustainability

Sustainability is often seen as a three-dimensional concept that includes a social, ecological and economic perspective (Carter, 2007). This "three-pillar" or "triple bottom line" approach is

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popular in many policies and assessment methods and mostly fits in with "technological optimism" and "trickle-down" theories. The widely disseminated triple bottom line conceptualization of sustainability originated in the wake of what is commonly known as the Brundtland Report (WCED, 1987). However, it increasingly became a contested concept that gave rise to a multitude of interpretations, ranging from the status quo to reformist and radical agendas. For example, Hopwood et al. (2005) mapped three broad views on the nature of the changes needed in society's political and economic structures and human–environment relationships to achieve sustainable development: "[The view] that it can be achieved within the present structures – status quo; that fundamental reform is necessary but without a full rupture with the existing arrangements – reform; and that as the roots of the problems are the very economic and power structures of society a radical transformation is needed" (Hopwood et al., 2005, p. 42).

A more typical debate is held on the differences between strong and weak sustainability (see Neumayer, 2003). A so-called weak-sustainability approach builds on a strong belief in technological solutions for (environmental) problems and the shortage of raw materials. It also builds on a commitment to some form of "trickle-down" thinking, according to which economic benefits provided to wealthy actors will inevitably benefit poorer members of society by improving the economy as a whole (Devolder and Block, 2015). Such thinking is often reflected in the debate on "green economy" and "ecological modernization". On the other hand, proponents of "strong sustainability" question the existing dominant structures and plea for more radical transformations. According to ecological economists, conventional economics does not adequately reflect the value of essential factors like clean air and water, species diversity, and social and generational equity (Daly and Farley, 2011). Rather than viewing the three "pillars" as three distinct but complementary dimensions of sustainable development, the "stronger" nested model presupposes that economic activities serve a socially just society and that both can exist only within the limits and carrying capacity of natural systems.

Ongoing debates about the definition of *sustainability* show that the exact meaning of the concept remains ambiguous. This "constructive ambiguity" (Robinson, 2004) makes the concept of sustainability flexible, as it can be translated in a range of actions adapted to the needs and possibilities of a diverse set of stakeholders. However, although constructive ambiguity is useful for gaining broad support, it entails the risk that the concept becomes meaningless. If sustainability is to move beyond the gap between rhetoric and action, it should become a decision-guiding strategy, defined as a way forward to a desired future (Hugé et al., 2013).

3.1.2. Framework for assessing sustainability in infrastructure projects

If commitments to sustainability are to be turned into action, measurement issues must first be tackled. Making an absolute assessment of sustainability is difficult, if not impossible; therefore, sustainability indicators are essential for setting targets, monitoring progress and determining relative performance (Hueskes, 2013; OECD, 2004, 2008). For the past few decades, various efforts have been made to develop indicator sets (see also Labuschagne and Brent, 2005). Examples of generic frameworks to incorporate sustainability in project management include the sustainable-footprint methodology of Oehlmann (2010) and an assessment instrument by Martens and Carvalho (2016).

In our research, we chose to treat the discussion framework of Devolder and Block (2015) as a starting point for measuring levels of sustainability. This framework not only improves the debate on ecological challenges (e.g., closed loops, ecological footprint, nature, heath and quality of life) and social concerns (e.g., social justice, emancipation, community, participation and co-production); it also focuses on the transformative character of projects. In this way, it attempts to address some of the criticisms of the "weak sustainability" approach. The authors encourage thinking about radical changes in the structure (e.g., institutional or economic), culture (e.g., values or paradigms) and practices (e.g., routines or behaviour) of urban systems. In addition, their element concerning "cross-contamination" makes users of this learning tool think systematically about possible interactions beyond the initial scope of an urban project. For a broad literature overview that is related to all of these aspects of sustainability, we refer to the original article by Devolder and Block (2015).

The original discussion framework by Devolder and Block was developed for urban development projects. However, the empirical focus of our research is instead on economic and social infrastructure projects. For the purpose of our study, we therefore merged some of the 15 elements of the initial discussion framework, and we refined others in subcategories that are applicable to infrastructure and construction projects (see Table 1). This analytical exercise is not only based on academic literature but also on other relevant reports and instruments, including an assessment tool for sustainable buildings from the Flemish government (LNE, 2012). The sustainability framework we developed includes 54 sustainability indicators that are divided into the following six main categories: "environment and natural resources", "liveability", "health and comfort", "social justice", "community and participation" and "others". Each of the main categories is divided into subcategories (second level); which are again divided into further subcategories (third level). To give an overview, Table 1 provides the first and second level categories with examples of indicators at the third level.

The sustainability framework we developed goes beyond the "classical" trichotomy of social, ecological and economic indicators and includes indicators that refer to transformative change and a political-institutional dimension. In this way, we respond to justified criticism concerning the three-pillar model. For example, Kemp et al. (2005) argue that the interlinkages and dynamics between social, environmental and economic perspectives are missed by simply adding up indicators from the three dimensions. Similarly, Devolder and Block (2015) emphasize the importance of synergies between the dimensions: environmental aspects cannot be seen separate from social justice aspects, for example, but for sustainable development to be realized, one must account for both dimensions. Moreover, transitions towards sustainability require the adoption of a long-term, systemic perspective

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Table 1
Sustainability framework with sustainability criteria and indicators used in document analysis.

