European Commission

THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

Robotics

HORIZON 2020

Call for proposal: ICT24 - Robotics

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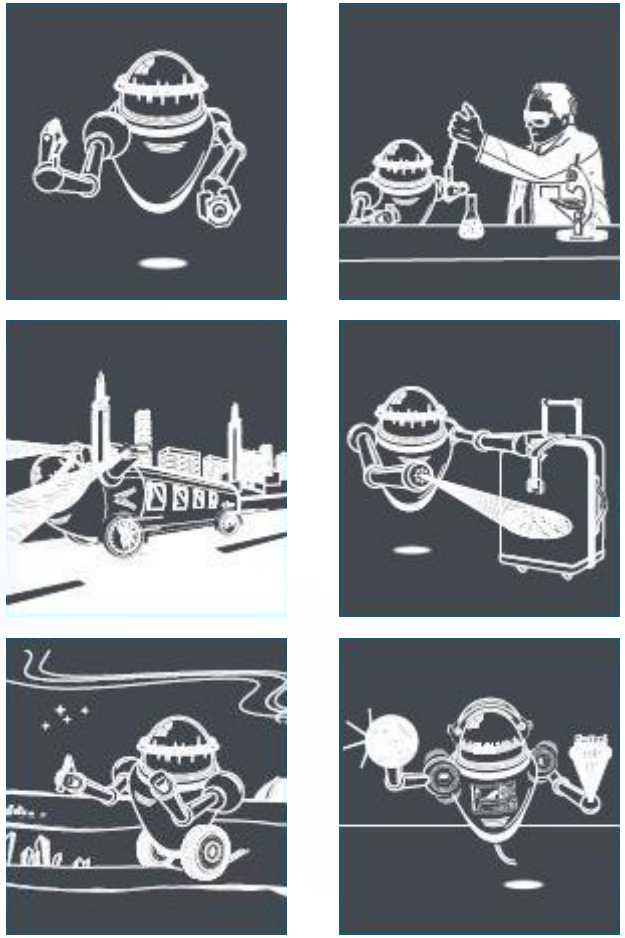
European Commission

Outline of ICT24 - 2015

- Introduction and background information
- French Participation in FP7 – H2020: Robotics
- Overview of the Call
  - ICT 24.a Research & Innovation Actions (RIAs)
  - ICT 24.b Innovation Actions (IAs): industry-academia cross fertilisation
  - ICT 24.c Innovation Actions: robotics use cases
  - ICT 24.d Pre-Commercial Procurement (PcP) in robotics
  - ICT 24.e Coordination Actions
- Additional information

Robotics today – key issues

- Millions of robots in the world today – many more tomorrow
- Not just on the factory floor, but also in hospitals, transports, fairs, shops, farms…
- Robots becoming much more intelligent, cooperative, versatile, flexible…
  - ➢ R&D&I challenges
- Huge untapped potential
  - ➢ Economic and societal impact



Robotics in EU programme

- Dedicated unit created ten years ago (FP5-FP6-FP7-H2020)
  - More than 100 ongoing projects
    - over 700 partners
    - over €500m funding
  - €70m–€80m funding for new projects per year
  - 1 call per year, up to 200 proposals
  - About 20 new projects every year
  - Emphasis in FP6 and FP7 on perceiving, understanding, acting – cognitive, intelligent enabling technologies
- Additional robotics related activities in application areas: Health, Agriculture, Transport,…
- FET (Future and emerging technologies)

First H2020 Call – ICT23

Numbers

- 155 proposals, 127 RIA + 28 IA; 13 RIA + 4 IA selected

Success rate

- 1:9 of proposals

Selected proposals – industrial participation

- Partners: 34% (11% SMEs)
- Funding: 26% (10% SMEs)

