

D3.2 – Discussion paper

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Terms and abbreviations

Term / Abbreviation	Definition
CIP	Competitiveness and Innovation Programme
EC	European Commission
C-ITS	Cooperative Intelligent Transport Systems and Services
PCP	Pre-Commercial Procurement
R&D	Research and Development
PPI	Public Procurement of Innovation
TRL	Technology Readiness Level

1 Introduction

1.1 Purpose of Document

This document is a public deliverable of the P4ITS Thematic Network and it is intended to trigger the discussion between P4ITS partners and external stakeholders on the topic of Public Procurement of Innovation (PPI). By sending this document to stakeholders experienced with public procurement the P4ITS network is performing a first reality check, asking for feedback on the flowchart and concepts described in this discussion paper and collecting information about approaches used by public procurers, the pros and cons of those approaches and the experience with public procurement in general and in PPI, as well as on specific aspects related to the (cooperative) ITS sector. Therefore the second part of this document is a questionnaire published on <http://p4its.eu/external-consultation>. This consultation will be concluded with a workshop to be held in Vienna on the 20 May 2015, where stakeholders will have the possibility to exchange their experiences and reflect on the outcome and lessons learned from this P4ITS Discussion paper & Questionnaire. In addition, it will be also the opportunity to engage in a debate on PPI priority aspects and enablers, which can be effectively addressed through a concerted approach.

Note that your data (questionnaire) will be treated in a responsible way and that your name or the name of your organization will not be published.

1.2 Intended audience of this document

This document is prepared for the European Commission and the P4ITS Thematic Network partners as well as to stakeholders experienced with public procurement external to the P4ITS Network.

1.3 P4ITS Contractual References

P4ITS is a Thematic Network of the ICT Policy Support Programme (ICT PSP), Competitiveness and Innovation Framework Programme (CIP). It stands for Public procurement of innovation for cooperative ITS.

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2 Definitions

The definitions of ‘Innovation’ and of ‘Public Procurement of Innovation’ (PPI) encompass complex concepts and can be subject to different interpretations. The P4ITS network has sought to apply definitions that are acknowledged at EU programme level, but also being applicable in the frames of C-ITS, as a reference for the discussions in this paper. The definitions are provided below.

2.1 The Concept of Innovation

The new Procurement directive (Directive 2014/24/EU, Article 2 (1), n. 22) defines ‘Innovation’ as:

***‘Innovation’** means the implementation of a new or significantly improved product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations inter alia with the purpose of helping to solve societal challenges or to support the Europe 2020 strategy for smart, sustainable and inclusive growth.*

2.2 The definition of PPI

The following definitions taken from C(2013) 8631, including corrections from C(2014) 1509, apply specifically to PPI actions supported by the European Union through the Horizon 2020 Programme¹. They therefore largely focus on the European market.

***Public procurement of innovative solutions (PPI)** is when contracting authorities, possibly in cooperation with additional private buyers, act as lead customer (also called early adopter or launching customer) by procuring ‘innovative’ solutions (not the R&D to develop them) that are newly arriving on the market but that are not yet available on large scale commercial basis due to a lack of market commitment to deploy².*

***Innovative solutions** are innovative goods or services with better than best available performance levels which suppliers are called to meet through production innovation. This includes solutions that typically have already been (partially) technically demonstrated with*

¹ See full definitions in the Annex E. “Specific requirements for innovation procurement (PCP/PPI) supported by Horizon 2020 grants” of the Horizon 2020 Work Programme 2014-2015 published on http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-ga_en.pdf.

² See “FAQ 19: What is the difference/link between PCP and PPI (public procurement of innovative solutions)?” published on http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=5207.

success on a small scale, and may be nearly or already in small quantity on the market, but which owing to residual risk of market uncertainty have not been produced at large enough scale yet to meet mass market price/quality requirements and have therefore not widely penetrated the market segment of the procurers yet. This also includes solutions based on existing technologies that are to be utilised in a new and innovative way. PPI does not include the procurement of R&D.

Notwithstanding the above-mentioned definitions, it must be acknowledged that the definition of PPI may also encompass public procurement solely aiming at fulfilling certain public needs, allowing new ‘innovative solutions’ to fulfil these needs; the so-called ‘mission oriented PPI’³.

Having the above-mentioned sentence in mind “*This also includes solutions based on existing technologies that are to be utilised in a new and innovative way*”, the P4ITS network has, for the purpose of the discussions, decided that PPI may (indeed) include R&D for adaption and/or integration of innovative solutions.

