EUROPEAN COMMISSION
Directorate-General for Communications Networks, Content and Technology

Coordination
Innovation

Subject: Study: "Quantifying the impacts of PCP procurement in Europe based on evidence from the ICT sector" (SMART number: 2014/0009)

1. Context

Pre-Commercial Procurement (PCP) is an approach for procuring R&D services that is defined in the PCP communication COM/2007/799 and the associated staff working document SEC/2007/1668. PCP enables the public demand side to identify the best value for money solutions on the market to address a specific procurement need, by making use of competitive development in phases, risk-benefit sharing under market conditions, and a clear separation between the procurement of R&D services via the PCP and possible Public Procurements of Innovative solutions (PPI) focusing on deployment of commercial volumes of end-products.

The study shall focus on PCPs that are implemented in line with these key characteristics and are thus in line with the applicable exemptions from the EU public procurement directives and the WTO Government Procurement Agreement without involving State aid. Public procurement of innovative solutions (PPI) refers to a public procurement implemented according to the applicable EU and national Legislations, in which public procurers act as early adopter, possibly in cooperation with additional private buyers, by procuring innovative solutions that are new arrivals on the market but not yet available on a large-scale commercial basis. In this context, PCP and PPI are separate but complementary procurements. A split between PCP and PPI allows companies that have developed products through other means than a PCP (e.g. through SME funding instruments, other R&D grants, own company R&D resources) to still compete for PPI deployment contracts, avoiding issues of foreclosing of competition and crowding out of private R&D investments.

By acting as technologically demanding first buyers, public procurers can drive innovation from the demand side. This enables European public procurers to innovate the provision of public services faster and creates opportunities for companies in Europe to take international leadership in new markets. Reducing time-to-market, by developing a strong European home market for innovative products and services, is key for Europe to create growth and jobs in quickly evolving markets such as ICT.

To address this issue, Action 55 of the Digital Agenda for Europe puts forward a target to double total annual public spending on ICT R&D in Europe by 2020 and identifies PCP as a key instrument to achieve that goal. PCP and PPI are also new instruments in Horizon 2020, the new 2014-2020 European Union's research and innovation funding programme, to speed up the time to market for innovative solutions.

A number of PCPs and follow-up PPIs have taken place in Europe over the past years and similar experiences exist in other parts of the world. To encourage wider implementation across Europe, there is a need to collect quantitative evidence from concrete cases that demonstrate the benefits versus costs of undertaking PCPs. Addressing this gap is essential to encourage wider usage of PCP across Europe.

2. Objectives

The study will cover the following tasks:

- Build an evidence base to better quantify the – in particular economic - impacts of PCPs compared to traditional procurement approaches, based on experiences from US and Europe

- Make recommendations for new actions to be undertaken in Europe to encourage wider use of PCP

The contractor is required to address the following tasks:

4.1. Quantifying the economic impacts of PCP

The objective of the study is to collect evidence from in-depth research to quantify the economic impacts of the implementation of PCP in Europe and to synthesise the conclusions from this work an easily understandable format for high level policy makers around Europe to encourage wider use of PCP.

The study shall propose a methodology that enables to quantify and compare ex-ante expected impact and ex-post observed micro-economic impacts of PCP procurements with respect to other procurement approaches that differ in the key characteristics from PCP, e.g. procurement approaches with less competition over time than in PCPs such as long term partnerships that combine R&D and deployment into one procurement, approaches without multiple sourcing or without IPR ownership rights being allocated to suppliers, approaches where R&D procurements are not conducted by procurers that represent the real demand side for the innovative solutions.

Due to limited amount of fully completed PCP cases in Europe at present, the study shall propose a methodology that can extract at the moment the impacts that can be observed from a limited set of European PCP cases, but that is already forward compatible to extract the impacts from larger data sets of PCP cases that will become available over the coming years. The methodology proposed for PCP impact analysis in Europe should be crosschecked, in terms of taking into account valid types of expected impacts, also against evidence of already observed ex-post economic impacts of large data sets of PCPs that have been analysed over the past decades in the US.

Due to limited amount data on joint cross-border PCP cases in Europe at present, the study shall aim to quantify also from the impacts observed in PCPs done by single procurers the additional impacts that could be achieved if such PCP projects were to be performed also more frequently by groups of procurers from different European countries, thereby providing a basis to analyse the potential additional expected impacts of EU support to joint cross-border PCPs. Such expected impacts of larger scale EU funded PCPs compared to smaller scale national PCPs by pooling purchasing power and stronger cross-border cooperation between procurers include defragmentation of the public demand side across Europe.

