



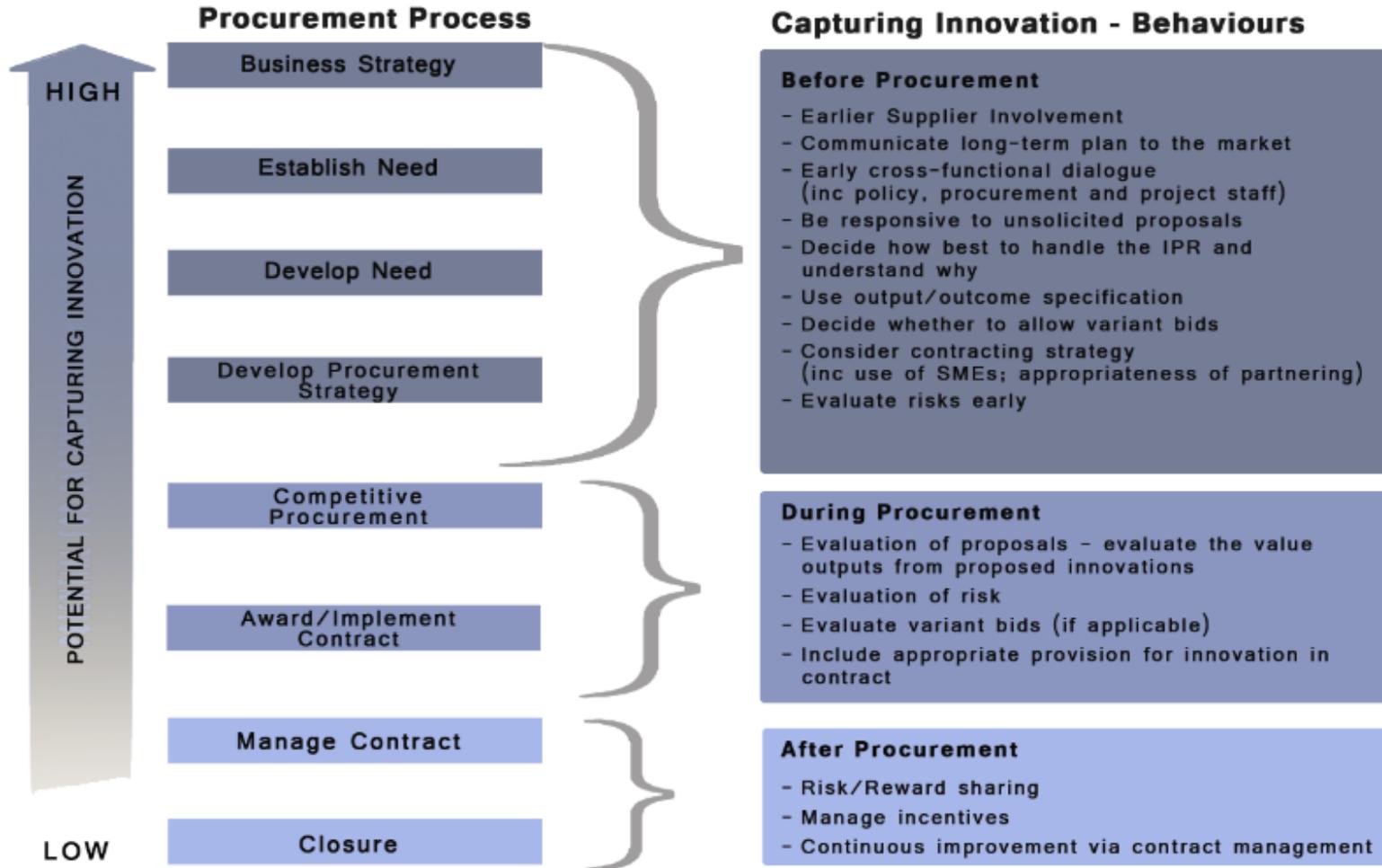
Innovation procurement in action

Steps *before* the procurement

Prague, 14th of November 2017

Innovation procurement

Schematic: Capturing Innovation through the procurement cycle



Steps *before* procurement

How to build a Business Case & carry out an Open Market Consultation

Steps *before* the procurement

Needs assessment

Prior art analysis & IPR
search

Business case & open
market consultation

Steps *before* procurement

Needs identification and assessment - examples



WIBGI (Wouldn't It Be Great if...) - developed by the English National Health Service (NHS UK)

- Large scale survey
- Face-to-face needs assessment meetings
- Interviews
- Short scenarios
- “Voice of the Customer” methodology

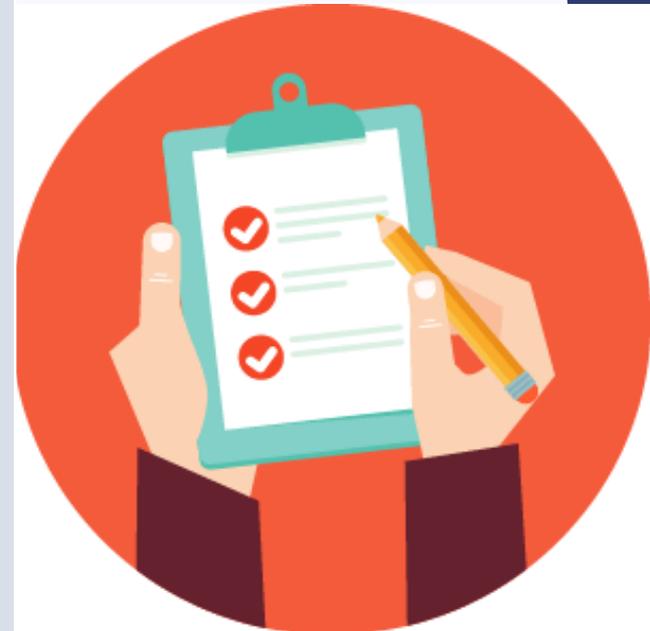
Needs identification and assessment

Technology neutral needs description

A requirement for 'electric vehicles' sounds innovative, but the technology neutral requirement is more likely to be a 'low carbon zero emission vehicle' (to give equal chances to solutions based on other technological approaches to compete on the market).

Describing the problem instead of prescribing the solution

A London Borough identified a requirement for "a cost effective, on site waste management solution for non-recyclable waste, suitable for use in high rise flats and council housing in a densely populated urban environment, that eliminates the requirement for waste collection, involves minimal management and is environmentally benign".