N.B. **multiple submission** a questionable approach

numbers indicate that success rate decreases rapidly with number of applications

-> focus your efforts – target excellence

First H2020 Call – ICT23

Coverage

- Manufacturing (1/3), Agriculture (1/5), Civil, Commercial, Healthcare

Increased industrial participation

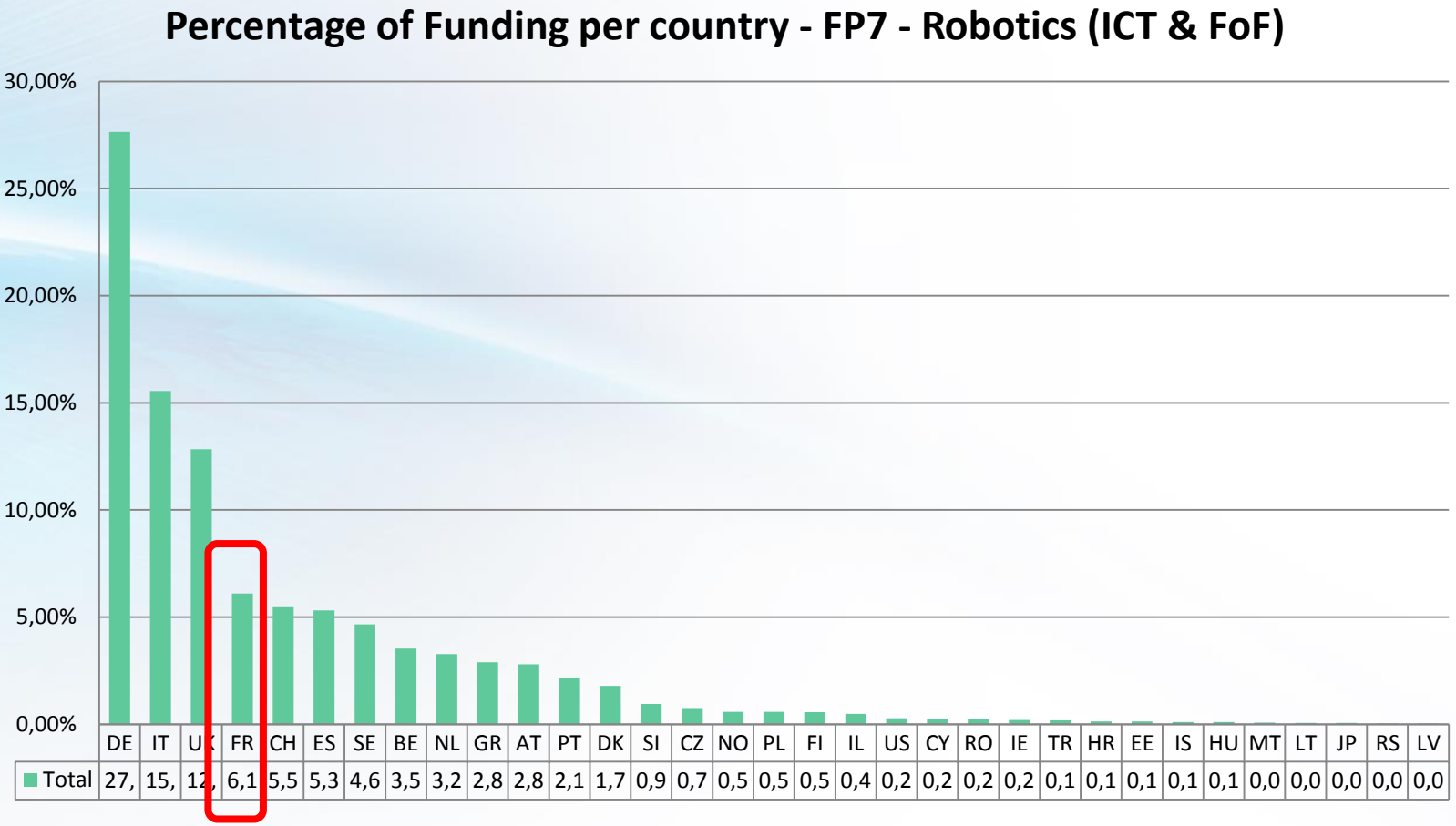
- Most funded proposals involve at least one industrial partner
- Industrial coordinator: 29% of funded proposals

Presence of the whole value chain

- research & development + innovation
- 70% of funded proposals involve end-users