2.3 P4ITS flowchart to understand PPI

Based on the above, the P4ITS partners developed a flowchart shown in Figure 1 defining the PPI concept from the point of view of the public procurer. Where the public procurer is identified as legal entity governed by public law responsible for the acquisition of products, goods, services or solutions of public interest, regardless of its nature.

This flowchart is intended as a **conceptual reference** to common issues and themes related to PPI among ITS procurers and their counterparts from other entities and countries, with a view to developing a more concerted approach in Europe.

³ Ref. Charles Edquist, “*Public Procurement for Innovation (PPI) as Mission-oriented Innovation Policy*”, April 2012, published on <https://underpinn.portals.mbs.ac.uk/Portals/70/docs/10.1%20-%20Edquist-Zabala%20-%20Public%20Procurement%20for%20Innovation.pdf>.

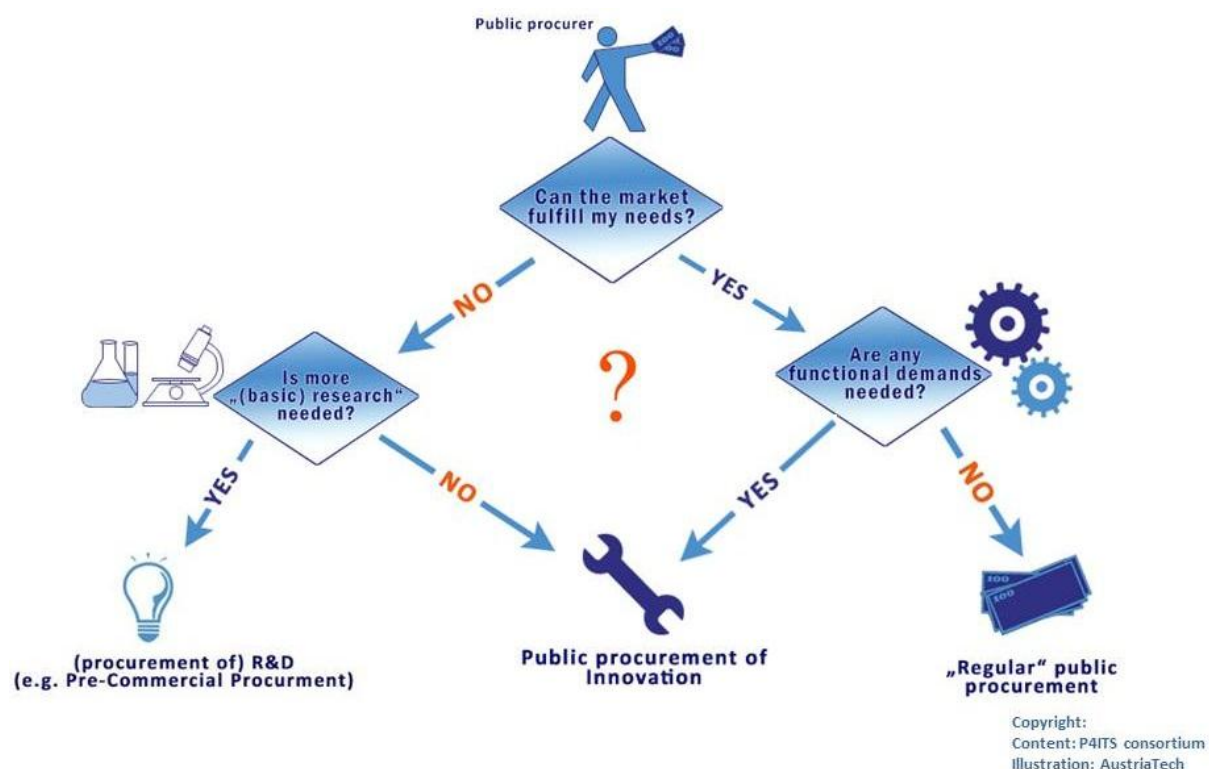


Figure 1: Flowchart defining the PPI concept

The next sub-sections explain what is meant in the graphic of Figure 1, by referring to some theoretical grounds. At this point, the flowchart aims to identify the type of procurements a public authority has to address: Procurement of R&D (e.g., PCP), Public Procurement of Innovation (PPI) or Regular public procurement. However, the flowchart does not answer how it is addressed.