The study shall analyse and quantify at least the following types of micro-economic impacts on the supply and demand side in at least 6 PCP cases across the US and Europe, including the cases referred to below:

1) Improvements in the quality and/or efficiency of the public services achieved by deploying the innovative solutions developed as a result of the PCP

The study shall provide quantitative evidence of quality and/or efficiency improvements achieved by concrete PCP cases taking into account PCPs conducted by procurers that represent the demand side for the innovative solutions developed during the PCP. The study shall take into account in particular results achieved by PCPs conducted by the US Department of Energy and Defense (in particular the supercomputing R&D procurements[1]), UK National Health service[2], UK ministry of Defence (e.g. R&D procurement to reduce the load carried by soldiers[3]) and Statoil Norway (Mongstad carbon capture PCP[4]).

[1] ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/pcp/pcp-final-ramboll-report-js2_en.pdf
[2] Examples of NHS PCP cases: http://cordis.europa.eu/fp7/ict/pcp/nhs-nic-od-2010.pdf
[3] http://www.science.mod.uk/events/event_detail.aspx?eventid=16
[4] http://www.statoil.com/en/TechnologyInnovation/NewEnergy/Co2Management/Pages/CO2Mongstad.aspx

The study shall compare where possible ex-post observed impacts versus ex-ante expected impacts / Key Performance Indicators (KPIs) that were set forward by the procurers that did a business case analysis or benchmarking to define the goals to be achieved by their PCP before launching their PCP (e.g. NHS UK).

2) Increase in quality and decrease in prices of products resulting from the highly competitive multi-sourcing, phased procurement approach that distinguishes PCP from other procurement approaches

The study shall analyse cases where there are multiple competitors in the R&D procurement developing alternative solution approaches to address the same procurement need and where the R&D procurement is split from any follow-up PPI procurement to maximize competitive pressure on firms to deliver best value for money. The study shall take into account in particular existing reports on cases conducted by the US Defense[5], including the impacts on the first unit acquisition cost and the procurement cost of larger volumes of such products in potential follow-up PPIs, and any other evidence from European PCP cases.

The study shall estimate the potential quality improvements and cost savings for Europe if PCP were to be mainstreamed across Europe and similar impacts as in the US on value for money on products procured were achieved in Europe.

3) Reduction in the risk of failure in large scale follow-up PPI procurements

Studies point out that around 70%[6] of public procurements for deployments of commercial solutions in the ehealth sector (ehealth = ICT solutions for healthcare) do not achieve the expected results. Reasons quoted in literature are that procurements run out of budget because of vendors with monopoly position charging too high prices and stalling project duration, or procurers wrongly specifying PPI tender specs because of lack of knowledge on pros and cons of different competing solutions on the market. Engaging in a PCP before launching such large PPI deployment tenders can significantly reduce this risk of failure and the budget lost by unsuccessful PPI procurements.

The study shall gather evidence on the effect of being better informed through a PCP about pros and cons of competing solutions before launching a PPI procurement on the success of the PPI procurement in reaching its goal, and estimate the potential costs savings for Europe from reducing the risk of failure in PPIs via PCPs by assuming a best and worst case reduction in the current failure rate of PPI procurements.

4) Increase in the efficiency of R&D expenditures

The study shall take into account US analysis[7] from several impact assessment studies that shows that traditional supply side R&D measures are prone to have a high failure rate reaching commercialisation success rates of ~ 26-30% for participating companies across the US[8]. As inadequate understanding of and guidance of the project goals by concrete user needs is identified as the most important reason for such high failure rate, the study shall collect evidence on the commercialisation success rates of companies in the R&D procurement programs run by the large US federal agencies (e.g. DOD, DOE)[9]. The study shall also analyse the commercialisation success rate in Europe (e.g. in PCPs of NHS UK).

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5 [5] Source: 'Competitive Dual Sourcing', Jacques Gansler, 7/10/2007. Based on analysis from Annex G, 'International Armaments Cooperation in a era of coalition security', report US Defence Science Board, August 1996. Based on RAND report that shows from analysis of 60 years of US cases that multiple-sourcing R&D procurements deliver steep increase in product quality and on average 20% cheaper products compared to similar single source procurements.

