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Using Public Procurement as an Instrument for Implementation of ITS

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Abstract

There are not so many off-the-shelf ITS services and solutions which makes purchasing/implementing such services and solutions challenging for public procurers. Challenges public procurers face when purchasing ITS solutions range from uncertainty in costs and time, risks in failed commercialisation of innovation, to difficulties of reviewing or extending contracts. However, many of the challenges can be addressed by innovation procurement procedures such as Competitive Dialogues. City of Copenhagen has used various procurement procedures to implement innovative and sustainable transport solutions which has set an outstanding example to other cities and authorities of using public procurement as an instrument for implementation of ITS. Analyses of the cases of using various procurement procedures have been carried out in order to identify how the city overcome the barriers, and benefits and lessons learnt from the procedures. The analyses aim to provide comprehensive references to other public authorities.

Keywords:

Public procurement, public authorities, innovation

Introduction

Traditional procurement procedure has been set to buy off-the-shelf products and services, often for a tender with the lowest price. Such procurement is based on short-term tactical purchasing considerations, and often prioritises cost over quality, as well places immediate outcomes above long term cost benefits. The traditional procurement procedure is not designed to purchase innovative and sustainable solutions and services which may be more expensive in short term but may deliver better quality, as well as result in long term benefits to environment and the society. The course of public procurement has been forced to adopt the fast pace of innovation together with increasing concerns on environment and sustainability has changed the course of public procurement. Public authorities may look into a wide range of selection criteria for any tender publications such as Life Cycle Cost (LCC). Using traditional procurement is difficult to purchase innovative services and solutions. That would delay implementations of innovative solutions and services using public funding. This issue is particularly crucial for the ITS sector since it is an innovation driven sectors. Many ITS services and products may not be off-the-shelf, making public purchasing using traditional procurement procedure

difficult

This issue has been well recognised by national government as well as by the European Union; hence, legal frameworks have been made to enable public procurers to use different procurement procedures for purchasing innovation. For example, the EU level public procurement directive, 2014/24/EU [1], give public procurers various procurement procedures for innovative and sustainable products and services such as Competitive Procedure with Negotiation, Competitive Dialogue, Design Contest, Preliminary Market Consultation etc. Although the legal frameworks are available, using such innovation procurement procedures are challenging for public procurers. The challenges and difficulties have been well recognized by policy makers. Thus, much effort into assisting public procurers has been made at national and EU levels. For example, EAFIP – European Assistance for Innovation Procurement [2], an important European initiative, started in 2015 in order to provide adequate supports to public procurers through knowledge transferring and experience sharing.

In the transport sector, several projects have carried out in order to assist public authorities to purchasing energy-efficient or low emission vehicles, e.g. the Clean Fleet [3], the COMPRO project [4]. The COMPRO also aimed to form common buyer groups that made several cities who had similar needs to publish tenders and carry market consultations together, resulting in saving costs, more efficient management of the tender process and attracting more suppliers to participating in the tenders.

In the ITS sector, much of the efforts has been made into procurement of Cooperative ITS (C-ITS) with two EC funded projects dedicated to the subjects, P3ITS and P4ITS. Both projects produced a number of guidelines [5][6] on how to procure Cooperative ITS (C-ITS). Many cities may not be ready to invest into implementation of C-ITS [7], since C-ITS have not yet established its commercial market. Despite that, some small scale trials and pilot projects on C-ITS have been carried out through PCP (Pre-Commercial Procurement) and PPI (Public Procurement Innovation) [8].

Key challenges public procurers face in the ITS sector

Although the legal frameworks are available for implementation of innovative solutions, there are many challenges for any public procurers, since new products and solutions may lead to a certain level of uncertainties and thus bring potential risks to the public procurers. Moreover, public procurers and contract managers may intent to select those products and solutions they are familiar with. In the other word, there are many innovative solutions which can address challenges cities and transport authorities face, but they are not able to purchase such innovative products or solutions. This is mainly due to lack of knowledge and capacity on the appropriate procurement procedure to purchase such innovative products or solutions.

Specific challenges a public procurer should take into account are:

- Uncertainty of commercialisation and costs;

- Dealing with confidential information;
- Unknown consequential cost for adaption or updating of existing infrastructure;

Contract extension and review; Those challenges are explained in details below and potential strategies to deal with the challenges are also given.