Main category *(first level)*	Sub-criteria *(second level)*	Examples of indicators *(third level)*
Environment & natural resources	Energy	E.g., reference to renewable energy
	Water	E.g., reference to limited water usage
	Materials & design	E.g., reference to environmental friendly materials; Life Cycle Costing; contextual fit in environment; multifunctional design; local products
	Biodiversity & land use	E.g., reference to protection of species; efficient land use
	Clean air	E.g., reference to reducing CO2 emissions
Liveability	Public facilities	E.g., reference to facilities for the community; sustainable public transportation
	Security	E.g., reference to security of object / environment; road safety; quality of public space
Health & comfort	Indoor climate & comfort	E.g., reference to indoor air quality; lack of harmful substances; thermal comfort
	Acoustics, noise & vibration	E.g., reference to measures reducing noise disturbance
	Healthy lifestyle	E.g., reference the encouragement of a healthy lifestyle
Social justice	Emancipation & equality	E.g., reference to accessibility for people who experience disabilities; affordability; promoting diversity
	Public meeting	E.g., reference to measures that stimulate social cohesion
	Labour and human rights	E.g., reference to social security and labour rights; non-discrimination; local employment
Community & participation	Local and societal needs	E.g., reference to demands of local community; fair distribution costs and benefits
	Involvement in decision-making	E.g., reference to citizen and stakeholder involvement in decision-making; participation and co-creation
Others	Transformative change	E.g., reference to systemic change
	Sustainability in general	Reference to the concept of "sustainability" without further explanation of the exact meaning
	Other sustainability indicators	Remaining category reserved in case sustainability aspect found does not fit into any of the other criteria

(Rotmans and Loorbach, 2010). Those are valid concerns that must be taken into account when empirically assessing sustainability in PPP projects.

3.2. Governance instruments in PPPs to stimulate sustainability

A widely accepted insight from the sustainability literature holds that sustainable development and radical transformations benefit from a governance approach (Grin et al., 2010). Or as Kemp et al. (2005, p. 18: 18) argue, "better governance is a prerequisite for […] steps towards sustainability". The relevant question for public–private partnerships then becomes which governance instruments can be used to induce sustainability. Decision-making on sustainability issues is increasingly the outcome of a process that proceeds via mixed networks of public and private actors, and less often a process within the context of formal, institutional and bureaucratic government frameworks at just one policy level (e.g., Block et al., 2013; Grin et al., 2010; Klijn, 2008). In particular, one can recognize complex settings in urban development projects in which local politicians, top-level civil servants, autonomous public agencies, supra-local governments, investment companies and so on are more or less intertwined within hybrid and autonomous coalitions (Block and Paredis, 2013). This complex interplay between public and private actors is also a key characteristic of PPP projects.

Specific governance instruments and incentives can be implemented within PPP projects that might stimulate sustainability. In PPPs, the private partner is typically responsible for the design and delivery of infrastructure projects. Consequently, if the procuring government aims to contribute to sustainability, it will need to try to influence or facilitate sustainable behaviour on the part of the private parties that are participating in the bid (concerning both potential candidates and the final contractual partner). In this regard, it is important to look at the "control mechanisms" at hand: i.e., the mechanisms and instruments used by the government to consciously influence the decisions and the behaviour of other public and private actors in the PPP to achieve the goals of the government (adapted from Verhoest et al., 2004; Verhoest et al., 2013).

There are many different ways to govern PPPs. Public procurers can use both formal and informal governance instruments. Formal governance instruments involve top-down command and control mechanisms and instruments regarding competition, outputs and transactions. The literature on contractual governance is particularly relevant here (see e.g. Poppo and Zenger, 2002; Zheng et al., 2008). Examples of possible formal governance instruments deployed in PPPs include a procuring government that unilaterally prescribes very detailed rules and procedures; a detailed reference design or rigid tender specifications; and a procurer that incentivizes private consortia via risk transfer, functional output specifications, performance monitoring and performance-based rewards and sanctions (Verhoest et al., 2013). In the latter examples, thinking in terms of getting the right incentive structure is dominant, or as Grimsey and Lewis (2004, p. 247: 247) observe, "it all revolves around incentives". In addition to formal governance instruments, informal instruments may also be deployed in PPPs. *Informal governance instruments* refers to network governance instruments or relational governance. Network literature emphasizes interdependent relationships, trust, loyalty and reciprocity (Kickert et al., 1997). The level of mutual trust, joint decision-