2.3.1 Can the market fulfil my needs?

The initial question separates two different tracks:

Can you or can you not buy the solution/product/good/service?

The underlying objective of this initial question is to spread innovation and to assess which step is missing before market introduction of a new product or service. Eventually, either track can lead to what is understood as PPI.

For the transport infrastructure operators, this question can also be linked with the compatibility with the legacy system. Indeed, new products on the market might need some substantial adaptation work to be integrated into a wider system.

2.3.2 Is more (basic) research needed?

The P4ITS network partners propose to understand this question “*Is more (basic) research needed?*” by referring to Technology Readiness Level (TRL). Basic research is meant as TRL 1 to 3; applied research as TRL 4 to 5, while experimental development is regarded as corresponding to TRL 6 to 7. This interpretation of R&D reflects the definitions given in the OECD Frascati Manual⁴.

2.3.3 Are any functional demands needed?

This question “*Are any functional demands needed?*” has to be read as is there any “new or additional” functional demands needed, which require innovation. The term “regular procurement” can be interpreted either as “business as usual” or as innovation friendly procurement, i.e. allowing new potential innovative solutions to substitute already known and marked introduced solutions/ products/ goods/ services, e.g. by means of using functional specifications or allowing variants in standard procurement procedures⁵.

2.3.4 Scope of PPI

As additional R&D might be needed in PPI it has been crucial for the P4ITS network partners to clarify the differences between PPI and distinctly R&D procurement as provided for in the EU Procurement Directive (Directive 2014/24/EU, Article 14) and manifested in PCP (Pre-Commercial Procurement). PCP is one particular approach of procuring R&D services in which risk benefit sharing at marked conditions apply. PCP contains parallel R&D activities carried out by several suppliers and enables public procurers to share the risks and benefits of undertaking new developments with the suppliers participating in the PCP in a way that does not involve State aid⁶.

The P4ITS consortium has suggested that the differences between PPI and distinctly R&D procurement should be defined by the level of innovation. The best way of doing that is by categorising the level of innovation by the TRL (Technology Readiness Level) metrics⁷.

⁴ *Frascati Manual, Proposed Standard Practice for Surveys on Research and Experimental Development*, 6th edition (2002), chapter 2.2 “Research and experimental development (R&D)”, page 30, www.oecd.org/innovation/inno/frascaticmanualproposedstandardpracticeforsurveysonresearchandexperimentaldevelopment6thedition.htm

⁵ “Innovation friendly procurement” may also be defined as PPI according to the Horizon 2020 definition.

⁶ See “FAQ 1: What is R&D procurement, in particular PCP?” published on http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=5207.

⁷ See Annex I for a detailed description of the concept of Technology Readiness Level.

2.3.5 Linking the PPI flowchart to the TRL metrics

There is not a clear cut between PCP, PPI and “regular” procurement regarding TRL and the opportunity to follow a certain approach or using a given tendering procedure or approach depends on several factors.

To differentiate between PCP, PPI and “regular” procurement, the “*Guidance for public authorities on Public Procurement of Innovation*” (available at www.innovation-procurement.org⁸) has been taken as a reference. Here, the objective of PCP is described at pg. 20 as the action “*to procure research and development services, up to the prototyping or first test production stages. PCP may include the acquisition of the limited prototypes and/or test products developed, but does not include the acquisition of larger volumes of resulting end-solutions on a commercial scale and must not constitute state aid.*”⁹

In other words, PCP covers from the pre-concept phase up to the material solution analysis, the technology development (at component or system level), and the engineering development, while it does not include the production and deployment even at low rate.

According to this definition, the PCP can be considered in the TRL range from 3 to 5, also including **TRL 2 to 7**.

In principle, PPI does not encompass R&D, but R&D cannot be totally excluded from the PPI concept, e.g. when a public authority needs specific cooperative ITS services to be integrated on existing technology solutions, thus requiring more R&D and innovative solutions, which are not available in the market due to the lack of demand. Consequently, it can be affirmed that PPI can be considered in the TRL range from 6 to 8, also including **TRL 5 to 9**, being the lower limit linked to the need of more R&D and the upper limit to the need of innovation on C-ITS solutions.

The link between the PPI flowchart and the TRL metrics defined in the frame of the Horizon 2020 programme is shown in Figure 2. This flowchart shall be used as conceptual reference to create a common understanding between public/private purchasers and their counterparts on the choice of the most appropriate approach and tool in PPI tendering process.