French Participation in FP7 & H2020 Call1: ICT23

FP7 Robotics – French participation



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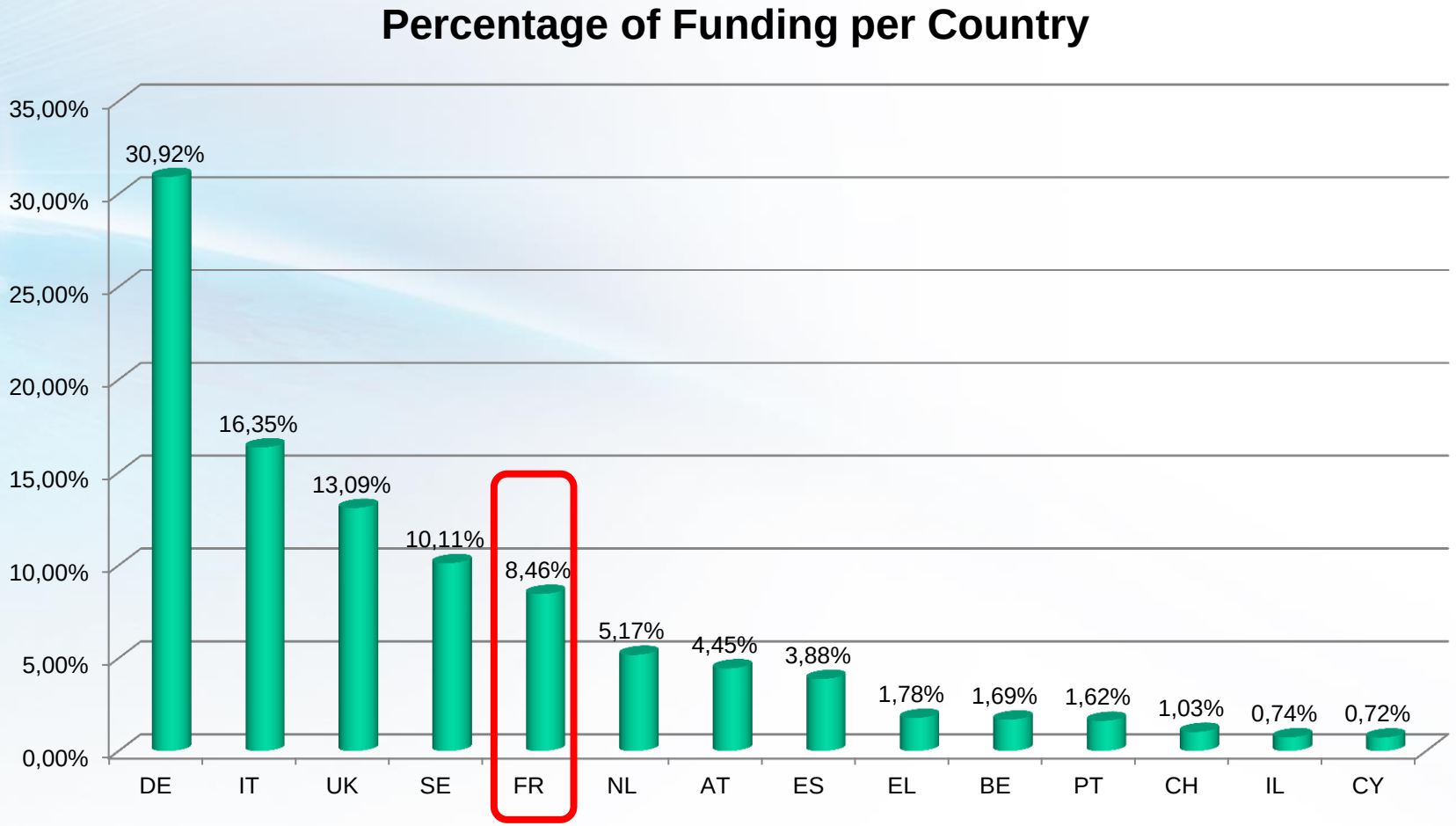
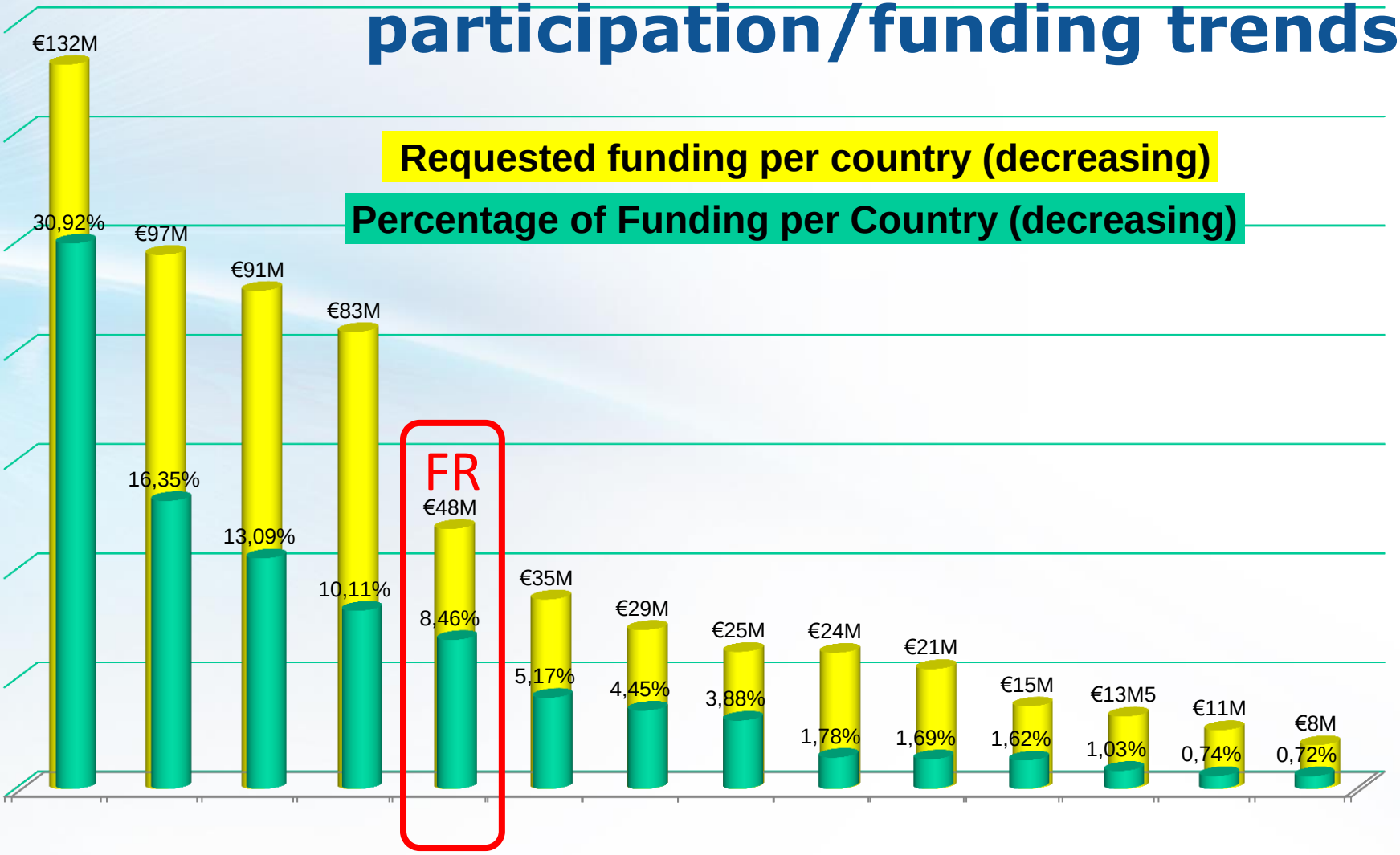
Total	27,	15,	12,	6,1	5,5	5,3	4,6	3,5	3,2	2,8	2,8	2,1	1,7	0,9	0,7	0,5	0,5	0,5	0,4	0,2	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0

