

Increasing efficiency in public procurement in Slovakia: Report on good practice in innovation procurement

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1 Introduction

Purpose and context

This report provides an analysis and summary of good practices for the use of public procurement to promote innovation. Innovation procurement is any kind of public procurement practice intended to stimulate innovation through research and development and the uptake of innovative products and services (OECD, 2017^[1]). It generally has one or both of the following aspects (European Commission, 2021^[2]):

- *Buying the process of innovation:* rather than providing detailed technical specifications, the buyer describes its need, creating an incentive for bidders to develop innovative solutions, which do not yet exist on the market, to meet that need.
- *Buying the outcomes of innovation:* instead of buying an off-the-shelf solution, the buyer acts as an early adopter and buys a product or service that is new to the market and has innovative characteristics.

These strategies translate into either Public Procurement of Innovation (PPI) or Pre-Commercial Procurement (PCP) implemented according to specific procurement procedures. Due to a low uptake in the Slovak Republic, the Public Procurement Office (PPO) expressed its interest in collecting experiences from abroad in the use of procurement procedures promoting innovation. The report highlights good practices in procuring innovation throughout the procurement cycle, and identifies elements such as objectives, results and lessons learned. Providing concrete examples of how governments at the national, regional and municipal level are leveraging public procurement to foster innovation, the case studies are drawn primarily from European Union member states to ensure relevancy with the Slovakian context. The report focuses on three procedures, as defined in Directive 2014/24/EU, that public institutions across Member States are using to leverage public procurement to stimulate innovation.

Competitive procedure with negotiation



The competitive procedure with negotiation provides buyers with flexibility where solutions are not currently available on the market. Through negotiation between the contracting authority and potential suppliers, it enables the adaptation of existing solutions or the development of an innovative solution that will meet the needs of the buyer (European Commission, 2021^[2]).

Contracting authorities provide a description of their needs and the characteristics of the required goods or services to be procured, as well as specifying the contract award criteria. In response, potential bidders submit a request to participate by providing information for a qualitative selection by the contracting authority.

Following the assessment of the information provided, only those economic operators invited by

the contracting authority submit an initial tender. Contracting authorities then negotiate with tenderers to improve the content of the tenders. Competitive procedures with negotiation can take place in stages in order to successively reduce the number of tenders to be negotiated. When the contracting authority is ready to conclude the negotiations, it informs the remaining tenderers and sets a deadline to submit any new or revised tenders, which are then assessed against pre-established award criteria (European Parliament and the Council, 2014^[3]).

Competitive dialogue

Similarly to the competitive procedure with negotiation, under the competitive dialogue, the buyer first describes its needs, sets minimum requirements for candidates and defines the contract award criteria. Potential suppliers submit requests to participate, and the buyer initiates a competitive dialogue with the participants meeting the minimum requirements. Negotiation takes place with each candidate and aims to identify and define the means best suited to satisfying the buyer's needs through a discussion of all aspects of the procurement with the chosen participants.

The public procurer generally set milestones that help evaluate the progress of negotiations and eventually create a shortlist of the candidates. Once the competitive dialogue has reached an optimal stage, the remaining participants are requested to submit the final tenders and the contract is awarded on the basis of the Best Price Quality Ratio (European Parliament and the Council, 2014^[3]) (European Commission, 2021^[2]).

The competitive dialogue procedure gives participants the freedom to propose a wide range of solutions. Relative to the competitive procedure with negotiation, the buyer generally has a less precise idea of the nature and subject matter of the contract. By engaging in a thorough dialogue with the buyer, prospective sellers have the opportunity to receive all relevant information for providing a tailor-made innovative solution. The competitive dialogue procedure can provide greater flexibility than the competitive procedure with negotiation as it expressly allows for the discussion of all aspects of the procurement, as well as limited discussions of final tenders and negotiation on the winning tender to confirm financial commitments or other terms (UK Government, 2021^[4]).

Innovation partnership

The main feature of an innovative partnership, and what distinguishes it from the competitive procedure with negotiation and the competitive dialogue, is that the innovation occurs after the partner is selected and awarded the contract. The procurer does not know what type of solution it is buying, but instead enters into a contract with the potential supplier judged best able to create the innovative solution and supply its real scale implementation (European Commission, 2021^[2]). Award criteria can include the candidates' capacity to undertake research and development and to develop and implement innovative solutions.

Innovation partnerships aim at the development of an innovative solution and the subsequent purchase of the solution. The contracting authority identifies its needs and the minimum requirements, with sufficient precision for potential tenderers to identify the nature and scope of what is required. The contracting authority may decide to set up the innovation partnership with one partner or with several partners conducting separate research and development activities in

parallel.

Partnerships are generally structured in successive phases following the sequence of the research and innovation process. The contract usually includes intermediate targets to be reached by the partners and payment in appropriate instalments. Based on those targets, the contracting authority may decide after each phase to terminate the innovation partnership or, in the case of a partnerships with several partners, to reduce the number of partners (European Parliament and the Council, 2014^[3]). Once a solution is developed, the contracting authority may decide whether to purchase it at scale.

For the purpose of this report, the use of the design contest will not be considered under the case studies, as these will focus on the above three procedures. In addition, while the case studies are organised around the procurement cycle, they will be mapped against the innovation procurement procedures.

Considerations in the use of public procurement to support innovation

Governments are increasingly leveraging their buying power to achieve a diverse set of policy goals. The OECD Recommendation on Public Procurement includes principles to assist governments in achieving the right balance between the primary procurement objective, delivering goods and services in a timely, economical and efficient manner, and secondary policy objectives, such as innovation.

Governments support innovation procurement for a number of reasons (European Commission, 2021^[2]). In many cases, innovative solutions offer value for money, delivering similar or higher quality solutions for an optimised cost. In some cases, existing solutions do not address new or changing needs and expectations, and innovation procurement is required to develop new products or services. Public sector buying power can create a market for innovative or higher quality offerings: the size of public procurement, 12% of GDP across OECD countries, gives governments the means to create the conditions for potential vendors to enter the market with new and innovative solutions (OECD, 2017^[1]). The use of innovation procurement can also help the launch and growth of start-ups and innovative SMEs.

Innovation procurement can be leveraged by creating an ecosystem approach to innovation. It implies for the contracting authorities to collaborate with the private sector, academia, technical services, and individuals that drive innovation, in order to accelerate the development of innovative solutions, and assess the readiness of the market. The ecosystem can be formalized through the creation of working groups, incubators, or innovation labs at different governance and sectoral levels (European Commission, 2021^[2]).

The OECD Framework to Promote the Strategic Use of Public Procurement for Innovation

In 2017, the OECD introduced a framework for promoting the strategic use of public procurement for innovation. The OECD Framework to Promote the Strategic Use of Public Procurement for Innovation (the OECD Framework) consists of a set of seven principles drawn from the OECD Recommendation on Public Procurement and nine areas where governments can take concrete action to successfully implement innovation procurement (OECD, 2017^[1]).

The OECD Framework applies the principles of the OECD Recommendation to the context of innovation procurement:

Table 1.1. OECD principles and their application to innovation procurement

Principle	Application to innovation procurement
1. Balance: The OECD Recommendation highlights that secondary policy objectives should be balanced against the primary objective of value for money.	In the context of innovation, governments should consider innovation a secondary policy objective of procurement, develop strategies to encourage procurement for innovation, and continue to assess the impact of their procurement for innovation projects and policies.
2. Access: The OECD recommends that governments ensure that firms of all sizes can participate in public procurements.	To help ensure that small companies can provide innovative solutions, they should seek to eliminate red tape, support SMEs in accessing procurement processes and keep eligibility requirements and criteria appropriate.
3. Participation: The OECD Recommendation advocates for transparent and regular dialogue, which can be leveraged for innovation generation.	Governments should ensure that dialogue with suppliers generates innovation while remaining fair, open and transparent and involves all relevant stakeholders.
4. Capacity: This principle addresses the capacity of the procurement workforce.	Countries should provide specific training on innovation procurement, have a system in place to reward innovative solutions and provide opportunities for staff to engage with knowledge centres.
5. Evaluation: The OECD recommends evaluating public procurement processes and systems.	When countries implement innovation procurement strategies, they should conduct evaluations to measure their effectiveness.
6. Risk management: The OECD Recommendation advocates that governments integrate risk management strategies through the procurement cycle.	This should include a higher risk tolerance in the case of innovation procurements, clear guidelines on addressing innovation-specific risks, and clear and open reporting structures to facilitate an early response to materialised risks.
7. E-procurement: The OECD recommends that e-procurement be leveraged to increase access and competition by simplifying procedures.	E-procurement can be a tool to encourage the participation of innovative firms with less capacity to participate in public procurement processes, and maintain a high standard of confidentiality and security for sensitive innovation procurements.

Source: (OECD, 2017^[11])

The OECD Framework lays out nine categories where governments can take action to implement these principles. The case studies in this report represent examples across the range of categories.

1. **Policy, strategy and targets:** Successfully implementing innovation procurement requires a comprehensive policy framework that provides vision, strategy and appropriate targets.
2. **Legal framework:** Legal barriers are often seen as a main challenge to implementing innovative procurement, and legal frameworks must address issues such as life cycle costing and intellectual property rights.
3. **Management and leadership:** Innovation procurement entails a complex decision-making process by officials and requires strategic and clear management to support change and cooperation.
4. **Financial support:** Successful procurement for innovation requires the availability of sufficient funds and can be supported by financial incentives, which can include tax reductions, flat fees, preferred loan conditions, incentives for procurers, awards or prizes and purchase guarantees.
5. **Professionalisation:** Having sufficient human resources with the appropriate capabilities related to innovation procurement contributes substantially to its success.
6. **Raising awareness and stakeholder engagement:** Innovation procurement policy should include measures to raise awareness about procurement for innovation, and ensure early stakeholder engagement.
7. **Monitoring risks and measurement of impact:** Monitoring is crucial for tracking and demonstrating the benefits of innovative solutions, while sound risk management systems can both help limit loss or damage and increase trust through greater transparency.
8. **Standards in procurement for innovation:** Standards and standardisation are necessary elements of an innovative procurement process for comparability and quality control, as well as serving as a catalyst for innovation, especially by defining test standards, methods and quality certificates.
9. **E-procurement:** As a process-supporting tool, e-procurement can help secure the transparency of complex innovation procurement processes. It should also seek to offer digital functionalities, such as dialogue with suppliers, that support innovation procurement.