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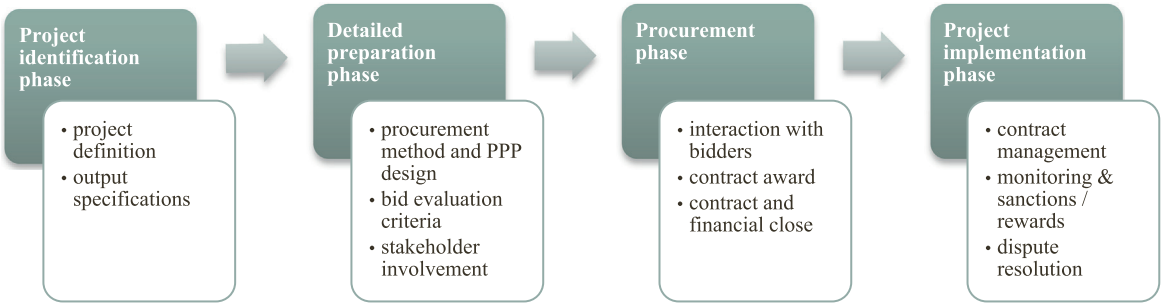

Fig. 1. Phases of PPP life cycle in which governance instruments may be deployed to stimulate sustainability.
Source: Adapted from "The Guide to Guidance: How to Prepare, Procure and Deliver PPP Projects". (EPEC, 2011).

making and process management are seen as factors that influence the performance of PPPs (Edelenbos and Klijn, 2009; Edelenbos and Teisman, 2008; Koppenjan, 2005; Verhoest et al., 2013). Informal governance instruments in PPP projects might be deployed in the interaction with bidders and in (relational) contract management. Formal and informal governance instruments might reinforce each other in achieving sustainability goals.

The model below (Fig. 1) depicts a non-exhaustive overview of the phases of the PPP life cycle in which governance instruments can be deployed (European PPP Expertise Centre [EPEC], 2011). The model distinguishes between several PPP project phases: "project identification", "detailed preparation", "procurement" and "project implementation". The model also sets out the main activities that take place in each of these phases. This model is useful, since for each of these activities, governance instruments are used and decisions are made that may also have an impact on the level of sustainability. For more information on the model developed by EPEC and the PPP project life cycle, see Carbonara et al. (2015). We will use the model depicted in Fig. 1 to guide the empirical research. For each of the relevant phases we will examine how sustainability considerations are currently taken into account by public procurers and what governance instruments are at hand to stimulate private sector behaviour towards sustainability.

4. Methods

The previous section describes the sustainability framework we used in the document analysis to score sustainability indicators in the selected PPP projects. In addition to the sustainability framework, we develop a second analytical framework that focuses on the formulation, weighting and monitoring of sustainability criteria in the bidding documents. If a sustainability indicator was found in the selection criteria, bid evaluation criteria or output specifications, we used the second framework to analyse the measurability and enforceability of the indicators formulated. These aspects are also important, because the mere mentioning of a sustainability aspect does not necessarily imply that the private partner responsible for delivering the PPP project will act upon the demands of the procuring government. Sustainability criteria have a higher incentivizing value when they are given a substantial weight in the award criteria or when the output specifications are formulated such that performance can be evaluated, monitored and/or enforced.

The tender documents of 25 PPP projects in Flanders (the northern region of the federal state Belgium) were analysed for this project. These projects constitute the whole population of PPP projects that have been initiated by the Flemish government. Where possible, we looked at the selection criteria, the award criteria and the output specifications.[1] The PPP projects are situated in various sectors and include both economic and social infrastructure projects such as highways, tram lines, sports facilities, youth hostels, social housing and schools.

Two single cases were studied in the second phase of our research. We selected one economic and one social infrastructure project that achieved, according to the outcomes of our document analysis, the highest scores on the incorporation of sustainability considerations. Selection of both a social infrastructure project (a youth hostel) and an economic infrastructure project (a highway) allowed us to examine the same phenomenon—i.e., the governance of PPP by public procurers in a way that it stimulates the incorporation of sustainability in these infrastructure projects—in very different contexts. By doing this, we were able to grasp the broad variety of governance strategies that are applied to stimulate sustainability in these two different contexts (social infrastructure projects and economic infrastructure projects).

The first case selected is a design-build-finance-maintain (DBFM) project called "Youth Hostel Brasschaat". Toerisme Vlaanderen, a Flemish governmental organization for tourism, initiated and managed several projects to build youth hostels. In the Brasschaat case, the local government of the city of Brasschaat acted as the procuring government and Toerisme Vlaanderen acted as the contractual partner. In the youth-hostel project, attention is explicitly devoted to energy-efficiency measures and to accessibility for disabled people. The second case is the highway project: "A11". This project has been procured by PMV: an independent investment firm owned by the government of Flanders. A11 is a large and complex project that involves the construction of a new, 12 km-long motorway link. The highway has been under construction since 2013 and

[1] Due to, amongst others, confidentiality issues it was not possible to obtain all tender documents, but with 19 times the selection criteria, 24 times the award criteria and 21 times the output specifications we were able to analyse a large share of the existing tender documents.

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is planned to become operational in 2017. With regard to sustainability, one of the main features of this project is the integrated design of the highway with a high contextual fit in the surrounding landscape. Moreover, ecological-sustainability measures have been taken such as the construction of wildlife passages and new ecological habitats (Van den Hurk and Hueskes, 2017).