[6] Source: Pyramid consultancy

[7] Source: Hippel, E(2005), Democratizing Innovation, The MIT Press Cambridge, Massachusetts, USA. Online pdf copy of this book is available: http://web.mit.edu/evhippel/www/democ1.htm

[8] Hippel, E(2005), Democratizing Innovation, MIT Press Cambridge, USA. Impact assessment studies shows that traditional supply side R&D measures are prone to high failure rate (in producer driven R&D 70-74% of new developments do not get commercialised successfully). Inadequate understanding of user needs is identified as the most important reason for such high failure rate.

[9] http://www.ncbi.nlm.nih.gov/books/NBK32824/#summary.s2 (The data from US SBIR program referred to in this paper, are from those US agencies that implement the US SBIR program as procurements, not grants. PCP is similar to the procurement approach of these agencies.)

Based on this evidence to be gathered by the study, the contractor shall estimate the potential efficiency improvement in R&D expenditure in Europe by shifting from an almost purely supply side R&D support culture in Europe towards a more balanced demand and supply side R&D support approach, where part of the close-to-market applied R&D grants are replaced by R&D procurements.

5) Speeding up time-to-market for firms and facilitating the access of SMEs to the procurement market

By challenging companies to develop breakthrough products for public sector challenges for which there are no solutions on the market yet and by making development efforts on the supply side converge faster towards solution requirements on the demand side through early customer feedback, PCP can reduce the time-to-market for companies to gain first mover advantage[10] and gain leadership in new markets. There is evidence of such lead market cases due to PCP in US supercomputing and in the UK MOD load of soldier pack PCP.

The phased PCP approach with gradually growing contract sizes that follow the natural growth path of innovative start-up companies can facilitate the access of small innovative firms / SMEs to the (procurement) market. There is evidence that PCP-like US R&D procurement programs 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 and are often staying in the lead of Europe – e.g. in supercomputing - because of regular US PCP procurements that continue to challenge them to deliver every better products. Basically speeding up time-to-market for breakthrough innovations translates into an effect on the economy where more SMEs are able to make it to market leaders. This fuels the creation of more high skilled (R&D / high tech innovation) jobs, more tax income to the government, increased exports in the newly created areas of global industrial leadership.

There is also first evidence of the economic effects of time-to-market reduction for procurers in Europe in terms of saving time and money by getting better value for money solutions developed and installed much quicker (e.g. first evidence from NHS UK PCP cases and Statoil PCP case).

The study shall gather further evidence of the economic effects of time-to-market reduction in PCP cases around the US and Europe and estimate the potential economic impact on Europe if PCP were mainstreamed more widely in Europe across various sectors.

6) Attracting financial investors to Europe

Studies have identified that US public procurers successfully act as a seal of approval towards financial investors confirming the market potential of new emerging technological developments, thereby attracting new investors for the highly innovative companies that participate in the PCPs such as Venture Capitalists to the US[11]. Similar first effects have started to be observed in PCPs in Europe: companies in PCPs conducted by the UK National Health Service attract large amounts of venture capital[2] enabling them to grow faster and become also more financially stable suppliers to buy from for the procurers in later PPIs.

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

By setting interoperability requirements in the PCP tender specs, procurers can create de facto standards by encouraging a number of key providers on the market that participate in the PCP to adopt open interfaces, thereby reducing previous supplier lock-in situations. There is first evidence from

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[10] As reported by a former head of technology for Hewlett-Packard, Joel Birnbaum: "Getting to the market one month earlier is worth more than all the engineering and development costs of a typical Hewlett-Packard product, whereas six months changes the lifetime profitability of a product by 33 percent."

[11] The SBIC venture capital program in the US, Secrets of the worlds largest seed capital fund, Cambridge Centre for Business Research

benchmarking exercises conducted by some of the first EU funded PCPs (e.g. CHARM project) that PCP can create 20% cost savings by moving away from proprietary towards open IT architectures.

The study shall collect evidence from other US and EU cases on impacts observed on increase of interoperability and reduction of supplier lock-in and estimate the potential impact on Europe if PCP were to be mainstreamed more widely.

8) Impacts on competition structure in the market

As PCP provides a way to facilitate the entrance of new small innovative companies into the procurement market and offers ways to reduce suppliers lock-in via standardisation, the wider impacts on the competitive position of companies in the market are important to analyse as well. This includes the impacts of PCP on dominant firms market share, impacts on the ability for firms to enter in new markets, as well as the impacts of PCP in terms of creating incentives for competitors to additionally innovative and invest more in the the R&D process in order to regain market share.

