

Green Public Procurement as environmental policy tool: A theoretical framework

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Executive summary

Although Green Public Procurement (GPP) is considered a promising instrument towards sustainable development and its governance, many countries face obstacles in implementing such a policy instrument. This paper uses the Socio-Technical Systems approach by Geels (2004) to present a model explaining which elements contribute to the successful implementation of GPP in the context of Europe.

1. Introduction:

Green Public Procurement (GPP) is considered a promising policy instrument to reduce the harmful impact that governments, businesses, and citizens have on the environment. GPP can be defined as *“a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured”* (European Commission, 2008a).

GPP is considered a promising path towards sustainability for several reasons: In the *EU*, the *public* purchase of goods and services has been estimated to be worth 16% of *GDP* (Testa et al., 2012). Governments spend this amount of taxpayers' money on e.g. office buildings, equipment and maintenance, and services related to transport and catering. Considering that the government determines considerable part of the total demand of products and goods in an economy, a switch to GPP can incentivise markets to move more towards environmentally sustainable products and technologies (Renda et al., 2012). This GPP firstly can stimulate eco-innovation, the development of new resource and/or energy efficient technologies which enhance environmental performance (Carrillo-Hermosilla, 2009). Profitability or feasibility of delivering environmentally sound solutions could be challenged had there not been a considerable demand for these products and services. Secondly, GPP directly reduces damage to the environment. To illustrate; the emission of CO₂ would decrease by 830 thousand ton if all European governments would use energy-efficient computers (Testa et al., 2012). A third reason that GPP is considered an effective environmental and economic policy instrument is that with their environmentally sustainable purchasing behaviour, governments can set an example to the private sector in terms of green supply chain management and prove the effectiveness and feasibility of green procurement (European Commission, 2016f). For the above-mentioned reasons, the importance of GPP is highlighted in the Europe 2020 strategy, which frames the wider endeavour towards more efficient use of resources in Europe (Renda et al., 2012). In the scope of this ambitious growth strategy, the European Commission formulated the goal of making half of all European public tenders green by 2020 (Testa et al., 2012). Although GPP is considered an effective policy instrument in reducing environmental harm, many countries still face certain obstacles in implementing such a policy (Renda et al. 2012). Key difficulties are insufficient political

support, perceptions that GPP is expensive, low levels of expertise and training on GPP, lacking practical instruments and insufficient intergovernmental cooperation (Bouwer et al., 2006). Consequently, twelve countries indicated in the same survey that GPP criteria were included in less than 20% of the most recent contracts.

The difficulties with GPP implementation and the low uptake of GPP renders research on successful GPP implementation highly relevant in the endeavour increasing GPP and hence protecting the environment. Therefore, this paper elaborates on the different aspects that contribute to a successful implementation of GPP using Socio-Technical System approach by Geels (2004). The rest of this study is structured as follows. Section 2 of the paper elaborates on the Socio-Technical Systems Theory by Geels (2004), which explains which is then used in section 3 to create a model explaining the factors that contribute to successful implementation of Green Public Procurement.

2. Green public procurement and systems of innovation

Green procurement requires the development, sale, and purchase of new products with a lower environmental impact than existing ones. In short, it requires innovation (Kline & Rosenberg, 1986). Since GPP is about promoting a specific type of innovation, insights from the field of innovation are helpful in understanding its drivers. Therefore, the Socio-Technical Systems approach can be used as a framework to understand the drivers of GPP (Geels, 2004). This model describes the process of innovation, and the different factors influencing it. Geels (2004) describes Socio-Technical systems (ST-systems) as the relations between those aspects which are required for complete societal functions, such as transport, communication, and nutrition.

ST-systems can be divided into the production, distribution, and utilization of technology, referred to as sub functions (Geels, 2004). Several aspects contribute to fulfilling these sub functions. Firstly, resources such as labour, capital and knowledge contribute to the realization of the sub functions (Geels, 2004). Secondly, human agents acting as part of social groups, contribute to the working of ST-systems. For example, the demand of consumers shapes the sub-function production. Thirdly, the sub functions are embedded in rules (Geels, 2004). Three different rules can be distinguished. Firstly, regulative rules are those implemented through the government, and are meant to regulate the conduct of actors. These rules are enforced by means of penalties. Secondly, normative rules refer to the expectations and norms that prevail in society. Thirdly, cognitive rules are those which determine the way in which people make sense of the world around them. To

illustrate, producers might not develop green products simply because they have never thought about environmental degradation, nor about the possibly detrimental ecological consequences of their own products. The different elements in ST-systems are depicted in Figure 1.

