



THE *EAFIP* TOOLKIT

The *eafip* Toolkit aims to provide support to policy makers in designing PCP and PPI strategies, and to procurers and their legal departments in implementing such procurements. The Toolkit consists of three modules:

- **Module 1:** A strategic module addressed to policy makers, providing economic and case evidence about the impacts and benefits of PCP and PPI, together with concrete guidance on how to embed PCP and PPI into innovation strategies;
- **Module 2:** An operational module addressed to public procurers aimed at clarifying the prerequisites and key steps to design and implement an innovation procurement process (PCP and PPI); and
- **Module 3:** A legal / operational module addressed to legal services aimed at clarifying legal issues and provide practical ‘how-to’ guidelines, supported by templates.

For further information regarding the Toolkit, such as the overall context, the disclaimers and authors thereof, please visit the *eafip* website at www.eafip.eu.

MODULE 1

Section 1: Introduction

Section 2: What is innovation procurement

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1. Introduction

1.1 Objectives

The objectives of this Module 1 are to explore and explain:

- What is innovation procurement: what are pre-commercial procurement (PCP) and public procurement of innovative solutions (PPI);
- What is the evidence on the economic impacts and benefits of PCP and PPI;
- Why is wide implementation of PCP and PPI needed to boost economic competitiveness;
- Why is it important to set-up an innovation procurement policy at national level;
- How to define, implement and assess an innovation procurement policy;
- How to incorporate local / regional development priorities and international cooperation as strategic goals into an innovation procurement policy.

1.2 Important issues

The most important issues in Module 1 are understanding:

- The rationale for the implementation of PCP and PPI;
- The (economic) impacts of PCP and, respectively, PPI;
- The basic principles and the role of policy makers in defining, implementing and assessing an innovation procurement policy;
- How to link an innovation procurement policy with local / regional development and international cooperation policies.

1.3 Relevance

Module 1 is addressed to national, regional and local policy-makers in EU Member States, who are responsible for setting long-term strategies for the public procurement of research and development ('R&D') services and for the public procurement of innovative solutions. The public procurers responsible for the implementation of the policy will also need to be aware of the economic rationale and basic principles explained in this Module to ensure effective implementation of pre-commercial procurement and of public procurement of innovative solutions.

2 What is innovation procurement?

Innovation procurement is an important tool at the disposal of policy-makers. It holds the key to solving important societal challenges that Europe is facing in various sectors, including health care, climate change, energy efficiency, transport, security, environmental protection, water and waste management, construction or effective justice systems. A procurer could identify a pressing need for new solutions in the functioning of its organization (e.g. to minimize infections in its hospital). Alternatively, the need could be triggered by policy decisions or legislation (e.g. COP21 agreement that requires also the public sector to reduce its CO2 emissions). To address all these issues, the public sector needs solutions for which, often no commercially proven products exist yet.

Often, challenges can be addressed by innovative solutions that are nearly or already in small quantity in the market and don't need new Research & Development (R&D). This is when Public Procurement of Innovative solutions (PPI) can be used effectively.

In other cases, there are no near-to-the-market solutions yet and new R&D is needed. Pre-Commercial Procurement (PCP) can then be used to compare the pros and cons of alternative competing solutions approaches. This will in turn enable to de-risk the most promising innovations step-by-step via solution design, prototyping, development and first product testing.

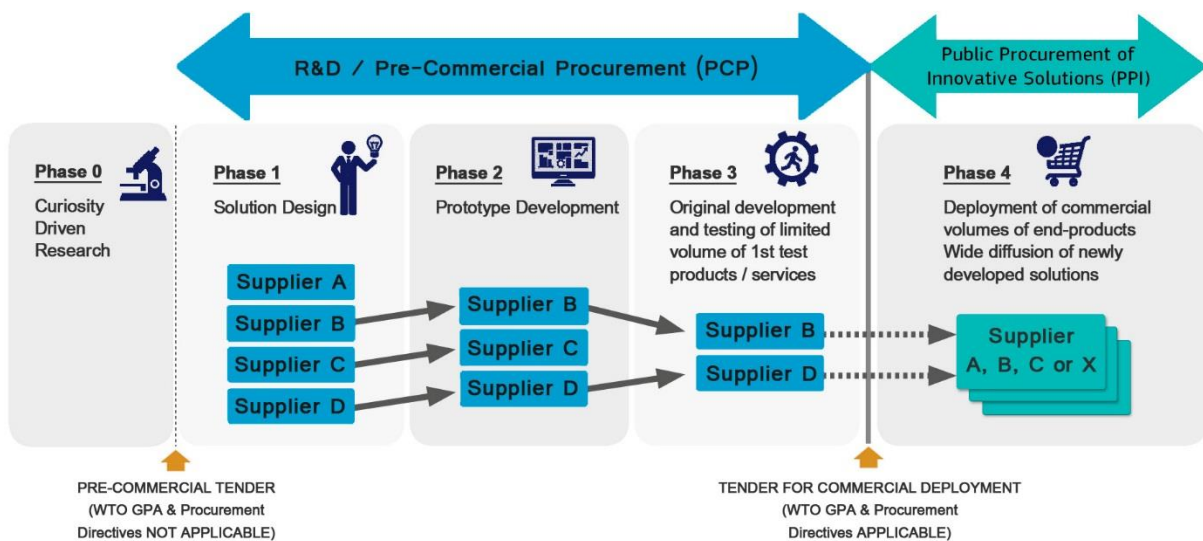


Figure 1 – Overview of a phased pre-commercial procurement process¹

By developing a forward-looking innovation procurement strategy that uses PCP and PPI in a complementary way, public procurers can drive innovation from the demand side. This enables the public sector to modernize public services faster while creating opportunities for companies in Europe to gain international leadership in new markets. Creating optimum conditions for wide commercialization of innovative solutions is also an important step towards job and growth creation.

¹ Source: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Region, "Pre-commercial procurement: driving innovation to ensure sustainable high quality public services in Europe", COM(2007) 799 final, 14.12.2007.

“Innovation processes are necessary to the development of organisations if their quality and efficiency are not to stagnate in the long term. [...] Organisations thus need to strike a balance between on the one hand efficiently satisfying immediate needs through efficient procurement of existing goods and services, and on the other hand demanding and procuring processes for the development of goods and services to meet the needs of the future.”

Source: VINNOVA (the Swedish Governmental Agency for Innovation Systems), ‘Public Procurement as a driver for innovation and change’ (2006)

2.1 What is pre-commercial procurement?

PCP is a specific approach to procure R&D services that involves competitive development in phases, risk-benefit sharing under market conditions, and where there is a clear separation between the PCP and the deployment of commercial volumes of end-products (potential follow-up PPI).

PCP identifies the best possible solutions the market can develop, by comparing alternative solution approaches from different technology vendors in parallel. By steering the development of innovative solutions towards concrete public sector needs, PCP may trigger industry to initiate R&D that was previously unthought-of. In PCP, procurers are thus demanding customers, who are articulating advanced solution requirements as potential future early adopters of the developed solutions (which will be selected in a separate PPI procurement that follows the completion of the PCP).

Procurers also share the IPR related risks and benefits of undertaking new developments with the R&D providers participating in PCP. IPR ownership rights are kept by the participating R&D providers, while the public procurers keep license free rights to use the developed solutions, the possibility to require participating R&D providers to license IPRs to third party providers at reasonable market conditions, and an option that enables procurers to call back the IPR ownership rights in case the participating R&D providers fail to commercialise solutions within a specific timeline after the PCP.

This approach maximizes the incentives to commercialise the developed solutions to other markets.

PCP was defined in 2007 in the PCP Communication² in full compliance with the legal framework.³

Parts of the PCP Communication have been included in later legislation: The 2014 public procurement directives clarify that PCP is exempted from its remit and the 2014 State aid framework for Research and Development and Innovation⁴ clarifies the conditions under which PCP is done according to market conditions and therefore does not constitute State aid.

2.2 What is PPI?

Public procurement of innovative solutions (PPI)¹ means procurement where contracting authorities act as a launch customer of innovative goods or services which are not yet available on a large-scale

² “Pre-commercial procurement: driving innovation to ensure sustainable high quality public services in Europe”, COM(2007) 799 final, 14.12.2007 (PCP Communication)

³ PCP is exempted from the application of the European public procurement directives, but remains subject to the applicable provisions of the Treaty on the Functioning of the European Union and the EU competition rules.

⁴ “Framework for state aid for R&D&I”, COM(2014) 3282 (2014 EU State Aid Framework).

commercial basis, and may include conformance testing.⁵ PPI is a specific approach for procuring innovative solutions in which procurers, unless they conducted a prior PCP, announce well in advance their intention to buy a significant volume of innovative solutions, in order to trigger industry to bring to the market solutions with desired quality / price ratios within a specific time. Market readiness prior to deployment can be verified through e.g. conformance testing, certification or quality labelling of solutions. In PPI, procurers act as launch customers, also called early adopters or first buyers, of the innovative solutions.

PPI focuses on innovative solutions which are not yet available on a large-scale commercial basis. This also includes solutions based on existing technologies that are used in a new, innovative way. The solutions may have been (partially) demonstrated with success on a small scale (e.g. field testing of a first batch of products) and may be nearly or already available in small quantity on the market. However, due to residual risk or market uncertainty, the innovations are not being produced at large scale yet and do not meet market price/quality requirements of procurers for wide deployment yet.

2.3 PCP and PPI are complementary

PCP focuses on the R&D phase prior to commercialization, whereas PPI, which does not cover R&D, concentrates on the commercialization/diffusion of solutions. In other words, PCP only covers the procurement of R&D services, in a way that is clearly separated from any potential subsequent purchase of commercial volumes of end-products.