Mitigating risk-aversion in the use of public procurement to support innovation

Innovation procurement is considered riskier than traditional procurement, and risk aversion is reported to be one of the main reason for the lack of use of innovation procurement procedures by contracting authorities. Risk aversion is mostly due to resistance to change, organisational culture, and lack of capacity of contracting authorities (OECD, 2017^[1]). Risks include unsuccessful delivery of the works, goods or services, mismatch between the expectations and what is actually delivered, higher investment costs than the foreseen budget, lack of resources to conduct the innovative procurement etc.

As such, several measures can be taken to mitigate these risks (OECD, 2017^[1]):

- **Creating incentives to innovate:** The provision of non-financial incentives such as promotion opportunities, raising awareness on the benefits of innovation procurement, rewarding good practices, or innovation procurement awards could help changing the mindset of public procurers and lower their risk aversion.

- Setting up financial instrument to mitigate risks: The procurers are encouraged to undertake cost-benefit analyses in order to demonstrate the benefits of the innovative solution despite a potential higher investment cost and a cost-intensive procurement process. In addition, the creation of specific sources of funding for innovation could provide incentive to buyers to undertake such procurement, such as ‘Innovfin large projects/science’ funded by the European Investment Bank (EIB) and European Investment Fund (EIF).
- Creating risk management strategies: Contracting authorities need to have an accurate understanding of the risks associated with the innovative solution, and lay out clear guidelines and tools to mitigate these risks. Mapping the actions to mitigate risks in innovation procurement by phase and by stakeholder is also a good practice (see Table 2.1).

Table 1.2. Mapping the actions of procurement for innovation phases related to risk management

Risk Management			
	Preparation	Implementation	Evaluation
Procurers	<ul style="list-style-type: none"> • Calculate risks • Estimate life-cycle costs • Use consultant expertise • Perform market consultation • Offer a win-win-situation • Offer framework agreements and functional specifications 	<ul style="list-style-type: none"> • Monitor the entire process • Where needed, use exit strategies • Use risk management tools 	<ul style="list-style-type: none"> • Perform impact assessment with, e.g. IT tool support • Disseminate lessons learned and benefits of the innovative process • Tweak future process based on evaluation results
Suppliers	<ul style="list-style-type: none"> • Build trust • Name specifications • Reflect risk-benefit-balance and seek win-win-situation 	<ul style="list-style-type: none"> • Monitor own processes • Protect own IPR 	<ul style="list-style-type: none"> • Exploit/access market • Enhance innovation capacity • Use scaling effects and followup projects
End-users	<ul style="list-style-type: none"> • Build trust • Accept offers for involvement at early stage 	<ul style="list-style-type: none"> • Give feedback at any stage • Test prototypes, use test beds 	<ul style="list-style-type: none"> • Evaluate benefit • Give feedback regarding experience

Source: (OECD, 2017^[11])

An overview of the current status of innovation procurement in Slovakia

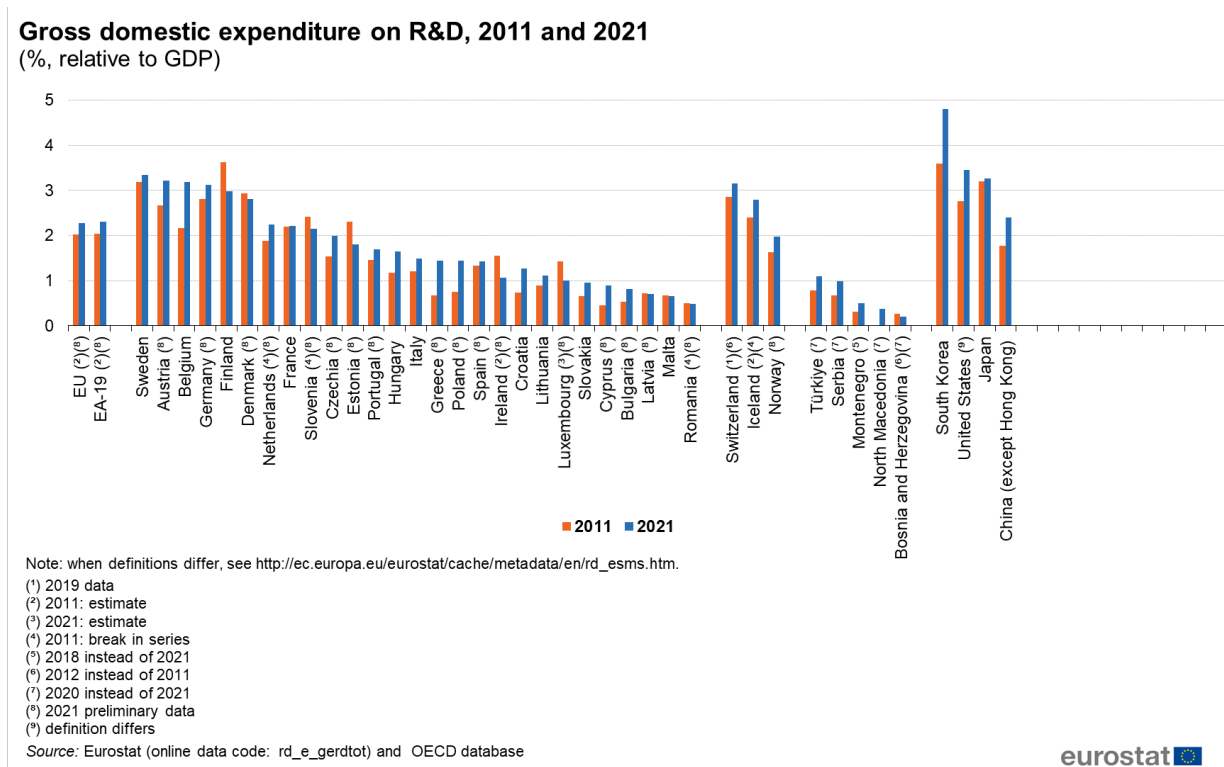
Slovakia’s 2030 Digital Transformation Strategy highlights that public administration needs to learn to innovate (Government of Slovakia, 2019^[5]). This includes testing pilot solutions, as well as using innovative procurement methods. However, in practice, public procurement for innovation (PPI) is not a common practice in the Slovakia (OECD, 2021^[6]).

In Slovakia, the Ministry of Finance and the Ministry of education, science, research, and sport are the two main drivers in the area of innovation. The Ministry of Economy is tasked with developing innovation policies, and has issued guidance and tools such as Support for innovative solutions in Slovak cities (2017), The concept of intelligent industry for Slovakia (2016), Concept for start-up support and start-up ecosystem development (2015), and Research and Innovation Strategy for Smart Specialization of Slovakia (2013) (OECD, 2021^[6]).

The Ministry of Economy has also issued guidelines on public procurement processes for demand-driven projects, which provide some guidance on innovation procurement. On the other hand, the Ministry of Education, Science, research, and sport is the managing authority for European Structural and Investment Funds, which are geared toward Research and Innovation. Among others, the Ministry is responsible for confirming expenditures and procurement, while some competencies are delegated to the PPO (OECD, 2021^[6]).

Despite these efforts, expenditure on research and development remains low in Slovakia compared to other EU member states:

Figure 1.1. Gross domestic expenditure on R&D, 2011 and 2021



Source: (Eurostat, 2022^[7])

Public Procurement in Slovakia is regulated by the Act No. 25/2006 Coll. of Laws on public procurement and on the amendment of certain laws ("The Public Procurement Act" or PPA). Innovation is defined in article 2 par. 5 (m) of the Public Procurement Act as the "introduction of a new or significantly improved product, service or process, which may include a production, construction or engineering process, a new marketing method or a new organizational method into business practice, the organization of the working environment or external relations." However, there is no definition of innovation procurement *per se*. The PPA states in article 44 (evaluation criteria) that the best price/quality ratio may be based on innovative characteristics.

The PPA foresees four procedures geared toward innovation:

- 1) Innovation partnership
- 2) Design contest

- 3) Competitive procedure with negotiations
- 4) Competitive dialogue

The PPO has established a Working group on Innovation Procurement, which supports contracting authorities in conducting innovation procurement processes. The working group provides training activities to contracting authorities regarding innovation procurement, however these trainings are not linked to EU initiatives, and are not offered to all procurers in the country (European Commission and Directorate-General for Communications Networks, 2021^[8]).

Furthermore, the working group issued a manual on innovation in public procurement in 2017, as well as guidance regarding innovation partnership, competitive dialogue, and competitive procedure with negotiations. A general methodology on the procurement of innovative solutions was also issued in 2020 (Public Procurement Office of Slovakia, 2020^[9]). The methodology states that beyond the abovementioned procedures, the contracting authorities should take the following measures into account to foster innovation:

- Conduct market consultations
- Evaluation criteria that reflect innovative characteristics
- Occasional joint procurement
- Cross-sectoral procurement
- Allowing the submission of alternative solutions/variants
- Dividing the procurement into lots

In a 2021 Innovation Procurement Policy Framework Benchmarking, Slovakia scored 23%, and was considered a modest performer regarding the implementation of policy measures that foster innovation procurement. The European average was 26.6%, and Slovakia ranked 16/30, compared to the other benchmarked countries. When it comes to the ranking of investments on public procurement of innovative solutions, Slovakia obtained a lower rank of 27/30 and fell within the group of bottom performers, with only 3.6% of public procurement devoted to innovative solutions (European Commission and Directorate-General for Communications Networks, 2021^[8]).