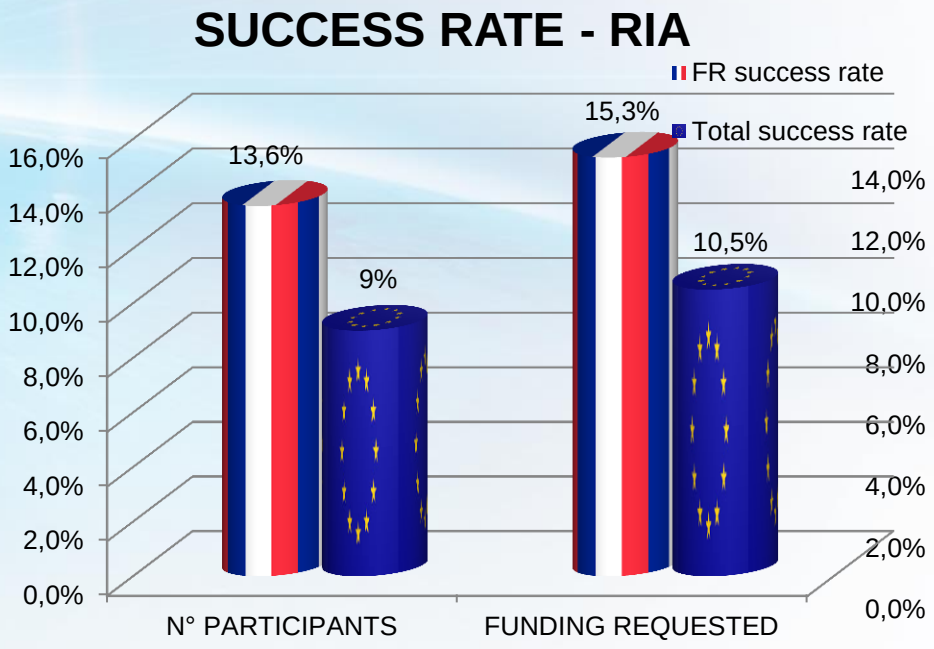
H2020: CALL1 - ICT23 Robotics
French participation