Dealing with uncertainty of commercialization and costs: in recent years, Apps for traveller information have been widely available to the public. Some Apps are done by private developers on their costs with their own business models. Public procurers also contract app developers to develop apps to provide services. The current trend is that public procurers use the budget for the app development to make their data open, e.g. the one transport project in UK [9] to developers and organise hackathons to enable app developers to use the open data to develop apps. Hackathon may be seen as a design contest which is a public procurement procedure defined by the directive 2014/24/EU. A potential risk is that the selected app does not have its own business model which can sustain the app, thus unable to be fully commercialised. Or the developer realises the cost to maintain and update the app is too high and decides to take the app out of the market. To address the risk, one of key selection criteria must be the business model and commercial plan. When organising such a hackathon, public procurers should specify the requirements of business models and communicate to developers in advance that business model is one of the selection criteria.

Dealing with confidential information: Market consultation is widely used by public procurers. Market consultation enables public procurers become aware of latest technologies, thus helping them to publish tenders. When carrying out market consultation or innovative dialogues, public procurers and suppliers need to consider how much information to be allowed to give without risking leak of commercially confidential information. There is a balance on sufficient information for public procurers and protection of business interests of all suppliers. For the Copenhagen's ITS-program project that aimed to address the Copenhagen's political determined service goals for CO2 Neutral City by 2025, the public procurer first used market consultation through some Public Private Innovation (PPI) initiative to present their challenges and looked for feedbacks from the market on their solutions. Based on feedbacks collected, the public procurer revised the technical requirements and were able to prequalified a limited number of companies to enter the next round of the tender process. Public procurers needed to pay attention to not give any competition advantages to any companies in the tender documentation.

Unknown consequential cost for adaption or updating of existing infrastructure: Consequential costs when buying new technology, e.g. a need for updating or expansion of existing infrastructure can be underestimated or overestimated. One barrier to prevent implementation of C-ITS is that public authorities or road operators have concerns on the cost of updating existing infrastructure. Although much effort has been made in disseminating benefits of C-ITS, there is lack of good practices on consequential costs and cost/benefits of C-ITS technology, particularly regarding

adaption or updating of existing infrastructure. Hence, replicability and scalability are still big challenges.

Contract extension and review: when implementing ITS services and solutions, public procurers may often face issue of extension of a contract. Because innovation may lead to certain level of uncertainty, a project may take longer than expected and an extension is needed. When the extension occurs, a new party should enter the project as often the first contractor of the project will not be allowed even though the contractor has carried out the project well. Therefore, when selecting innovative solutions, potential risks must be sufficiently addressed together with potential suppliers and extension rules should be communicated at the tender publication stage. Meanwhile, public procurers should monitor project progress at different stages in order to evaluate if there is any risks of contract extension. Alternatively, certain criteria giving variants may be considered when purchasing ITS technologies, even though contract managers are often reluctant to allow variants. Good practices on how to contacts allowing variants would be beneficial to show public procurers how to deal with similar situations.

Case studies on various tenders in Copenhagen

Under the climate plan for Copenhagen the city aims to be the first CO₂ neutral capital city in the world. To achieve the ambition, a number of projects aiming renewing the infrastructure to be more energy efficient and to reduce CO₂ emissions have been carried out. To deliver such projects, innovative solutions are essential. Thus the city had applied various procurement procedures to enable innovative solutions to be selected. By carrying out those projects, Copenhagen has established itself as a leading city in innovation procurement and there are many good practices. Three cases in the transport sector are selected and analysed in order to demonstrate how to use various innovation procurement procedure to address challenges and mitigate risks, as well to identify enablers and barriers. The cases are:

Table 1 – Procurement cases from Copenhagen

Name of the project	Main objectives	Procurement procedure used
Smart Street Lighting	Implementing more energy efficient street lighting, and a long-term service and maintenance contract.	Competitive Dialogues
Purchase of intelligent transport solutions	In the contract will form part of the future Smart City project of Copenhagen including: <ul style="list-style-type: none"> • Mobility and green transport • Traffic safety • Data and traffic management 	Perform a PPI to narrow down the scope and investigate the market capabilities for