The main differences between PCP and PPI are:

	PCP	PPI
When?	The identified challenge requires R&D to get new solutions developed and tested. No commitment to deploy (PPI) yet.	Challenge requires solution which is near to the market or already on the market in small quantity but does not meet public sector requirements for large scale deployment yet. No R&D involved (R&D already done, or no R&D needed to solve challenge).
What?	Public procurer buys R&D to steer development of solutions to its needs, gather knowledge about pros/cons of alternative solutions, avoid supplier lock-in later (create competitive supply base).	Public procurer acts as launching customer / early adopter / first buyer for innovative products and services that are newly arriving on the market (not widely commercially available yet).
How?	Public procurer buys R&D from several suppliers in parallel (comparing	Public procurer announces the intention to buy a critical mass of innovative solutions to

⁵ Art.2(18), Horizon 2020 Rules for Participation Regulation No 1290/2013.

alternative solution approaches), in form of competition evaluating progress after critical milestones (design, prototyping, testing). IPR related risks and benefits of R&D are shared between procurer and suppliers to maximize incentives for wide commercialization.

trigger industry to bring products on the market with desired quality / price ratio within a specific time. After verification if the market was able to deliver the desired quality/price – e.g. via a test and/or certification - the public procurer buys a significant volume of innovative solutions.

Figure 2 - Main differences between PCP and PPI

In conclusion, PPI is suitable in cases when, the required solution is close to the market and it is sufficient to signal the intention to buy a significant volume of solutions to encourage suppliers to invest in bringing the solutions to the market that meet the price/quality requirements of the procurer. Alternatively, for cases in which the solution still needs substantial R&D, active demand side steering during development is needed to ensure that developed solutions will meet all the procurers' requirements (e.g. regarding interoperability) and suppliers are not likely to invest in developing in such solutions on their own, PCP followed by PPI could be contemplated.

Some countries use national brand names for PPI. For example, PPI is called Forward Commitment Procurement (FCP) in the UK and "teknikupphandling" (technology procurement) in Sweden.

3 Why is innovation procurement important?

3.1 Benefits of PCP

Studies⁶ outline several benefits deriving from PCP:

1. Improving the quality and/or efficiency of the public services
2. Higher quality and cheaper products
3. Reduced risk of failure in large scale follow-up PPI procurements
4. Increased efficiency of public R&D expenditure and intensity of private R&D expenditure
5. Facilitating access of SMEs - to the procurement market, speeding up time-to-market and attracting financial investors for firms
6. Increased interoperability / impact on standardization / reduction of supplier lock-in
7. Impact on competition structure in the market

3.1.1 Improving the quality and/or efficiency of the public services

In sectors where public procurers are large buyers, their procurement provides significant leverage to stimulate innovation. PCP enables public procurers to provide early customer feedback and steer the development of solutions to meet their needs. This leads to higher quality and/or efficiency solutions compared to expensive, catalogue products which often fail to meet their real needs. As a PCP may only cost a fraction of the budget for deploying the final solution, the cost of a PCP can win itself back multiple times via the cost and quality gains the PCP generates for the subsequent PPI.

Lombardy Healthcare - Niguarda hospital PCP (Italy)

The PCP carried out in collaboration by Niguarda hospital, Lombardy Region and the regional purchasing agency (ARCA) addressed the problem of the long transport times and frequent injury and functional limitations to socio-health workers tasked with moving the hospital beds via manual pushing and pulling. Existing catalogue products from established vendors could not meet the needs of the hospital at an affordable price. Therefore, the PCP started in 2012 to develop a new and cost-effective medical device for moving hospital beds, that meets the hospital's real needs: a bed moving device that is cheaper and reduced in size, more environmental friendly, automated and universal, easy to use and to manoeuvre by a single operator, equipped with all anti-collision and safety systems, does not need tracks or guidelines and can also be used on non-rectilinear routes and in all hospital spaces (rooms, lifts and diagnostic ward spaces). The PCP encouraged the development of more sustainable / environmentally friendly solutions by comparing alternative solutions based on their lifecycle-cost.

From the 6 competing vendors that originally started the PCP, 4 passed to prototyping and 2 successfully tested their end-products in a real operational context. End 2015, the Niguarda PCP won the "Corragio di agire prize" for delivering solutions that bring breakthrough innovations to the

⁶ "Study SMART 2014/0009 – Quantifying the impacts of PCP procurement in Europe based on evidence from the ICT sector" and other studies quoted in this study, http://ec.europa.eu/information_society/newsroom/image/document/2015-44/final_report_published_11779.pdf.

healthcare sector. The PCP has successfully reduced the cost of solutions by opening up the market to new innovative providers (mainly SMEs) that were not able so far to enter this highly concentrated supplier segment. Savings of at least 40% are expected over the coming years when the solutions will be in use, through increased efficiency of hospital operations, reduction in accidents and lower cost, higher sustainability of the solutions. The multiplier effect of the impacts on other hospitals is also considerable as there are roughly 40 000 hospital beds in Lombardy alone.

Source: Extensive case description on INSPIRE project website: <http://inspirecampus.eu>
[http://www.ecoprocura.eu/fileadmin/editor_files/images/EcoProcura_2014 - Sara Bedin TEH Ambrosetti.pdf](http://www.ecoprocura.eu/fileadmin/editor_files/images/EcoProcura_2014_-_Sara_Bedin_TEH_Ambrosetti.pdf) (slides)
http://www.arca.regione.lombardia.it/shared/ccurl/497/198/ARCA_2013_02_Disciplinare.pdf (tender documents)

3.1.2 Higher quality and cheaper products

The use of competitive multiple sourcing during the R&D phase is highly beneficial for the procurer. It puts pressure on competing firms to develop better and less costly solutions, within prescribed time and budgetary limits. The awarding of several R&D contracts increases the probability of obtaining working solutions. Moreover, maintaining at least 2 competitors until the last stage in the R&D cycle prevents subsequent vendor lock-in. In combination with reopening of competition for the follow-up PPI procurement, this results in more aggressive bidding and thus additional cost and quality gains for the government. According to US studies⁷ competition during R&D stage reduced development time by 33 percent, development cost by 42 percent, and average per-unit cost of more than 50 percent. Maintaining competition for the provision of the final end-solution resulted in dramatically improved material availability (above 95 percent), world class response times (2-4 days), significant reductions in inventory, and savings of 17 percent over the historic support methods.

Supercomputing example – US Department of Energy and Defence

Since the 60's the US implements successive R&D procurements with multiple suppliers in competition to increase the performance of the available supercomputing systems. Evidence from the US shows that this sustained public demand since the 60's for increasingly performing computing power has brought enormous cost savings to government departments and has lowered the costs of personal computers for private consumers. The cost per unit of computing power reduced a trillion times over 60 years of R&D supercomputing procurements. The technology developed in response to the government's needs set the ground for subsequent industrial mainstream and commercial PCs.

Source: Study "Opportunities for public technology procurement in the ICT related sectors in Europe", 2008, Ramboll Management, <https://bookshop.europa.eu/>

3.1.3 Reduced risk of failure in large scale follow-up PPI procurements

A significant amount of public procurements do not achieve their goals and the public sector often pays far too much for suboptimal products. PCP provides procurers a better understanding of the

⁷ Gansler, J. S. Lucyshyn, W. and M. Arendt (2009), "Competition in Defence Acquisitions".

technological capabilities and limitations of competing innovative solutions. This reduces the risk that procurers over or underspecify the specifications for subsequent PPI procurements and buy products that do not match the public needs and expectations. Even when a PCP concludes that vendors are not able to deliver solutions that meet the needs and it does not make sense to proceed with PPI, the PCP will have been beneficial in terms of reducing the risk that unsuitable projects go ahead.

Statoil – Gassnova PCP

In 2011, Statoil and Gassnova launched a PCP to get better solutions developed for carbon capture. The project aimed to find new technology approaches to prevent release of large quantities of CO₂ into the atmosphere from fossil fuel use in the heat and power plant in Mongstad.

5 leading providers were selected to start the PCP. The procurers set-up a large test centre and paid an independent certification entity to certify compliance of the developed solutions with the procurer's requirements regarding technical, environmental and health quality. This approach was chosen to reduce the risks associated with the subsequent PPI deployment. PCP suppliers as well as companies that had not participated in the PCP could have their solutions certified. Based on the test results, the procurer concluded that any solution the market could deliver was still prohibitively expensive to deploy. The PCP prevented failure and large financial losses for subsequent PPI.

Source: http://ec.europa.eu/information_society/newsroom/image/document/2014-47/statoil_and_gassnova_case_7934.pdf

3.1.4 Increased efficiency of public R&D expenditure and intensity of private R&D expenditure

Active steering of suppliers to meet end-user needs from the customer side increases the success rate of the innovations. This leads to increased efficiency of public sector R&D expenditure and improved commercialization success rate for companies involved.⁸

Evidence also shows that innovation procurement in Europe leads to a larger increase of private sector R&D expenditure and firms' innovativeness compared to R&D subsidies.⁹ Firms that win public contracts grow more compared to those that compete but do not win, even long after the length of the contracts. Following initial participation in public tenders, winning firms tend to change their future bidding behavior. They target public contracts outside of their municipalities and increase the variety of the offered products. This enables them to win more future public contracts and penetrate other markets.¹⁰

⁸ Hippel (2005) & Ramboll (2008) references from the study mentioned in footnote 5, page 44.

⁹ Guerzoni and Raiteri (2012) reference found in the study mentioned in footnote 5, pages 43-44.

¹⁰ Ferraz, Finan and Szerman (2015) reference found in the study mentioned in footnote 5, page 44.

Danish CEO of top public procurer about the efficiency of R&D expenditure

"Rows of studies document that innovation contributes significantly to growth and value creation. Given that public-private innovation partnerships have been around and growing exponentially in numbers since years, where is this increase in economic growth and value creation?"