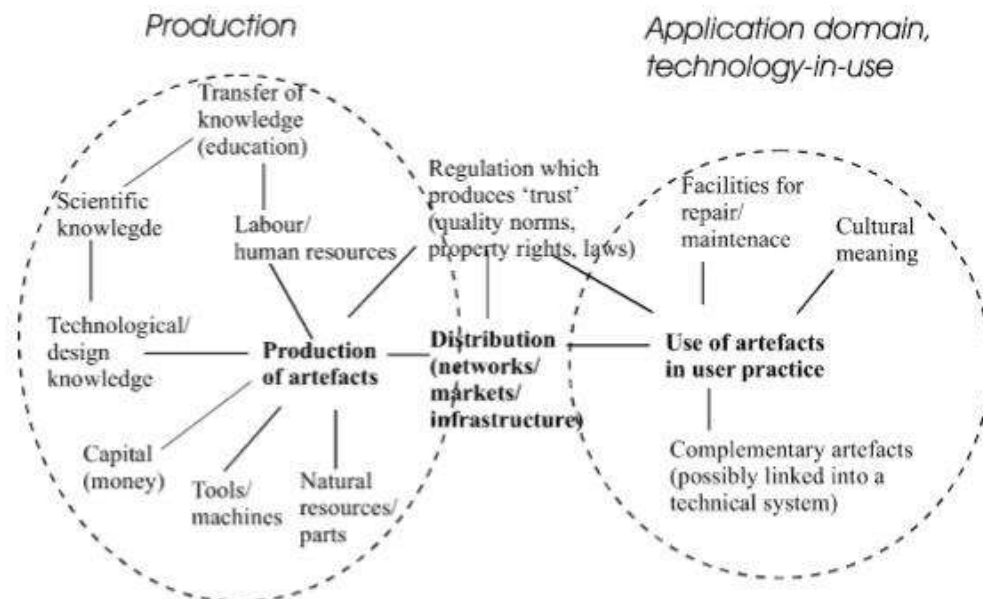


Figure 1. Socio-technical Systems, Source; Geels, 2004

3. Towards a model of Green Public Procurement and its-sub-functions

In the following section a literature review is conducted to assess which factors contribute to successful implementation of green public procurement, using the ST-systems approach as a framework. Various reports by the OECD and the European Commission provide the basis for this review.

3.1 Sub function 1. Production

Since Green Public Procurement requires the availability or development of green products, it is relevant to know which factors contribute to GPP in the first sub function, 'production'. Producers are important because they can supply the new, green technology that governments want to purchase to reduce their environmental footprint. The question is, how can producers be encouraged to invest in green technologies, and offer their products by participating in public tenders?

3.1.1 Improving access to public procurement processes

A first way in which GPP can be promoted among producers is to improve economic operator's access to public procurement processes. Especially smaller firms experience

obstacles to participation in tender procedures. For many tender procedures, firms must submit several documents before being allowed to participate (PWC, 2016). This high administrative burden could prevent the firms with few resources from participating in public tenders, which could otherwise have offered their green technologies to public procurers. An additional obstacle to participation of especially small firms is the lack of information about possible procurement contracts which are offered by authorities.

Governments can take several steps to remove these obstacles and increase accessibility to tender procedures. Firstly, governments can enhance access to public procurement by creating compatibility between data systems (PWC, 2016). In practice, this could speed up the process of electronic tender submissions, by combining all the data already registered in different government databases. Additionally, PWC (2016) suggests that 'pre-qualification' can enhance access to the procurement process. 'Pre-qualification' entails that firms only have provide the required documents once, after which they can participate in all tender procedures. The use of E-procurement instruments can also make public procurement more accessible for economic operators. E-procurement tools facilitate the purchase of products by e.g. public procurers on the internet (Davila, Gupta and palmer, 2003, p.2). These instruments can automate workflows, reduce the time it takes to complete an order, and facilitate cooperation and planning among firms and governments. Altogether, e-procurement tools can thus lower administrative costs for tender participation. In addition, e-procurement tools can easily make information available on which contracts are being offered by the government, making firms aware of which potential business deals are available.