⁸ https://www.innovation-procurement.org/fileadmin/editor-content/Guides/PPI-Platform_Guide_new-final_download.pdf.

⁹ See also Commission Communication COM (2007) 799 final on PCP, section 1 (1).

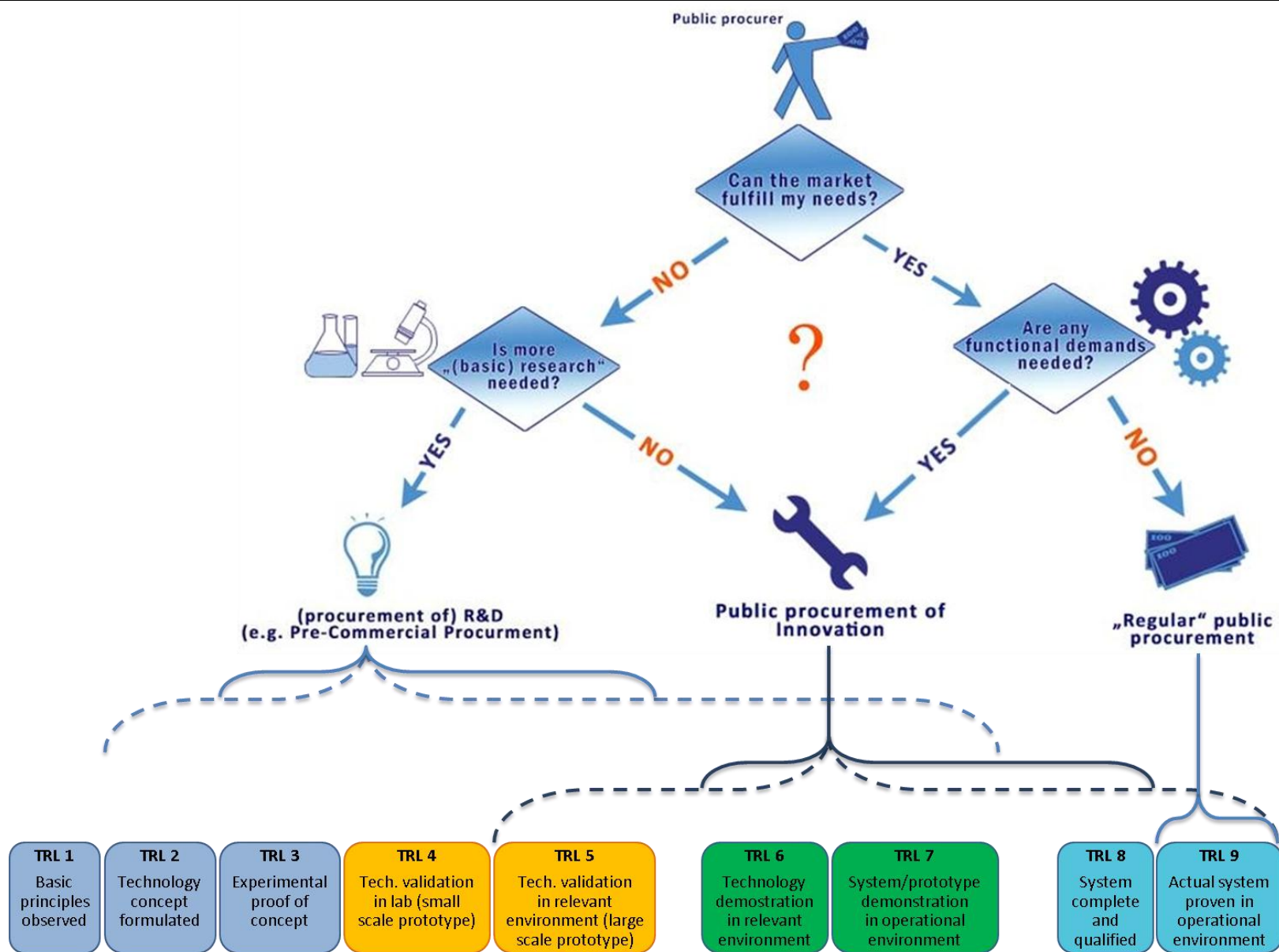


Figure 2: Final version of the PPI flowchart including TRLs

3 Questionnaire

The P4ITS network partners conducted a first analysis on a few key topics related to PPI, with focus on innovative ITS solutions. The questionnaire is available at <http://p4its.eu/external-consultation> and includes six parts:

1. Knowing you
2. Explanations & PPI flowchart with TRL
3. Procurement experience
4. PPI experience
5. Intelligent Transport Systems & Services (ITS) and Cooperative ITS (C-ITS)
6. P4ITS information.