Current public-private R&D collaborations are not working well because both parties have to focus on developing something together, without this necessarily leading to sales or purchases that increase company revenues in the long run. It is not enough for private companies that they can learn a lot or get access to testers and users by engaging in an R&D collaboration project. They need to tailor development to tangible commercialization and export opportunities from the start.

PCP is a good tool to increase the efficiency of public-private cooperation. In PCP the development of a new solution is driven by customers with a purchase in mind. Thus, there are pre-built incentives which focus on commercialization when developing a workable solution for a public sector need."

Source: Af Allan SØgaard Larsen, CEO of Falck (the world's largest rescue service headquartered in Denmark), <http://www.denoffentlige.dk/falck-topchef-stjael-andres-innovation-og-bliv-beloennet-det>

Impact on company R&D and innovation behaviour

"We have participated in other collaborative R&D projects before. Compared to this, PCP is helpful for us because it gives us more freedom to innovate, and pushes us more to establish collaboration with technology providers, with European universities and with the community of PRACE users, and gives us a lot more precise vision of the future need of the PRACE Community."

Source: Piero Altoè, Marketing & Business Development Manager, E4 Computer Engineering spa (SME that participates in the FP7 funded PRACE 3IP PCP project on energy efficient supercomputing: <http://www.prace-ri.eu/pcp/>).

"We received similar positive feedback from all three vendors, big or small, in the PCP."

Source: Philippe Segers, Project Manager at GENCI (GENCI is public procurer in the buyers group of the PRACE 3IP PCP)

3.1.5 Facilitating access of SMEs - to the procurement market, speeding up time-to-market and attracting financial investors for firms

The phased PCP approach, with gradually growing contract sizes that follow the natural growth path of innovative start-up companies, facilitates the access of small innovative firms (SMEs) to the (procurement) market. In the EU funded PCPs, so far 71 % of PCP contracts were won by SMEs¹¹. By challenging companies to develop breakthrough innovations for public needs and by offering early customer feedback and the perspective of early deployment, PCP can reduce time-to-market and help innovative companies gain leadership in new markets. PCP can also help firms attract subsequent

¹¹ First results 12 PCP projects funded by EU Framework Programme 7 (FP7): <https://ec.europa.eu/digital-single-market/en/news/updated-results-ongoing-pre-commercial-procurements-pcp-projects>

private investment to grow their business. Financial investors have pointed out that PCPs that address well-defined procurers' needs are considered a sign of market potential of the emerging innovations, thereby encouraging additional private investment.¹² In the US, such procurements have nurtured small companies into major market leaders across different industry sectors such as computing, telecommunications, aviation and bio/nano technology. Companies like IBM, HP, Dell, Cray, Intel, Qualcomm all developed their first block buster products in R&D procurements.¹³

CHARM traffic management PCP

“One of the aspects of PCP that we had to set out from the beginning was to attract some experience from outside traffic management and not only from the traditional large well-established vendors but also from innovative new players such as small and medium sized organizations. We have achieved that. We have got a company that comes from the mining sector, who had never been involved in traffic management. But it has really good products and great ideas about the way they could help us with our traffic management process.”

Source: Ian Chalmers, project manager CHARM PCP, Highways England.

For more info about the CHARM PCP:

<https://www.rijkswaterstaat.nl/english/about-us/doing-business-with-rijkswaterstaat/charm-pcp/index.aspx>

3.1.6 Increased interoperability / impact on standardization / reduction of supplier lock-in

PCP enables procurers to set interoperability and product inter-changeability requirements already during the development phase. This is a cost effective way to pave the way for open standards and to avoid the risk that early adopters of innovative solutions are penalized with the additional burden of making their solution compliant with standards defined afterwards.¹⁴ Indeed product modifications at the time of deployment can significantly increase deployment cost and the risk of project failure. Increased interoperability and competition also contributes to prevent supplier lock-in, which can prevent an estimated loss of 1,1 €Bn per year in public ICT contract.¹⁵ Buying sizeable amounts of innovative solutions can also create network effects that encourage other users to follow suit.¹⁶

¹² Idem 5, page 46-47.

¹³ Idem 5, page 45-46.

¹⁴ Idem 5, page 47.

¹⁵ Idem 5, page 48.

¹⁶ Network effects happen when the value of a technology for a user is given by the number of other users switching to that technology. Users may not switch to a superior technology due to fear that other users will not follow.

V-CON (Virtual CONstruction of road infrastructure) PCP

The Dutch and Swedish procurers Rijkswaterstaat and Trafikverket started V-CON because the market for road infrastructure construction is locked into expensive proprietary systems and could work much more efficiently by moving towards open standardised systems.

The ongoing PCP project V-CON has enabled the procurers behind the project:

- to pinpoint the cost savings that can be made by moving towards such as open information modelling systems for roads (30% of road construction costs)
- to obtain support from other road infrastructure directors across Europe (CEDR) to start a working group in CEN to standardize together the approach of using BIM (building information modelling) for road modelling for the public sector that is developed in V-CON

Source: <http://www.paneuropeannetworkspublications.com/GOV16/index.html#147>
<http://www.paneuropeannetworkspublications.com/GOV16/index.html#148>
<https://www.rijkswaterstaat.nl/english/about-us/doing-business-with-rijkswaterstaat/v-con/index.aspx>

3.1.7 Impact on competition structure in the market

PCPs can increase competition in sectors dominated by few competitors by allowing a large number of (start-up) firms to participate in the PCP. This was actively pursued in the US by the Department of Defense (DoD) in the 1970s, when 2 companies dominated the supercomputing market. The approach led to many spin-off firms becoming successful on the computer market.¹⁷

EU funded PCP projects - Impact on the EU internal market

First results from EU funded PCPs show a clear impact on opening up the EU internal market which creates cross-border growth opportunities for companies. 25% times more contracts than typically in national procurement (31% versus 1,23%) are awarded to companies that are not from countries of the procurers. 2,5 times more contracts than typically in national procurement (71% versus 29%) are won by new players/SMEs that are challenging established providers with new innovative solutions.

Source: Results of 12 first PCP projects funded by the EU FP7 program:
<https://ec.europa.eu/digital-single-market/en/news/updated-results-ongoing-pre-commercial-procurements-pcp-projects>

3.2 Benefits of PPI

The public sector accounts for a large share of the demand in a number of areas like mobility, health, construction, e-government, waste management, recycling etc. In these areas, PPI can generate benefits for the demand and supply side: quality improvements and cost savings to the procuring organization that deploys the innovative solutions as well as wider economic, environmental and societal benefits for European citizens that benefit from the improved public service and for companies, including SMEs, that are looking for first customers for their innovative solutions.

¹⁷ For example Digital Equipment Corporation, the precursor of Hewlett Packard, SUN, Silicon Graphics etc, more info in the study mentioned in footnote 5 page 50.

There is no comprehensive study that measures the benefits of PPI.

However, based on evidence from relevant case studies, we summarize the following benefits of implementing PPI:

- Improving the quality and / or efficiency of public services
- Helps innovative (start-up) companies to grow
- Incentivizes companies to invest in innovation

3.2.1 Improving the quality and / or efficiency of public services

Although the entry cost of innovations tends to be higher than when procuring an established product or service, the long-term cost-benefit analysis (the analysis of the costs and benefits over the entire life cycle of the solution) often proves positive.¹⁸ Early announcement of the expected long-term quality/efficiency improvements may thus prove crucial in PPI, to give suppliers enough time to make the investments to bring products to the market at the required quality/price ratio.

EXAMPLES of Forward Commitment Procurement

FCP sought to emulate in the public sector the approach of private sector companies that actively stimulate their supply chains to innovate ‘by clearly articulating their future needs and providing a credible promise of future sales, while ensuring competition until the purchasing moment’. FCP involves providing advance information of future needs, searching out and engaging with potential suppliers and, critically, incentivizing them through a Forward Commitment, an early notification of the intention to buy a significant amount of innovative solutions.

FCP starts with identification of the end-users and the definition of common requirements for the desired solution. It then moves to consultations with the industry in order to assess whether the desired solution could be developed and deployed within the timeframe of the procurers. Subsequently, the procurers place a Prior Information Notice in the European tender database, containing the procurers’ requirements and the invitation to suppliers to develop a compliant solution and to demonstrate it at a , e.g. at the premises of one of the procurers, at a certain date in the future. If the testing/demonstration results are positive, the procurers move to the actual procurement of the large volumes of the developed products. The procurement is either done jointly through one contract or through several coordinated smaller procurements.

Her Majesty's Prison Service piloted FCP in 2009. It needed to dispose every year more than 40000 foam mattresses due to soiling, misuse, and wear and tear. Each prison area handled their own arrangements for disposal through local contracts. The majority of ‘end of life’ mattresses were being sent to landfill, with the remainder classed as clinical or hazardous waste and incurred high disposal costs. In short, the situation was environmentally unsustainable and the combined cost of supply and disposal was estimated conservatively to be in the region of £2.8 million per year. The situation required a radical rethink. FCP provided a way to do this. The FCP led to a Zero Waste

¹⁸ European Commission’s Guide on European Commission, ‘Public Procurement as a Driver of Innovation in SMEs and Public Services’ (2014); Memorandum by Professor Luke Georghiou, Professor Jakob Edler and Dr. Elvira Uyerra, Manchester Institute of Innovation Research, MBS, University of Manchester.

Mattress service that eliminated waste to landfill. The projected savings amounted to 5 million pounds over the 4 year contract.

The Rotherham NHS Foundation Trust decided in 2006 it needed to reduce carbon emissions and costs of hospital ward lighting, while ensuring high quality services to patients. The project team secured management approval to start an FCP and subsequently announced a market consultation through a prior information notice published in the Official Journal of the European Union (OJEU), more than 2 years before the solution was needed on site. Engagement of the market was performed in 2 stages. First, suppliers were asked to complete a short market sounding questionnaire. A workshop was subsequently organized. Based on the input from the market, the project team developed a procurement strategy which involved refined outcome-based requirements, a refined pre-qualification questionnaire to be used during the competitive dialogue and whole-life costing. A pan-European consortium of suppliers won the contract and delivered a modular solution, with integrated biodynamic lighting, trunking and storage for patients and staff, at the same cost as a standard ward solution.