Empirical evidence for the two cases has mainly been collected through extensive document analysis and by conducting interviews with key actors in the projects. The two cases have been studied as single cases, but we asked for comparison with other projects and for reflection on the findings of the extensive document analysis during the interviews. In total, we conducted six semi-structured, face-to-face interviews with key-actors who played a crucial role in the projects. These include project and contract managers within the public procuring authority and the private consortium (see Appendix 1 for the list of interview respondents). Five out of six respondents were involved in both the procurement and project implementation phase, and this fact allowed us to get a comprehensive overview of the complete governance process. The interviews were recorded, transcribed and then coded and analysed using NVivo.

It is important to stress that we did not predefine dependent or independent variables. Nor did we test clear hypotheses. Rather, we aimed to produce a thorough understanding of the social context of a particular phenomenon (Gerring, 2009): in this case, the extent to which and way in which governments incorporate sustainability considerations when procuring PPP infrastructure projects. As Fisher (2003) argues, "the key to explaining how (policy) change comes about has to be grounded in a detailed contextual examination of the circumstances at play in specific cases". Such detailed, contextualized knowledge should allow us to formulate tentative insights that are probably transferable to other cases, including cases outside the Flemish context.

5. The incorporation of sustainability considerations in Flemish PPP projects

This section presents the findings of the research. Section 5.1 answers the first research question ("To what degree and in what way do governments incorporate sustainability considerations when procuring infrastructure PPP projects?"). Here we discuss the results of the document analysis of the tendering documents and the findings of the case studies. Section 5.1 is structured according to the relevant steps of the project life cycle presented in Section 2 (Fig. 1). Subsequently, Section 5.2 considers the governance options at hand in PPPs and offers recommendations for the incorporation of sustainability considerations. This section addresses the second research question ("How can the incorporation of sustainability considerations in these PPP infrastructure projects be stimulated?").

5.1. Current consideration of sustainability in PPP projects

5.1.1. Project definition

Nearly all respondents indicated that extensive preparation was a key factor in getting sustainable initiatives off the ground within their PPP projects. Preparation is a broad notion, but it is essentially about whether the public procurer knows what he or she wants and can ask for regarding sustainability. In the preparatory stage the procurer must state his own wishes and priorities with regard to sustainability (ambitions and goals), determine what other stakeholders demand (coordination and coproduction), identify which sustainability solutions are currently available against what price (market knowledge) and decide how to best ask for sustainability in the procurement (incentives in the output specifications, award criteria and bidding procedures).

Sustainability considerations could play a significant role in all PPP phases. Even before the final decision is made to initiate an infrastructure project and procure it via PPP, important choices will be made that affect sustainability. Consider, for example, the question whether it is desirable and necessary to build new infrastructure at all. Desirable and necessary to whom? What is the sustainability impact of alternative solutions, such as renovation of infrastructure? And what is the sustainability impact of the chosen location or trajectory of the planned PPP project? If the procuring authority decides to pursue the infrastructure PPP project, such sustainability questions typically have been dealt with and the choices are specified in the project definition.

In addition, it is possible to bring sustainability considerations into the project definition at a more general level—for example, by mentioning the importance of both social and environmental sustainability aspects. In the cases under study, several respondents emphasized the relevance of formulating sustainability ambitions at a high level of abstraction, as these ambitions can form a starting point both for drafting the output specifications and for award criteria.

5.1.2. Stakeholder involvement

Another element of the detailed preparation phase is stakeholder involvement. First of all, public procurers must consult other public actors to adjust and fine-tune plans and regulations with other governments or public organizations. Moreover, in the cases under study, we saw examples of how public procurers interact with private parties during the preparatory phase: e.g., via consultations or by canvassing the market (Respondents R3, R4, R6). Finally, stakeholder involvement in itself is a dimension of sustainability that can be addressed by involving citizens and users in the development of the infrastructural project. However, based on the document analysis, it was not possible to assess to what extent and in which way stakeholders were involved in the preparations.

5.1.3. Procurement method and PPP design

The chosen procurement method and PPP design might also affect the realization of sustainability goals. For example, in some procurement methods there is more space for interaction with bidders than in others, and this could influence sustainability results. The two projects selected for the case study both worked with a "restricted procedure" to procure PPPs, as did most of the other PPP projects studied in the document analysis. Consequently, we were not able to systematically compare the relative advantages and disadvantages of different types of procurement

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procedures. In this regard, it might be interesting to look at a procurement procedure called "competitive dialogue", as within this procedure there is more interaction with bidders than there is in the restricted procurement procedure.

In addition, the exact form or design of the public–private partnership matters. Public–private partnerships can be structured through several contract variants of design, build, finance, operate, maintain (DBFOM) such as DBF, DBM and DBFM. The contract type chosen is likely to influence sustainability outcomes, as each PPP form provides a different incentive structure. One of the respondents (Respondent R4) argued that he considered only the fully integrated DBFOM type to be true PPP and that only this type provides all incentives for "life-cycle costing" – which is one of the reasons that public–private partnerships associated with sustainability, as was stated in the introduction. On the other hand, other interviewees suggested that all PPP forms have sustainability advantages in comparison to traditional procurement in which the project phases are separated instead of integrated. Due to the limited scale of this study, and because it analysed predominantly DBFM-type PPPs, we were not fully able to scrutinize these opposing views.