A printout of this questionnaire is shown in Annex II of this deliverable.

Annex I: Technology Readiness Level

The Technology Readiness Levels (TRL) were originally developed by NASA in the 1980s. They are measures used to assess the maturity of evolving technologies (devices, materials, components, software, work processes, etc...) during its development (Wikipedia definition). They are now defined by the European Commission for the Horizon 2020 Programme in the Communication C(2013) 8631 (see Table 1 here below).

Table 1: Definition of Technology Readiness Level (TRL)

TRL	Horizon 2020 – C(2013) 8631 definition ¹⁰	Explanation
1	Basic principles observed	<i>Basic research</i>
2	Technology concept formulated	<i>Concept and application formulated</i>
3	Experimental proof of concept	<i>Applied research; first laboratory tests completed; proof of concept</i>
4	Technology validated in lab	<i>Small scale “ugly” prototype built in a laboratory environment</i>
5	Technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)	<i>Large scale prototype tested in intended environment</i>
6	Technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)	<i>Tested in intended environment close to expected performance</i>
7	System prototype demonstration in operational environment	<i>Pre-commercial scale</i>
8	System complete and qualified	<i>First of a kind commercial system; manufacturing issues solved</i>
9	Actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)	<i>Full commercial application, technology available for consumers</i>

Annex II: Questionnaire

In the next pages a printout of the questionnaire is shown.

¹⁰ See Annex G. “Technology readiness levels (TRL)” of the Horizon 2020 Work Programme 2014-2015 published on http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-ga_en.pdf

Introduction

This questionnaire is part of the P4ITS external consultation (<http://p4its.eu/external-consultation/>) and it is intended to trigger the discussion between P4ITS consortium and external stakeholders on the topic of Public Procurement of Innovation (PPI).

The questionnaire shall be completed after reading a short [Discussion paper](#) issued by P4ITS.

We ask you to respond to this questionnaire as an individual (your own personal situation and opinions). If you prefer to represent the position of your employer then that is fine, but it is not necessary. All responses will be treated confidentially, so it will not be possible for the reader of any report on this survey to tell which individuals or which companies gave different responses. We ask that you give your company or organisation type and your role, but we do not ask your personal identity.

There is an optional field for your email at the end of the questionnaire, should you wish to be informed about the P4ITS Thematic Network. If you give your email, it will not be linked with your survey responses and the analysis will not identify individuals or companies/organisations that responded.

There are between 14 and 30 questions (depending on your answers). For any question, please do not hesitate to enter comments in the free text box to give opinions or explanations.

If there is a question you have difficulty answering, if you do not have sufficient knowledge or experience in the field, or do not fully understand the question, please insert "Don't know".

For any technical problem with the questionnaire, please contact g.somma [at] mail.ertico.com

Many thanks for your contribution!

The P4ITS Consortium

Knowing you

*1. What organisation do you work for?

