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# PUBLIC PROCUREMENT FOR SUSTAINABILITY

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## **Abstract**

Public procurement emerges as an instrument to promote sustainability and innovation, facilitating the implementation of policy goals. Adaptive procurement leverages sustainable innovation available in the market. Developmental procurement creates demand for solutions that do not exist yet but need to be developed first. Real-world applications from sectors such as construction, transportation, and waste management illustrate the transformative role of procurement. However, challenges persist, including the inconsistent implementation of sustainability and innovation-oriented procurement practices across organizations and sectors and the presence of multiple potentially conflicting objectives.

**Keywords:** public procurement of innovation; sustainability; environmental criteria; performance-based contracts; public services

## **Outline of the Topic**

By virtue of its large economic volume, public procurement can play a significant role in driving the development, adoption, and diffusion of sustainable innovations. Public procurement expenditure accounted for 14.9 percent of gross domestic product (GDP) in OECD countries in 2020. By setting environmental requirements for goods and services and by purchasing the development of new environmentally friendly solutions, the public sector can reduce its environmental footprint and promote the sustainable transformation of markets. The need for developing and adopting new solutions is significant, as policy goals for mitigating climate change, resource scarcity, and biodiversity cannot be met with conventional solutions and technology alone.

The traditional focus in mainstream public procurement practices has been on cost efficiency and the lowest bidding price, leaving little room for favouring green products. Over the years, procurement approaches allowing environmental considerations in tendering have been developed and consolidated. These include the use of environmental criteria, labelling and certification, and life cycle costing. More recently, public procurement has become a tool for promoting the development and demonstration of new sustainable products and services through public procurement of innovation. By facilitating the adoption of innovations in the markets, public procurement is increasingly considered to play a major role in transitions toward sustainable societies.

## **Conceptual Overview and Discussion**

Based on the maturity of available technologies in the supply market, two distinct modalities of innovation procurement can be discerned: adaptive and developmental.

### *Adaptive procurement*

Adaptive procurement concerns the adoption of newly developed cleaner products already available in the market. By using environmental tendering criteria such as greenhouse gas emissions, energy efficiency, or recycled content, more environmentally friendly products can be favoured in procurement. In the case of newly developed products, certifications might not be available yet, but functional and performance-based requirements can be used. In evaluating products, it is essential to consider all stages of the product life cycle, covering manufacturing, distribution, operation, and use, as well as disposal and end of life.

Another approach for adaptive procurement is the valuation of the total cost of ownership of the procured good over its life cycle. The higher purchasing price of clean technology is often compensated by lower costs during its use through smaller energy or materials consumption. By taking into account the costs incurred during use, the procurer can carry out cost-effective acquisition. This approach is particularly applicable for the acquisition of various types of durable goods and investment assets, such as vehicles, devices, machines, buildings, and facilities, which have significant environmental footprint during their period of use.

A related approach concerns the use of performance-based contract incentives. The procurer pays for results (e.g., availability) under a service contract instead of the transfer of ownership of a physical product or asset. Performance-based contract incentives are a particularly valuable approach to fostering circular economy solutions by incentivizing the service provider to optimize asset utilization over its lifetime and minimize the creation of waste.

All the above-mentioned approaches for adaptive procurement can be used to facilitate sustainable innovation through two complementary mechanisms. First, by setting requirements for a product's functioning and environmental performance, the procurer may provide space for innovative products without specifying particular technologies. Second, the emphasis on environmental goals

prioritizes sustainable products and services, providing them with opportunities for market penetration.

### *Developmental procurement*

The second modality, developmental procurement, is about contracting for the development of a solution that does not yet exist at the time of procurement or requires considerable adaptation to user needs. When markets do not readily provide a product or service that meets the user's high environmental requirements, the public sector can initiate a process for purchasing innovation. Hence, developmental procurement is about demanding a solution that needs to be developed first. By doing so, public procurement can drive innovation and promote the green transition of the market. Various approaches have been used, including pre-commercial procurement, innovation contests, design contests, and innovation partnerships, each assigning public procurement a specific role in the innovation process. Some cover only the development stage, while others also commit to deploying the developed solution for operative use by the procurer.