5.1.4. Selection criteria

In the Flemish projects analysed, the procurement process was organized in two (or three) selection stages. In the first round a pre-qualification questionnaire (PQQ) was used to evaluate the technical knowledge, experience and financial standing of potential bidders. The bidders who pass the exclusion and selection criteria formulated in the PQQ proceed to the next stage of the bidding procedure. In the exclusion criteria, some elements that relate to sustainability can be found, such as exclusion of companies that have breached environmental law. In addition, selection criteria that relate to the technical and financial capacity of companies may have an impact on sustainability. It is, under certain conditions, legally possible to set requirements regarding past experience with sustainable considerations (European Commission, 2011), but we did not encounter such requirements in the Flemish PPP projects we analysed. A general sustainability concern might be that—due to high selection criteria regarding technical and financial capacity—too many companies will be excluded, which might undermine competition and in particular the position of small and medium-sized enterprises (SMEs) (European Commission, 2010). This, in turn, might also diminish the degree of innovative sustainability solutions. However, whether this concern is valid cannot be determined from this document analysis and case study and should therefore be a subject for further research.

5.1.5. Output specifications

The output specifications form a dense set of service requirements that, in the projects under study, are usually listed in a document of fifty to one-hundred pages. The idea behind *output* specifications is that the requirements are defined on the basis of results and performance (outputs) rather than means (inputs). This manner of stating the requirements gives bidders the freedom to design their own (sustainability) solutions.

In order to examine how sustainability is currently included in the output specifications, the output specification documents have been screened for the presence of sustainability indicators. The results of the document analysis show that that there are large differences between the PPP projects in the number of sustainability indicators found. On average, 16 sustainability indicators per project were found in the output specifications. In some output specifications, reference to sustainability indicators is made more than 40 times, whereas in others barely any reference to sustainability aspects are made. Fig. 2 shows, per main sustainability category, the percentage of projects in which at least one sustainability indicator was found in the output specifications.

Whereas Fig. 2 shows the number of projects with at least one indicator, it is equally important to know how many sustainability indicators are found per main sustainability category. The division of the main sustainability categories (and subcategories) formulated for this research helps us to analyse which kind of sustainability measures receive the most attention. Fig. 3 shows the average number of sustainability indicators scored per project in both the output specifications and the award criteria.

It is clear from Fig. 3 that the average score in some of the sustainability criteria is much higher than in others. On average, 7.2 indicators—47 % of the sustainability indicators found in total—can be positioned in the main category "environment and natural resources". Note that this main category encompasses only ecological indicators. Looking at the second-level subcategories within this main category (see Section 2, Table 1), most of the indicators can be placed in the categories "energy" (49%), "materials" (31%) and "water" (10%). Other second-level sub-criteria distinguished within the main criterion, "environment and natural resources", are "clean air" and "biodiversity and land use". Within these subcategories, however, hardly any sustainability criteria were found. This suggests that ecological sustainability, as encountered in the output specifications of the Flemish PPP projects, is mainly about saving energy, materials and water.

Going back to the other main sustainability categories, we also observe that a considerable number of indicators in the output specifications have been scored at the categories of "liveability" (20%), "health and comfort" (14%) and "social justice" (14%). Within the main category "liveability", a few indicators were found around "public facilities" and "security". Within the category "health and comfort" primarily sustainability indicators were found that can be placed in the subcategories "indoor climate and comfort" and "acoustics, noise and vibration", and almost no indicators related to a "healthy lifestyle". Within the "social justice" category, a large percentage of the sustainability indicators (91%) were scored around whether buildings or facilities are accessible for the disabled (sub-criterion "emancipation and equality". Aspects that were mostly neglected within the social-justice category include social criteria such as "affordability", "avoiding discrimination" and "stimulating social cohesion".

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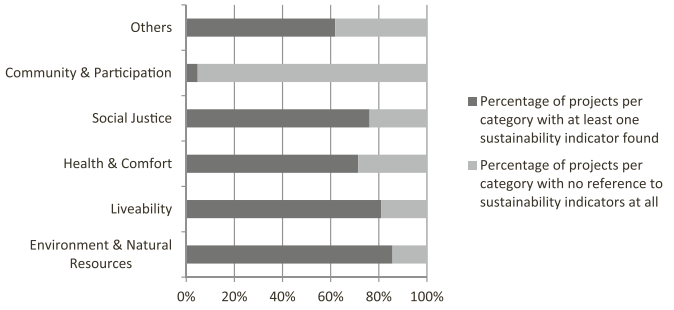

Fig. 2. Percentage of projects per main sustainability category in which at least one sustainability indicator was found in the output specifications.

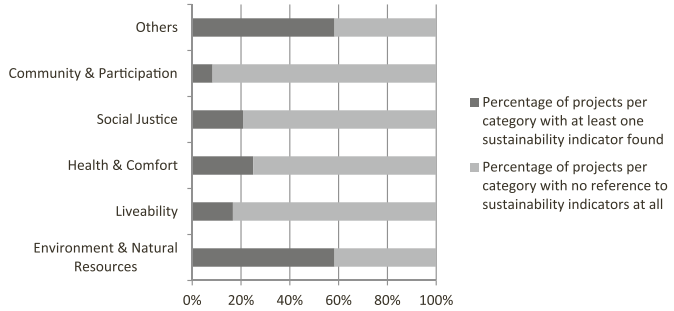

Fig. 4. Percentage of projects per main sustainability category in which at least one sustainability indicator was found in the award criteria.