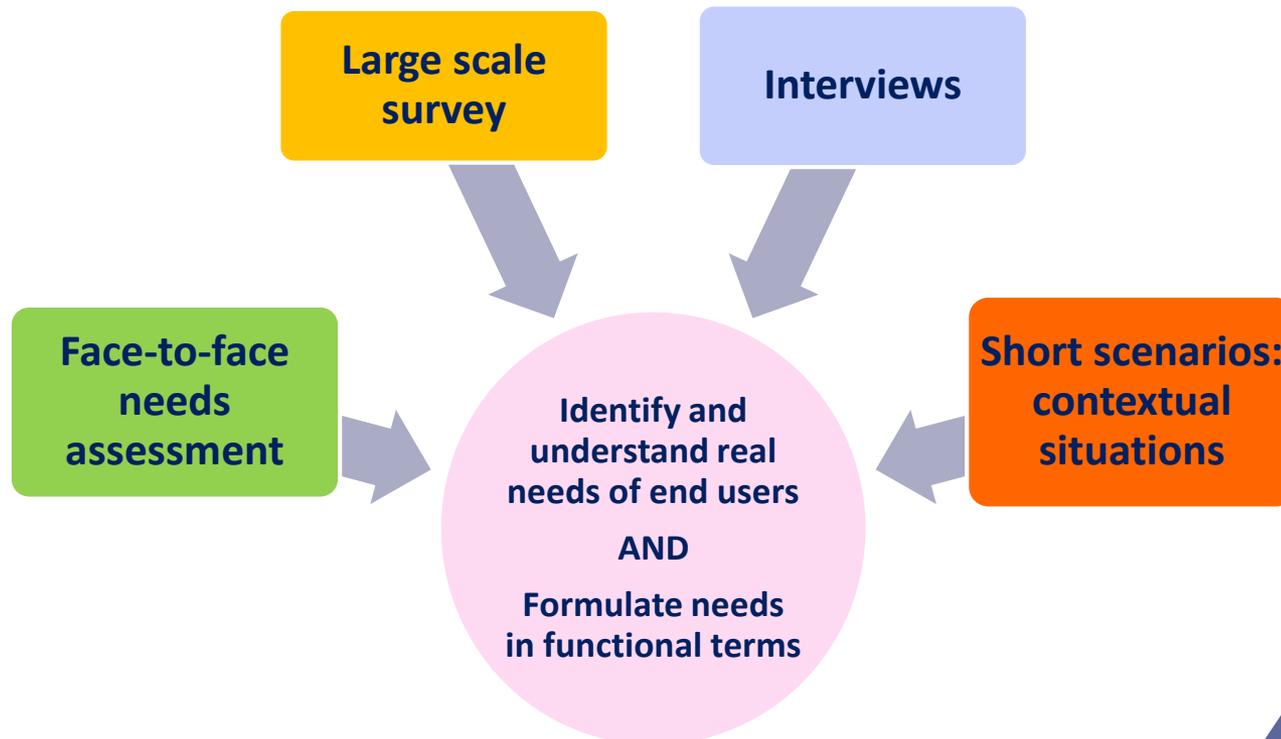
Needs identification and assessment

Best practices

Identifying and assessing needs approach used in the Smart@Fire PCP
961 fire brigades were involved in the needs assessment exercise.

“How to increase the safety and reduce risks of first responders undertaking fire-fighting and other civil protection work?”