Public procurement of innovation is typically carried out in several stages to validate results before committing to proceeding forward. An essential step in the development is piloting and demonstration, which provides the buyer with valuable information about technical reliability, performance, and costs. The supplier company, in turn, receives feedback from users and an opportunity to adapt the solution to the requirements of a real-world operational setting. Successful sustainable innovations typically require systemic change, i.e., linking with surrounding infrastructure, information systems, regulatory requirements, and user practices, thus requiring collaborative validation with multiple partners. Particularly when several complementing technologies need to be trialled to find out if the complete system works – e.g., low carbon asphalt in road construction or recycled content in textiles – small-scale procurement can be used before more extensive deployment.

In order to meet ambitious environmental policy goals such as carbon neutrality targets, it can be helpful to formulate a service-specific procurement strategy. The essence of such a strategy is to manage the transition of a specific category of procured products and services related to a public service from development to piloting, adoption, and upscaling. Examples of such strategies are the procurement of zero-emission bus fleets in public transportation and the incorporation of recycling requirements in the procurement of medical supplies by hospitals. A service-specific procurement strategy implements environmental policy goals through procurement by managing the transition from the developmental stage towards adaptive and mainstream procurement.

Through its significant purchasing power, the public sector can aim to direct the evolution of markets towards a more sustainable future. Combining public procurement budgets with their regulatory power, the governments may create purchasing commitments for environmentally friendly products. A case in point is The Federal Buy Clean Initiative, which is a commitment of the United States federal government to source only low-carbon construction materials for the most carbon-intensive materials: steel, concrete, asphalt, and glass. The commitment is accompanied by grants and technical assistance programs to assist federal agencies in fulfilling these procurement commitments. With its \$650 billion procurement budget, the U.S. federal government is the largest purchaser in the world and can be expected to influence the direction of the market towards sustainability significantly.

## **Application**

Green procurement has been applied in a variety of sectors. Due to its large economic significance and environmental footprint, building construction has been subject to efforts to improve energy efficiency, reduce carbon footprint, and introduce circular solutions through procurement. The impacts of public purchasing may also spill over to private sector activities. A study conducted in California by Simcoe and Toffel demonstrated that when environmental building standards are

applied in public sector construction procurement, they may diffuse to private sectors, thus fostering the adoption of a common environmental standard.

Another sector where public procurement may play a significant role is infrastructure procurement. Construction and maintenance of public roads, parks, bridges, and tunnels is resource-intensive and provides opportunities for the utilization of recycled, reused, and low-carbon materials. In the Netherlands, the national infrastructure agency uses environmental requirements in contracting. Contractor companies are required to be certified based on their management proficiency in terms of carbon reduction. Application of these criteria has been estimated to account for close to half of achieved emissions reductions by contractor firms.

Introducing new clean technologies and transitioning the market towards their wide-scale diffusion is pertinent in the field of transportation. Procurement of vehicles and services involves opportunities for using public procurement strategically to shift towards lower emissions technologies. In various countries, bus procurement and public transport service contracting have utilized tender requirements for driving the uptake of biofuels, biogas, battery-electric, and hydrogen technologies and associated infrastructure. A similar transition is taking place in off-road machinery as several cities have initiated low-emission procurement for construction sites. Public procurement may reduce the risk of investing in clean technologies in these markets by creating initial demand and aligning expectations.

Another example of public procurement having a market-transforming role can be found in the area of waste management and bioenergy. In Sweden, a public energy utility carried out a procurement using functional specifications to acquire the development of a new solution based on generating bioenergy from biowaste and processing the residue into bio-based fertilizers. The procurement process contributed to making the institutional conditions more favourable for innovation development by removing regulatory hurdles. This way, public procurement may contribute to market formation for novel sustainable products and processes.