Another typical "social" main category is "community and participation", but a sustainability criterion was found that touched upon this theme only in one project. We believe that this can be explained by the fact that participation is not usually covered in the output specifications because it is also part of the detailed preparation phase of PPP projects. To finish, 0.5% of the sustainability indicators in the output specifications have been scored under the category "others". Output specifications in the "others" category are typically very general (referring to mere sustainability without further explanation), and they therefore could not be placed in one of the specific sustainability main categories. In the "others" category, no output specifications were found that refer to transformative or systemic change, which is yet another important aspect of "strong" sustainability (Devolder and Block, 2015).

5.1.6. Award criteria

In the second stage of the procurement procedure, selected bidders can submit a tender to be evaluated based on predetermined award criteria (also called bid evaluation criteria). Whereas the output specifications should set the minimum sustainability requirements, the award criteria can express preferences with regard to sustainability. As with the output specifications, the award criteria have been screened for the presence of sustainability indicators. Remarkably, in one-fourth of the award criteria analysed, no reference was made to sustainability criteria at all. Fig. 4 shows, per main sustainability category, the percentage of projects in which at least one sustainability indicator was found in the award criteria.

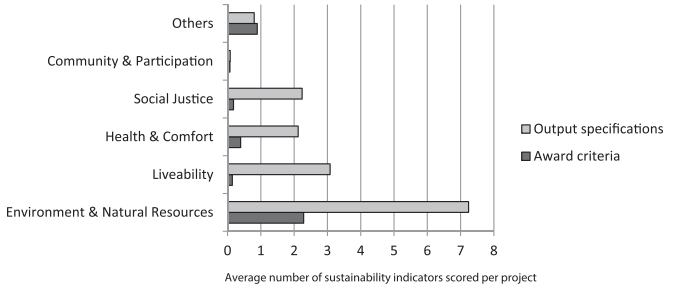

Fig. 3. Average number of sustainability indicators per project across main sustainability categories found in both the output specifications and award criteria.

The distribution of the main sustainability categories in the award criteria exhibits many similarities with the distribution in the output specifications (see Fig. 3 again), and it will therefore not be discussed in-depth. Again, ecological sustainability indicators take in a central place. Note that, for the award criteria, the main sustainability category, "others", is relatively large. This can be explained by the large number of "vaguely" formulated award criteria that mention "sustainability" in general but do not specify exactly what kind of sustainability is meant. In some projects, this was solved by referring to an external document (e.g., a sustainability report).

Besides the number of sustainability indicators, another important aspect in the award criteria is the weighting given to sustainability aspects, since this determines the influence sustainability has in the final evaluation of tenders. Fig. 5 shows the weighting of sustainability aspects in the final evaluation of the award criteria. The percentages are an estimation, because it was not always possible to determine the exact weighting, as sometimes sustainability aspects were included in one award criterion together with, for example, architecture, functionality or quality aspects. In only 1 out of the 24 award criteria analysed, sustainability had a weighting of approximately 15 to 20% — a percentage we considered substantial. An additional 4 of 24 PPP projects gave a weighting of 10 to 15% to sustainability aspects. However, in the majority of the projects analysed, the weighting given to sustainability was low (5 to 10%) or even very low (0 to 5%). From this we can conclude that the influence of sustainability criteria in the final evaluation of bids is small.

Are low weightings attributed to sustainability problematic? Based on the findings of the case studies we believe that for procurers with high sustainability ambitions it is a missed opportunity when sustainability considerations are not included in the award criteria and attributed a substantial weighting. Several respondents indicated that the private parties participating in the bid strongly reacted on the incentives provided in the award criteria (Respondents R1, R3, R5). Hence, without sufficient "points" to gain in the award criteria, the bidders would not be motivated to take sustainability measures.

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5.1.7. Formulation of output specifications

Another important aspect we analysed extensively is how output specifications that include sustainability indicators are formulated. An output specification loses its incentivising value when it is not possible to determine whether it is fulfilled or when the specification cannot be enforced. Therefore, we looked at the measurability and enforceability of sustainability output specifications. Measurability was assessed by analysing whether a specific indicator and norm are present in the output specification. One out of five sustainability specifications did not have a measurable indicator. For example, some specifications just state that something should be "sustainable", without specifying what is meant by that. In addition, one out of four sustainability specifications did not include a clear norm that makes it possible to review when exactly (and at what value) the specification was fulfilled. For example, in many sustainability specifications, words like "sufficient", "high", "low" and "regularly" were used without a clarification of when these levels are fulfilled. This shows that many of the current sustainability output specifications are not adequately measurable.