3.1.2. Green innovation: Small and Medium sized Enterprises

Encouraging the participation of Small and Medium Sized Enterprises (SME) in green procurement processes could stimulate green innovation by SME's, hence enlarging the supply of green technologies substantially. In 2010, Small and Medium-Sized Enterprises accounted for 57% of value-added in the European Union (Centre for Strategy & Evaluation Services, 2012). Due to large share in the European economy, MSE's also account for a high share in environmental degradation (Del Brio & Junquera, 2003; Hoskin, 2011; Pimenova, 2004). Hence, encouraging SME's to participate in green public tenders is beneficial in two ways. Firstly, by encouraging green innovation by SME's, a large polluter in the market is dealt with. Secondly, the supply of green products which

governments could possibly purchase is enlarged.

A first step toward encouraging SME's to participate in GPP procedures is to stimulate the development of new, green technologies or eco-innovation. The literature review brings forward several ways to promote this eco-innovation. One way of encouraging the development of environmentally friendly products to increase awareness of environmental issues. Del Brío & Junquera (2003) argue that a lack of ecological awareness among MSE's staff are causally related to the absence of green innovation. SME's per definition have a small number of employees and are thus unlikely to have staff educated on environmental degradation. It is therefore important to stimulate the development of ecological products by raising environmental awareness among SME's. Secondly, Lee (2008) claims that government involvement, by providing finances, knowledge, networks, and resources to small firms increases the willingness of SME's to participate in green supply chain initiatives. For example, governments can provide financial tools to stimulate green entrepreneurship among SME's. For example, micro-credits, financial guarantees, and risk capital funds have been employed by governments in the Baltic Sea Region to promote green innovation Vasilenko (2011).

Table 1. Policies to increase GPP in sub function 1. Production

Production				
Actor	Policy	Good practices	Source	Goal
Economic operators	Improve economic operator's access to public procurement processes	<ul style="list-style-type: none"> - Creating compatibility between data systems - 'Pre-qualification' of economic operators - E-procurement tools 	<u>PWC, 2016</u>	Increased participation of Economic Operators in GPP processes
SMEs	Creating environmental awareness		<u>PWC, 2016</u>	
	Encouraging the participation of (SME) in GPP processes	<ul style="list-style-type: none"> - Providing SME's with finances, knowledge, networks, and resources 	<u>Del Brío & Junquera, 2003; Vasilenko, 2011; Aschhoff & Sofka, 2009; Walker and Preuss, 2008, Lee, 2008</u>	

3.2 Sub function 2. Distribution

In the distribution phase of Socio-Technical systems, it is important to match eco-innovative needs of the government with available products on the market. In this paper,

the concept 'procurement for innovation' is also used to refer to the government's attempt to generate eco-innovate tenders. The OECD (2017c) defines procurement as innovation as *"Any kind of procurement practice [...] that is intended to stimulate innovation through research and development and the market uptake of innovative products and services"*.

3.2.1 Generating eco-innovative tender bids

Several instruments can facilitate this process. Firstly, the preliminary notice of planned innovative contracts to the market can provide entrepreneurs the time to prepare for such a tender. This time can be used to do research and alter plans in case the contract turns out to be promising. Furthermore, market consultation can be used before the procurement process takes off. Market actors can suggest solutions or inform the purchasing authority on the possible available techniques. Thirdly, a competition-based dialogue can stimulate the invention of the innovative solutions for which the procurer is looking. In this setting, the procurer requests innovative solutions for a societal problem, without knowing which technologies are available and which are appropriate. To aid the procurer with establishing what kind of solution is suitable, the procuring body engages in a dialogue with different market actors. These entrepreneurs can do several proposals they think fit the needs of the procurer and win the contract when they offer the best solution (PIANOo, 2011). Next to that, life cycle costing is a useful instrument to identify which product is the most sustainable. In this method, the calculation of the costs of a product includes the costs that are made during the complete lifetime of a good. Hence, besides the commonly considered buying price, maintenance, and "end-of-life" costs are also considered (European Commission, 2016b, P. 57). Finally, the use of ecolabels can be useful in the process of purchasing eco-innovative products. Labels awarded based on transparent criteria, awarded by a third objective party can indicate the sustainability of a product. The labels are instrumental in creating technical specifications, award criteria, and controlling compliance (European Commission, 2016b).