Voice of the Customer methodology

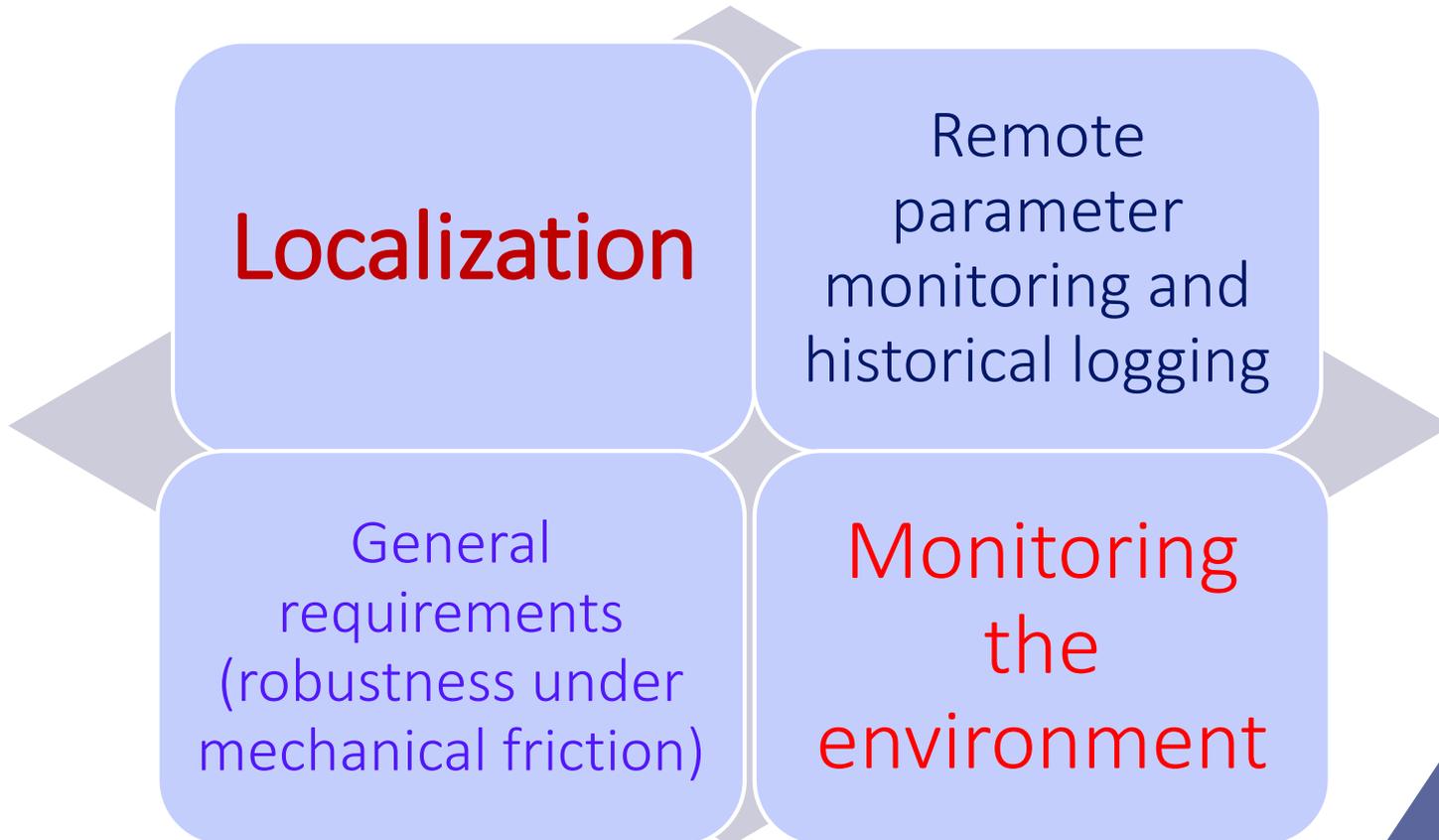


Needs identification and assessment

Best practices

Outcome based specifications in Smart@Fire PCP project

Features of a smart Personal Protective Systems (PPS) are highly desirable for the surveyed fire-fighters



Steps *before* procurement

Prior art analysis & IPR search

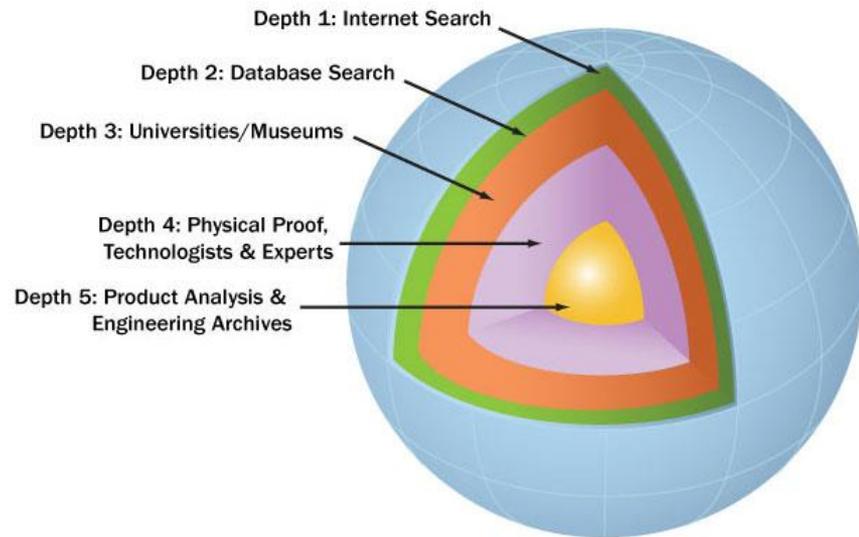
?	PRIOR ART ANALYSIS	IPR SEARCH (patent search)
When	<ul style="list-style-type: none"> Once the needs are identified 	<ul style="list-style-type: none"> Once the needs are identified
Why	<ul style="list-style-type: none"> it reveals if the solutions to the identified need are already available or will already become available before the planned procurement will start (in this case, the PCP/PPI might be questionable); it helps validating the identified need(s); it helps confirming the novelty of the identified need(s); To establish the 'state-of-art' at the time of the analysis 	<ul style="list-style-type: none"> it is a way to safeguard the fact that the technological solutions to be developed during the planned project are innovative and can thus be protected by IPR; alternatively, it will reveal whether there is a provider who owns all IPR needed to develop the solution to the identified need(s); To establish the 'state-of-art' at the time of the search.
What	<ul style="list-style-type: none"> All information currently in the public domain (scientific publications, reports, existing products) 	<ul style="list-style-type: none"> a search of registered intellectual property held in a national or international database

Steps *before* procurement

IPR search

- The European Patent Register's *espacenet* (http://worldwide.espacenet.com/?locale=en_EP) search tool contains 90million patent documents taken from worldwide sources and dating from 1876
- **Google patents** (google.com/patents) allows searchers to trawl through over 7million US patents
- IP Intelligent tools like IPlytics

The Many Layers of a Patent Search



Prior art analysis and IPR search

Best practices

- Most relevant: **patent search** -> '*absolute novelty*' standard
- Don't restrict patent searches to national databases
- Work with technicians to conduct the search
- **Use terms that allow for a broad search** (e.g., "*mobile telecommunication device*" instead of "*mobile phone*")

	Construction Task																																
ICT Technology	Project management	HR Management	Communication & info sharing	Collaboration	Cost	Design	Virtual Collaboration	Educational	Information Modeling	Knowledge Management	Health	Project Planning	Research & Development	e-commerce	Quality Assurance (QA)	Data Modeling	Decision making	Digital City	Environmental	Document Management	Agile production business process	Business strategy	Time saving	Delineation	Safety	Marketing Management	Performance	Standardization & Protocols	Task Management	Models Coordination	Presentation	Frequency (%)	
Web-based	X	x	x	x	x	x	x					x		x	x	x				x						x					x	44	
BIM based			x	x	x				x			x				x									x			x		x			28
ICT	x		x	x	x	x													x		x		x									25	
Video	x	x	x		x					x		x		x	x																	25	
Virtual Reality		x		x	x		x			x			x			x																22	
CAD	x	x				x				x			x																x			19	
Mobile Technology			x								x											x				x						13	
Information System	x	x									x									x												13	
Decision based							x										x							x								9	
Knowledge Mgt		x								x											x											9	
Project Mgt	x		x																													6	
3D						x							x																			6	
GPS	x																	x														6	
Computer-mediated							x	x																									6
Simulation	x								x																							6	
UCD		x										x																				6	
RFID		x									x																					6	
Simulation	x								x																							6	

Ehab J.Adwan1 and Ali Al-Souf, (2016). A REVIEW OF ICT TECHNOLOGY IN CONSTRUCTION, International Journal of Managing Information Technology (IJMIT) Vol.8, No.3/4, November 2016