Furthermore, we checked to see if an output specification was really about reaching the results (outputs) agreed upon, or if it was formulated more like an "effort commitment". Effort commitments are not enforceable, because whether the private party has put "enough effort" into reaching the specification cannot be objectified. Examples of such "effort" formulations include phrases such as the following: "should be taken into account", "is preferred", or "should be pursued". Based on the document analysis, we find that one in ten sustainability output specifications is formulated based on "efforts" and is thus not enforceable.

To sum up, the analysis of how sustainability specifications are formulated shows that, in many instances, these output specifications are neither measurable nor enforceable. This is problematic from a contractual perspective on PPPs, since it means that there are no guarantees that intended sustainable measures will be implemented.

5.2. Governing PPPs for sustainability

As the previous section shows, the document analysis of output specifications and bid-evaluation criteria of Flemish PPP projects shows that the attention currently devoted to sustainability in tender documents is limited. Best practices found in the two selected cases can provide us with governance options to stimulate the incorporation of sustainability considerations in public–private partnerships.

First of all, the output specifications provide opportunities to include sustainability considerations. Although this opportunity was not always fully taken in the projects we investigated, we encountered several examples of how public procurers used the output specifications to prescribe sustainability measures or to set norms regarding sustainability. However, one specific problem encountered is that a considerable portion of the sustainability specifications cannot be measured or enforced. Interviewees confirm the difficulties experienced in formulating sustainability output specifications in a measurable way. The socially oriented specifications are especially difficult, as these often involve qualitative rather than quantitative indicators. In the A11 highway project, the procurement team looked for best practices abroad. They visited a Dutch infrastructure-procurement organization that had used a "sustainability instrument": i.e., an assessment method regarding sustainability impact (Respondent R3). Although that sustainability instrument offered some useful inspiration, the Belgian procurement team in the A11 project still felt that the instrument was useful only for those sustainability criteria that are easy and objectively measurable – mostly criteria related to material use and energy. The sustainability instrument included hardly any "qualitative" criteria (Respondent R2). This case example illustrates the broader and perhaps inherent tension between the criteria that output specifications should meet (formulated as objectively measurable) and the more qualitative character of many of the social-sustainability norms.

The reasons for not including social sustainability aspects in the award criteria seem to be similar to the reasons given with respect to output specifications. For instance, one of the public procurers interviewed stated that he wanted to include more qualitative sustainability criteria but that the lawyers working on the project were hesitant about his suggestion because it would become too difficult to compare tenders objectively and because this might lead to lawsuits filed by losing consortia (Respondent R3). In some of the cases, measurability was solved by referring to "sustainability instruments" or standards set by external parties or organizations. However, although this

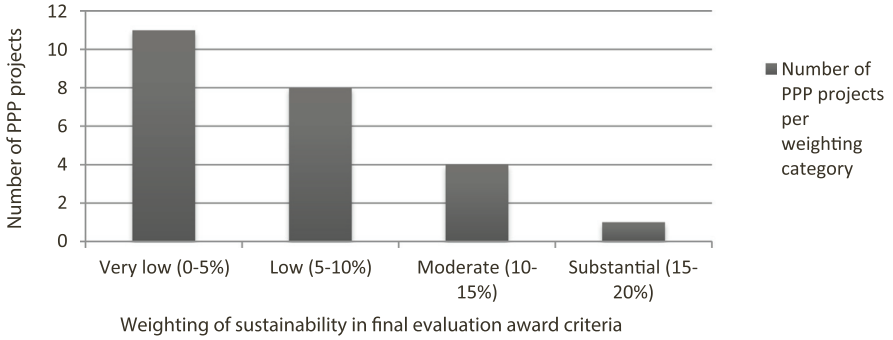

Fig. 5. Weighting of sustainability in Flemish PPP projects in final evaluation of award criteria.

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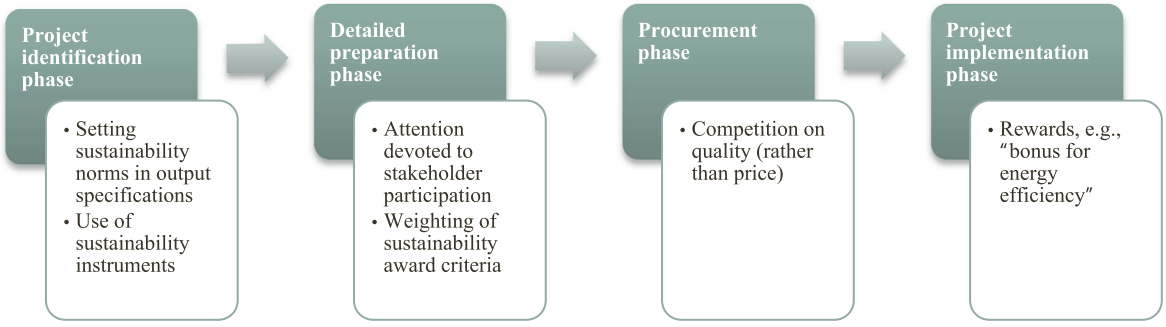

Fig. 6. Areas in which governance instruments may be deployed to stimulate sustainability per PPP phase.

might be a good initiative, these instruments may still have limitations regarding the measurability of the sustainability indicators included in the documents, especially the social ones.