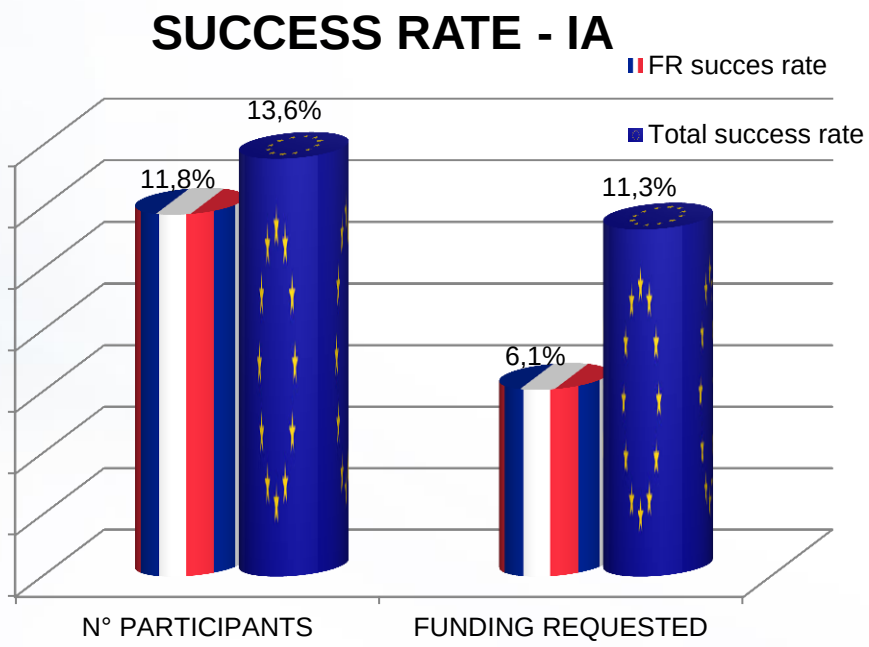


H2020: CALL1 - ICT23 Robotics – participation/funding trends

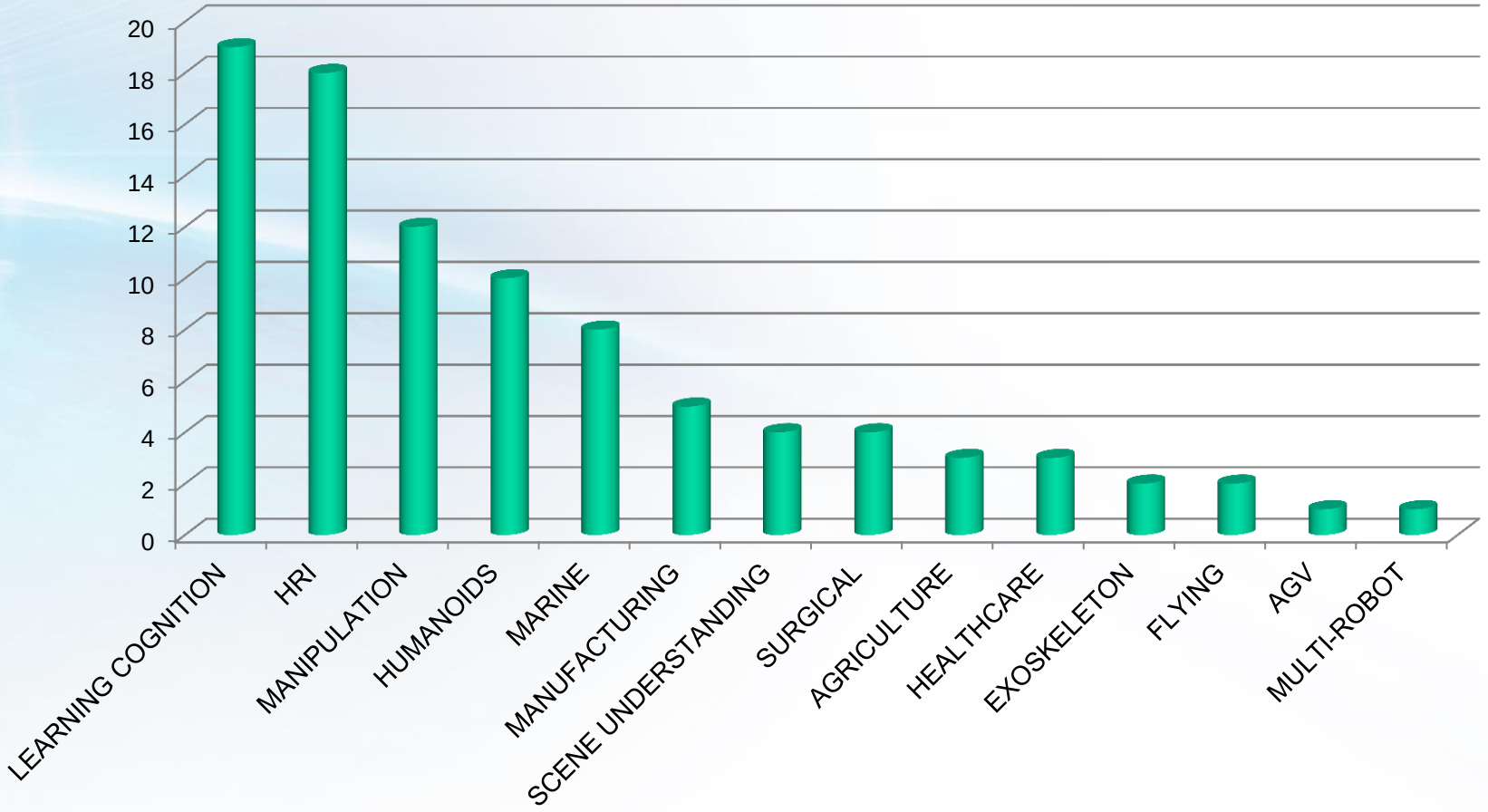


Success rate of French Participants in H2020-ICT23