The benchmark identified a good basis for developing an innovation procurement policy, and some know-how, however there is no concrete policy framework or dedicated capacity-building measures in the field of innovation. In practice, the benchmark also showed that the above measures are seldom implemented by procurers. For instance, variants were allowed in 0.53% of the total number of procedures, and preliminary market consultations were used in 4% of the procedures, while the lowest price is still the dominant criterion for award with 92% of the procedures (European Commission and Directorate-General for Communications Networks, 2021^[8]). The predominant sectors for PPI in Slovakia are general public services and public administration, as well as construction and housing. Innovation procurement is still low in sectors where it could be a key player, such as environment, energy, public transport, and healthcare sectors (European Commission and Directorate-General for Communications Networks, 2021^[8]).

As per PPO's annual statistical report, in 2021, out of 2,375 procurement processes, no innovation partnership was launched, while 1 competitive dialogue and 24 competitive procedures with negotiations were awarded. However, it is impossible to know whether these processes were awarded on the basis of innovation (Public Procurement Office of Slovakia, 2021^[10]).

2 Innovation procurement case studies in the pre-tender phase

While this phase is key in all strategic procurements, pre-tendering can be considered as the most important phase in the procurement of innovation (OECD, 2021^[11]). Procurement of innovation is not a one-size-fits-all process and the pre-tendering phase allows to define the needs, consult with the market, draft technical specifications and choose the most appropriate procurement procedure as well as award criteria.

Prior to launching the process, the very first step is the definition, mapping and fine-tuning of the contracting authorities' needs, which is a crucial aspect to fully deploy procurement for innovation (OECD, 2017^[11]). The needs assessment phase is usually when innovation uptake may originate, as the assessment will allow to identify shortcomings and areas for improvement in the goods and services under use, and evaluate whether the current solution is still the most appropriate one. Distance from the current solution is needed, to ensure impartiality in the definition of the needs, and interviews with end users are usually necessary (European Commission, 2021^[2]). A preliminary analysis of the market by contracting authorities can also help identify innovative solutions and tailor public needs accordingly (European Commission, 2021^[2]).

Following the needs assessment, it is essential for contracting authorities to bridge the gap with the supply-side by organizing preliminary market consultations. Market consultation sessions are important to check the state of play before launching a procurement process. In these sessions, public buyers can obtain information on price structures, capabilities of the market, as well as the feasibility to develop the envisaged technological solution. They can find out if the solution already exists, if they could result from adapting or combining existing ones, or if the market can develop a brand new solution. In addition, these sessions are also useful to clarify potential risks associated with innovation and the ability of the public buyer to take on and mitigate these risks (European Commission, 2021^[2]).

The needs assessment and market consultation will help inform technical specifications, the choice of the procurement procedure and award criteria. Technical specifications are usually drafted in terms of functional requirements or performance-based requirements in innovation procurement, as opposed to descriptive requirements, thus shifting the responsibility of finding a suitable solution to the private sector. The public buyer will then choose the procedure based on the degree of clarity of the project. Usually, competitive procedure with negotiation is used when the buyer has a more precise idea of the nature, while competitive dialogue is chosen when several choices upstream are still to be made under the project (European Commission, 2021^[2]).

Needs assessment and planning

Croatia: Refurbishment of a kindergarten building



The City of Koprivnica needed to replace a prefabricated kindergarten building, but sought to maintain as much of the existing physical structure as possible. A market analysis indicated that there was no solution for the refurbishment of a prefabricated wooden structure available on the market and the City decided to undertake an innovation procurement (European Commission, 2020_[12]).

Background: buyer, good or service, and objective

The City of Koprivnica is a small city of 31,000 inhabitants, and is located in central Croatia. In 2011, the City issued a development policy requiring that all new public buildings be constructed to low-energy or passive building standards. In late 2016, the City, in cooperation with the Regional Energy Agency North, started implementing the EU project called “Public pROcureMent of INnovation boosting greEN growTh in MED area” (or “PROMINENT MED”), funded by the Interreg MED Program of the European Union. The goal of the project was to improve innovation capacities and connections between public and private stakeholders involved in the social innovation sector through the application of Public Procurement of Innovation (PPI) in order to stimulate research and development of innovative technological systems and solutions in the field of energy efficiency (City of Koprivnica, 2019_[13]).

As such, in 2018, the Tratinčica kindergarten needed replacement due to its serious structural defects and high energy consumption levels, and the fact that the building was approaching the end of its useful life. The City did not want to demolish the building, as the demolition would have brought detrimental economic and environmental costs, and was keen on keeping as most of the physical structure of the building as possible, and refurbish its current state (European Commission, 2020_[12]).

The objective of the City was to increase the longevity of the building, to increase energy efficiency, and to significantly improve childcare, learning environment quality, and indoor space functionality (European Commission, 2020_[12]). However, a market analysis revealed that there was no solution for the refurbishment of a prefabricated wooden house available on the Croatian market. The City therefore decided to conduct a public procurement of innovation (PPI), in order to find innovative solutions for the refurbishment of the building. The PPI was the first one conducted in Croatia.

Process

As part of an open market consultation, the City published a Prior Information Notice in Tenders Electronic Daily (TED) and in the National Official Journal, and launched a dedicated market consultation website (City of Koprivnica, 2018_[14]), containing market engagement and technical documentation, an expression of interest response form and a possibility to connect with other suppliers. The market consultation lasted from March to June 2018.

A workshop was also organized, which nearly 60 companies attended, and during which a working group was formed with the aim of analysing project requirements. A tour of the kindergarten building was also provided to prospective bidders. Parallel to market consultations, an in-depth assessment of the needs was undertaken and involved end users of the building such as the personnel of the kindergarten and parents. The outcome of the market consultations and the assessment of the needs resulted in a feasible plan for the reconstruction

of the building with outcome-based technical specifications, and a competitive procedure with negotiations was selected as the most suitable procurement procedure (European Commission, 2020_[12]).

The competitive procedure with negotiations was launched on January 31st 2019 and consisted of two stages. In the first stage, interested companies were invited to apply to be considered for the competitive negotiation phase. To be eligible, they needed to submit evidence of their capacity to perform the contract and a price estimate. All eligible bidders were then invited to submit initial bids for the competitive negotiation phase (stage two). Bidders were asked to submit technical solutions that fulfilled eight measures, including two innovative measures: 1) replacement of the water supply system; and 2) thermal protection of the building envelope. Bidders who submitted technically feasible solutions for all eight measures were considered for the final evaluation of tenders (European Commission, 2020_[12]).

Tenders were evaluated based on a scoring system that considered qualitative/innovative criteria and price (see. Table 2.1)

Table 2.1. Award criteria for the refurbishment of the Tratinčica kindergarten building

Criterion	Points
Price	50 points maximum
Innovative features proposed for measure 1	15 points
Innovative features proposed for measure 2	15 points
Warranty period offered in months	20 points maximum
Maximum number of points: 100 points	

Besides the scoring of innovative features proposed for measures 1 and 2, the solutions offered for these two measures had to fulfil minimum requirements defined by the City. For instance, for measure 1 - replacement of the water supply system, the newly installed water supply system shall not be visible to occupants (European Commission, 2020_[12]).

Results and lessons

Only one bid was received at the end of the second stage of the procurement process, despite a strong participation of the private sector during market consultations. The bid was submitted by a consortium of three Croatian companies, and the consortium was eventually awarded the contract on April 24, 2019, as the proposed innovative solution satisfied the requirements of the tender documents. The value of the contract was HRK 2,765,205.00 (approx. EUR 370,000), which represents less than EUR 500 per square meter, and 50% of the cost of a new building (European Commission, 2020_[12]). The implementation of the contract was foreseen to be based on design and build, with two phases as follows: 1) providing design services for the main project of internal and external reconstruction works; and 2) execution of extensive reconstruction works according to the main project (City of Koprivnica, 2019_[15]).

The contract was successfully completed on August 31, 2019, and resulted in an extension of the lifetime of the building for more than 25 years (City of Koprivnica, 2019_[16]). In addition, the innovative solution offered by the consortium resulted in 61% savings on heating energy, 66% savings on primary energy and as a result of that 66% less CO₂ emissions per year. However, the outcome of the procurement process with a single bid received showed that performance-based procurement approaches are not frequent in Croatia. Engaging with the market before issuing a tender is essential since the lack of experience and awareness of the private sector regarding innovative procurement is one of the key weaknesses, as most contractors are used to detailed technical specifications. Ultimately, the City of Koprivnica was the winner of the

Procura+ Award in 2020 in the category "Procurement Innovation of the Year" (City of Koprivnica, 2020_[17]), and other municipalities showed interest in following the City's example (European Commission, 2020_[12]).

Disposable bio-based aprons for the healthcare sector (Sweden)



Skåne's Regional Council decided to seek a more environmentally-friendly alternative for the purchase of protective disposable aprons. Disposable aprons were chosen for an innovation procurement as they have a relatively high environmental impact but are straightforward to produce (ICLEI European Secretariat, 2017_[18]).

Background: buyer, good or service, and objective

Skåne is one of the 25 provinces in Sweden and its Regional Council's main competency is the coordination of the public and private healthcare. In November 2016, the council issued its Environmental Programme for years 2017-2020, under which one of the main objectives was to promote research, development and innovations that help to bring about a positive environmental impact. The Programme also highlighted that innovation procurement strategies could facilitate the goal to increase the proportion of recycled materials, and gave the innovative procurement of climate-smart aprons in the healthcare sector as a key milestone in the environmental offensive (Skåne Regional Council, 2016_[19]).

An analysis of the region's climate impact was conducted in 2011 and concluded that the healthcare sector accounted for 40% of the region's total CO2 emissions. Disposable aprons were among the products with the highest carbon footprint, as they accounted for 300 tonnes of CO2 emissions in 2014 for 5.2 million single-use aprons. The Council therefore decided to seek more environmental-friendly alternatives for aprons, but previous joint procurement for bio-based plastic aprons had found the market unable to offer the type of product requested, and no tenders were submitted. Following this failed procedure, the Council decided to purchase bio-based aprons through public procurement of innovation using competitive procedure with negotiations (ICLEI European Secretariat, 2017_[18]).