9) Increased exploitation of IPRs and R&D results (IPR protected or not) in general

Most often in public procurements in Europe procurers still keep the ownership of all results (IPR and non IPR protected results) for themselves, discouraging companies in their procurements to exploit results and submit and exploit IPRs. In PCPs, companies obtain IPR ownership rights on their inventions (as is the standard case in the US already since beginning of the 80s).

The study shall gather evidence on the exploitation rate of R&D results, in particular IPRs, in R&D procurements in the US compared to Europe, and estimate the effect on increased protection and exploitation of IPRs (via commercialisation of products and/or licensing etc) that could potentially be achieved through wider adoption of PCP in Europe.

4.2. Recommendations for new actions to encourage wider use of PCP and the link with PPI

Based on the lessons learnt from the analysis in section 4.1 above, the study shall make recommendations for new actions to be undertaken at EU level (and where possible also at national level) to encourage wider use of PCP and the link with potential follow-up PPIs. This shall cover at least:

- Recommendations on how to integrate the lessons learnt on economic impacts of demand side PCP policies more prominently in economic planning by European governments when undertaking structural reforms, based on argumentation that enables PCP impacts to be measured and compared with impacts of other R&D/innovation policy measures such as R&D tax incentives, R&D grants/subsidies to firms etc

- Recommendations on effective new EU policy initiatives that can help mainstream wider use of PCP and the link with potential follow-up PPIs across Europe. Based on the analysis in 4.1 of the underlying success factors in terms of policy incentives that achieved real economic impact and on emerging national experiences in designing different types of incentive mechanisms to encourage more PCP/PPI to take place, recommendations are welcomed on what could be an effective way(s) forward at EU policy level.

    Should we go for setting a target at European level as is done in some European countries for a percentage of public procurement expenditure to be dedicated to PCP?

    Should this be combined with extending across more European countries the financial incentive schemes that exist at EU level as well in a few countries at national level to reduce the risk for procurers to undertake PCPs?

    Should this be accompanied with more extensive EU training of procurers?

    Should there be more large scale strategic initiatives where Member States to pool resources at European level to undertake PCPs in selected key flagship areas with high innovation potential?

Should the EU engage Member State to commit to a concrete action plan for mainstreaming PCP across different areas of public interest as a part of a more holistic approach to establish a more balanced supply-demand side R&I strategy?

- Recommendations on specific EU policy actions that could be undertaken to mainstream PCP more widely in the ICT sector in Europe in particular

- Lessons learnt on how to best conduct ex-post assessment of PCP projects and policies in Europe to best collect the impacts of PCPs in a more systematic way in the future

5.1. Deliverables, meetings and timetable

Phase 1: Preparation (at the latest, month 1 from the entry into force of the contract)

Deliverable 1: Detailed outline of the study, including:

- Detailed plan for the study;
- A presentation of a fully-fledged methodology to conduct the qualitative and quantitative research illustrated by the first case study analysed and the selected choice of data sources and specific issues and cases for further analysis;
- Identification of possible challenges to be taken into account for the implementation phase and ideas for resolving those.

The detailed outline of the study shall be made available to the Commission's services within 1 month after signature of the contract by the last contracting party. A draft of the outline shall be made available to the Commission's services five working days before the inception meeting.

Phase 2: Interim study report (month 3 from the entry into force of the contract)

Deliverable 2: Interim Study Report

The interim study report will present the first research results. This shall include the analysis of the impacts observed from the first 3 PCP cases analysed as well as a draft outline for the recommendations for new actions to be undertaken in Europe to encourage the wider use of PCP in Europe, to be further elaborated for the final study report.

The interim study report shall be made available to the Commission's services within 3 months after signature of the contract by the last contracting party. A draft of the report shall be made available to the Commission's services 7 working days before the interim meeting. The report should be finalised after the meeting taking into account all observations and comments raised at the meeting. The finalised Interim Study Report shall be submitted to the Commission's services within five days after the interim meeting.

Phase 3: Final report (month 6 from the entry into force of the contract)

Deliverable 3: Final study report

The final study report will present the final research results. This shall include the 6 PCP cases and the impacts observed, other evidence analysed as well as the final recommendations for new actions to be undertaken in Europe to encourage the wider use of PCP in Europe based on the lessons learnt from the cases and other evidence analysed.