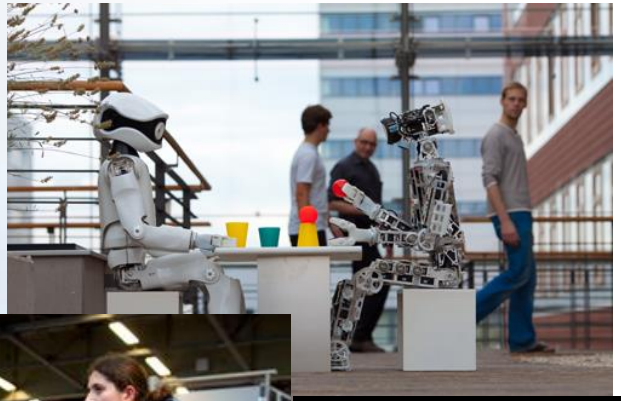


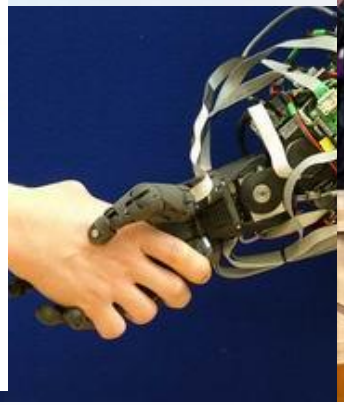


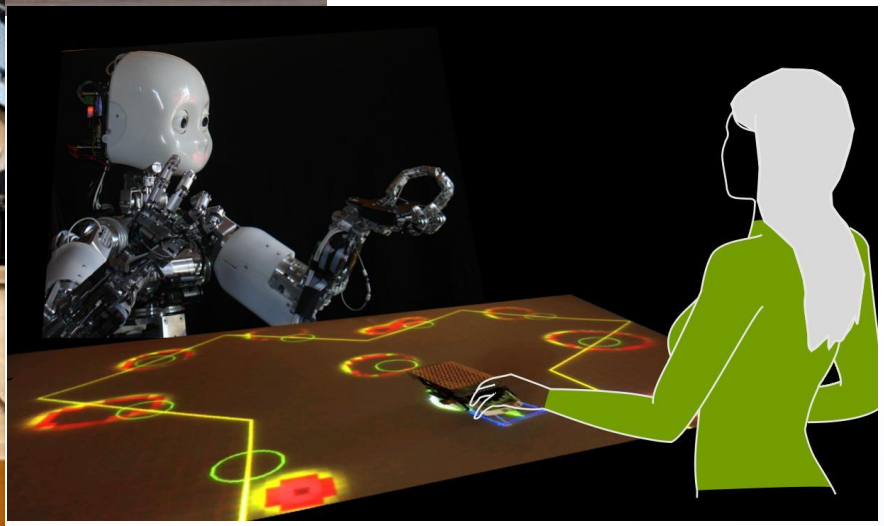
FP7 Robotics – French participation: domains of expertise