An interesting case where public procurement has catalyzed sustainable transition can be found in maritime transportation. Public procurement of short-distance car ferries has been used in Norway to trigger innovation, demonstrate performance, and create an offtake market for low-emission technologies. The public procurement market of coastal ferry connections has provided an ‘advanced niche market’ for the transformation of a new innovation ecosystem development for battery-electric and hydrogen-driven vessels. As advanced customers, public procurers may demand innovation, which can have a more significant impact on the surrounding markets.

Other examples of sustainable procurement of innovation can be found in a variety of product categories, including food, chemicals, textiles, packaging, furniture, and electronics. Great expectations are also put on information and communication systems and digital tools to optimize the use of energy and materials, facilitate circularity in the value chains, and improve user awareness of their consumption choices.

### **Critical summary**

The significance of public procurement in fostering sustainable innovation is increasingly recognized. However, empirical studies on this topic remain sparse. Although some forerunners excel in implementing advanced procurement practices, the majority of public organizations struggle with effectively incorporating both innovation and sustainability into their operations. As a result, several aspects of this area demand additional research.

Questions arise regarding modifications needed in organizational procurement practices to enhance sustainability transitions. Traditionally, sustainable procurement has been inconsistent, focusing on specific products and services. It often relies solely on tendering criteria. Consequently, alternative procurement methods are overlooked, and sustainability is not consistently prioritized across all procurement categories. This has resulted in only marginal impacts on innovation and broader societal transformations.



In certain sectors, a single public organization can significantly influence the market. However, in most cases, collective efforts from multiple procurement units are essential to create the incentives needed for companies to develop and offer innovative solutions. Thus, altering market demands significantly may necessitate collaborative strategies across organizations and establishing a unified vision for desired advancements. Engaging in knowledge-sharing dialogues between buyers and suppliers can also provide beneficial insights. Therefore, there is a growing consensus that public procurement for innovation should transition from being seen as merely an operational organizational function to a strategic one, with an emphasis on interactive governance. Yet, there is a dearth of research on how to actualize this paradigm shift in public organizations and institutionalize sustainable and innovative procurement practices more broadly.

The motivations behind promoting sustainable and innovative public procurement are not universally agreed upon, highlighting areas for future research to elucidate these ambiguities. Past studies have suggested that public procurement plays a role in facilitating the development and diffusion of sustainable innovations. However, whether public procurement is the most cost-effective instrument to pursue sustainability transitions has been called into question. Public organizations often face a multitude of procurement targets, which may sometimes conflict. These range from cost minimization to promoting environmentally friendly solutions and facilitating innovation. In certain instances, these objectives align seamlessly. However, they often necessitate compromises, further muddling the formulation of a clear procurement strategy. It is plausible that the approach to public procurement needs to be tailored according to the unique attributes of specific industries.

Variables such as the public sector's relative purchasing power, the innovation capacity within the firm base, and other environmental and innovative policies should be taken into account. Implementing a standardized set of procurement practices across various industries might produce unintended negative outcomes. For instance, stringent environmental criteria could inadvertently push unsustainable production to alternate markets rather than bringing about genuine changes in

firms' operations. In such cases, alternative tools like environmental regulations might yield more favourable results. The scenarios under which public procurement is an effective policy mechanism remain largely uncharted, thus inhibiting its full potential.

Finally, this entry underscores a prevailing focus in discussions on public procurement of innovation: the emphasis on environmental sustainability, especially concerning carbon emissions. However, this narrowed perspective overlooks other vital environmental facets, such as biodiversity, which have received scant attention in procurement discourse. Beyond environmental concerns, there is a noticeable absence of discussions around social sustainability dimensions. Aspects like diversity, inclusivity, and inequality are seldom deliberated upon in the context of public procurement.

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