Source: Hendrik van Meerveld, Joram Nauta and Gaynor Whytes, 'Forward commitment procurement and its effect on perceived risks in PPI projects' in Charles Edquist et al (eds) *'Public Procurement for Innovation'* (Edward Elgar Publishing 2015)

By including greening the environment as a quality improvement to be achieved by the procurement, a PPI may lead also to significant environmental benefits. A study in 2015 in the Netherlands calculated the potential impact of PPI on reducing carbon emissions in road infrastructure.¹⁹ They concluded that procurement of 10 selected innovations in road construction, maintenance and recycling or disposal could potentially reduce greenhouse gas emissions by 37% for both the main road network and the asphalt roads in the secondary road network, by 28% for both bricks and concrete element roads, and by 84% for maintenance and control of the total road infrastructure.

In Sweden, NUTEK, the precursor of the Swedish Energy Agency, has assessed in 2006 and 2007 the effects of ten of the most important PPIs (called technology procurements in Sweden) that have been performed since 1990 (heat pumps, Energy efficient motors, Cold counters, FTX systems, Individual heat metering, Control and monitoring systems in premises, Motion detection lighting systems, Copiers, Tap water armatures, Freezers/refrigerators). Bringing these technologies to the market created energy savings that reduced by 15% Sweden's dependency on nuclear energy.

Source: <http://www.ecomotion.us/results/pdfs/108es.pdf>

3.2.2 Helps innovative (start-up) companies to grow

PPI may fuel the growth of European companies by provide a leading edge to serve potentially larger markets. These companies may be able to export and create additional economic outputs.

When the government is a large user of innovation it can enable innovators to reduce costs and to extend into private markets. By acting as first buyer, the government will signal the market acceptance

¹⁹ Keijzer, E. E., Leegwater, G. a., de VosEffting, S. E. & de Wit, M. S. (2015), 'Carbon footprint comparison of innovative techniques in the construction and maintenance of road infrastructure in The Netherlands' *Environmental Science & Policy*, 54, 218–225.

of the innovation and will encourage other (public and private) customers to adopt the innovation. In this manner, PPI can significantly contribute to speeding the adoption and diffusion of innovations. Public procurement has a positive and significant impact on the commercialization of products that are new to the whole market (measured in sales). PPI provides firms with immediate sales opportunities and has the greatest impact on small firms with limited financial resources.²⁰ Indeed, particularly innovative start-ups often struggle to find the first customer to begin their 'reference list'. A public contract can fill this credibility gap and help these companies grow.²¹

EXAMPLE Austrian Mint - PPI of Vacuum vaporizer based waste water recycling system

The Austrian Mint, the entity responsible for coin production in Austria, required a new solution to treat the residual water (wastewater) left over from the production of coins, as at that time the treated water still contained high amounts of chemicals which exceeded legal limits. A thorough analysis of the market was conducted before tendering with market research indicating that three potential technologies were available on the market: chemical treatment of wastewater, filtration and vaporization. The Austrian Mint came to the conclusion that a vaporization system would be the most sustainable solution and would also allow it to meet its ISO 14001 requirements.

The Federal Procurement Agency initiated the procurement for the Austrian mint for planning, delivery, installation and bringing into service a wastewater treatment plant (vacuum evaporation) including maintenance and service. A negotiated procedure was used that was split into three phases. In the first phase suppliers were invited to provide information on their qualifications as a company. After that suppliers submitted their first offer which included a calculation for the Life Cycle Costs (LCC) and a full report with detailed information on wastewater consumption and the savings of the proposed system as well as concentration of waste filtered. Based in the results of the study suppliers were invited to submit their final offer.

The contract was finally awarded to Schell GmbH, a family-run business with around 20 employees. The innovative solution is now used by the mint to clean water contaminated during the production of coins and notes. The new system reduces the need for fresh water by 97 percent, savings 4 million liters of water per year. The easy to install innovation can be used to filter a wide range of particles such as metal, galvanic, photo, print, pharmaceutical, food, etc., making it suitable for use in a variety of industries. A good example of how PPI procurement can improve the access to markets and foster the market uptake of innovations.

Source: http://ec.europa.eu/environment/gpp/pdf/news_alert/Issue58_Case_Study117_BBG_Austria.pdf

3.2.3 Incentivizes companies to invest in innovation

PPI does not finance the R&D or innovation activities needed to bring the innovative solutions to the market, but it creates the market incentives for suppliers to make these investments themselves. PPI sends a signal to industry that the demand side is ready to introduce and diffuse a significant volume of novel solutions. This can encourage companies and private investors to finance the later stage

²⁰ Birgit Aschhoff and Wolfgang Sofka, 'Innovation on Demand – Can Public Procurement Drive Market Success of Innovations?', page 2, ZEW Discussion Paper, No. 08-052, Centre for European Economic Research.

²¹ Memorandum by Professor Luke Georghiou, Professor Jakob Edler and Dr. Elvira Uyarra, Manchester Institute of Innovation Research, MBS, University of Manchester.

innovation activities that are needed to bring the solutions to the market (e.g. make final product adaptations, move to large scale production, setup wider product distribution channels). When a single procurer cannot create enough demand pull, procuring in group can be used to offer innovative companies the perspective of a large enough market to make these type of investments.

EXAMPLE Swedish PPI procurements in group to create sufficient demand pull for energy innovations

Since 1990, NUTEK (the precursor of the Swedish Energy Agency) has financed and initiated nearly 60 different PPIs (called technology procurements in Sweden). To create sufficient market pull, it grouped public and when possible also private buyers (e.g. municipalities and private building owners) interested to buy innovations with the same requirements. An open market consultation with industry clarified what level of innovation requirements can realistically be achieved by suppliers in the deployment time frame of the procurers, and how large the purchase volume needs to be to trigger industry to make the necessary investments to bring the innovations to the market. Based on this information, NUTEK published for the buyers group their requirements in terms of functions, characteristics and price and informed the market about their intention to purchase significant amounts of products. Suppliers were invited to come forward by a certain predefined data (e.g. 6 months or 1 year) to demonstrate whether their solution met the minimum requirements defined by the buyers group. Test/certification events were organized at the procurers' premises and participating products were classified into different categories matching different energy labels A,B,C,D,E etc. The buyers from the buyers group then launched individual procurements to buy the solutions they needed with the energy performance they wished. This approach of coordinated PPI procurements in group encouraged the industry to make the additional necessary investment to bring to the market more energy efficient appliances (light bulbs, washing machines, windows, heat pumps, refrigerators for public housing etc.).

Source: http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=7935

3.3 Benefits of PCP and PPI compared to other procurement methods

3.3.1 PCP/PPI versus traditional procurement

Traditional procurement is based on short-term tactical purchasing considerations, usually prioritizing low cost over quality or looking only at immediate instead of longer term cost/quality impact²². Lack of knowledge about technological solutions often leads to over or underspecified tender specifications. Procurement decisions are driven more by considerations to avoid deployment risks (fear to introduce 'new' solutions) instead of maximizing cost / quality improvements. This often leads to suboptimal overall value for money and technology / vendor lock-in.

It is perfectly understandable that their obligation to wisely spend tax payers' money makes procurers inevitably risk-averse. However, when innovation procurement is implemented as a smart PCP/PPI

²² European Research Area and Innovation Committee –ERAC – Secretariat (June 2015) ERAC Opinion on Innovation Procurement: <http://data.consilium.europa.eu/doc/document/ST-1209-2015-INIT/en/pdf>

combination, it is not a risky adventure. On the contrary, it becomes a strategic tool to systematically improve the quality/efficiency of public services whilst minimizing the risks of deploying 'new' solutions.

Replacing existing with innovative solutions typically requires initial investment that pays itself back over the life-time during which the solution is deployed and generates cost and/or quality improvements for the procurer. PCP can deliver procurers the proof that innovative solutions can truly generate such long-term benefits compared to existing solutions. Indeed, PCP enables procurers to de-risk novel technologies, remove supplier lock-in, and gain invaluable insights into the pros and cons of competing solutions 'before' making any commitments to deploy large volumes of solutions. Using two separate PCP and PPI procurements thus enables the procurer to take into account lessons learnt from the PCP to specify 'after' the PCP the optimal tender specs for subsequent deployment (PPI) This solves the main problem why many procurements today don't deliver the expected results and procurers often pay too much for suboptimal products²³: the problem that procurers already select or preselect specific vendors for deployment based on past credentials (*they should be able to develop me the desired solution*) 'before' collecting first the hard test evidence that proves whether their innovative solutions can truly generate better value for money compared to other solutions on the market. A smart PCP/PPI combination is thus what risk-aware procurers, who are committed to wisely spending our tax payers' money, really need to objectively motivate their decision to purchase innovative instead of existing solutions.