Global Patent Coverage

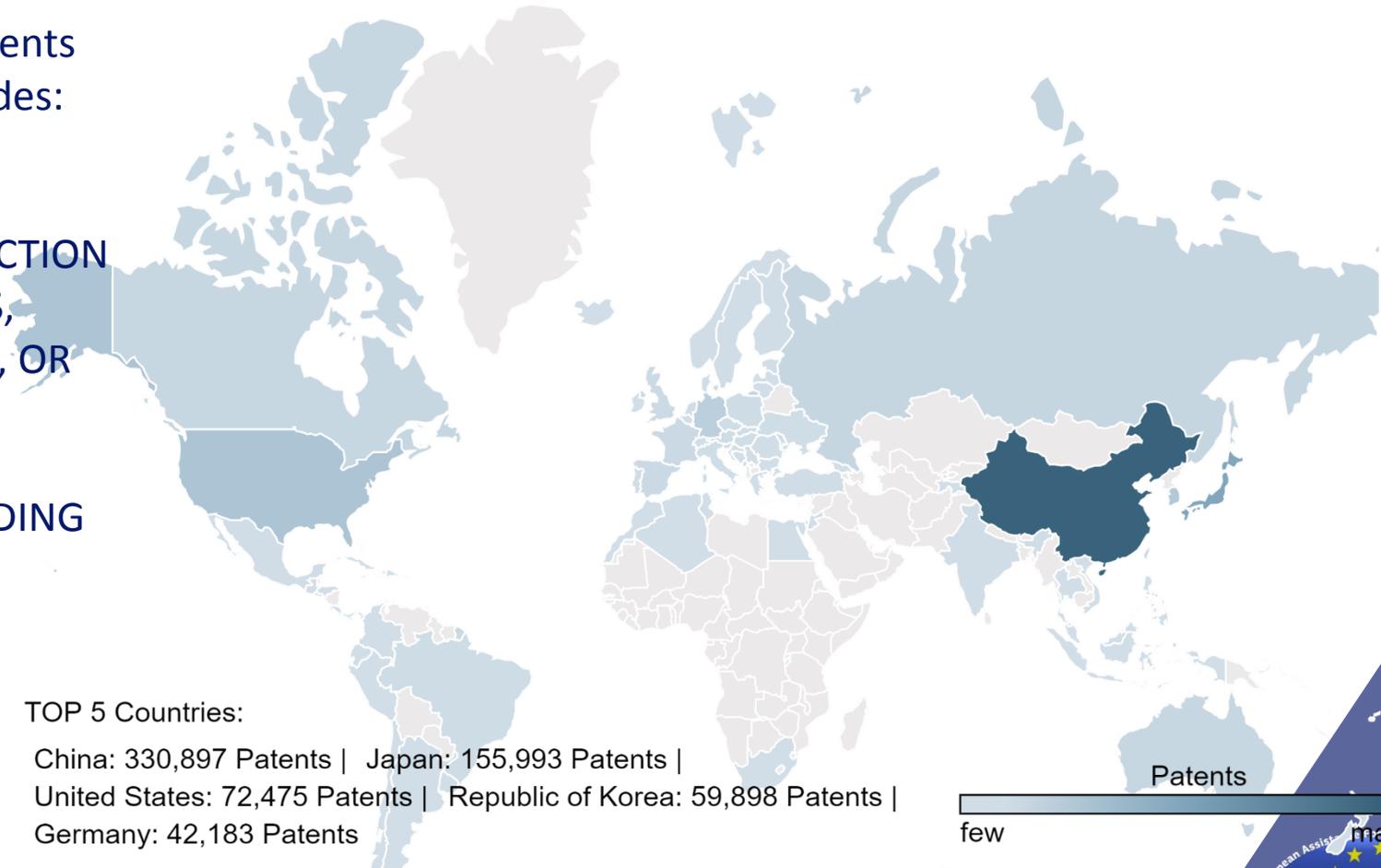
Active patents
for IPC codes:

E01:
CONSTRUCTION
OF ROADS,
RAILWAYS, OR
BRIDGES

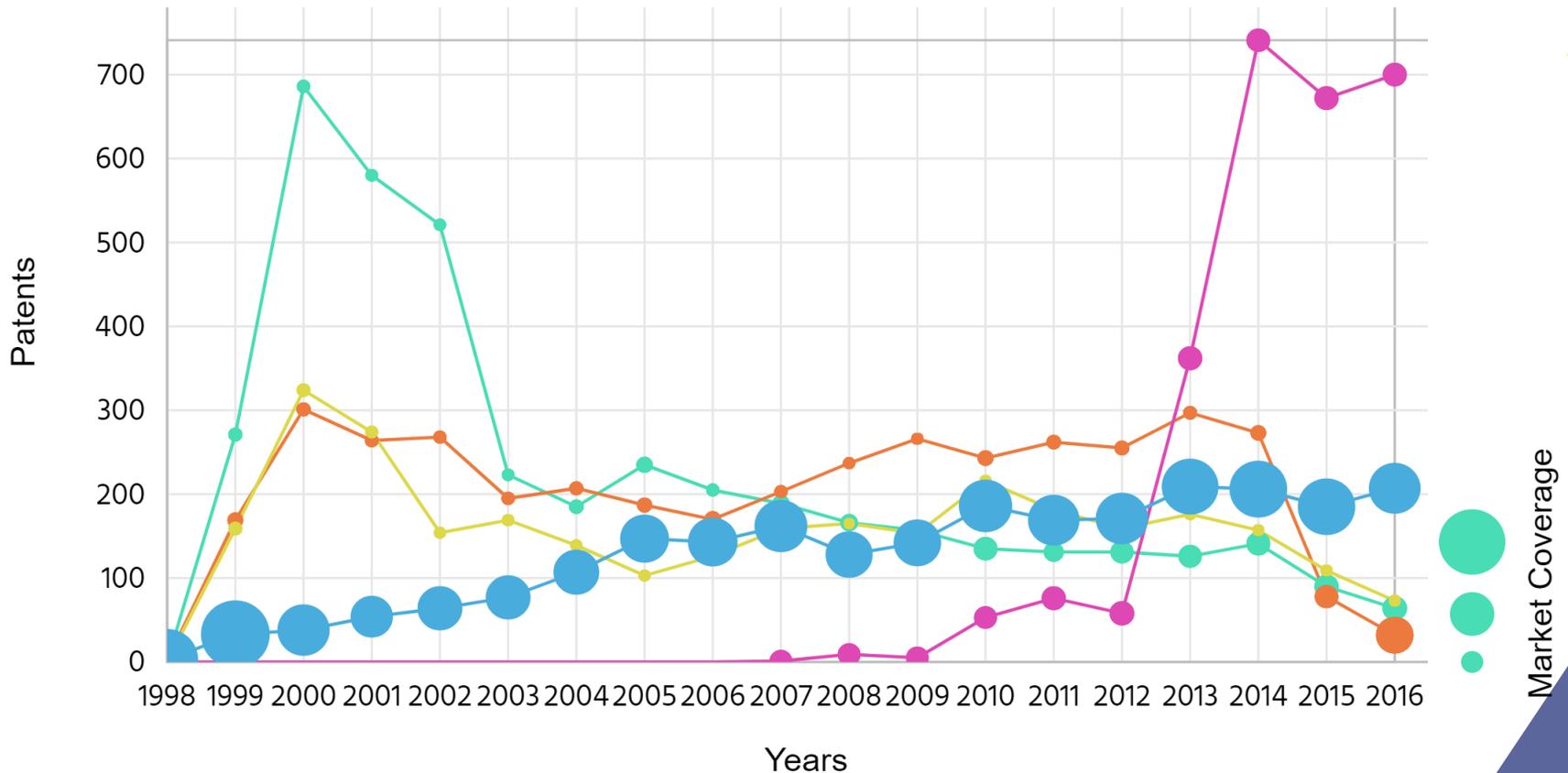
E04: BUILDING

TOP 5 Countries:

China: 330,897 Patents | Japan: 155,993 Patents |
United States: 72,475 Patents | Republic of Korea: 59,898 Patents |
Germany: 42,183 Patents



Activity & Market Coverage over time - Global



● Sekisui Chemical Co., Ltd.
 ● Panasonic Corporation
 ● Misawa Homes Co., Ltd.
 ● State Grid Corporation of China
 ● Compagnie de Saint-Gobain S.A.