The final study report shall be made available to the Commission's services within 6 months after signature of the contract by the last contracting party. A draft of the final report and the executive summary in English shall be made available to the Commission's services 14 working days before the final meeting. The Final study report should be finalised after the final meeting taking into account all

observations and comments from the Commission during the meeting. The finalised Final Study report shall be submitted to the Commission's services within ten days after the final meeting.

5.1.2. Report format

All deliverables must be written in English.

All reports should be consistent in style (headings, margins, citations, bibliography, etc) and contain a short executive summary. The contractor is required to properly apply quotation techniques and particular care will be taken to verify improper re-use of existing material.

All reports will be submitted in electronic format (.doc, .xls, .ppt or equivalents in open formats). Exchange of advance copies as well as other non-formal communications shall take place via electronic mail.

The Commission services will decide the possible dissemination of the findings and conclusions and any other information produced under this assignment.

5.1.3. Content

- **Final Study Report**

The final study report shall include:

- an abstract of no more than 200 words and an executive summary of maximum 6 pages in English, French and German;

- the following standard disclaimer:

  "By the European Commission, Directorate-General of Communications Networks, Content & Technology.
  The information and views set out in this publication are those of the author(s) and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained therein.

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- specific identifiers which shall be incorporated on the cover page provided by the Contracting Authority.

- **Publishable executive summary**

The publishable executive summary shall be provided in English, and shall include:

- the following standard disclaimer:

  "By the European Commission, Directorate-General of Communications Networks, Content & Technology.

  The information and views set out in this publication are those of the author(s) and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained therein.

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- specific identifiers which shall be incorporated on the cover page provided by the Contracting Authority.

- **Abstract**

The abstract provided in English, French and German in the Final study report (see point 4.1.3.) in no more than 200 words shall be provided as well in a separate document for the purpose of the description of the study on the website of the EU Bookshop.

No identifiers shall be incorporated on this file.

5.1.4. Structure

The **Final study report** shall include the following sections:

1. Executive summary
2. Content
3. Annexes (up to the appreciation of the contractor).

5.1.5. Graphic requirements

The new visual identity applies to all commission services and related bodies.

For graphic requirements please refer to the template provided in the annex V, "Visual identity template for DG CONNECT studies". The cover page shall be filled in by the contractor in accordance with the instructions provided in the template.

In case you foresee other logos than the Commission logo, the additional logo may only be placed on the cover page of the study if they are one of the following categories:

- a logo duly authorised by the Secretary General and the Director-General for Communication of the European Commission;

- the logo of the author of the study (i.e. the contractor);

- in case of co-branded studies, the logo of a partner organisation involved in the production of the study. In this case, the European Commission's Visual Identity Manual does not apply.

5.2 Meetings

All meetings will be organized by the contractor with the support from EC officials for the premises of the meeting in Brussels or during a conference organised with the support of the Commission, where in both cases the logistical costs for organising the workshop will be borne by the Commission. The Commission Services and the contractor will select attendees. The contractor has to invite attendees, prepare the agenda, the list of participants, prepare and disseminate the relevant documents to the participants, send the agenda and the documents before the meeting to each participant in an electronic format, moderate the meeting and write the meeting reports.

Inception meeting
An inception meeting will be organised at the Commission’s premises in Brussels within three weeks after signature of the contract by the last contracting party.

Interim meeting
An interim meeting during which the contractor will present the interim findings will be held within two months and three weeks after signature of the contract by the last contracting party. The contractor will have to finalise the interim study report on the basis of the outcome of the interim meeting.

Final meeting
A final meeting during which the contractor will present the final findings and proposed conclusions will be held within 5 months and three weeks after signature of the contract by the last contracting party. The contractor will have to finalise the Final study report on the basis of the outcome of the final meeting. The contractor is expected to provide a senior member of staff having worked on the contract to deliver a presentation on the main findings.

Each candidate should include costs of attendance of its own representative(s) at all the above meetings in the financial section of the offer. In case other participants besides the contracting party and Commission services are invited to attend any of the above meetings, their costs of attendance to the meeting(s) do not have to be borne by the contracting party.

5.3. Timetable

Deliverable ↓	**Meeting ↓**	**Month →**	1	2	3	4	5	6	7
	Inception meeting	3 weeks							
Detailed outline of the study		1 month							
	Interim meeting	2 months and 3 weeks							
Interim study Report		3 months							
	Final meeting	5 months and 3 weeks							
Final study Report		6 months							

6. Duration

The duration of the tasks must not exceed 8[12] months and is subject to the provisions of Article I.2 of the contract.

[12] Including the period of approval of the final report.