3.3.2 PCP and PPI versus the innovation partnership procedure

When should you use PCP-PPI, two separate but complementary procurements, versus a long-term vendor partnership that combines the purchase of R&D with the subsequent purchase of commercial volumes of end-products? As explained in the factsheet on innovation accompanying the 2014 public procurement directives²⁴, both are equally valid but different types of procurements that correspond to different situations. In order to make an informed decision, procurers should carefully weigh the arguments for choosing between the two approaches, as presented in the following table:

²³ For example in the e-health sector 70% of procurements do not reach their goals, see page 39-43 Idem 5

²⁴ Fact sheet on innovation accompanying the introduction of the new 2014 public procurement directives: http://ec.europa.eu/internal_market/publicprocurement/docs/modernising_rules/reform/fact-sheets/fact-sheet-09-innovation_en.pdf

	Two separate PCP - PPI procurements	Innovation Partnership procedure
When State aid free?	Considered State aid free if PPI is implemented through an open procurement procedure and if PCP is implemented in line with the conditions to avoid State aid listed in the 2014 R&D&I State aid framework ²⁵ (in line with the PCP Communication)	Considered State aid free only if the procedure is implemented in line with the conditions to avoid State aid listed in the 2014 R&D&I State aid framework ²⁵ and the procurer demonstrates beforehand that the procedure is used for the development and the subsequent purchase of 'unique or specialized products or services'.
Can be used in which cases?	<p>No legal restriction on the type of cases PCP-PPI can be used for.</p> <p>PCP is for the vast majority of the cases where the procurer needs a solution that is not so unique or specialized that it has to be developed exclusively for him, but instead there is a wide range of potential customers for the solution beyond the procurer. Typically many providers are interested to develop solutions for wide markets and it makes most sense to leave ownership of IPR generated in the PCP with the providers (encourages companies to commercialize widely which drives prices down for procurers).</p> <p>PPI can also be used for close to the market cases that don't need R&D (R&D has already finished or no R&D is needed (e.g. organisational or process innovation)).</p>	<p>Only in exceptional cases when the procurer needs products or services that are so unique / specialised that the procurer is the only potential customer for the solution and there are no other potential providers on the market outside of the innovation partnership, that could be disadvantaged.²⁶ When the procurer is the only customer, he has no other choice but to keep himself the IPR generated in the partnership (the IPR has no value for providers as there is no wider market beyond the procurer) and to pay the higher price for exclusive development.</p> <p>Innovation partnership procedure cannot be used for close to market cases that don't require R&D.</p>
Value for money?	Significantly higher quality products and on average 20% cost savings on the first deployments, compared to partnership approaches, because supplier lock-in is prevented as competition for contracts is kept till the end (incl. reopening of competition for the deployment - PPI). Product cost savings win back PCP cost. ²⁷	Restricting the choice of suppliers before there is test evidence which vendor on the market can deliver best solution creates a supplier lock-in effect that typically delivers lower quality and cost overruns because supplier that are comfortably settled in long term partnerships lose motivation to deliver top performance (lack of competition). ²⁸
Ability to de-risk deployment?	The procurer retains the freedom to modify the tender specs (the solution requirements) and to choose the most appropriate procurement procedure for the PPI 'after' the	High risk of inferior solutions as the procurer is forced to restrict the choice of suppliers for deployment from the start when there is no test evidence yet that solutions from any of the

²⁵ Section 2,3 article 33 of the 2014 State aid framework for R&D&I

²⁶ Bernhard Von Wendland, 'New rules for State aid for R&D&I: Not a revolution but a silent reform', (2015): http://estal.lexnion.eu/data/article/7535/pdf/estal_2015_01-012.pdf

²⁷ Von Wendland (2015) page 41-42

²⁸ Von Wendland (2015) page 30

Room for break-through R&D?	PCP based on the lessons learnt from the PCP. Commitment to deploy is only needed 'after' test evidence shows that solutions developed in the PCP are indeed better than others on the market. This ability to de-risk a large scale, large cost, deployment contract with a small scale cost R&D contract enables procurers to focus the PCP on real breakthrough R&D.	vendors in partnership will be better than others on the market. No possibility to choose the most appropriate tender procedure or to substantially change the requirements for the deployment phase based on lessons learnt from the R&D phase. High risk of failure ²⁸ creates tendency to focus on incremental adaptations to existing solutions instead of radically new breakthrough R&D.
Creating growth and jobs in Europe?	As procurement of R&D services falls outside of WTO government procurement agreement, PCPs 'can require' suppliers to locate the majority of the R&D and first production activities 'in Europe'. This encourages innovative companies to reinforce R&D and production activities and thus to create growth and jobs 'in Europe'. Starting PCPs in advance of the rest of the world and concatenating PPIs right after such PCPs can also create a first mover advantage for such companies to win follow-up big PPI contracts (creating lead markets).	Long term vendor partnerships that combine the purchase of R&D with large scale deployment fall under the WTO government procurement agreement. If such contracts are won by non-European suppliers, procurers 'cannot require' them to locate R&D or production activities in Europe. Suppliers that are not in the partnership, but 'do' invest in similar R&D activities in Europe during the R&D stage of the contract are not allowed to compete for the deployment stage of the partnership contract. This is a missed opportunity that has negative impact on growth and job creation in Europe.
Helping SMEs to access the market?	Facilitates the access of SMEs to the market because of (1) 'gradually' increasing contract sizes (first small PCP in phases, then larger PPI) and (2) no stringent selection criteria in PCP. Easier for SMEs to enter the PCP and to grow during the PCP into a stronger business that is able to compete against larger established vendors by the time procurement for follow-up PPI starts.	Restricts the access of SMEs to the market because the combination of R&D and deployment into one procurement (1) raises the contract value to one large purchase that small companies cannot handle and (2) obliges SMEs to meet the stringent qualification and financial guarantee requirements, that normally only apply for deployment contracts, already from the start of the partnership before starting R&D.
Impact on other R&D investments?	Companies that have developed products outside the PCP can still compete for deployment contracts (PPI). No crowding out of the major sources of R&D investment in Europe (own company R&D resources, public R&D grants). Encourages suppliers outside PCP to invest in R&D.	Only companies whose R&D was financed by the partnership can win the contract for deployment. Serious risk of crowding out of all other R&D investments in Europe (public R&D grants and private R&D investments worth 200 €Bn/year). Discourages suppliers outside partnership to invest in R&D.

Figure 3 - PCP followed by PPI approach versus the innovation partnership procedure

Even though the 2014 public procurement directives are still under transposition in many countries, some of the large procurers with experience on innovation procurement have already determined their strategy on when to use PCP-PPI versus the innovation partnership procedure.

The view of a large procurer on when to use PCP-PPI versus the innovation partnership procedure

"The differences between the 2 approaches (PCP/PPI and Innovation partnership) are really interesting and the use of one or the other method depends on the situation. If a special need of a particular (unique/highly specialized) solution is detected, the innovation partnership will be the best way to address this need. But indeed, the PCP/PPI approach offers a better overview of what it is possible to develop solutions to address global needs.

The separation of the 2 phases, R&D through PCP and procurement of the solutions through PPI, is much more secure for a procurer than the innovation partnership procedure, even more for a Central Purchasing Body as RESAH which represents many organizations and so many different needs."

Source: Dominique Legouge, Director of Resah-Idf (Réseau des acheteurs hospitaliers Région Île-de-France, the central purchasing body for hospital procurement in the Île-de-France region: www.resah.fr)

4 Defining an innovation procurement policy

Procurers identify a number of barriers that need to be overcome to start innovation procurement:²⁹

- budget and time (staff shortage) constraints;
- lack of incentives for engaging in innovation procurement / risk-averse public sector culture;
- high learning and switching costs for potential end-users when adopting new solutions;
- higher costs of the first batch of innovations (benefits come with time after the investment);
- lack of experience to articulate advanced technological requirements;
- trade-off between complexity of coordination and the advantages of pooling demand (cost savings, impact on supply chain) when more procurers are involved.

“Procurement is primarily regarded as an administrative function, rather than one of several strategic functions in the organizational development of the public sector. Unlike in the private sector, procurement managers in the public sector are rarely included in the management team. As long as public procurement is not seen as a strategic issue in the organization itself, it probably has far to go before it becomes a driver of economic development.”

Source: VINNOVA (the Swedish Governmental Agency for Innovation Systems), ‘Public Procurement as a driver for innovation and change’ (2006)

By defining an innovation procurement policy, policy-makers can address the above barriers. Indeed in countries that have such a policy, the innovation procurement policy works as a crucial incentive for public procurers to engage in innovation procurement. It provides a policy and support framework that creates the incentives for procurers to put modernization of their public services as strategic priority, provides support in creating the buyers groups that are needed to create enough demand pull, and trains and assists them in market and cost-benefit analysis to identify those innovation procurement opportunities that will bring clear return on investment for the procurer.

An innovation procurement policy can be adopted at national level, at regional or local level, or even by individual public procurers. The policy could address innovation procurement in a specific sector (e.g. when the procurer is an important market player in this sector or there is a specific need or opportunity for public sector modernization in this sector) or could be defined as a broader innovation strategy across various sectors that interlinks with other innovation instruments.

EXAMPLE of sectorial national innovation policy, embedding innovation procurement

In Sweden, a national policy was formulated, addressing the water sector. The policy mentions innovation procurement (both PCP and PPI) as important tool for achieving the policy goals. Other tools mentioned are: subsidies for R&D projects and for testing and demonstration activities, awards, creating consortia for full scale implementation of innovations, support to SMEs for participating in Horizon 2020, support to SMEs in commercializing their innovations etc.

Source: http://www.svensktvatten.se/PageFiles/5511/Strategic_Water_Innovation_Programme_Application.pdf

²⁹ Amann, M. and M. Essig (2015). "Public procurement of innovation: empirical evidence from EU public authorities on barriers for the promotion of innovation." Innovation: The European Journal of Social Science Research: 1-11.

This section outlines the steps policy-makers should consider in creating an innovation procurement policy. It is particularly based on the recommendation made by policy-makers of EU Member States with experience in the implementation of innovation procurement policy (the ‘ERAC Opinion on innovation procurement’) and in particular on the Austrian innovation procurement policy.³⁰

Opinion of the European Research Advisory Committee (ERAC) of the European Council

In the ERAC Opinion in innovation procurement, policy makers from EU countries with experience in innovation procurement policy-making have defined the most important steps in the set-up of an innovation procurement policy:³¹

1. “Create a strategic framework for innovation procurement, together with an action plan. The framework should contain definitions, goals and indicators, tools and activities as well as roles and responsibilities;
2. Set up a national coordinating service offering support to contracting authorities and raising awareness on innovation procurement;
3. Provide financial incentives for contracting authorities to undertake innovation procurement, in the form of grants or loans.”