Industry Trend - Global

Top 5 Industries

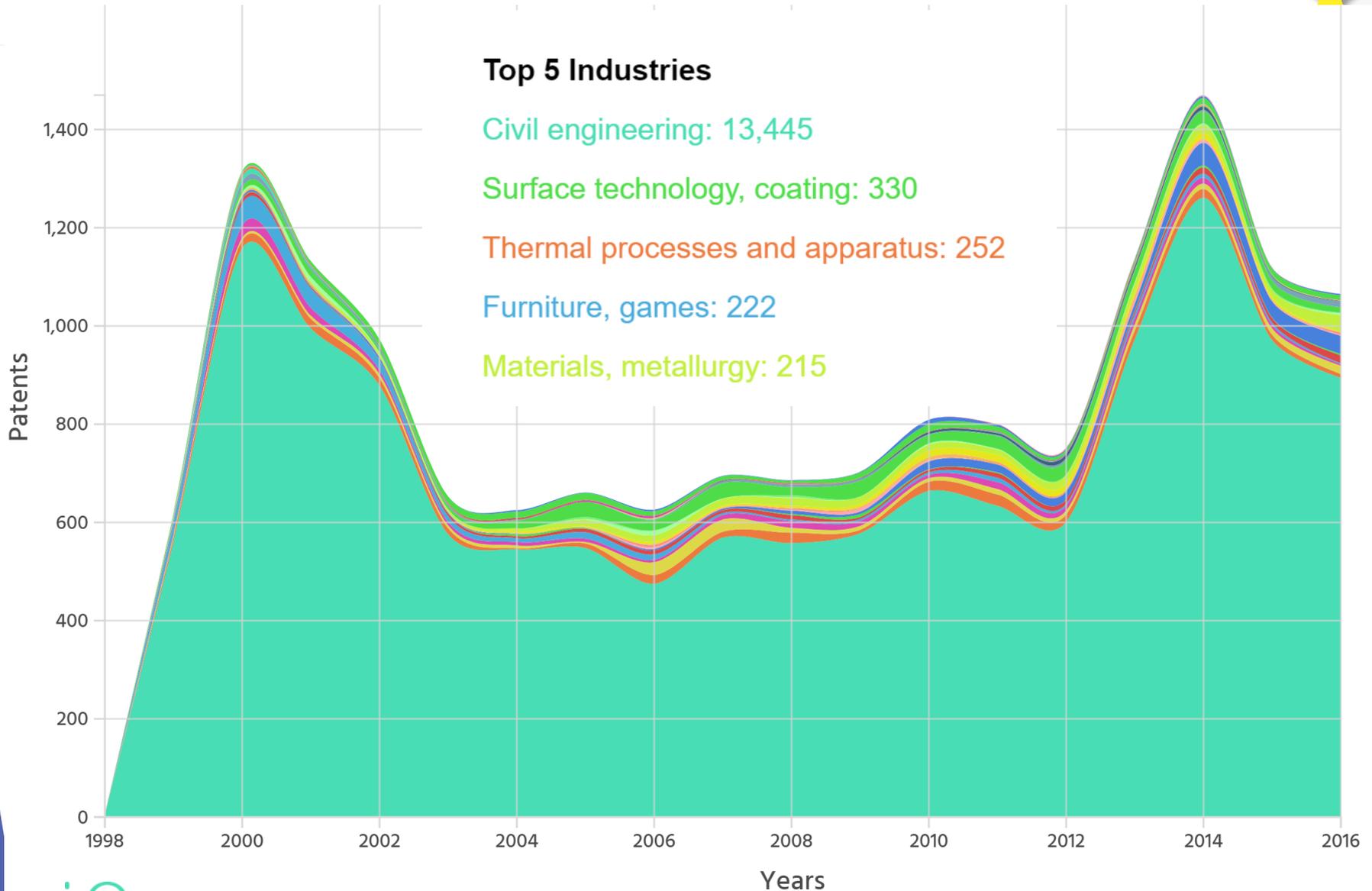
Civil engineering: 13,445

Surface technology, coating: 330

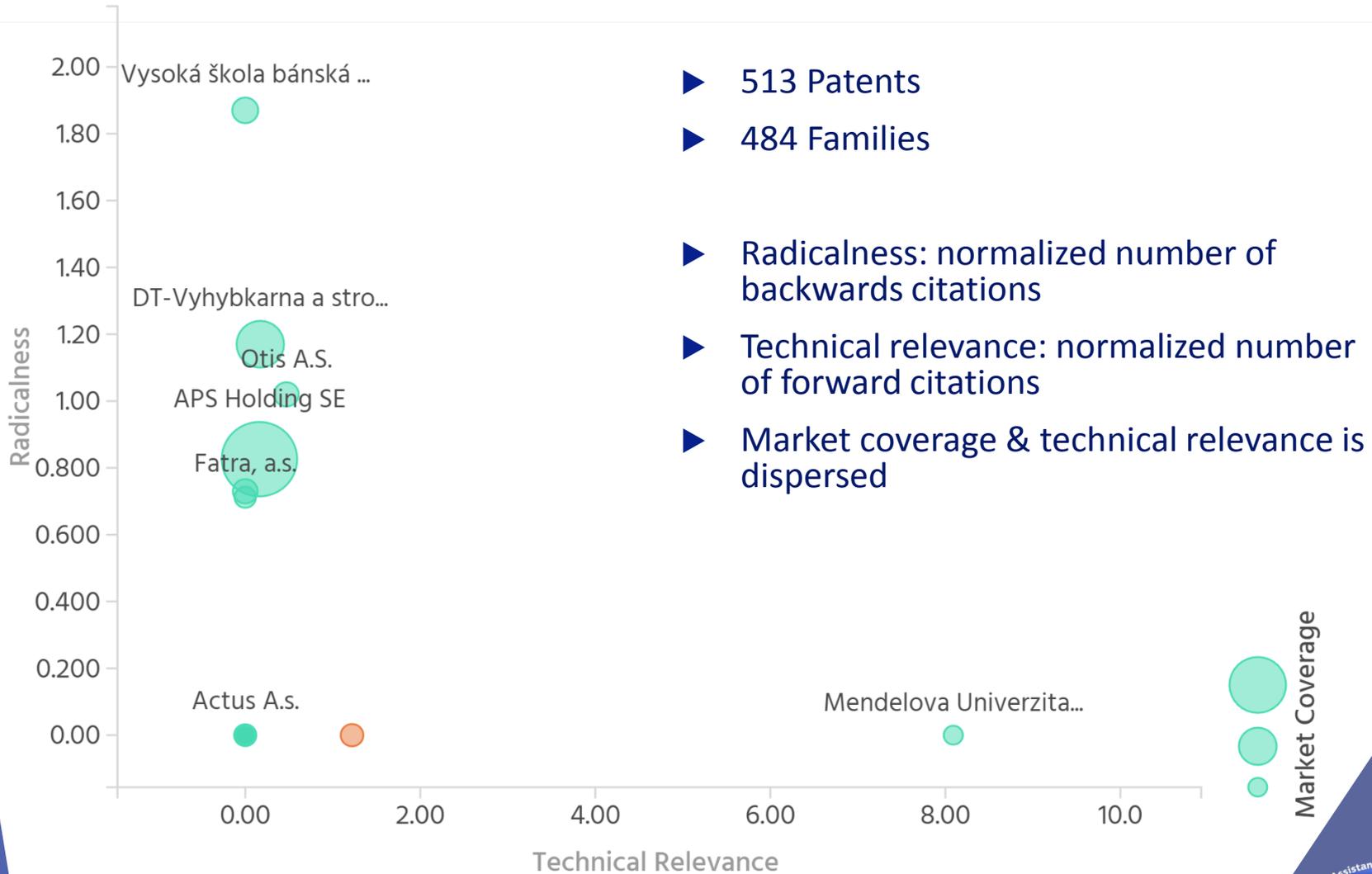
Thermal processes and apparatus: 252

Furniture, games: 222

Materials, metallurgy: 215



Industry Trend – Czech Republic



▶ 513 Patents

▶ 484 Families

▶ Radicalness: normalized number of backwards citations

▶ Technical relevance: normalized number of forward citations

▶ Market coverage & technical relevance is dispersed

Steps *before* procurement

Market consultation



- (1) Improvements are needed but don't require new and significant R&D (only integration, incremental adaptations and improvement, customization...), so authority can act as early adopter of innovative commercial end-solutions newly arriving on the market
- (2) There isn't any solution or the problem is so technologically demanding that a radical and breakthrough new solution and significant R&D is needed.

Steps *before* procurement

Market consultation - examples

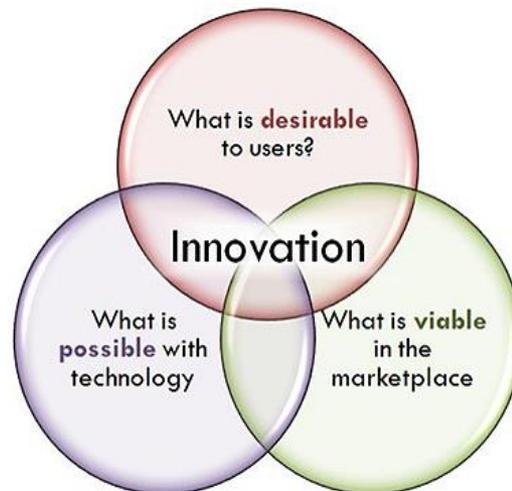
- market survey
- “meet the buyer” events
- industry days
- webinars
- the organization of an industry platform

A successful market consultation requires efficient time planning, effective resource allocation and broad coverage (stakeholder- and geographical wise).



Open market consultation - Key issues to consider

- **Wide dissemination** (PIN in TED)
- Pro-active **communication** of the needs
- **Sufficient time** for the market to respond
- Participation of a supplier in the market consultation must not affect competition within the future tender procedure
- Valuating feedback



Open market consultation - Key issues to consider

- Compliance with the **TFEU principles** is a must
- Suppliers' intellectual property rights (**IPRs**) and **trade secrets** should be protected
- Clear **separation** from the procurement itself
- Build **trust** between potential buyers and potential providers by **explaining** the procurement need, the envisaged contracting setup to vendors and valuating their feedback

Steps *before* procurement

The Business Case methodology

- ▶ Introduction
- ▶ Operationalization
- ▶ Case studies

Pre-commercial procurement (PCP)

Public procurement of innovation (PPI)

Business Case Methodology - Review

- ▶ A **tool** to support investment decisions before, during and after the project:
 1. **before the project:** to determine whether there are enough economic reasons to start the project;
 2. **during the project:** to decide whether or not to proceed with changes to the project content, the environment, or the pattern of the project phases; and
 3. **after the project:** to assess whether the results achieved meet the public procurer's goals and, if needed, make adjustments accordingly