Process

The procurement involved four phases: 1) a preliminary market dialogue/sounding phase; 2) a qualification round to select potential suppliers; 3) a negotiation phase; and 4) an award phase. As bio-based plastics were available on the market but not for aprons, several open dialogue meetings were held between the internal project group of the Council and industry representatives, in order to encourage suppliers to participate. Suppliers were invited to attend seminars and take part in a dialogue with the internal project group, which had representatives from the departments of innovation, environment and regional development. The sounding phase also included tests panels, which included nurses responsible of testing the new products and their functional requirements in a hospital environment. Based on these tests, an industrial designer helped supplier better shape their solutions (ICLEI European Secretariat, 2017_[18]).

The Council also provided trainings to suppliers that had little experience in public procurement, therefore increasing chances of greater competition. These extensive market consultations provided an exchange platform to both the Council and the suppliers to better understand the availability of bio-materials on the market, and to better shape the requirements of the procurement process (ICLEI European Secretariat, 2017_[18]).

A prior information notice on the procurement procedure was published in June 2015, and the chosen procedure was competitive procedure with negotiations. In this phase, interested suppliers were invited to submit a bid. Bidders were required to demonstrate that they could fulfil certain minimum requirements (e.g. single-use aprons should be made of at least 70% bio-based materials) (ICLEI European Secretariat, 2017_[18]).

Four potential suppliers submitted bids, and all four passed the qualification round and were invited to take part in the negotiation round. In the negotiation round, tenderers were given feedback and were supported in the preparation of their tenders. The negotiation round included two meetings with each supplier and dialogue via e-mail. Negotiation led to significant improvements in the submitted bids, in terms of renewable material content, price, and origin of raw material. The contract was awarded based on MEAT criteria, with price allocated 50% of the final score, while the rest of the criteria included the climate impact assessment, share of renewable material, and delivery schedule (ICLEI European Secretariat, 2017_[18]).

Results and lessons

The contract was awarded in February 2016 (Official Journal of the EU, 2016_[20]), and the winning bid offered aprons with 91% of renewable materials. The innovation procurement has been considered as having given a technology boost to suppliers, and the Council's requirement for climate-neutral disposable products helped companies increase their competitiveness, especially since the demand for these products is constantly increasing and similar requirements for other products in the healthcare sector will likely be sought. The Council, through its Carbon Footprint Calculation tool, estimated that the use of bio-based aprons will result in savings of 250 tonnes of CO₂ emissions, compared to the 300 tonnes of CO₂ emissions for non-bio-based aprons (ICLEI European Secretariat, 2017_[18]).

Regarding the lessons learned, in this case, the procurement procedure for innovation has been deemed overly cumbersome and labour-intensive compared to the lack of complexity of the product itself. The process has shown the importance of market consultations and dialogue with the suppliers for shaping the needs, and modelling of the tender documents and technical specifications. Engaging with the market is also important to ensure that the contracting authority receives quality offers from qualified suppliers, as failed previous procurement attempts had the sole incentive of supplying large quantities of a product. The choice of negotiated procedure also proved helpful in significantly improving the quality and costs of the offers (ICLEI European Secretariat, 2017_[18]).

Choice of procurement procedure

Construction of the Rantaväylä tunnel in Finland



Due to the complexity of the Rantaväylä tunnel construction project, the Finnish Transport Agency (FTA) and the City of Tampere used an innovative procurement approach carried out through an alliance between public and private stakeholders and a competitive procedure with negotiation to procure the works while risk and opportunities are shared (Interreg Europe, 2020_[21]).

Background: buyer, good or service, and objective

Finland has a strong strategic policy framework for public procurement of innovation. Finland's innovative procurement program has already supported over 70 innovation procurements. The

City of Tampere, the second largest city in Finland, wanted to construct a new tunnel, i.e. the Rantaväylä tunnel in order to improve the flow and safety of traffic. The City centre was indeed experiencing bottlenecks due to increased traffic and congestions, as the City is an important industrial centre for Finland. The tunnel would have also freed up a large portion of the City's northern area for the use of residents. However, the construction of the tunnel had a few complexities as the tunnel was sited to be underneath old buildings, roads, a railway and a river link, and involved moving a highway into a tunnel for a length of 2.3 km (Smart Procurement for Better Transport Project, 2017^[22]).

Due to this complexity, the City and the FTA decided to use an innovative approach to procurement, the Alliance Model, which used competitive procedure with negotiation. The objective of the Alliance Model was to select the best firm or consortium in order for the firm to act as an actual partner to the buyer throughout project implementation, and not a mere contractor based on the customer-service model. The contractor was expected to significantly participate to the project in earlier phases, and decisions were to be made unanimously (Smart Procurement for Better Transport Project, 2017^[22]).

Under the Alliance model, the public buyer and the partner have a common organisation with shared interests, targets and risks. Among other objectives, the FTA through the Alliance and through negotiations wished to improve the productivity of the industry, to change the culture into a more open and trusting way of working, and to foster innovativeness and knowledge. In addition, the price was not agreed upon from the very beginning, but the buyer and contractor agreed on a cost budget, and the contractor was paid against costs that are actually incurred during the implementation, in addition to a premium in a form of a percentage (Smart Procurement for Better Transport Project, 2017^[22]).

Process

The Alliance contract was expected to be divided into three phases, including the procurement phase, the project design phase under which innovative solutions were developed, and construction phase. The procurement process started with extensive market consultations, followed by a four-phase procurement procedure (Smart Procurement for Better Transport Project, 2017^[22]).

The initial competitive process assessed bidders on criteria including technical ability and the resources and team they would bring to the project. Based on applications, the selected five candidates submitted tenders, and the buyer selected the two best tenderers over several stages that included evaluation of tenders and dialogue with the tenderers. The selection of the final best tender was based on price-quality ratio criteria, where the price component was based on the abovementioned premium of the contractor and accounted for 25%, while the remaining criterion was the ability to undertake the project (Smart Procurement for Better Transport Project, 2017^[22]).

Following the selection of the successful consortium, the FTA, the City and the winning bidder signed the alliance agreement and worked through the detail design process before a final budget was set, particularly to identify and allocate all risk elements, rather than oblige the contractor to price them into the contract. The alliance consisted of two public entities (the City and the FTA), and a consortium of three firms. The consortium and the client shared the risks using agreed pain-gain formulas, with cost overruns or schedule and cost savings producing a penalty or benefit for both parties (Smart Procurement for Better Transport Project, 2017^[22]).

The project design phase lasted several months before the contractor started working on-site. The initial estimated amount of the procurement was EUR 185 million, while the final target budget agreed upon during the development phase of the Alliance was EUR 180.3 million. The

remaining tenderers received feedback from the buyer as to why their offer was not selected (Smart Procurement for Better Transport Project, 2017_[22]).

Results and lessons

The Alliance model has proven successful in terms of timeline and costs and the construction was completed in 2017. Over 140 innovative solutions in areas such as safety and construction were created during the process. One of these innovations consisted of the excavation of another tunnel in order to avoid re-routing the traffic, which sped up the schedule by four months (Rantatunneli Alliance, 2014_[23]). The innovations resulted in estimated savings of approximately 20 million euros and the project was finished six months earlier than was originally forecast. Based on the success of the alliance, the City has reiterated the experience for other projects, such as tramway construction or welfare centre construction (Interreg Europe, 2020_[21]).

However, this choice of procurement procedure for innovation also came with some drawbacks. As the Alliance model was relatively new in Finland and in Europe in general, the buyer faced some challenges in determining selection and evaluation criteria, but also in evaluating the tenders against these criteria, especially given the high complexity of the project and the tight schedule of the procurement process. The determination of the target budget with the partner was also challenging, given the uncertainty regarding certain project costs and the determination of what should be included in the partner's premium. As a lesson learned, adequate planning, flexibility, training regarding the new approach and close cooperation among the parties is needed to tackle these obstacles. This type of procurement procedure should not be used for simple, low-value and less-complex procurements (Smart Procurement for Better Transport Project, 2017_[22]).

Joint procurement of high-performance computing

Four leading European supercomputing centres formed a buyers group to execute a joint public procurement of innovative solutions in the area of high-performance computing for the first time. The project used the French public procurement framework, and the competitive dialogue procedure with one lot per buyer (Brunel et al., 2020_[24]).

Background: buyer, good or service, and objective

The Public Procurement of Innovative solutions for High-Performance Computing was launched in 2017 following a communication from the European Commission, which highlighted the need for a European Data Infrastructure with super-computing capacity with a target for development of 2022 (European Commission, 2020_[25]). The project, financed by the European Commission for a total of EUR 73 million, is executed by four leading European supercomputing centres from France, Spain, Germany, and Italy, and aims at implementing an innovative joint procurement of high-performance computing (PPI4HPC, 2017_[26]).

Each of the four centres already had great experience in large procurement of systems both at the national and transnational levels, and they sought to procure an innovative high-performance supercomputer and/or an innovative high-performance storage system. A coordinated approach was expected to give greater weight to the needs of European scientists and engineers in the design of innovative solutions. The objectives of the public procurement of innovation included the contribution to the European Data Infrastructure, enabling opportunities for research and engineering, stimulating the market regarding the availability of solutions, and demonstrating the

benefits of joint procurement, and pave the way for further initiatives (PPI4HPC, n.d.^[27]).

Process

Prior to the procurement process, the four centres needed to coordinate the project governance structure, in order to determine several key points such as the type of procurement procedure, evaluation committee composition, roles and responsibilities of each centre, nomination of the lead procurer and technical needs of each centre. One important question was about the legal framework to be applied for the procurement process. A working group of legal experts was tasked to identify the most suitable legislation among the four countries to be used by the lead procurer and the possible conflicts among the legislation in each of these countries. In the end, the French centre GENCI was chosen as the lead procurer and the French Code of Public Contracts would be followed to conduct to the joint procurement (Brunel et al., 2020^[24]).