Source: <http://data.consilium.europa.eu/doc/document/ST-1209-2015-INIT/en/pdf>,

ERAC opinion innovation procurement, June 2015

We identified the following most important steps in the policy-making process:

- 1 Clear political commitment to implement innovation procurement
- 2 Preparatory work for the formulation of an action plan
- 3 Formulate the action plan
- 4 Periodical assessment of the working of the innovation procurement policy

Each step will be explained in more detail.

4.1 Clear political commitment to implement innovation procurement

Innovation procurement requires cooperation across government departments, often when there are no working processes in place.³² To put in motion the needed change in behavior and in administrative structure, an official governmental decision should be taken to formulate an innovation procurement policy as input for the subsequent formulation of an action plan.

“If a higher degree of [innovation] procurement is to be achieved, a fundamental change to the structure of incentives in procurement by public authorities will be necessary. This will have to be based on the marking out of clear positions and a clear commitment from government and Parliament, as mandators of public sector activities.”

Source: VINNOVA (the Swedish Governmental Agency for Innovation Systems), ‘Public Procurement as a driver for innovation and change’ (2006)

³⁰ Based on an interview with Eva Buchinger, PCP/PPI expert at the Austrian Institute of Technology.

³¹ ERAC Opinion on Innovation Procurement (2015), ERAC 1209/15 p.2.

³² ERAC Opinion, p.5.

4.2 Preparatory work for the formulation of an action plan

- I. **The first step** for the policy-maker is to acquire a thorough understanding of the rationale behind implementing PCP and PPIs.

This understanding could be acquired through:

- desk studies;
- meetings with PCP/PPI experts; and
- meetings with government officials in other countries with expertise in defining and implementing public policy related to innovation procurement.

EXAMPLE of approach to capacity building

In May 2006, the Swedish government commissioned Nutek and VINNOVA, in consultation with the Swedish National Board for Public Procurement (NoU) “to examine how public procurement can contribute to developing innovation and creative renewal. The study is to include investigation as to how procurements may be structured in such a way that, to a greater extent, they drive forward technological development and business opportunities.”

The commission included assessing:

- a) which methods are the most appropriate to an innovation promoting procurement process the sectors in which the need is most urgent for establishing conditions to enable public procurement to become a driver of innovation and renewal; and
- b) the extent to which the development of public procurement may have an important role to play in implementing the strategic programmes formulated for key sectors in Sweden.

The report from the agencies was structured in such a way that it could serve as the basis of a policy including guidelines for public procurement as a driver of innovation and renewal.

The report concluded that Sweden already had large experience on PPI, but lacked implementation of PCP. A dedicated VINNOVA programme for the implementation of PCP was setup as a result.

Source: <http://www.vinnova.se/upload/EPIStorePDF/vp-07-03.pdf>
<http://www.vinnova.se/sv/innovationsupphandling/>

- II. **The second step** is to involve key stakeholders in the formulation of the innovation procurement policy, in order to identify barriers to the implementation of the policy as well as opportunities. At this stage it is important to clearly convey the need for change and the reasons why PCP and PPI are important. Involvement of the stakeholders is important:
- to build awareness of the need for the PCP and PPI policy;
 - to build acceptance for the envisaged policy;
 - to create the feeling of ownership;
 - to increase the willingness of public procurers to subsequently implement concrete PCP and PPI projects.³³

³³ Austrian Institute of Technology, ‘The Austrian PPPI Strategy Process 2011/12’, December 2012.

Key stakeholders are:

- political leaders who can provide support for the adoption of the policy,
- public officials who can ensure the coordination of the policy implementation and
- public procurers who are expected to deploy the policy, suppliers etc.

The following topics should be discussed with stakeholders:

- the feasibility of the policy,
- the objectives,
- the beneficiaries; and
- the needed funding.

Stakeholder involvement can be achieved through the set-up of an expert group and a coordinating group that will organize working groups, broader consultations, workshops.

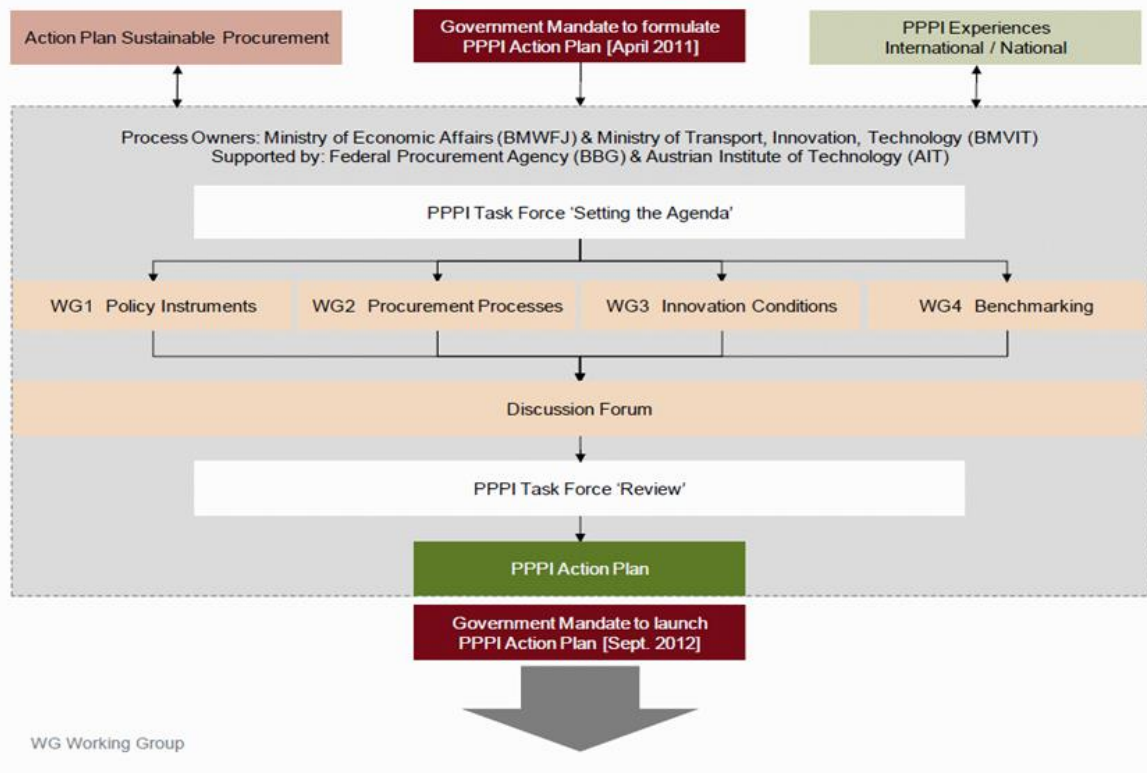


Figure 4 - Key stakeholder involvement in the Austrian PPPI Action Plan³⁴

III. **The third step** is to integrate the innovation procurement policy into the broader R&D and innovation policy.

This entails for example, making an overview of the already made public investments in R&D (e.g. subsidies) in specific areas of national strategic interest and identifying gaps with areas where public procurers still see a lack of innovative solutions that meet their needs. These areas could be set as priorities for PCP and PPI projects. In addition, possible synergies with EU innovation procurement policies could be verified. Moreover, the policy-makers could envisage making government laboratories and research infrastructures available to participants in innovation

³⁴ Source: Austrian PPPI Action Plan

procurements. This could lower costs for both procurers and suppliers for e.g. testing and could encourage the participation of small companies.

IV. The fourth step is to analyze the framework conditions (procurement regulations) and to eliminate potential barriers to implementation, for example:

- Include innovation procurement as specific objective for public procurement with binding targets for public procurers, to avoid that policy objectives are not achieved;
- Define how to conduct PCP and/or PPI by means of decrees, circulars or guidelines (including guidance on how to define suitable IPR strategies for PCP projects, on how to limit administrative burden in order to facilitate the participation of SMEs etc.).

V. The fifth step is to tackle cultural obstacles and the risk-averse attitude of public procurers.³⁵

Unlike the implementation of supply-side innovation measures (e.g. subsidies), which is usually concentrated in a few public agencies, the innovation procurement policy should be implemented by a large number of public procurers. This may be hampered by insufficient skills and capabilities and by the resulting risk-aversion of public procurers.

Policy-makers should be aware that failure in a PCP/PPI project may be associated with important career penalties for public procurers, while the reputational benefits may not be immediately visible. Non-R&D public procurement budgets are often linked to obligations of delivery and value-for-money, with no incentives for the procurers to take the risks of innovative procurement.³⁶

Addressing this barrier requires:

- *Defining clear roles and responsibilities*

Government agencies that are important end-users and have advanced needs, may be identified and mandated to implement PCP and/or PPIs. In addition, a central/national coordinator, could be created, with the aim to provide assistance and to assess the performance of the implementing agencies.

The tasks of the central coordinating function could include the following:

- Map promising innovative procurement early demand opportunities and identify strategic innovative procurement sectors, according to the political specificities of the Member State (for instance: healthcare, transport, housing, energy).
- After inviting different public procurer to present an annual innovation procurement plan, setting out the innovation procurement projects with forecast amounts and/or targets, this coordination service would then support the management of these plans with an innovative purchase referent in each department.
- Publish the plans and targets to enable companies to identify companies' future markets so they can position themselves upstream. This will also facilitate the reporting of innovation procurement qualitatively.

³⁵ ERAC Opinion page 7.

³⁶ See also House of Lords page 11.

- Facilitate networking and knowledge-sharing among stakeholders, coordinate implementation initiatives such as trainings, online platforms, trade shows etc. Specialised trainings to mobilise public procurers for innovation procurement should enhance the involvement of different actors into market dialogues.
- Provide support and advice to buyers on defining innovation, solving legal and contractual aspects of innovation procurement procedures, EU instruments available in Horizon 2020 and European Structural and Investment Funds (ESIF).
- Spread best practices among regional and local authorities in order to facilitate awareness raising and peer-learning on innovation procurement. This should also include assessment tools regarding both risk sharing management and benefits of innovation procurement.