	<ul style="list-style-type: none"> • Traffic information and services • Dynamic urban space • Operating and maintaining equipment and systems 	delivering a right solution.
Copenhagen Street Lab	developing and gaining knowledge on innovative solutions within the use of digital technologies, network and sensors in the urban space	Public Private Partnership (PPP)

Smart street lighting using Competitive Dialogues

Why used Competitive Dialogues:

There was no off-the shelf product that would meet the goals of the project. Since market for LED technology is fast developing. It was important to keep the system advance and compatible with the future demands. Using Competitive Dialogues can reduce the risk of buying a product which is already out-dated. There is lack of knowledge and in-house experiences for such a fast developing areas to make drafting tenders difficult.

Selection criteria

A weighted sum of the following criteria:

- Solution itself
- The business case
- Innovation on Nordic-Design
- Service-level
- Price.

Benefits of using Competitive Dialogues:

The experience with competitive dialog was that the suppliers and the city get to know each other from very early stage and get the chance to know each other’s’ needs through the meetings/workshops to narrow down the scope and ensure a good dialogues through the entire project phase and to ensure the solution will fit the cities need.

Lessons learnt:

It is the first time for the city to apply Competitive Dialogues, resulting in a long and costly process to negotiate with the prequalified bidders for determining the requirements and preparing the final tender materials. Because of the cost, the project has become a long-term project to benefit both the city and the bidder to have long term commitment in this project (resulted in 12 year service contract).

Purchase of intelligent transport solutions using PPI

Why used PPI

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Due to the restriction for using the standard IT-contract in Denmark, the city could not have an open market dialogue. Hence, PPI was chosen as an instrument to evaluate the market capabilities, narrow down the scope and reduce the risk on the innovation. Procuring innovation is always risky and PPI helped to investigate the market capabilities and ensure the solutions are feasible for implementation.

Selection criteria

A weighted sum :

- 45% technical solutions :
- 25% price
- 20% process and organisation
- 10% support and maintenance

Benefits of using PPI:

The City is satisfied with the outcomes and were able to develop a technical requirement which could end up meeting the service goals designed for Co2-neutrality. Moreover, by using a clarification phase after the winner was selected, both city and the winner were able to clarify the issues and make sure all the visons are set and it enables the city to make some modifications after the contract was signed.

Lessons learnt:

There was lack of experience in PPI, resulting in more time and resources from technical and legal expertise to prepare the tender material than expected. Changes and adaptions result in additional costs.

Copenhagen Street Lab using PPI

Why used PPP and PPI

Same as above

Benefits of using PPP:

Having an equal share with private partners using PPP helps all the parties to have equality and reduce the chance of the failure. Maintaining a close dialogue with suppliers in order to investigate the possibilities is the market ready for the solutions is important. Determining the best contract method can be achieved via close dialogue with suppliers. The results insure scalability as the city has gained knowledge and expertise on the innovative solutions through the process.

Lessons learnt:

There is urgent need in legal and technical expertise in PPP and new instruments such as PPI.

Conclusion

Traditional public procurement may not be suitable for purchasing ITS technologies as cost and cost/benefits of many innovative products and solutions may not be well defined. Although the current

legal frameworks, such as EU Directive 2014/24/EU, give the legal framework for various procurement procedures for purchasing innovation such procedures have not yet widely used by public procurers for purchasing ITS technologies. There are of course many challenges and risks associated with purchasing ITS technologies using public fund. Because of the risks and challenges, it is not surprising that public procurers may be reluctant to use innovation procurement procedures. City of Copenhagen, in order to achieve its ambition to be the first CO₂ neutral capital city, has used various procurement procedures to implement innovative and sustainable transport solutions which has set an outstanding example to other cities and authorities of using public procurement as an instrument for implementation of ITS. Those cases show that innovation procurement procedure can reduce risks and deliver solutions meeting requirements of the city. Through the procurement process partnership with private sectors can be formed, thus ensuring scalability and long term success. Although there are some initiatives on assisting public procurers using innovation procurement procedures, there is still lack of expertise in innovation procurement in the public sector, resulting in longer time for tender process. Therefore, share experiences and best practices are urgently needed. In addition, capacity building and training on this subject should be provided to a wider range of public procurers.

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