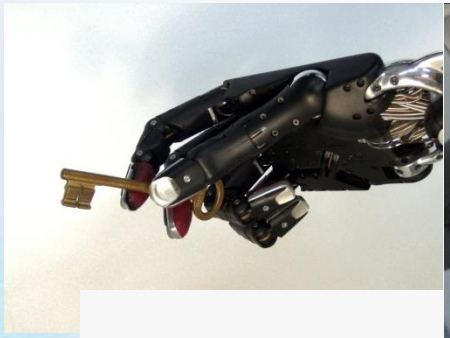


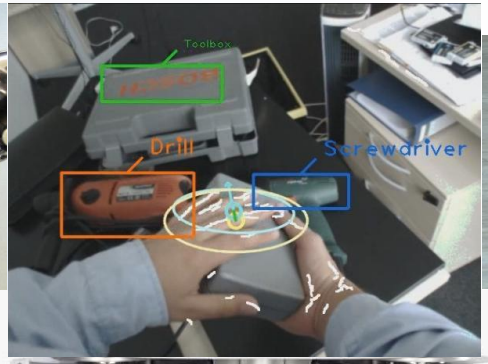
Some illustrations of the French landscape in FP7

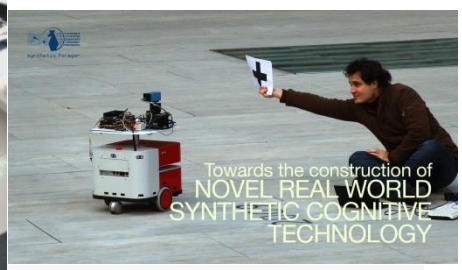









Toolbox
Drill
Screwdriver

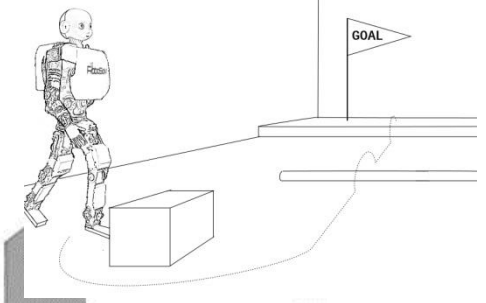

Towards the construction of
NOVEL REAL WORLD
SYNTHETIC COGNITIVE
TECHNOLOGY

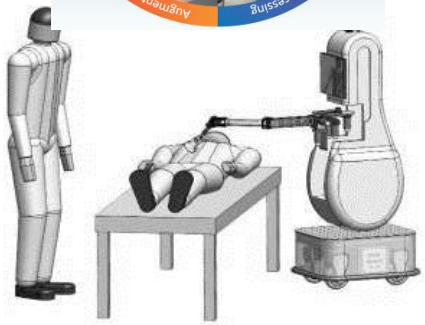

CODYCO

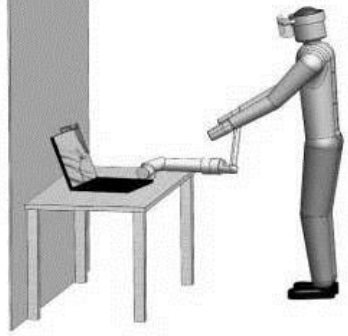

OBSTACLE
ADVOIDANCE
OVERSTEPPING
STAIR
CLIMBING


LAFERTSERVO
Nabtesco
Harmonic Drive AG

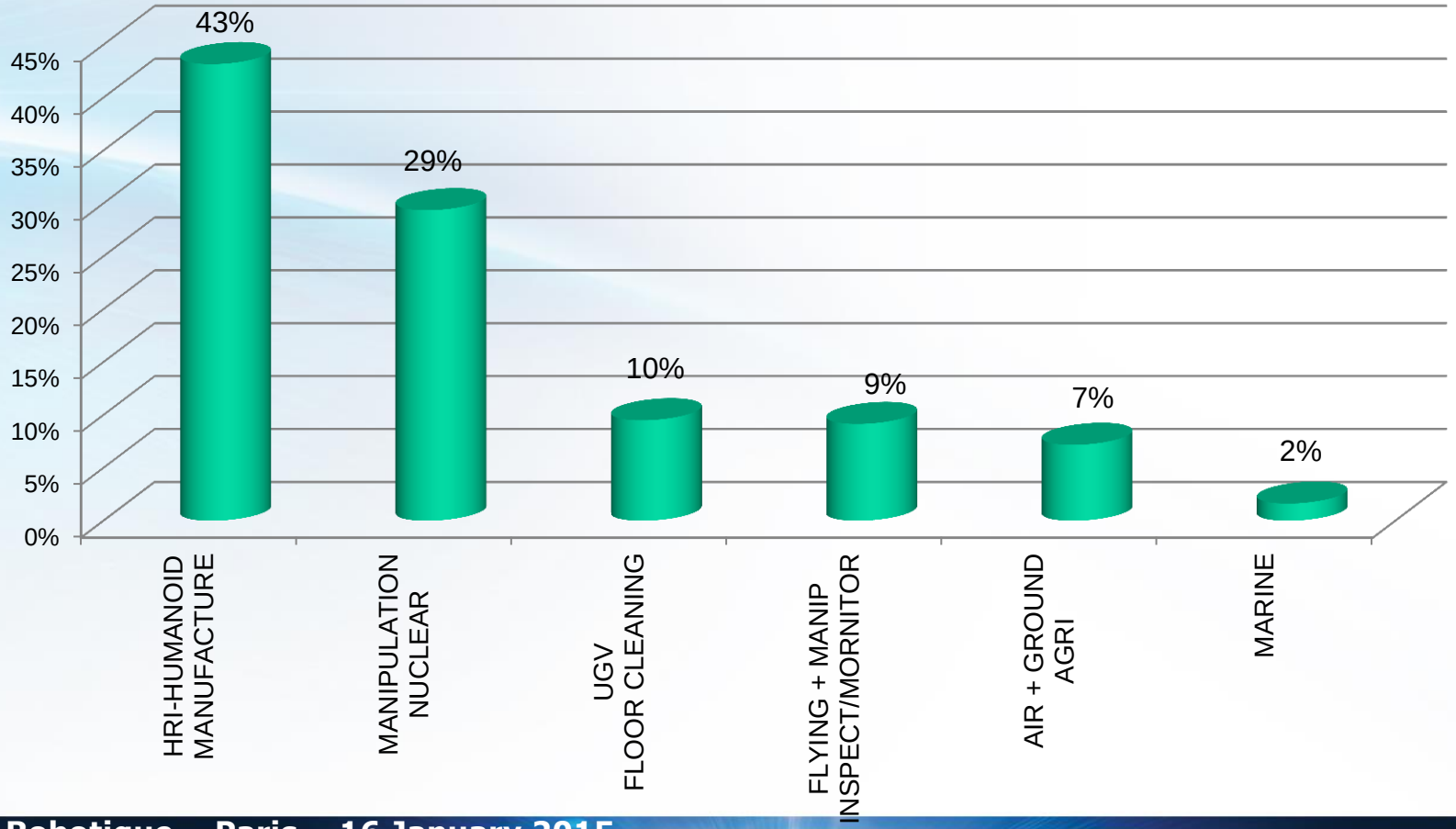

Laser treatment of pathological conditions on the vocal cords
LARYNX
Robotic tools for surgery
Alternative Interfaces
Image Processing
Augmented Reality
Artificial Cognitive Supervisory System
μRALP