Another important finding that derives from the document analysis of Flemish PPP projects is that the weighting given to sustainability aspects in the award is generally low. A straightforward governance option would be to award more points to sustainability criteria in the bid evaluation. However, a problem encountered in some of the projects is that sometimes bidders strategically choose not to apply sustainability measures in their tender because they feel that they have a higher chance to win the bid by setting a very competitive price than by gaining a few extra points with the sustainability criterion (Respondent R6). An interesting practice we found for dealing with this issue is to set a minimum score for each of the individual award criteria. If a minimum score for a sustainability award criterion is required, the bidders have to do *something* with that criterion even though it may have a low weighting in the final evaluation of the award criteria.

Related to the previous governance option, a more general strategy is to focus the procurement on quality aspects rather than price. An interesting practice we find involves working with a ceiling price. The two cases selected both worked with a ceiling price, but in a different way. In the youth hostel, the ceiling price was set as a target price. Therefore, there was less competition on price and more competition on the quality of the tenders. The public and private actors involved experienced this positively, since there was more emphasis on aspects other than price, such as sustainability (Respondents R4, R5). In the A11 highway, the ceiling price set was not based on a realistic estimate of the costs but functioned as an absolute upper limit of what the public procurer could spend. In this case, the final bids of the candidates were far below the ceiling price. Therefore, there was just as much competition on price as in "regular" procurement procedures (without a ceiling price) (Respondent R1). The differences in the approaches between the two cases point towards the possible relevance of working with a fixed price as a governance instrument (in order to let bidders compete on quality elements such as sustainability).

A final governance instrument we encountered in the A11 case involves working with a "bonus for energy efficiency" (Respondent R2). This is a specific reward measure that provides an incentive for bidders to apply additional energy-efficiency measures. In general, rewards in the contract might create interesting opportunities to stimulate sustainability. The figure below (Fig. 6) provides an overview of the governance instruments we encountered that might help to stimulate the incorporation of sustainability considerations.

6. Discussion and conclusions

This article considers to what degree and in what way Flemish public procurers currently take sustainability considerations into account and how the incorporation of sustainability considerations in PPP infrastructure projects can be stimulated. The document analysis shows that, in the procurement of Flemish PPP projects, sustainability considerations play only a small role. Although there are differences between the projects, the attention paid to sustainability in the output specifications and award criteria is generally limited in terms of the number of sustainability criteria referred to, in the way in which these are formulated and in the weighting and influence sustainability criteria have in the final bid evaluation. If sustainability considerations are taken into account, this is mostly from an environmental perspective that largely neglects the social dimensions of sustainability. The public procurers who wanted to include more sustainability criteria explained the difficulties they experienced in incorporating them, especially with regard to the measurability and enforceability of social sustainability norms. These insights are relevant to project management and confirm the suggestion for future research by provided Labuschagne and Brent (2005), which is to identify measurable indicators for sustainability evaluation criteria.

The previous section discusses several governance instruments that might make it possible to give more consideration to sustainability. These recommendations should be of value to practitioners who wish to procure sustainable PPP projects. However, even when these governance instruments are successfully implemented, the emphasis within PPPs on measurability remains problematic and might result in a so-called "weak" conceptualization of sustainability. We believe that a "strong" sustainability perspective is inherently incompatible with the contractual PPP project structure, which requires those measurable and enforceable performance indicators. Many of the social indicators and indicators regarding transformative change are difficult to formulate in a measurable way. Moreover, the actors involved in PPP infrastructure projects

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are accustomed to the current contractual structure and routines, and it is difficult to change these existing structures and patterns from the inside. In sum, PPPs can be beneficial structures for including weak conceptualizations of sustainability, but they are far less suitable for incorporating a strong conceptualization of sustainability.

The findings of this study are subject to at least three limitations. First of all, the scope of this study is limited by its public-sector perspective. The document analysis focuses on the way in which sustainability considerations are incorporated by public procurers, especially in tender documents. However, this is not necessarily equal to the extent to which private companies apply these sustainability considerations to the infrastructure projects in practice. A private partner might do more than envisioned by the client, but they might also do less – especially when sustainability criteria are not formulated in an enforceable way. Second, some limitations must be acknowledged with regard to the research methods. The follow-up case studies include a limited number of interview respondents. Future studies on the current topic are therefore recommended. In addition, the generalisability of the findings is subject to certain limitations because data was collected only in Flanders. The structuring of Flemish PPP projects is inspired by international PPP practices, such as the UK Private Finance Initiative. Further research should determine whether other Western countries have similar experiences with regard to the incorporation of sustainability considerations.

Conflict of interest

There is no conflict of interest.

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Appendix 1. List of interview respondents.

Respondent	Date	Affiliation of respondent	Case
R1	29 October, 2014	Architecture firm	A11 Bruges
R2	4 November, 2014	Public sector, regional level	A11 Bruges
R3	5 November, 2014	Consultancy firm	A11 Bruges
R4	15 October, 2014	Public sector, local level	Youth Hostel Brasschaat
R5	21 October, 2014	Construction firm	Youth Hostel Brasschaat
R6	23 October, 2014	Public sector, regional level	Youth Hostel Brasschaat

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