The procurement was designed as a single procurement using the competitive dialogue procedure under the French Code, which offered most flexibility, with four lots, one per centre, and the prior information notice was published in July 2017 (see Table 3.1).

Table 2.2. Division of the procurement into three lots (Official Journal of the EU, 2018^[28])

Lot	Goods or services	Estimated value (net of VAT)
Lot 1	Storage and computing infrastructure for high-performance data analytics – BSC (Spain)	€ 1,350,000.00
Lot 2	Acquisition, delivery, installation and maintenance of a supercomputer with innovative support for data-intensive applications – JSC (Germany)	€ 24,200,000.00
Lot 3	Evolution of the Tier-0 system towards exascale architectures – CINCECA (Italy)	€ 25,000,000.00
Lot 4	Framework agreement for the acquisition, delivery, installation, maintenance and decommissioning of a high-performance and energy-efficient computing system towards the convergence of HPC, HPDA and AI – GENCI (France)	€ 32,000,000.00

A wide market consultation was organised to inform potential suppliers about the procurement and to gather information for the tendering package. The market consultations included one-to-one meetings with suppliers, collective legal teleconference, market survey, and an Open Dialogue Event. The consultations already allowed for the uptake of innovation, as they helped further shape functional requirements and include solutions that were not originally envisaged by the technical team, but also to better shape the procedural aspects of the procurement procedure (Brunel et al., 2020^[24]).

The criteria for qualification for the competitive dialogue phase included the economic and financial standing of the candidates as well as their technical and professional abilities, and some innovation criteria. The criteria and their respective weighting were tailored to each lot. After jointly deciding on the suppliers that qualified for each bid, each of the four procurers proceeded with a competitive dialogue for their own lot. The four procurers maintained a regular exchange of information during the whole process, to ensure that consistent information was given to

bidders since the competitive dialogue were not progressing at the same pace, especially for those bidders that participated in more than one lot. In addition, while the competitive dialogues were held separately, GENCI (France), as the lead procurer, maintained the responsibility of ensuring the coherence of the whole process and handling formal communication with the bidders (Brunel et al., 2020^[24]).

Results and lessons

Two lots received only one tender while the two others received three tenders, and all four lots were awarded between March 2019, and February 2020 (Official Journal of the EU, 2020^[29]). Three lots were awarded for the exact same estimated price, while the fourth was awarded for a price slightly above the estimation. The four innovative systems were deployed in the period 2019-2021. The joint procurement of high-performance innovative equipment has been deemed a success as it was implemented without complications and without complaints from suppliers. The joint procurement enabled the sharing of experience and information among the four procurers, which proved valuable throughout the procurement process. However, a clear definition of the governance structure in joint procurement is crucial for its success, including the roles and responsibilities of each procurer but also the legal framework chosen for the process. Market consultations are also important to improve technical specifications and examine innovative solutions suggested by the market (Brunel et al., 2020^[24]).

3 Innovation procurement case studies in the tender phase

The tender phase is also a critical phase of the procurement process as the interaction with the bidders in PPI procedures such as negotiations or dialogue is usually what shapes the final outcome of the procurement process, and where innovation solutions are provided. Indeed, PPI procedures are collaborative in the sense that both the public and private sector are discussing to find the best solution for the procurement subject-matter at stake, and bidders can even be asked to provide demos, prototypes, or sample tests. The public buyer shall ensure that enough time is allowed in the tender phase in order to maximize innovative outcomes (OECD, 2017^[1]).

Following the collaboration with bidders, the evaluation of final tenders against criteria set in the tender documentation is also an important part of the tender phase. The criteria for innovative procurement are usually based on the most economically advantageous tender, and may include criteria that reflect technical, innovative and sustainable aspects in addition to price, as using only price as the award criterion carries very little chance of stimulating innovation. Non-price criteria therefore allow to obtain the most innovative solutions while achieving the best value for money (European Commission, 2021^[2]).

Invitation to tender and interactions with the suppliers

Denmark: Procurement of real-time traffic data



The Danish Road Directorate (DRD) decided to tender a new type of data procurement contract, aimed at real-time traffic data from private and commercial vehicles. The DRD used public procurement of innovation as the contract was highly complex and had not been tendered in the proposed form in Europe (Smart Procurement for Better Transport, 2017^[30]).

Background: buyer, good or service, and objective

The Danish Road Directorate (DRD) is mandated to plan, construct and maintain the Danish national roads. To ensure the efficiency and safety of the road network, the DRD collects and provides traffic data to end-users but also uses the traffic data for planning purposes. In several countries, the methods for collecting traffic data have evolved over recent years, and countries are switching from expensive and inefficient on-road sensors to real-time traffic data based on the location of vehicles collected from mobile and GPS devices (Smart Procurement for Better Transport, 2017^[30]).

The DRD has traditionally collected traffic data via roadside systems as well as via real time GPS-based data for more than 10 years. However, the DRD wanted to be able to collect data in a better quantitative and qualitative way, especially since traffic was constantly increasing. Therefore, the DRD aimed to procure traffic data from private and commercial vehicles for the

most congested roads of Denmark, in a way that would provide four different types of data: 1) traffic status; 2) extraordinary queuing; 3) incidents detection; and 4) statistical data. The objective was to offer better traffic information to drivers, including a display of average travel time, to detect and handle incident efficiently, and issue early warnings of extraordinary queuing (Smart Procurement for Better Transport, 2017_[30]).

A similar procurement process for real-time traffic data has not been launched before in comparable countries in Europe and the needs of the DRD were very specific and technologically complex. In addition, DRD did not have a standard service agreement for traffic data collection. Therefore, Denmark bought both the process of innovation and the outcomes of innovation by launching a competitive dialogue procedure for an innovative solution for real-time traffic data that could not be found off-the-shelf (Smart Procurement for Better Transport, 2017_[30]).

Process

The competitive dialogue procedure was launched in June 2014. Market consultations were not particularly extensive, since the DRD had already a good knowledge of the requirements and considered that any potential changes could be brought during the dialogue phase. The process lasted for nearly a year (Smart Procurement for Better Transport, 2017_[30]).

The process consisted first of a pre-qualification phase, resulting in the qualification of three potential bidders. The process was then followed by a two-step dialogue phase and a final tendering and award phase. During the dialogue phase, each of the three bidders was required to conduct data tests for a week on a particular stretch of road, and to deliver evaluation results of the test data to the DRD. DRD was therefore able to verify whether the quality and quantity of the test data was matching its requirements. Each of the three qualified bidders were also paid approx. EUR 13,500 for their participation in the dialogue (Smart Procurement for Better Transport, 2017_[30]).

The contract and technical specifications were also amended through the dialogue phase as a result of the discussions with suppliers, allowing for the design of quality tenders that led to the expected results. The contract was expected to be implemented in three phases, i.e. a design phase, a preparation phase, and a data delivery phase for Once the DRD was confident that it would receive proposals meeting its requirements, it ended the competitive dialogue phase and invited and evaluated final tenders based on price (30%), and non-price (70%) criteria including quality, extend of delivery, and organization and planning based on time schedule. The contract was awarded in June 2015 (Smart Procurement for Better Transport, 2017_[30]).

Results and lessons

Since no similar procurement was undertaken before for road traffic data, the DRD had to draft the technical specifications from scratch and was unsure of the interest and maturity of the market. The lack of knowledge of the market in particular represented a very high risk for DRD as the procurement procedure could fail, due to either lack of response or poor response to the requirements, while incurring costs and time in the procurement process.

Nonetheless, the dialogue held with the tenderers greatly helped the DRD specify the tender and find a suitable solution, since some points were either unclear or difficult such as the type of business model to be used for this specific type of service, or the terms regarding the rights of use of the data under the contract which was an important cost-driver (Smart Procurement for Better Transport, 2017_[30]).

Construction of mixed tenure residential development in Dublin

Dublin City Council undertook a procurement for the redevelopment of a residential site to provide social, affordable purchase, and market price residential units. The procurement used the competitive dialogue procedure, with a series of dialogue meetings to refine the legal, technical and financial aspects of the project (European Commission, 2020^[31]).

Background: buyer, good or service, and objective

The Dublin City Council's is the largest procuring authority in Ireland. Its Procurement Unit was established in 2005 and is tasked to ensure compliance, support for service delivery, minimisation of risks and the provision of good value for money on an ongoing basis. Among other objectives, the Council is tasked with facilitating economic, social, or environmental objectives through procurement. The unit issues corporate multi-annual procurement plans, which set out specific procurement objectives. The corporate procurement plan for years 2015-2017 clearly specifies that the Dublin City Council shall engage with the market and encourage suppliers to present innovative solutions which will deliver better value for money and a more efficient service to citizens (Dublin City Council, 2015^[32]).

As per the Council's social housing programme 2015 – 2020, the Council intended to seek the social, economic, and physical development or rejuvenation of residential units. The O'Devaney Gardens Site was part of this plan of redevelopment of residential sites, and the Council wanted to redevelop the site in a mixed tenure residential scheme to include social, affordable purchase and open market units. The Council decided to take a new approach to increase the social impact of procurement under this project, by seeking to identify an economic operator that was considered most capable of working in collaboration with the Council, to identify the optimal solution for the site and to deliver it as efficiently as possible. Therefore, the Council decided to use competitive dialogue in order to enter into a development agreement with the selected tenderer. The estimated contract value was EUR 125.5 million (Dublin City Council, n.d.^[33]).

Process

The competitive dialogue was launched on June 20, 2017 with the publication of a prior information notice, and the Council invited potential bidders submitted a pre-qualification questionnaire, with information such as economic and financial standing and technical and professional ability. The contracting authority would evaluate these submissions against three types of criteria: 1) Completeness/compliance check; 2) Evaluation of pass/fail responses; and 3) Evaluation of scored responses. In principle, the top four ranked candidates would be shortlisted and issued the invitation to participate to the dialogue, however the Council was free to shortlist more candidates (Dublin City Council, 2017^[34]).