Name

Type

Country, Region

***2. Is your work directly related to public procurement?**

☐ Yes

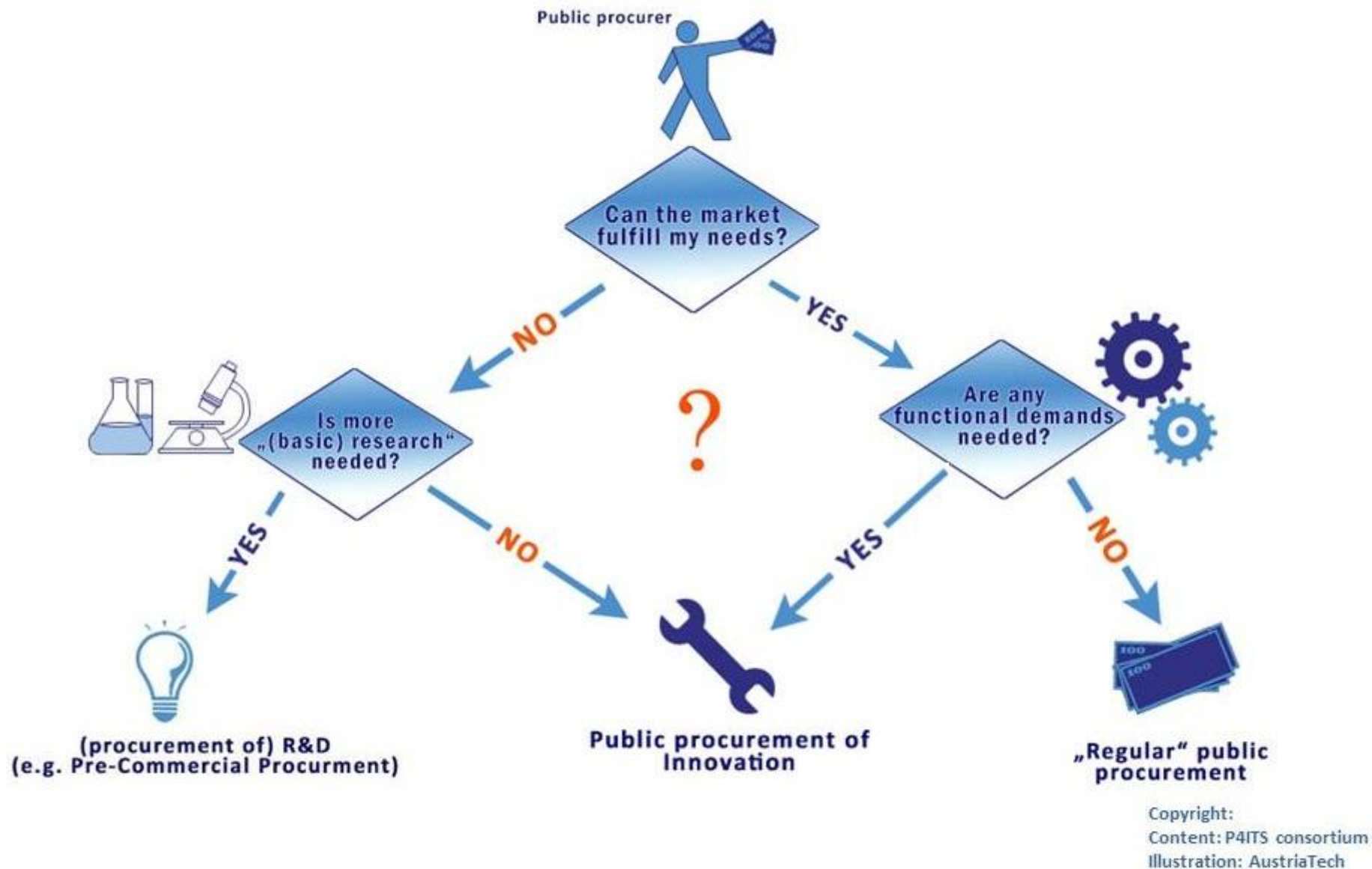
☐ No

3. In which area / sector?

Explanations & PPI flowchart with TRL

The questions presented in this page shall be completed after reading the [Discussion paper](#) issued by P4ITS.