Source: ERAC Opinion 2015

- *Capacity building through:*
 - awareness raising activities (such as conferences, newsletter etc.);
 - trainings;
 - permanent helpdesk.
- *Creating incentives:*
 - awarding prizes for innovation procurement;
 - offering co-funding for public procurers to prepare and implement PCP and PPI.
- *Providing clear recognition and acceptance of the risks of innovation procurement:*
 - Risks need to be understood, accepted and tolerated to a certain degree. A suitable approach might be to create a large projects portfolio that includes just a few high risk projects in order to spread the risk of failure. Politicians should be prepared to redirect the attention to the performance of the whole portfolio.
 - Insurance companies can be involved to offer guarantees that cover (part) of potential losses of purchasers due to unsuccessful innovation procurements etc.

EXAMPLES of incentives for innovation procurement

In Finland, TEKES is running a programme “Smart procurement” (2013-2016) which provides a financial incentive for public procurers in Finland to undertake more “innovative” procurements. The programme budget is about EUR 60 million of which Tekes will cover half. TEKES funds the planning of public contracts aiming at renewal of services and activities. This funding is targeted at all Finnish public procurers, and it typically covers 50% of total project planning costs. The procurement must be extensive enough to have an impact on the development of the sector, at least regionally. The planning and preparation of a PPI procurement should encourage active dialogue with potential tenderers and end-users. Additionally, strategic commitment to the PPI procurement is expected of the public procurer. Examples of successful projects include the “Flood risk warning system” for comprehensive

flood risk management as well as “Zero Energy Building” in Järvenpää testing innovative solutions for the energy-efficient constructions of a nursing facility.

Source: ERAC Opinion 2015, more info on TEKES smart procurement programme:
<http://www.tekes.fi/en/programmes-and-services/tekes-programmes/smart-procurement/>

4.3 Formulate the action plan

The action plan should embed the following parts:

- a. Analysis of starting situation – where we are;
- b. Vision, mission and objectives – where we want to be and what we want to achieve;
- c. Goals and strategies – how to reach there;
- d. Implementation:
 - identify projects - the policy-maker could start with sponsoring (a) pilot projects. The specific needs or areas of implementation could be decided by the policy-maker (e.g. ministry) following a call for ideas for innovation procurement topics from implementing public procurers. The policy-maker could also sponsor public procurers to set-up of open market consultations to enable communication with potential suppliers, the performance of foresight and market study processes or the formulation of technology roadmaps.
 - define timeframe for implementation;
 - allocate budgets to projects;
 - know-how and capacity building (e.g. training schemes, create a point of concentrated expertise, formulate guidelines, good practice networks etc.)
 - clear definition of responsibilities of key players, various institutions and stakeholders;
- e. Monitoring, evaluation and review – indicators of success and progress.

4.4 Periodical assessment of the working of the innovation procurement policy

It is important to ensure that all entities engaged in the procurement of innovation operate to the same consistent standards and have similar understanding of policy rules among them. In order to do this, a robust control system needs to be put in place, under the coordination of, for example, the above mentioned central coordinating function:

- setting up monitoring and measuring mechanisms, based on periodic reporting;
- reports would provide sufficient up-to-date and accurate information to evaluate compliance with the overall requirements for a successful innovation procurement;
- the indicators of compliance and progress used in the evaluation could be:
 - the amount of procurement budgets allocated to PCP and PPI;
 - the percentage of R&D contracts within the total budget spent (portion of PCP);
 - wide market consultation and engagement of potential providers

In addition, it is important to evaluate the impact of the policy and to introduce changes accordingly against the broad targets of the innovation procurement policy:

- to stimulate technological innovation and boost economic growth; and
- to provide public authorities with new cost-effective solutions to fulfil their needs.

Impact indicators could thus entail:

- the impact on business opportunities for providers that participated in PCPs/PPIs. (e.g. employment and sales growth as a result of being involved in the innovation procurement);
- the level of quality and efficiency improvements (e.g. cost savings) generated by the PCP/PPI for the public procurer that implemented the innovation procurement;
- wider societal benefits e.g. environmental protection of the new solution

MEASURING innovation procurement

Innovation procurement has not been included in the regular collection of data by member states in the past. This situation is slowly changing.

- On the European level, [innovation procurement](#) is included as part of the [Innobarometer Survey](#), the [Community Innovation Survey](#), and the [Public Sector Innovation Scoreboard](#).
- On national level, several countries started monitoring activities and are preparing assessments and evaluations – e.g. Austria, Estonia, Finland, France, Germany, Ireland, Italy, Lithuania, Norway, Portugal, Spain, and Sweden.
- The [European Commission](#) and the [OECD](#) are working on the development of standards for the monitoring and [measurement of innovation procurement](#).

Source: European Research Area and Innovation Committee –ERAC – Secretariat (2015), ERAC Opinion on Innovation Procurement, p.12. <http://data.consilium.europa.eu/doc/document/ST-1209-2015-INIT/en/pdf>

Hereunder, we present several examples of national policies related to innovation procurement.

Germany

Germany defined guidance on how to make best use of public procurement in innovation policy and in the thematic R&D programs that develop new technologies and new scientific findings.

The High tech Strategy 2020 defines 5 areas which future technology development should target: climate/energy, health/nutrition, mobility, security and communication. The Strategy recommends the use of forward looking techniques to set specific objectives related to scientific, technological and social development over a period of ten to fifteen years.

In 2012, financial incentives were provided to German federal public procurers to undertake R&D intensive public procurements such as PCP. In addition, the Federal Ministry for Economic Affairs and Energy set up in 2013 a Centre of Excellence on public procurement that serves several roles:

- an online platform to promote best practices of innovation procurement;
- a virtual market place, where public procurers and providers communicate;
- information, advice and trainings to public procurers on cost-effective ways of purchasing innovative products and services; this includes information and advice on PCP;
- organization of an annual “Contracting Authorities Day”, which offers contracting authorities the

opportunity to discuss actual procurement issues;
awards an annual prize (“Innovation schafft Vorsprung” or “Innovation leads to advancement”) for an outstanding German innovation procurement.

Source: BMWI website

Austria

The Austrian action plan “Public Procurement Promoting Innovation PPPI” from 2012 aims at boosting the use of innovation procurement (PCP and PPI) in Austria. Previous to the implementation of the PPPI action plan, innovation procurement was a marginal issue in Austria. Therefore, the mobilization of public entities is most important. This was and is done by a comprehensive approach on the basis of the involvement and empowerment of public procurers.

The comprehensive approach unfolds as a support-structure consisting of interlinked actors and services. A central innovation procurement service centre (www.ioeb.at) was established in 2013 within the Federal Procurement Agency (BBG). It offers various services ranging from e-platforms to awareness activities and event organization to personalized consulting and training. All these services are well received by the procurement community. Subsequently in 2014, complementary innovation procurement competence centres have been set up in order to cooperate closely with the central service centre. At the moment there are commitments for “general competence centres” with the Austrian Research Promotion Agency (FFG) for PCP and the Austria Wirtschaftsservice (aws) for PPI.

Commitments for “sectoral competence centres” have been set up with AustriaTech for “smart mobility”, and with the Austrian Energy Agency for “energy”. The next commitment is on its way covering “buildings”. Beyond that the Austrian Economic Chambers (WKO) and the Platform of Procurers of the Austrian Federal Provinces have agreed to serve as PPPI “contact centres”. To achieve a proper coordination a “PPPI Board” was established, including all above mentioned actors plus key-procurers. Finally, the legal dimension – i.e. amendment of the procurement law by including innovation as an explicit issue, 2013 – completes the comprehensive Austrian policy approach.

Within this policy, a national PCP-scheme was designed and implemented, which gives the procurers the central role concerning the thematic issues and involves them beyond that in the financing. The Austrian PCP-scheme is co-financed by the Ministry for Transport, Innovation & Technology (BMVIT) and the Ministry of Science, Research and Economy (BMWFW) and administered by the Austrian Research Promotion Agency (FFG).

Two PCPs in the transport sector were completed in 2014. The procurers – the Austrian Railways (ÖBB-INFRA) and the Austrian Highway Agency (ASFINAG) – are quite satisfied with the results. Two further PCPs are ongoing; one dealing with innovative solutions in the building sector with the Burghauptmannschaft Österreich (BHÖ) as the procurer and the other again dealing with transport challenges (ÖBB-PRODUKTION). PPI implementation is also growing. The exchange events attract an increasing number of participants & contributors from the public sector as well as from the industry.

A competition for PPI-service-vouchers that supports procurers in preparing a PPI (80.000 €) was successfully completed in 2014 (5 excellent PPI projects were selected, see: <http://www.ioeb.at/ueber-ioeb-und-die-servicestelle/news/news-detail/ioeb-projektwettbewerb-2015-bis-zu-80000-eur-fuer-ihre-innovativen-projekte/>).

The cooperation with the green procurement action plan & service center is another important aspect of the growing mobilizing power for PPI.

Sources: Buchinger, E. (2014) Policy brief: Implementation of the Austrian PPPI action plan (Public Procurement Promoting Innovation), Vienna: Austrian Institute of Technology.