The following case studies will focus on the business case methodology before the project

Benefits of the Business Case – Before & During

1. Support for project approval – internally and externally

- Outline alternatives

- Define potential cost savings, benefits

2. Support best value

- Become informed on market/technology potential

- Translate learnings to improve:

 - Technical specifications

 - Key Performance Indicators (KPI)

Business Case Methodology

- ▶ Business case development
 - Define the problem to be addressed
 - Gather information to understand potential solutions
 - Compare costs, benefits, and risks
 - Decide on purchasing strategy
 - Create the right conditions for competition
- ▶ Inform the business case via
 - Stakeholder consultation – user needs, market consultation
 - Technology assessment – prior art analysis, IPR search
- ▶ Next we examine application of the business case methodology in a PPI and in a PCP
 - Cases gathered under the eafip initiative

Case Study – Business Case Methodology in PPI - Problem

- ▶ Purchase of energy-efficient lighting
- ▶ Transport for London, 2014-2016
- ▶ For installation in 5 different areas
- ▶ Option of different lighting technology

Current: T8 Linear fluorescent lights (LFLs)

Potential: Light Emitting Diodes (LEDs)



Case Study PPI – Cost Breakdown

- ▶ Capital costs (CAPEX) - Costs of the product
- ▶ Operation expenses (OPEX) / Operations and maintenance (O&M)

Installation costs

Energy costs

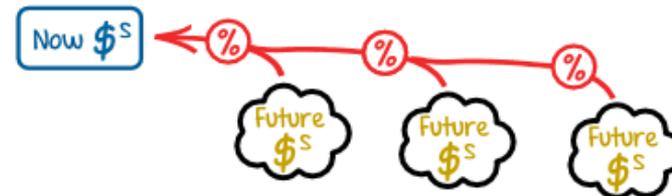
Carbon tariffs

Cleaning costs

Storage costs

Maintenance costs

- ▶ Upfront vs future costs – discounting can apply



Case Study PPI – Exploring Feasibility

- ▶ First cost comparison (“back-of-the-envelope”) – for each area
 - Calculate costs of current solution
 - Calculate costs of a (typical) LED solution
- ▶ Estimate cost savings – benefits
- ▶ Found overall cost savings
 - Significant in two areas in particular
 - From reduced maintenance requirements
 - Overall benefit outweighed higher CAPEX

Case Study PPI – Informing Strategy

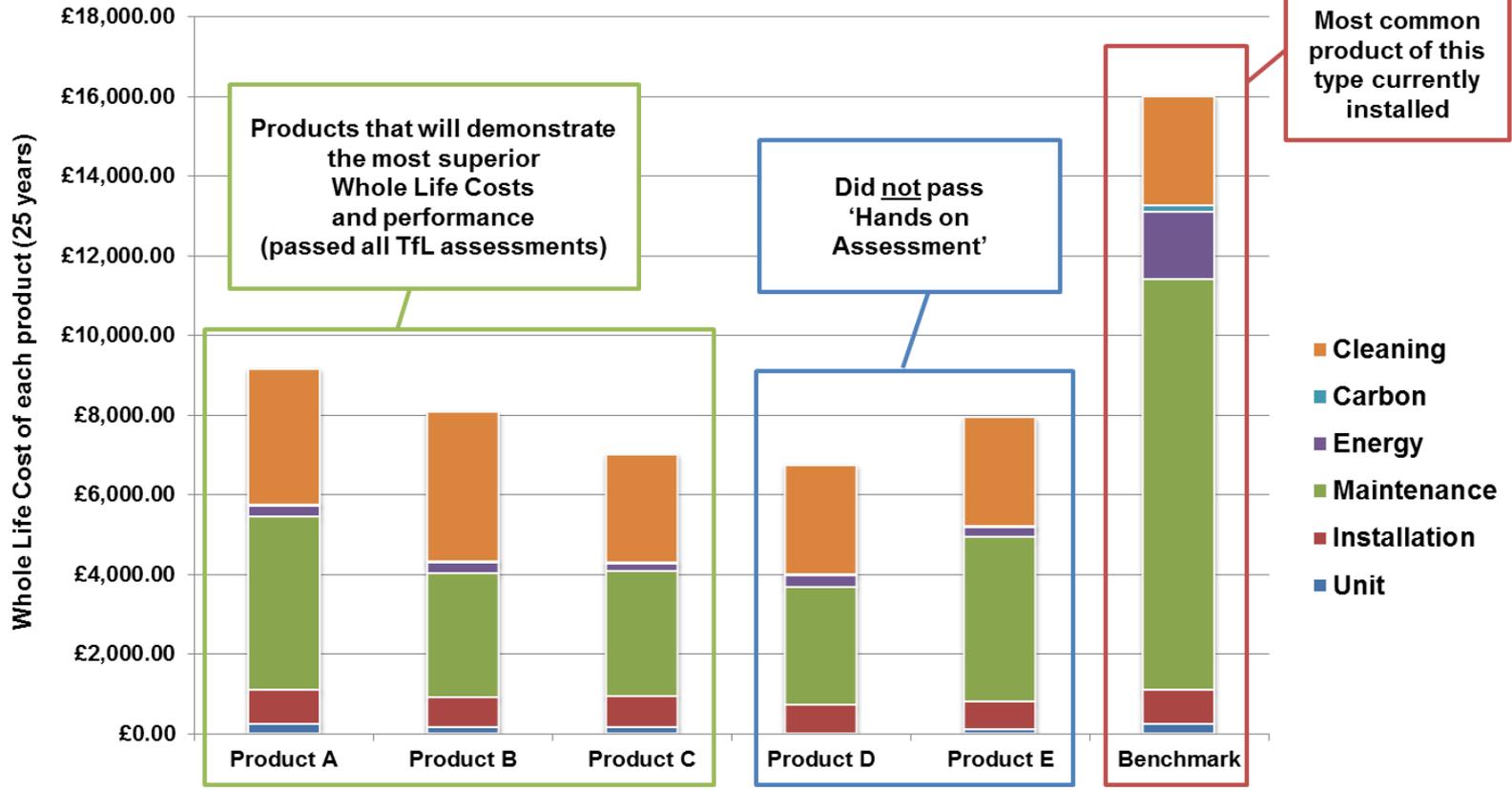
- ▶ Developed an implementation strategy to capture highest short-term benefit
- ▶ For areas with highest OPEX costs
 - Shorter pay-back time
 - Higher Return on Investment (ROI)
- ▶ Savings from this strategy could help cover higher upfront costs of the product
 - Made installation in other areas more attractive