During the dialogue stage, Dublin City Council worked with qualified bidders to develop their tenders, as well as potential amendments to the initial draft development agreement. Tenderers were also required to submit development plans for the site, which included a description of the project, planning history, site constraints, financial requirements etc. A series of dialogue sessions were organised between Dublin City Council's Project Team and each of the developers' technical team, in order to assess and better understand the solutions proposed (Dublin City Council, 2019^[35]).

Once suitable solutions were identified, the dialogue stage was concluded, and bidders were then invited to submit final tenders. Two tenders were received and evaluated based on predetermined award criteria. These criteria were as follows (Dublin City Council, n.d.^[33]):

- Quality criteria (600 points):

- Design Quality / Weighting: 300
- Fitness for Purpose of the Proposed Development / Weighting: 150
- Methodology and Programme for Delivery / Weighting: 100
- Management Strategy / Weighting: 50
- Cost criteria (400 points):
 - Land Contribution & Development Site Costs / Weighting: 50
 - Cost of Building Social & Affordable Purchase units / Weighting: 350

Results and lessons

The contract was awarded in July 2020, a long time after the procedure has been launched, as the competitive dialogue lasted longer than expected. One of the innovations included in the contract that resulted from the dialogue was a new social employment clause, which required the successful bidder to ensure, among others, that 1) 10% of the Person Weeks worked under the contract are carried out by individuals who have been registered on a national unemployment register; 2) 5% of the Person Weeks worked under the contract are carried out by individuals who are employed under a registered scheme of apprenticeship; 3) The contractor enables possibility for these individuals to progress into full-time jobs. This social employment clause has also been included in similar residential developments programs, however the dialogue with the bidders helped the Council understand that such a clause cannot be implemented in all contracts and that market consultation is important to understand the suitability of such a clause (European Commission, 2020_[31]).

Evaluation and award

France: Procurement of facilities management for the 2024 Olympic Games



The Paris 2024 Organising Committee for the Olympic and Paralympic Games is committed to delivering an inclusive and sustainable Games. To procure socially responsible facilities management for its headquarters, including the supply of cleaning products, waste management, general facility management and food supply, the organisation used the competitive procedure with negotiation (European Commission, 2020_[31]).

Background: buyer, good or service, and objective

The International Olympic Committee (IOC) is already a carbon-neutral organisation and aims at becoming climate-positive by 2024. The first recommendation within IOC's Olympic Agenda 2020+5 includes to continue to develop an Olympic Programme which ensures gender equality and innovation. As such, the Paris 2024 Organising Committee is committed to delivering the "most inclusive and sustainable Games in history" and has announced its ambition to stage the first climate-positive Games (Paris 2024 Organising Committee, n.d._[36]).

Hosting the Olympics games involves a wide-array of investments, not only in infrastructure and facilities, but also equipment, cleaning products, management services etc. Therefore, procurement is seen as a strategic tool to deliver these investments while achieving the above-mentioned goals. The Paris 2024 Organising Committee launched ESS 2024 Solidarity Platform with several partners such as the City of Paris and NGOs, and the objectives of the ESS include channelling 25% of the value of purchases to social businesses and SMEs and ensuring that 10% of hours worked in construction, equipment and maintenance operations are carried out by disadvantaged workers (European Commission, 2020_[31]).

As part of its investments, the Committee needed to launch a procurement process for a mixed framework contract for facilities management, including supply of cleaning and hygiene products, waste management, general facility management, food supply, delegated management of contracts and regulatory control. As the subject-matter of the procurement involved different services under a framework agreement, the buyer decided to use the negotiated procedure with a call for competition to find innovative solutions to deliver the above services (European Commission, 2020_[31]).

Process

The procedure was launched in late 2019. The first phase of the procurement consisted of a public call for expressions of interest. The call was open to all interested firms, and respondents were assessed against their professional capacity (40%), their technical capacity (40%) and their financial capacity (20%). As a result, two candidates were selected to participate to the second phase (European Commission, 2020_[31]).

In the second phase of the procedure, the two selected candidates submitted their initial tenders, which were assessed according to MEAT criteria, with 30% of the score allocated to price and 70% to quality and other criteria which included, for instance, 10% to hygiene quality. However, as part of its commitment to foster innovation, the Committee also decided that 5% of the weight would be allocated to progress and innovation planning. The latter criterion focused on the way the delivery of the services could be organised to ensure an improved delivery model, focusing in particular on the critical factors influencing quality, cost and corporate social responsibility performance (European Commission, 2020_[31]).

The Paris 2024 Olympic and Paralympic Games Organising Committee then met the two candidates selected for negotiations. At the conclusion of the negotiation, the bidders submitted their final tenders, which were assessed on the same criteria used for the assessment of the initial tenders. In this particular case, the innovation criterion was used to achieve the procurement principle of balance of secondary policy objectives, namely social responsibility, against the primary objective of value for money, as per OECD Framework to Promote the Strategic Use of Public Procurement. The contract itself contains a clause on social and professional integration, and during the process, the ESS 2024 Solidarity Platform helped connect the winning bidder to a sub-contractor employing disadvantaged workers such as single households, asylum seekers etc. (European Commission, 2020_[31])

Results and lessons

The framework agreement was awarded on October 8, 2020 (Official Journal of the EU, 2020_[37]). The agreement was concluded without a minimum and maximum value and would be paid in three different ways: 1) against purchase orders based on a unit price schedule 2) against a lump sum amount; and 3) against subsequent contracts. The solutions proposed regarding social requirements are closely monitored by the contracting authority, with the help of performance indicators. Performance indicators that are graded less than 80 points would result in penalties for the contractor.

This particular case shows that innovation-based evaluation criteria can help find solutions that foster secondary goals such as inclusivity and sustainability. This model of PPI has a high potential for replication in other countries for the procurement of large-scale events (European Commission, 2020_[31]).

Eindhoven's procurement of smart public lighting ¹¹¹¹

The municipality of Eindhoven's public lighting was facing the end of its lifecycle and the City planned for a citywide replacement, which was subject to several innovation goals. To achieve these goals, the municipality implemented a competitive dialogue process (Brock, Voncken and den Ouden, 2016^[38]).

Background: buyer, good or service, and objective

Eindhoven is considered the technology capital of the Netherlands, and is internationally recognized as a smart city that focuses on social innovation and collaboration among government bodies, businesses and citizens. The City Council adopted a Smart Society Programme, which focuses on mobility, sustainability and climate, and safety, and where citizens are encouraged to participate to addressing problems with the support of technology and design (Brock, Voncken and den Ouden, 2016^[38]).

Eindhoven's public lighting system was facing the end of its lifecycle both in economical and technological terms and the City planned for a citywide replacement. Normally, replacement of public luminaires follow strict product and technology specifications to which a bidder has to adhere to, and which offers no opportunity for collaboration or innovation. However, the City wanted to take this opportunity to implement a smart public procurement process for the replacement of the lighting. The City's main policy objective was to improve the quality of life of citizens through continuous innovation in lighting and smart city applications. To do so, the City had two goals in mind regarding the replacement:

- Implement a smart lighting grid that would facilitate data and services to stimulate creative applications.
- Stimulate an innovation ecosystem for the development of new lighting solutions, including hardware and services developed and realised by existing and new companies.

To achieve these goals, the municipality implemented a competitive dialogue process in order to challenge companies to think beyond lighting products and illumination, and because the requirements of the City were quite complex (Brock, Voncken and den Ouden, 2016^[38]).

Process

Eindhoven held a market consultation session and one-on-one meetings with potential bidders, which garnered a lot of interest from the market. Initially, eight firms received the opportunity for one-on-one meetings, and four consortia were selected to participate in the dialogue phase. However, some of the parties did not carry on, as they may have considered the contract to be too complex regarding the budget or technical capacity. Eventually, three consortia participated in the competitive dialogue phase, including three official dialogue sessions as well as expert meetings focused on specific topics such as "open data" and "governance" (Brock, Voncken and den Ouden, 2016^[38]).

The primary goal of the dialogue was to further shape the project, including the scope of the requested products, creating an assessment framework with KPIs, determine the terms of collaboration between the city and the partner, and assessing the legal, financial, and technical aspects of the solutions, with innovation and business potential being the common thread of the discussions. Following the dialogue phase, the municipality gave feedback to the consortia to further refine their offers, and applied the award criteria to assess the final tenders and award the contract (See Table 3.1) (Brock, Voncken and den Ouden, 2016^[38]).

Table 3.1. Award criteria for the procurement of smart public lighting

Qualitative criteria (45 points)		Performance Criteria (55 points)	
Additional future opportunities (15 points)	Risk document (15 points)	Upgrade public lighting grid to a smart lighting grid (15 points)	Steering the quadruple helix (15 points)
	Key staff involved (15 points)	Sustainable solutions (15 points)	Exploitation of smart lighting grid (10 points)

Eventually, the selected consortium stood out with its concept of Smart City Continuous Innovation Process (SCCIP), which involves an ecosystem approach to innovation, i.e. knowledge sharing among a wide-array of stakeholder such as the government, businesses, citizens, and academia, in order to foster innovation on a continuous basis. The SCCIP is divided into three phases, i.e. 1) identification of the needs, taking into account consultations with various stakeholders; 2) open innovation phase, which maps the needs to existing solutions, solutions envisaged by the consortium during the procurement process, or new solutions that will be created during co-creation sessions; and 3) realisation phase, following an implementation plan, KPIs and close monitoring (Brock, Voncken and den Ouden, 2016^[38]).

Results and lessons

The Eindhoven case was a stepping stone for public procurement of innovation, as it challenged the traditional procurement approach in an environment where many public buyers feel limited by the product-oriented procurement procedures. Beyond the sole procurement of public lighting, the competitive dialogue process allowed for the identification of solutions to propel the concept of Smart City, by involving key stakeholders, beyond the municipality and the contractor, and therefore truly making an impact on the quality of life of citizens (Brock, Voncken and den Ouden, 2016^[38]).