Table 2. Policies to increase GPP in sub function 2. Distribution

Distribution				
Actor	Policy	Good practices	Source	Goal
Government procurer	Matching government demands with eco-innovative products offered in the market.	Preliminary notice of planned innovative contracts	PIANOo (2011)	Increased procurement of green products
		Market consultation	PIANOo (2011)	
		Competition-based dialogue	PIANOo (2011)	
		Pre-commercial and a commercial stage	PIANOo (2011)	
		Life cycle costing	(European Commission, 2016b, P. 57).	
Eco-labels	(European Commission, 2016b, P. 57).			

3.3. Sub function 3. Utilization

On the user side of Green Public Procurement, public procurers are the main actor of importance. A literature review brings forward several factors on the user side that can increase the procurement of green products and technologies.

3.3.1 “Professionalizing the procurement function”

The OECD (2013) stresses the importance of ‘professionalizing the procurement function’. Successful GPP implementation requires a sizable and skilled workforce specialized in procurement (OECD, 2017a). After all, GPP is an interdisciplinary process, which requires knowledge on procurement, law, and environmental science. One way to ensure expertise in all these fields is to compose a team with experts on each subject (OECD, 2013). Alternatively, a list of capabilities can be established, which lays out which skills and knowledge are required to work as a procurer (PWC, 2016). Employees can be demanded to follow a course or earn a certification to prove their competencies. Additionally, providing ad hoc support can provide help to procurers to carry out their function professionally. A survey in 15 European countries revealed that providing ad hoc support can contribute to increasing GPP by assisting procurers with specific questions (PWC, 2016). For instance, a hotline can be made available, to which procurers can refer with questions about law or procurement regulations.

3.3.2 Financing GPP

Financial strategies, strategies which facilitate the financing of GPP, are essential in the successful institutionalization of GPP. According to the European Commission (2016a), the perceived higher costs of GPP compared to regular PP form a barrier to the uptake of GPP, especially in purchasing departments. The literature review brings forward two main financial strategies toward the successful implementation of GPP.

One way of financing GPP is through joint procurement (European Commission, 2008b). Joint procurement means that several government bodies engage in procurement activities together. In practice, one of the cooperating governments publishes the tender on behalf of all the involved governments. Joint procurements reduce costs in two ways. Firstly, economies of scale reduce the purchasing costs for purchasing governments. This is especially beneficial for small authorities. Secondly, joint procurement saves on administrative costs, because only one tender must be prepared rather than several individual ones. Secondly, Pre-Commercial Procurement (PCP) can facilitate the procurement of low-priced innovative products. Pre-commercial procurement is the procurement of research and development services, through a process in which several firms compete to develop innovative solutions for the government (Bedin, Decarolis and Iossa, 2015). PCP can contribute to the financial feasibility of GPP as this type of procurement can reduce on costs. In PCP, several companies compete in the development of products. This competition incentivises the development of high quality products for a low price compared to one source tenders (Bedin, Decarolis and Iossa, 2015; Gansler, Lucyshyn & Arendt, 2009; Grimm et al., 2006). An empirical study by Gansler, Lucyshyn & Arendt (2009) suggests that having multiple suppliers compete creates a steeper learning curve for all companies which is followed by more efficient pricing.

Table 3. Policies to increase GPP in Sub function 3. Purchase

Utilization				
Target actor	Policy	Good practices (<i>to implement policy</i>)	Source	Goal
Government procurer	'Professionalizing the procurement function'	Multidisciplinary teams	OECD, 2013 ; OECD, 2017a	Increased procurement of green products
		Education and Certification	OECD, 2013 ; OECD, 2017a	
		Precise GPP planning (Timely publicised strategies)	OECD, 2013	
		Prioritizing products and government departments	EC, 2016b	
		Setting targets	EC, 2016b	
		Providing 'Ad hoc support' to procurers	PWC, 2016	
		"One-stop helpdesk"	PWC, 2016	
Government	Financing GPP	Joint Public Procurement	European Commission, 2008b	Increased procurement of green products
		Pre-Commercial Procurement	Bedin, Decarolis and Iossa, 2015	

3.4. Regulation and institutions

As Geels (2004) argues, the production, distribution, and utilization sub functions are imbedded in rules. After all, regulative rules implemented by the government are meant to regulate the conduct of actors, whose behaviour determines how GPP is implemented. Consequently, regulations and institutions play an important role in the implementation of GPP. For instance, putting a legal and policy framework in place for the implementation of certain measures, communicates to other stakeholders that the government is committed to the implementation of this measure (PWC, 2015). Furthermore, division of responsibilities among different government level and actors determines how efficiently the policy can be implemented (Allain-Dupré, 2011).