Figure 1: Flowchart defining the PPI concept



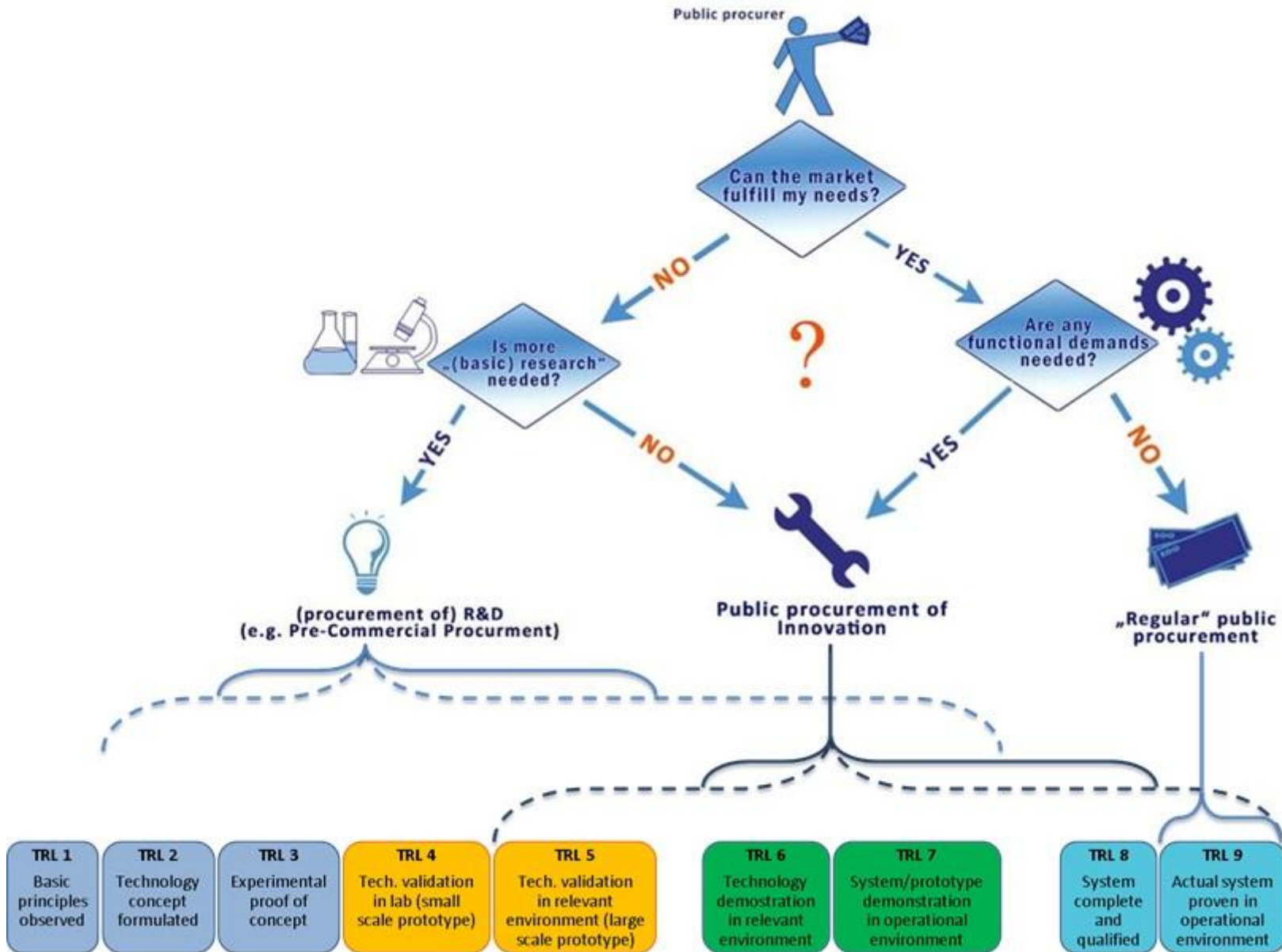
***4. Is the flowchart shown in Figure 1 clear (in relation to understanding PPI)?**

- ☐ Yes
- ☐ No
- ☐ Don't know

***5. Do you have any comments / remarks to the flowchart in Figure 1? Would you like to propose any modification to it?**

The questions presented in this page shall be completed after reading the [Discussion paper](#) issued by P4ITS.

Figure 2: PPI flowchart with reference to TRL metrics



***6. Do you have any comments to the link between PPI and TRL in Figure 2?**

Procurement experience

Several procurement approaches can be utilised when preparing a tender for innovative solutions. In the next set of questions, you will be asked to indicate the procurement approaches you have experience with. If any, you will be asked to:

- describe in what context you have experience with the named approach, or in what context it has been used;
- comment shortly about what you find positive (Pros) or negative (Cons) about a such approach, explaining why you have or not used it.

***7. Approach: Prior Information Notice (PIN) and market consultation**

- ☐ I have experience in this procurement approach
- ☐ I don't have experience in this procurement approach
- ☐ I have never heard about it

8. Please indicate your experience:

In which context have you used it?

Pros:

Cons:

*9. Approach: Using functional specifications in your technical specifications

- ☐ I have experience in this procurement approach
- ☐ I don't have experience in this procurement approach
- ☐ I have never heard about it

10. Please indicate your experience:

In which context have you used it?

Pros:

Cons:

*11. Approach: Allowing the suppliers to offer variants

- ☐ I have experience in this procurement approach
- ☐ I don't have experience in this procurement approach
- ☐ I have never heard about it

12. Please indicate your experience:

In which context have you used it?