As a result, in 2014, the City introduced the first set of LED smart street lights, which was expected to reduce energy costs and CO2 emissions. The new lighting system included lights that automatically dim if nobody is around, lanterns adapting to weather conditions, illuminated walking sticks to be taken from one street to another, illuminated bike paths etc. (Haselmayer, 2021^[39]) While this approach could serve as a good practice for other cities, one of the key lessons learned is the need for a balance between locally tailored solutions and scalability on a global level. In addition, the lack of awareness from municipalities and customers regarding smart solutions may also hamper these efforts, and education regarding these opportunities is therefore crucial (Brock, Voncken and den Ouden, 2016^[38]).

4 Innovation procurement case studies in the post-tender phase

Procurement of innovation is specific in the post-tender phase, as the relationship between the buyer and the contractor is usually not the traditional customer-service based approach under conventional procurement processes, but is rather seen as a partnership, where both parties try to collaborate in order to bring the innovative solutions to life. Since most innovative procurements are awarded on the basis of non-price criteria, such as quality, contract management is also riskier than in non-innovative procurements. Contract management usually entails three areas: 1) Delivery management which requires that whatever is ordered is then delivered with the required level of quality as per the contract; 2) Relationship management which seeks to keep the relationship between the parties open and constructive; and 3) Contract administration which entails the formal governance of the contract and any permitted changes during implementation (OECD, 2011^[40]).

As such, innovation contracts need several measures put in place to ensure that all three areas are accounted for throughout implementation of the contract. Innovative solutions are also found during the life of the contract, which brings high volatility in implementation. Therefore, innovation contracts should contain clauses that cover the following three aspects at a minimum: 1) performance criteria or key performance indicators, with measurable targets in terms of quality; 2) Clauses that allow a fair exit for both the buyer and the contractor, in case of underperformance or if the market is able to bring a better solution than the one proposed under the contract; and 3) Clauses that allow modifications in case the innovative solution needs to be readjusted during contract performance. Contract may also include so-called value-engineering clauses, which encourage suppliers to continually improve the quality and cost of the delivered solutions (European Commission, 2021^[2]).

Contract management

Quay wall renovation in Amsterdam



With the scale of quay wall renovations, the City of Amsterdam needed innovative solutions that would allow it to renovate as much of the quays and bridges as possible, in the shortest amount of time, while minimising negative impacts such as noise and traffic (European Commission, 2020^[41]).

Background: buyer, good or service, and objective

Amsterdam has historically been built on a centuries-old canal system, which represents 850 bridges and 200 kilometres of quay walls. The City of Amsterdam is responsible for the management of these bridges and quay wall, but crucial information about them is missing, such as their current state, or the composition of the soil around them. In 2020, one of the quay walls

collapsed, while hundreds of bridges and tens of kilometres of quay wall were at the end of their life and needed urgent renovation to guarantee safety and accessibility (Innovation Origins, 2021^[42]).

The goal for the city was to renovate about two kilometres of quay and six to eight bridge per year until 2024, however with the scale of these renovations, the City of Amsterdam needed innovative solutions that would allow it to renovate as much of the quays and bridges as possible, in the shortest amount of time, while minimising negative impacts such as noise and traffic. The rationale behind the tight schedule and need for innovation was that most of the quays are located in busy inner-city areas, with significant traffic and tourism, and renovation would entail traffic closure, noise and vibration nuisance, risks to the environment, and displacement of houseboats (European Commission, 2020^[41]).

Another goal of the City was to renovate the quays and bridges in accordance with the City's overall circular economy strategy, and the goal to reduce primary resource consumption by 50% in 2030 and to be fully circular by 2050. Due to the amount of construction and demolition waste produced by the renovation, the City wanted the works to be as circular as possible by reusing the waste or using sustainable materials. Taking into account all of these factors, the City of Amsterdam decided to use the innovation partnership procedure and foster innovative solutions to promote circularity, while ensuring efficiency of the works (European Commission, 2020^[41]).

Process

The innovation partnership was launched in 2018. The City had a set price for a reference case (EUR 4,900,00.00 for 268 meters of quay wall) so that bidders would compete solely on innovation and the quality of the offer, and bidders' business cases were eventually evaluated based on realistic construction cost levels. The innovation partnership was organised in three stages: the competitive phase, the research and development stage and the commercial phase (see Figure 1.1) (European Commission, 2020^[41]).

Figure 4.1. Phases of procurement in the City of Amsterdam's innovation partnership



For stage one, the competitive phase, the City published a call for tender and selected six entries to be eligible to submit bids for the next stage, research and development. From those six bids, three were selected to enter into an innovation partnership with the City based on the pre-determined price and criteria which included scalability, environmental impact, future value and the proposed collaborative research and development process. In particular, the future value criterion was addressing the City's priorities regarding circularity, as it ensures that the proposed solutions are sustainable, that they promote high quality reuse of materials from local sources, and the use of organic or compostable materials (European Commission, 2020^[41]).

During the research and development stage, the bidders are expected to complete an innovation process that takes ideas from concept stage to prototyping, validating and testing. The latter part involves a pilot project on a real quay, under which the solution is tested. The partners that have successfully completed this stage are invited to the last phase, *i.e.* commercial phase, where they are invited to conclude a framework contract with the City of Amsterdam (European Commission, 2020_[41]).

Results and lessons

The City of Amsterdam was very satisfied with the quality of the solutions proposed by the partners, which included electric vehicles, construction material to be on site, no tree-cutting around the quays, reuse of old quay wall bricks, prefabricated modular constructions, transport of material over water etc. In addition to the circularity, the solutions proposed by the partners also tested smaller quay constructions, which could potentially leave space for other purposes on the quay wall, such as smart grids, rainwater storage or energy storage batteries. The solutions were piloted successfully in 2021 (European Commission, 2020_[41]).

In addition to the innovation partnership concluded for the actual reconstruction of the quays, the City wanted to continue its efforts regarding innovation fostering, and concluded a pre-commercial procurement process for the monitoring of the bridges and quays, in order to identify which ones need to be strengthened and/or renewed, and within which period of time. The City is specifically looking for new measurement techniques for these monitoring efforts, however these techniques are not yet available on the market. The pre-commercial agreement will allow for the City to actively seek innovative solutions from several suppliers and purchase the best solution after several competitive rounds (European Commission, 2020_[41]).

Acquisition of Innovative high-speed trainsets in France



The French Railway Company SNCF sought to find innovative solutions to purchase high-speed trainsets that would allow for a circulation speed greater than or equal to 320 km/h under optimal cost and environmental conditions (European Commission, 2021_[2]).

Background: buyer, good or service, and objective

The Société Nationale des Chemins de Fer Français (SNCF) is the national railway company of France, responsible for passenger and freight transport, as well as management, operation and maintenance of the national rail network. Innovation is in the centre of SNCF's policy for future investments. One of the objectives of the SNCF is to increase the capacity of the existing network to meet the increase in the number of traffic (from 30-50% increase in the past 10 years), by increasing the number of trains on the network, modernizing the signalling installations, reduce the spacing between trains while finding innovative solutions to ensure value for money, and sustainability (Alstom, 2016_[43]).

As such, in 2016, the SNCF wanted to purchase a new generation of high-speed trains which would fulfil the following ambitions (Alstom, 2016_[43]):

- Reduce acquisition and operating costs by at least 20%.
- Optimize the environmental footprint, with a material recyclability rate of more than 90% and a reduction in energy consumption of at least 25%.
- Improving the passenger experience, with greater modularity of interior fittings and composition of the train, increased quality in terms of customer services, comfort and connectivity. These trains should offer 20% more capacity.

A market study on available high-speed rolling stock showed that there was no available solution on the market that could fulfil the above criteria, the SNCF decided to launch an innovation partnership procedure to obtain a custom-made solution.

Process

The innovation partnership was launched in June 2015, with the publication of a contract notice. The SNCF had set performance and maximum cost levels that were outlined in the tender documents. The actual acquisition phase could be implemented only if the result of the research and development phase corresponded to the level of performance and maximum cost agreed between SNCF and the partner. Following the submission of the bids, SNCF shortlisted candidates and negotiations were conducted with them. The discussions focused on adjustments to the offer in light of the design, development, and production needs, and on the intellectual property rights associated with each phase of the project (European Commission, 2021^[2]).

Eventually, Alstom was selected as the partner in May 2017. The implementation of the contract was divided into three phases (Official Journal of the EU, 2017^[44]):

- 1) Joint research and development phase aimed at achieving a detailed specification of innovative very high-speed trains at a limited acquisition price. The requirement from SNCF for these trains was to be able to circulate mainly in France and in other European countries, at a speed greater than or equal to 320 km/h according to optimal cost and environmental conditions. The target completion date was end of 2017.
- 2) Detailed design and industrialization of innovative very high-speed trains for approximately four years.
- 3) Production and delivery phase of the trains and associated supporting elements for the trains' operation and maintenance, with an estimated quantity of between 50 and 200 trains. The delivery was scheduled for mid-2022.

Results and lessons

Alstom and SNCF cooperated closely under the contract. The goal was to form a true alliance with both parties combining their know-how in order to maximize results. SNCF brought its experience and knowledge of passengers, while Alstom brought its expertise in train design. For the purpose of the partnership, a common workspace was inaugurated, and an integrated and multidisciplinary team of 20 experts fully dedicated to the project was created. It was estimated that the project created around 4,000 jobs (Alstom, 2016^[43]).

The high-speed trains were successfully designed, with maintenance costs being 30% lower than those recorded for other SNCF trains and passenger capacity increasing by 20%. The delivery of the trains is still ongoing. The quantity of trains delivered was based on optional tranches under the contract. The SNCF recently used its second optional tranche and ordered 15 additional trains, which completed the initial 100 trains order (Alstom, 2022^[45]). The experience under this innovation partnership prompted the SNCF to reiterate the process for other railway equipment, and recently signed an innovation partnership with three firms/consortia to develop innovative signal boxes (SNCF Réseau, 2020^[46]).