Objective	Increasing the share of innovation related public procurement in Austria			
Principles	Demand-side innovation policy	Combination of policy instruments (policy mix)	Incentives to increase industrial R&D	
	Public procurers as "intelligent customers"	Better services for citizens	Establishment of reference markets	
Pivotal elements	Strategic aspects	Operational aspects	Legislative aspects	Monitoring & benchmarking
	<ul style="list-style-type: none"> Political commitment Procurement strategies Setting objectives & priorities Dialogue Communication of benefits Sectoral characteristics SME 	<ul style="list-style-type: none"> Qualification & training Institutional setting Risk aversion of procurers Budgets & spending Awareness Controlling & evaluation 	Innovation as explicit as well as implicit objective of procurement	Outcome orientation
Measures	innovation related procurement plans	PPPI-Service-Point and PPPI-Competence-Centers	Amending procurement law	Establishment of monitoring system
	Political support	PPPI stimulation programs & PPPI pilots		
Synergies	RTI-Strategy	naBe action plan	Lead Market Initiative	Europe 2020 and Innovation Union

Figure 5 - Overview Austrian PPPI Action Plan

Source: Austrian PPPI Action Plan

5 Linking innovation procurement policies with local/regional development and international cooperation policies

When creating an innovation procurement action plan, it's important to identify which procurements can best be carried out by procurers nationally versus which ones would benefit more from international cooperation. Procuring in group enables public procurers to offer a large enough market perspective to incentivize innovative companies to invest in high risk R&D (PCP) and wide product commercialization (PPI). Pooling purchasing power also offers public procurers more leverage in contracting with companies and enables procurers to share expertise and the costs of implementing innovation procurements. The EC co-finances groups of procurers from different EU Member States and associated countries who share a common challenge and wish to undertake a PCP or PPI together.³⁷ This happens since 2012 under the FP7, CIP and the Horizon 2020 program.

When creating an innovation procurement action plan, it's also a good idea to identify which procurement needs correspond to specific local/regional priorities. In addition to using own budgets for innovation procurement, public procurers in EU Member States can obtain co-financing from the European Structural Funds and Investment Funds (ESIF) program to undertake - on their own - PCPs and PPIs that match priorities identified in the smart specialization strategy of the city/region.

Policy-makers can thus reinforce their innovation policy by:

1) Using in addition some ESIF Funds³⁸ for local/regional innovation procurements

Including innovation procurement as condition for receiving structural funds is possible due to the fact that ESIFs support massive investments, mostly via large scale public procurements (e.g. such procurements accounted for 46% of the total Cohesion Policy budget in 2007-2013), in the following sectors: transport, environment, energy, ICT infrastructure, urban development, health, research and education infrastructure.³⁹ These sectors *“are employment-intensive, have a great need for innovation and are areas in which European industries are world leaders”*.⁴⁰

The new 2014 ESIF rules encourage investments in R&D and innovative solutions that increase the capacity and efficiency of public administration and address key societal challenges.

³⁷ More details on the calls for proposals across the different Horizon 2020 work programs in support of PCP and PPI, can be found here: <https://ec.europa.eu/digital-agenda/news/calls-eu-funding-opportunities-pre-commercial-procurement-and-public-procurement-innovative>.

³⁸ There are five ESIFs: European Regional Development Fund (ERDF), European Social Fund (ESF), the European Agricultural Fund for Rural Development (EAFRD), European Maritime and Fisheries Fund (EMFF) and Cohesion Fund (CF).

³⁹ European Commission, 'Public Procurement as a Driver of Innovation in SMEs and Public Services' (2014).

⁴⁰ See European Commission, 'Public Procurement of Innovative solutions (PPI) for the benefit of public services and SMEs/businesses in Europe' (Draft version. EGESIF_14-0023-00 PPI, page 19), See <http://www.dgfc.sggp.meh.es/sitios/dgfc/en-GB/cfr/cocof/Paginas/DocumentosEGESIF.aspx> document EGESIF_14-0023-00 PPI.docx' under option I+D+i. Also see European Commission, 'Enabling Synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes – Guidance for policy-makers and implementing bodies' (2014), <http://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_en.pdf> accessed 7 April 2015.

They allow the ESIF Managing Authorities in each country to explicitly include innovation procurement as a type of action to be used in the ESIF Operational Programmes (OPs) under different Thematic Objectives (TO) to achieve the Investment Priorities (IP) of those objectives. There are three possibilities:

- I Managing Authorities that want to foster R&D and innovation in public procurement across sectors can launch calls for proposals that co-finance the implementation of PCPs/PPIs by public procurers in any sector whose proposals address topics that are most suitable for PCP/PPI, from the budget of:
 - TO 1 (IP1B) Strengthening research, technological development and innovation
- II Managing Authorities that want to foster the use of innovation procurement to meet specific public needs in specific areas of public interest can launch PCP/PPI calls in the TOs matching those areas. Procurers can also directly use PCP/PPI as an instrument inside a project funded by a call for proposals from the Managing Authorities to address the following specific TOs objectives:
 - TO 1 (IP1A) Enhancing research and innovation (R&I) infrastructure
 - TO 2 (IP2C) Strengthening ICT applications for e-government, e- learning, e-inclusion, e-culture and e-health
 - TO 4 (all IPs) Supporting the shift toward a low –carbon economy in all sectors
 - TO 5 (all IPs) Promoting climate change adaption, risk prevention and management
 - TO 6 (all IPs) Preserving and protecting the environment and promoting resource efficiency
 - TO 7 (all IPs) Promoting sustainable transport and removing bottlenecks in key network infrastructures
- III In addition, Managing Authorities can use the following TOs to improve the administrative capacity of procurers across different sectors to implement innovation procurement procedures (e.g. via trainings funded by TO11) and to encourage the use of ICT applications to implement innovation procurement procedures more efficiently (e.g. via e-procurement funded by TO2):
 - TO 11 (IP11) Enhancing institutional capacity and an efficient public administration
 - TO 2 (IP2C) Strengthening ICT applications for e-government, e- learning, e-inclusion, e-culture and e-health

In addition to co-financing the actual procurement cost, ESIF can fund coordination, networking and preparation activities for the implementation of a PCP and/or a PPI via the ETC programme.

Lithuania and Hungary deploy ESIF funded innovation procurements

PCP and PPIs are planned under the National Hungarian R&D&I strategy 2013-2020. A first call for innovation procurements funded by Hungarian ESIF OPs is planned for 2nd half 2016.

Source: <http://www.nih.gov.hu/strategy/national-rdi-strategy/hungarian-rdi-strategy>⁴¹

The ministry of economics developed guidelines for PCP and the Lithuanian Agency for Science and Technology MITA provides (ESIF) co-financing for Lithuanian procurers to start PCPs.

Source: http://ec.europa.eu/information_society/newsroom/image/document/2015-50/lithuania_12535.pdf

⁴¹ 'Investment in the future. National Research and Development and Innovation Strategy (2013-2020).' See site: <http://www.nih.gov.hu/strategy/national-rdi-strategy/hungarian-rdi-strategy> and search for 'National RDI strategy'. See search result '[National RDI strategy](#)'. October 10, 2013'.

2) Applying for Horizon 2020 funding for PCPs/PPIs that benefit from international cooperation⁶⁰

The Horizon 2020 program offers the following types of funding that enables groups of procurers:

- To prepare and undertake together a PCP or PPI procurement (calls for PCP actions or PPI actions).
- To cooperate on identifying opportunities and preparing for future PCPs / PPIs (calls for coordination and support actions)

The calls for proposals to apply for this funding are published via the Horizon 2020 participant portal: calls exist in several domains like Health, Security, Energy, Transport, Space, Climate Change / Environment, European Research Infrastructures, Information and Communication Technologies.

Procurers about the benefits of procuring in a European cooperation

“We have definitely strengthened our position with the marketplace by joining partners with Rijkswaterstaat (to implement the CHARM PCP that aims to create an open modular architecture for the next generation traffic management centers). To say we are buying for 14 traffic management centers has really caught the market's attention and made them listen and respond to us.”

Source: Ian Chalmers, project manager for the CHARM PCP funded by the FP7 program, Highways England

3) Creating synergies between the use of Horizon 2020 and ESIF funding⁴²

There are several possible synergies between Horizon 2020 and ESIF funding for PCP/PPI⁴³:

- Joint or simultaneous use of funds (when different activities in a PCP/PPI are funded either by Horizon 2020 or by ESIF). For example, the coordination and preparation of a PCP is co-funded by ESIF, while the execution of the PCP contracts is co-funded by Horizon 2020.
- Sequential funding (e.g. when PCP is funded under Horizon 2020 and the PPI under ESIF).
- Additional funding (e.g. when ESIF money is used to enhance the skills of national/regional public procurers and end-users to use innovative products procured via Horizon 2020)
- Alternative funding (when ESIF is used to fund projects that have received positive evaluation under Horizon 2020, but were not funded due to the insufficient funds).

All the above scenarios require that the ESIF Managing Authority is aware of the Horizon 2020 calls at an early stage, in order to ensure synchronization between H2020 and ESIF calls. Of the above mentioned 4 scenarios, the sequential funding presents the lowest risk of illegal double funding of the same activity from more than one European funding source.⁴⁴

⁴² See European Commission, ‘Enabling Synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes – Guidance for policy-makers and implementing bodies’ (2014),

http://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_en.pdf accessed 7 April 2015.

⁴³ Vasileios Tsanidis, ‘Possible Synergies for innovation procurement between ESIF and Horizon 2020 in the programming period 2014-2020’ available at <http://s3platform.irc.ec.europa.eu/documents/20182/138105/ESIF-H2020synergiesforinnovationprocurement2016-17.pdf/1ab24a75-4168-4ebc-ab1d-a67e1ce85af4>

⁴⁴ Idem 41.

North Rhine Westphalia region – Example synergies between Horizon 2020 and Structural Funds

North Rhine Westphalia region has decided to financially help public procurers from its region to participate in EU funded PCP and PPI projects by financing the own contribution of public procurers to participate such projects up to maximum 200.000 EURO. Moreover North Rhine Westphalia region decided to kick start PCP and PPI projects that actively use Horizon 2020 and ESIF funding in synergy and appointed ZENIT as coordinator for such projects.

Source: <http://s3platform.jrc.ec.europa.eu/digital-innovation-procurement>