Pros:

Cons:

***13. Approach: Using the principle of Total Cost of Ownership (TCO) as award criteria**

- ☐ I have experience in this procurement approach
- ☐ I don't have experience in this procurement approach
- ☐ I have never heard about it

14. Please indicate your experience:

In which context have you used it?

Pros:

Cons:

***15. Approach: Joint procurement with other stakeholders**

- ☐ I have experience in this procurement approach
- ☐ I don't have experience in this procurement approach
- ☐ I have never heard about it

16. Please indicate your experience:

In which context have you used it?

Pros:

Cons:

***17. Approach: Risk sharing between procurer and supplier / provider**

- ☐ I have experience in this procurement approach
- ☐ I don't have experience in this procurement approach
- ☐ I have never heard about it

18. Please indicate your experience:

In which context have you used it?

Pros:

Cons:

***19. Do you know about other procurement approaches suitable for catalysing innovation procurement?**

- ☐ Yes
- ☐ No

20. Please describe shortly other procurement approaches that you know (including Context, Pros & Cons):

PPI experience

***21. Do you or your organisation have experience with Public Procurement of Innovation (PPI) as described in Chapter 2.2 of the P4ITS [Discussion paper](#).**

- ☐ Yes
- ☐ No
- ☐ Don't know

22. Please describe your own or your organisation's experience in PPI.

***23. Are aspects like Intellectual Property Right (IPR) taken into account?**

- ☐ Yes
- ☐ No
- ☐ Don't know

24. Please describe how:

25. What are, according to you, the most challenging aspects of PPI?

26. Do you have any recommendations related to the use of PPI?

Intelligent Transport Systems and Services (ITS) and Cooperative ITS (C-ITS...

***27. Do you or your organisation have experience with PPI in the sector of Intelligent Transport System and Services (ITS) and/or cooperative ITS (C-ITS)?**

- ☐ Yes
- ☐ No
- ☐ Don't know

28. Is there any risk or difficulty factor specific to PPI in this particular sector? Please rate each of the following factors from 0 (no particular sector related risk) to 5 (high risk when procuring ITS solutions):

	0	1	2	3	4	5	Don't know
a. Technology lock-in	☐	☐	☐	☐	☐	☐	☐
If you rated this factor 3-5, please explain why:							
b. Lack of interoperability with other systems / solutions	☐	☐	☐	☐	☐	☐	☐
If you rated this factor 3-5, please explain why:							
c. Lack of backward compatibility with legacy systems	☐	☐	☐	☐	☐	☐	☐
If you rated this factor 3-5, please explain why:							
d. Technical maintenance (including updates / upgrades) difficult to guarantee	☐	☐	☐	☐	☐	☐	☐
If you rated this factor 3-5, please explain why:							

29. Is there any other risk / difficulty factor specific to PPI in the (cooperative) ITS sector? Please name up to three factors and rate them from 0 (no particular sector related risk) to 5 (high risk when procuring ITS solutions):

	0	1	2	3	4	5	Don't know
e. Other risk / difficulty specific to PPI of (cooperative) ITS:	☐	☐	☐	☐	☐	☐	☐
Please name factor and, if you rated it 3-5, please explain why:							
f. Other risk / difficulty specific to PPI of (cooperative) ITS:	☐	☐	☐	☐	☐	☐	☐
Please name factor and, if you rated it 3-5, please explain why:							
g. Other risk / difficulty specific to PPI of (cooperative) ITS:	☐	☐	☐	☐	☐	☐	☐
Please name factor and, if you rated it 3-5, please explain why:							

P4ITS information

If you wish to be on the mailing list of P4ITS to receive occasional news from the project and be informed of events, please enter your email address below. Your email will not be passed to third parties. You may alternatively subscribe (or unsubscribe) at any time by sending an email to [g.somma \[at\] mail.ertico.com](mailto:g.somma@mail.ertico.com)

We remind you that your responses to this questionnaire will be treated anonymously. If you provide your email here below, it will not be linked to your responses to the questionnaire.

30. Do you want to receive:

- ☐ More information about the P4ITS Network
- ☐ The results of the questionnaire analyses
- ☐ **Invitation to the stakeholders' workshop to be held in Vienna the 20 of May 2015 (10:00 - 16:00 CET)**, where the results of the analyses will be discussed (targeted group are public procurers)

If yes, please enter your email address here:

Many thanks for your participation!

For any questions about this survey or the P4ITS Thematic Network, please contact g.somma [at] mail.ertico.com