Order and payment

Norway: Innovative home follow-up for cancer patients



Østfold Hospital worked with Innovation Norway, the Norwegian Agency for Public Management and eGovernment, and the National Programme for Supplier Development to enter into innovation partnerships with private suppliers to develop solutions and services to enable safe and good home follow-up for cancer patients (Østfold Hospital, 2019_[47]).

Background: buyer, good or service, and objective

The healthcare sector in Norway was facing capacity challenges, due to the increased number of patients in need of healthcare services and the decrease in healthcare personnel. The personnel, in particular, raised issues related to lack of resources, high stress, poor logistics, and unpredictability. On the other side, patients experienced discontinuity in treatments and long waiting times. Therefore, prevention, self-treatment, and home follow-up were considered important in order to mitigate the effects of strains on the healthcare system, especially regarding hospital admissions. As such, one of the government's goals was to create a patient health service under which patients are actively participating in the way they receive healthcare services, including choice of treatment. For this service to be efficient, digitalization and access to healthcare information is key (Østfold Hospital, 2019_[47]).

Østfold Hospital, located in the south-eastern part of Norway, serves approximately 300,000 patients in the region and has around 5,000 employees. In line with the government's goal, the Hospital wanted to find innovative solutions that could give patients, and specifically cancer patients, more time at home, including the provision of follow-up care. To realize this, Østfold Hospital required a comprehensive digital service for home follow-up that is integrated with the overall patient process. The target objective was for cancer patients to be able to stay at home as much as possible and have as good overall condition as possible, through the detection of changes in the patient's condition by hospital personnel, and taking measures early to reduce deterioration and hospital admissions (Østfold Hospital, 2019_[47]).

No off-the-shelf solution was available on the market, as the digital solution needed to address needs both on the hospital, personnel and patient sides, and these needs had to be further clarified. The only solutions on the market were single solutions without integration into the patient process or clinical specialist systems. As such, the Hospital teamed up with Innovation Norway, the Norwegian Agency for Public Management and eGovernment, and the National Programme for Supplier Development and launched an innovation partnership procedure to find the best solution that is tailored to all stakeholders' needs (Østfold Hospital, 2019_[47]).

Process

The innovation partnership was launched in 2017 and consisted of five phases: needs clarification, market dialogue, competition, development and purchasing. Østfold Hospital carried out a comprehensive initial needs assessment in the form of conversations with patients and health personnel. This exercise helped mapping the needs to technological possibilities, including overlap with existing solutions and projects. It also included the assessment of potential gains (Østfold Hospital, 2019_[47]).

The market dialogue was used to discuss issues, gather input on possible solutions and any challenges, and clarify innovation potential. It was carried out between April and October 2018, and consisted of two dialogue meetings and match-making events where suppliers were

presented with the Hospital's needs. During this phase, follow-up options were also decided, *i.e.* the possibility for some other contracting authorities to acquire the solution after the development phase such as Fredrikstad and Halden municipalities (Østfold Hospital, 2019_[47]).

The competition phase consisted of the publication of a procurement notice/prequalification notice on October 15, 2018, after which 15 suppliers were qualified to submit an offer. Out of the 15 suppliers, 12 submitted an offer in January 2019. These suppliers were then invited to present their concept solution during the same month. The Hospital moved to the evaluation of offers, and reduced the number of offers from 12 to 3. These 3 offers were selected for negotiations. Two rounds of negotiations were held, following which the Hospital awarded the contract to the selected development partner on April 2019 (Østfold Hospital, 2019_[47]).

During the development phase, the hospital worked closely with the successful partner to develop a specific solution in four different phases: 1) Basic development where several functionalities are developed simultaneously and tested; 2) Final prototype is tested by the supplier; 3) Client gives approval to the solution; and 4) The client chooses whether or not to buy the solution. Under phase 4, the Hospital had a deadline of 120 days to decide whether or not to buy the solution (Østfold Hospital, 2019_[47]).

Results and lessons

The Hospital eventually decided to exercise its option to purchase the developed solution in December 2021. The solution, titled "Nimble Homewards," has been deployed in the cancer ward, with plans to expand its use to other wards. Two applications have been developed under the solution, one for patients, and one for healthcare personnel at the Hospital (Østfold Hospital, 2019_[47]).

The main lesson learned for the Hospital regarding the process is that innovation partnerships are resource-intensive for both the client and suppliers who participate in the process. In some phases, the procedure would have benefited from further guidance. Stakeholder management was also very time-consuming, as testing of the solution involved both healthcare personnel and patients (Østfold Hospital, 2019_[47]).

Some of the challenges identified for each of the phases of the innovation partnership process include the following (Østfold Hospital, 2019_[47]):

- In the **needs assessment** phase, the Hospital found challenging to be specific about what it wanted and expected from the potential partners. Clarifying needs and problem areas, level of needs, method and degree of involvement of various resources was time-consuming.
- In the **market dialogue** phase, dialogue activities proved to be very useful but were resource-intensive in terms of preparation, implementation and follow-up work.
- The **competition** phase was the most time-consuming, with difficulties in striking a balance between needs and requirements specifications while preparing the tender documentation, since innovation partnership is needs-driven procurement and unfamiliar to both public and private actors. The presentation of concept solutions prior to the evaluation has proven very helpful.
- The **development** phase would have benefitted from further guidance, and requires meticulous coordination among the stakeholders. This phase is divided into two areas – the early development of the solution, which is collaborative, while the finalization of the solution focuses more on the contractual work and negotiations.
- The **purchase** phase has shown that the option period to purchase the solution has been

short, given the time needed to finalize the agreement. The client and supplier should ensure that the necessary technical and functional resources are allocated to the contract.

TfL innovation challenge to make roads safer and smarter during roadworks



Transport for London (TfL) undertook a procurement to find new, innovative solutions to reduce the impact of roadworks by making them safer, smarter and/or more inclusive (London Roadlab, n.d.^[48]).

Background: buyer, good or service, and objective

Transport for London (TfL) is a functional body of the Greater London Authority, responsible for the management of public transport in the City of London. TfL administers the London Underground, London Rail, and surface transport including the bus network. The Mayor of London's transport strategy adopted in 2018 sets out policies and proposals to reshape transport in London over the next two decades. Innovation is at the centre of the strategy, and it commits TfL to engaging with market innovators and guiding them to develop innovative products.

As such, TfL's vision is to look to the market for innovative approaches to challenges, rather than prescribing solutions, and has engaged in several innovation partnerships over the years. The five areas of focus of TfL's innovation initiatives include vision zero, carbon reduction, air quality, customer experience, and operational efficiency (Transport for London, n.d.^[49]).

Under this context, TfL sought to find new and untested solutions that could make roadworks safer, smarter and more inclusive. Roadworks are the main contributors to delays on London roads, and their estimate cost is more than GBP 2 billion every year. TfL's objective was to find a technology that would keep people safe, help cut congestion and clean up London's air during roadworks. TfL therefore launched London RoadLab, an innovation partnership procedure in order to address these goals, in collaboration with Plexal, an innovation centre that supports start-ups to solve challenges (Transport for London, 2021^[50]).

Process

The innovation partnership procedure was launched on October 25, 2018, with the publication of a contract notice which invited economic operators to express interest in the tender. The procedure was then divided into two stages. The first stage involved shortlisting of the candidates to take part in a 10-week innovation programme under a participation agreement. Nine innovative solutions were shortlisted on March 19, 2019 and awarded £20,000 (approximately 24,000 euros) each. They joined the programme and worked closely with subject matter experts to further develop products that could help TfL, and, where needed, test them on live roadworks site (Official Journal of the EU, 2021^[51]).

By the end of the 10-week programme, the economic operators were required to deliver a Minimum Viable Product (MVP), to be presented at a demonstration day to all TfL stakeholders and partners. TfL then evaluated these solutions, and established, based on the criteria set out in the tender documentation, whether or not the solutions met the MVP and quality proposal requirements. A total of four products were chosen to advance to the contract negotiations stage with a maximum value of up to £2 million (approximately 2.4 million euros) to be awarded (Official Journal of the EU, 2021^[51]).

The second stage involves contractual and commercial negotiations with the four shortlisted

economic operators. The goal was to agree on final terms for such contracts and possibly discuss options for scaling the solutions. Following these negotiations, the four economic operators were expected to submit a final commercial offer, which would be evaluated based on criteria set out in the tender documentation. The criteria included two quality criteria for transport impact and business saving, and a cost criterion regarding the commercial value.

Following final tender submission, TfL awarded contracts to two suppliers, for the following solutions (Plexal, 2019^[52]):

- **Samdesk** with “A global disruption monitoring tool that will deliver speedy alerts and situational awareness to disruptive activities and emergency events relating to roadworks through the lens of social media” – GBP 478,000
- **Immense Simulations** with “A simulation-as-a-service platform that automates what is traditionally a very manual and time-consuming process of modelling to understand the impacts of roadworks on traffic” – GBP 700,000

Results and lessons

Both contracts were awarded on September 6, 2021. The procedure was deemed a success, as the innovation partnership procedure helped the TfL find new ways to tackle the biggest challenges in the road sector. Immense Simulation solution provides TfL and utilities staff with information on predicted congestion impacts, increases in emissions and the safety impacts of planned roadworks, which can then be used to inform the public, while Samdesk’s solution leverages artificial intelligence to give TfL a better insight into incidents unfolding across the transport network (London Roadlab, n.d.^[48]).

While innovation partnership are usually much more lengthy than traditional open procurement processes, following the success of RoadLab, TfL decided to pursue this initiative by launching RoadLab 2.0, a second innovation partnership to improve the reliability and efficiency of portable traffic signals, and to get better data on trips and journeys taken by pedestrians and cyclists to improve TfL's offering to vulnerable road users during roadworks. TfL has also decided to expand this strategic way of procurement to other areas, such as FreightLab, with the goal to make goods movement in London safer, cleaner and more efficient (Transport for London, n.d.^[53]).

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