3.4.1 Multi-level governance

The first theme related to regulations and institutions is that the successful institutionalization of GPP requires a Multi-Level Governance approach where all levels of governance are included into policy development and implementation. In this study, Multi-level Governance is defined as the *"negotiated, non-hierarchical exchanges between institutions at the transnational, national, regional, and local levels"* (Peters & Pierre, 2001, p. 131). Including different levels of government contributes to efficient implementation of GPP, because each government level has its own capacities. Subnational governments could contribute to the successful implementation of GPP, because they are aware of local

capabilities and needs. They have access to local stakeholders, as well as the ability to create policies adapted to the local context (Allain-Dupré, 2011). On the other hand, the central government can influence the legal framework, as well as allocating financial resources. This government might also have the policy knowledge for an efficient policy. In this regard, OECD (2016) recommends reorienting toward a bottom-up approach to public investment. To this end, regional differences should be acknowledged and accordingly, local priorities should be accounted for in investment planning on the national level.

3.4.2. Legal and policy framework

Having an institutionalized GPP policy and legal framework in place can be a useful instrument of promoting GPP (PWC, 2015). Indeed, a study in 10 European Member states confirms a positive relationship between the institutionalization of GPP and the uptake of GPP (PWC, 2015). This can be explained by the fact that an institutionalized policy framework demonstrates that the government is serious about this topic, something which can be expressed by setting targets. Since a policy framework involves formulating explicitly what is to be achieved and how, such a policy also automatically mobilizes the means required to do so. PWC (2015) defines an institutionalized policy framework as a strategy that contains an action plan, introduces laws that contain GPP aspects supplementary to EU directives, and/or includes an educational strategy. Practically, the GPP framework can be communicated to procurers by means of guides and handbooks (PWC, 2016).

3.4.3. Review of GPP procedures

PWC (2016) recommends facilitating the review of GPP procedures. Review here implies analysis of GPP procedures to improve them and ensuring compliance or solve conflicts between stakeholders. For example, feedback from relevant stakeholders can contribute to ongoing perfection of public procurement procedures (PWC, 2016). Additionally, PWC (2016) recommends introducing specific 'mediation systems' for procurement to minimize the disruption period of procurement processes. Such a system introduces a third party to solve conflicts between the procurers and economic operators. Appeal processes are a primary obstacle to procurement procedures (PWC, 2016). In some cases, procurement processes are paused while waiting for the treatment of an appeal. A separate appeal process for Public Procurement could reduce the waiting times.

3.4.4. Monitoring

Moreover, the OECD (2013) and the European Commission (2016b) argue that monitoring can add value to GPP approaches. Monitoring refers to the tracking of progress and checking whether goals are achieved. Assessing the process of GPP can provide empirical evidence on the benefits of this policy, but also produces the information necessary to improve dysfunctional parts of the GPP process. Additionally, monitoring could demonstrate the environmental effects of each procurement decision (European Commission, 2016b). Surveys are one useful example for gathering GPP data. The value of this approach is that it can pick up on relative qualitative aspects, such as the barriers to GPP implementation. On top of that, surveys present a way of gathering information in case a complete database is not available.

Table 4. Regulation that can facilitate an increase in GPP

Regulation		
Policy	Good practices (to implement policy)	Source
Improving Multi-Level Governance	Reorienting toward a bottom-up approach to public investment	<u>OECD (2016)</u>
Institutionalized GPP policy framework (PWC, 2015)	Guides and handbooks	<u>OECD, 2013; PWC, 2016</u>
	Procurement document templates	<u>PWC, 2016</u>
Review of GPP procedures	Feedback channel	<u>PWC, 2016</u>
	Mediation systems	<u>PWC, 2016</u>
Monitoring	Surveys	<u>PWC, 2015</u>