Case Study PPI – Market Consultation & Internal Assessment

- ▶ Compared between different LED technologies
- ▶ Potential suppliers submitted product and cost information
- ▶ Scored potential solutions
- ▶ Benchmarked by comparing with current solution
- ▶ Predicted an average of 50% total cost savings over 8 years



Whole Life Cost comparison of Lighting Product Type 1 (1 of 16 types)



5 Lighting products submitted by manufacturers (A-E), plus the most common product of the same type currently installed on the London Underground (Benchmark)

Case Study PPI – Outcome

- ▶ Awarded by Transport for London in June 2016
- ▶ Covered by 8 million euro framework contracts
- ▶ Eight-year long contracts were awarded to 13 manufacturers to supply 45 products
 - Incentives to keep improving over the contracting period
- ▶ New solution will save 25% of life cycle costs
 - 75% on maintenance costs

Case Study PPI – Summary

Pre-Procurement

Public Procurement

Identify need
Calculate
baseline

Cost-Benefit
Analysis of the
new solution
(general)

Market
consultation

Cost-Benefit
Analysis of each
new solution
(specific)

Award best
solutions

Understand problem
& solution space

First look into
feasibility of a new
solution

Estimate range,
costs of potential
solutions

Compare potential
solutions

Compare
potential
solutions

70 suppliers
3000 products

30 suppliers
170 products

13 suppliers
45 products

Case Study – Business Case Methodology in PCP - Problem Introduction & Approach

- ▶ For improved quality/efficiency in healthcare service delivery
- ▶ Lombardy region in Italy, 2011, mid- to long-term scope
- ▶ Pre-selection – end-user needs assessment - WIBGI

Medical personnel, operators, clinical engineers,
managers

- ▶ Reduction – market consultation, patent search
- ▶ Focus assessment on three possibilities

Automatic robotic system for venipuncture

Automatic and universal bed mover

Universal interface devices for home medical
devices

Case Study PCP – Qualitative Cost-Benefit Analysis for Feasibility

- ▶ Current costs
 - Of equipment to be replaced
 - Due to supply side concentration
 - Due to lack of open standards/interoperability
- ▶ Expected benefits (Cost savings)
 - Due to economies of scale/potential market volume
 - Potential to reduce supplier lock-in costs
- ▶ Risks and technical complexity

Case Study PCP – Problem Reduction

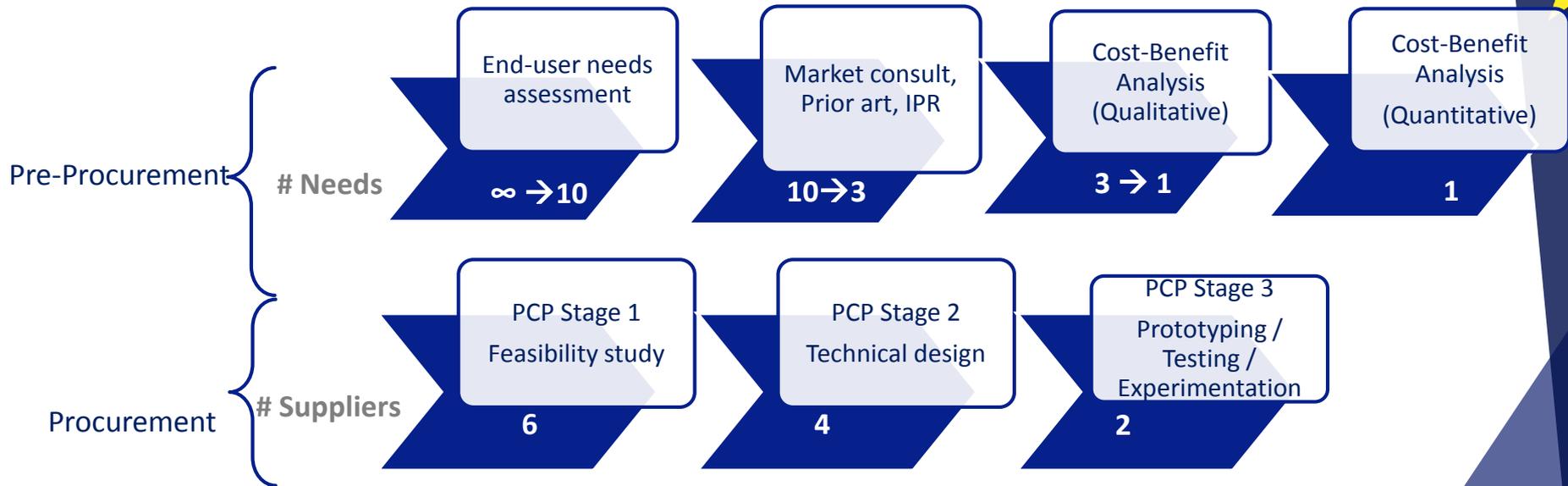
- ▶ Combined findings of market consultation and qualitative cost-benefit analysis
- ▶ Reduced the number of potential focuses to one
 - Robotic system had low anticipated user acceptance
 - Universal interface devices are less suitable to address regionally
- ▶ Identified greatest potential in addressing the bed mover need

Case Study PCP – Cost-Benefit Analysis (Quantitative)

- ▶ Calculated the value of meeting the bed moving need
- ▶ Costs
 - Current cost of bed movements – €1,843,200/year
 - Cost of R&D (PCP) – €750,000
- ▶ Benefits
 - Wide applicability – 40% of beds
 - Efficiency gains – 20% increase
 - Cost savings – €921,600/year
- ▶ 40% expected cost savings (labour savings, efficiency gains)
- ▶ Conclusion: R&D investment recovered in less than a year post-PCP



Summary – Informing a PCP Decision



Take-Aways

- ▶ Focus on pre-procurement
 - Make informed purchasing decisions
 - Maximize value of a purchase
- ▶ Business case methodology
 - Compare between competing needs for problem selection
 - Compare values of possible solutions
 - Inform implementation strategies
 - Based on cost/benefit analysis
- ▶ Outcomes can be highly dependent on interactions with suppliers

Thank you for your attention!

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With special thanks to