4. Conclusions

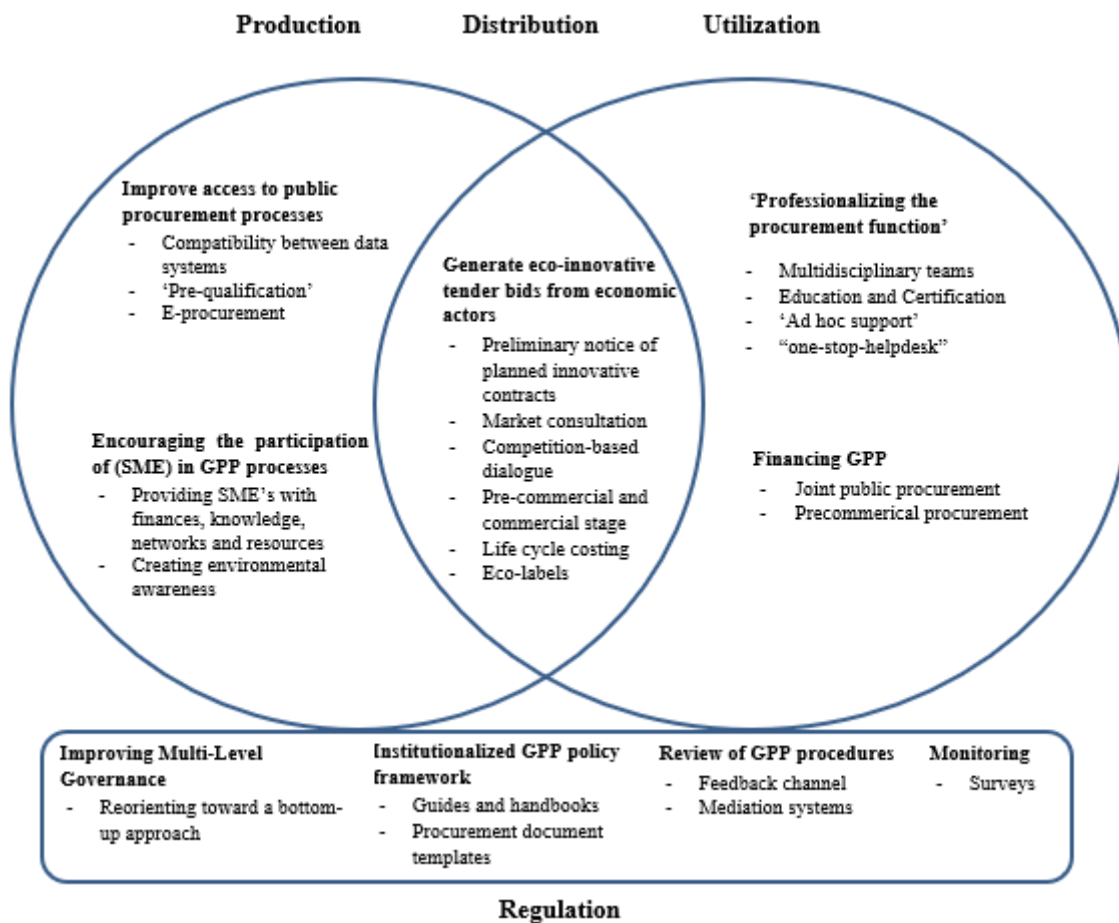


Figure 2. Theoretical framework based on the literature review

Figure 2 summarizes the different elements that contribute to a successful implementation of GPP. From this framework, it becomes clear that the successful implementation of GPP requires a broad approach involving the capacity building of many actors. Examples are SME's requiring more resources to participate in GPP, and government procurers needing more training on how to buy in a green way. Additionally, the importance effective communication between these actors was demonstrated several times in this study. For instance, many measures suggested in the production sub function are aimed at facilitating faster sharing of information about tenders. Furthermore, in the distribution phase, the most important question is the one of how to formulate the tenders in order to attract the most innovative bids from producers. Another example is that effective implementation of GPP requires that different levels of government coordinate their efforts, so responsibilities are carried out by the actor that is most capable of doing it.

The model presented in this paper can be used to analyse the progress of GPP implementation in different European countries. It collects the inputs of different expert organizations and scholars on which factors have proven to contribute to the successful implementation of Green Public Procurement. Bases on this, it provides a clear overview of the different factors required for GPP implementation. Consequently, this model can serve as an instrument to assess if the requirements for successful Green Public Procurement are in place. Additionally, this model can be helpful in identifying the gaps of a certain GPP policy and provide insight in which areas it can be improved.

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