GOAL

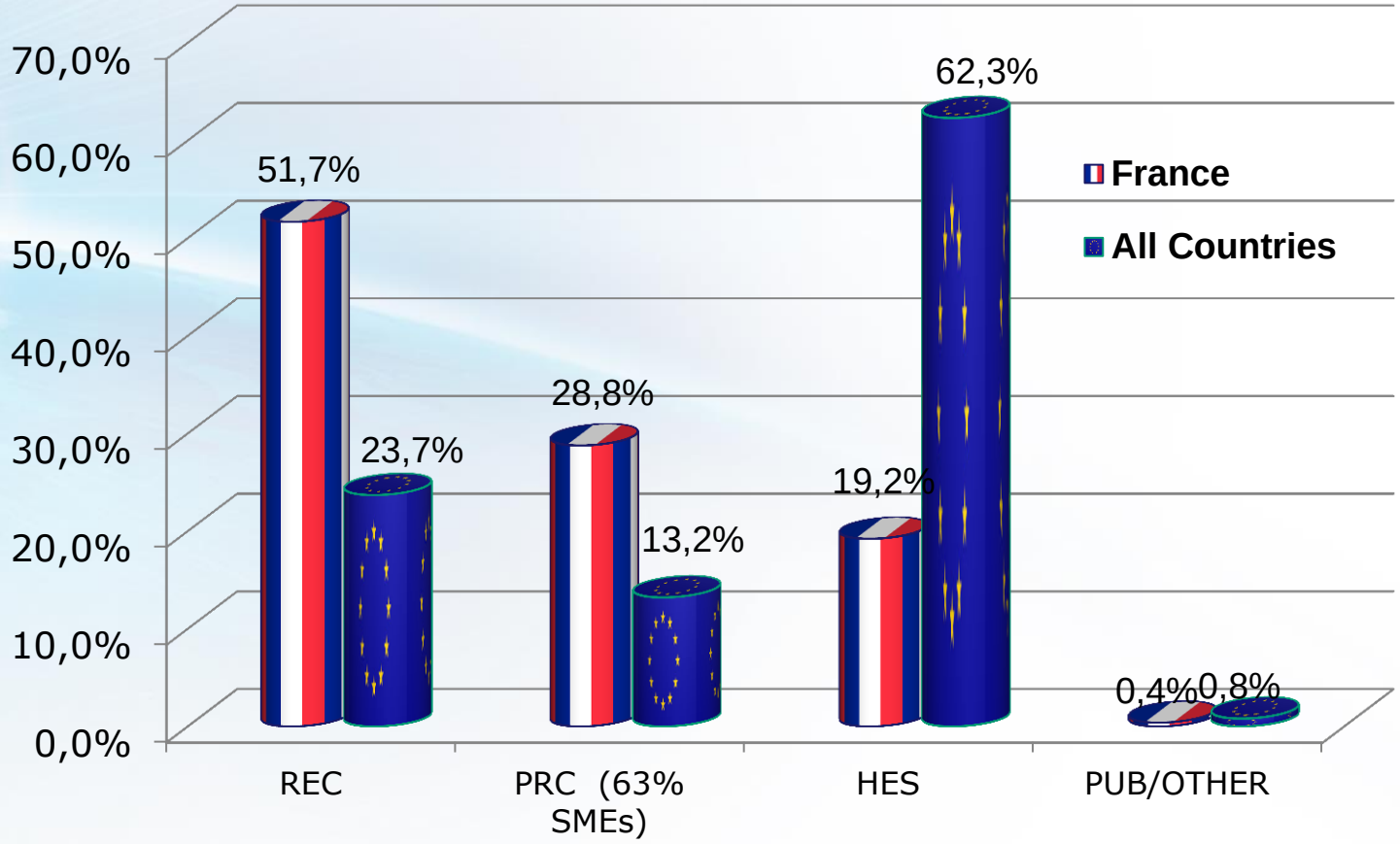




H2020: CALL1 - ICT23 Robotics
French participation: expertise

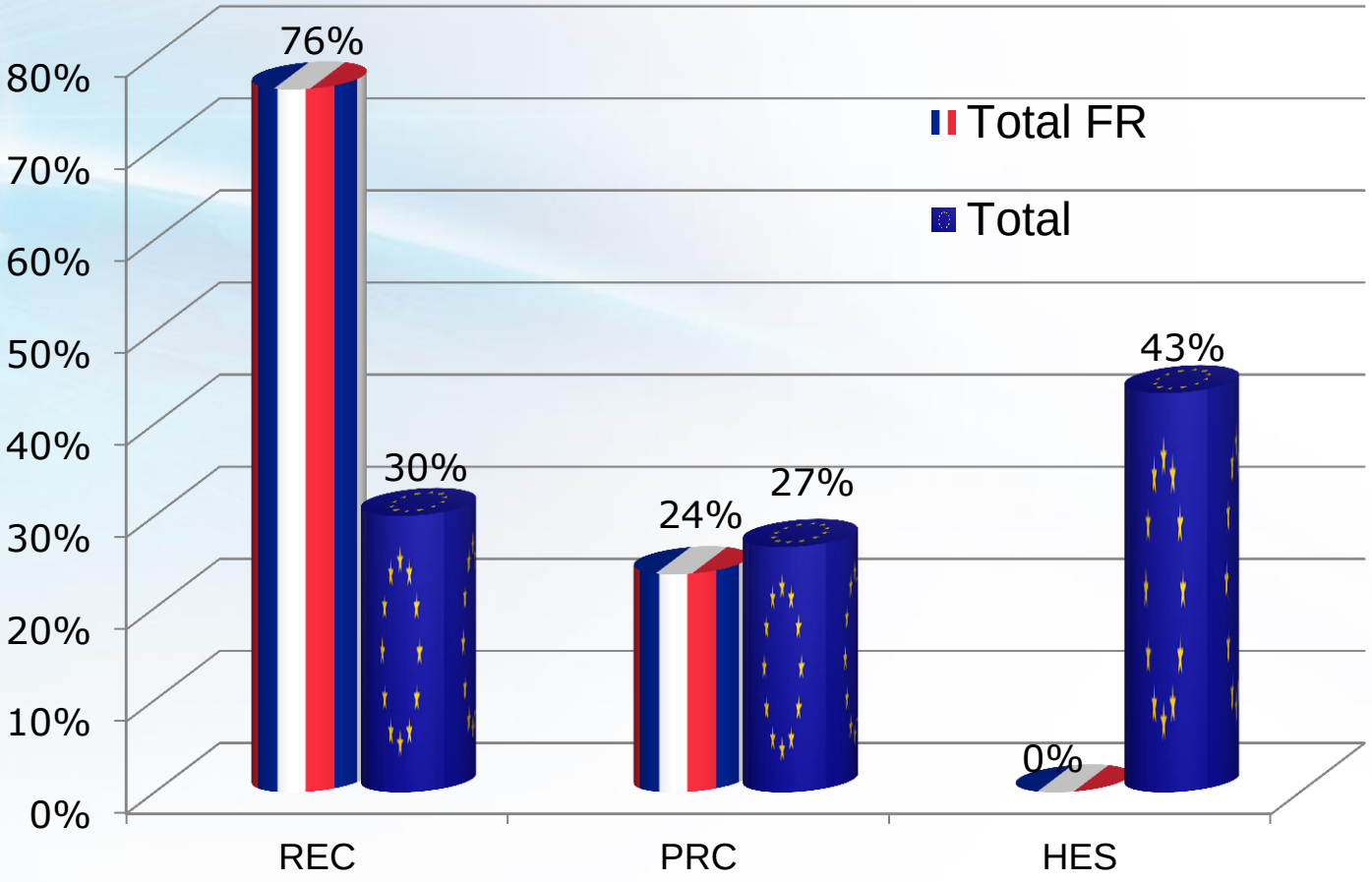


FP7 Robotics – French participation: type of organisations

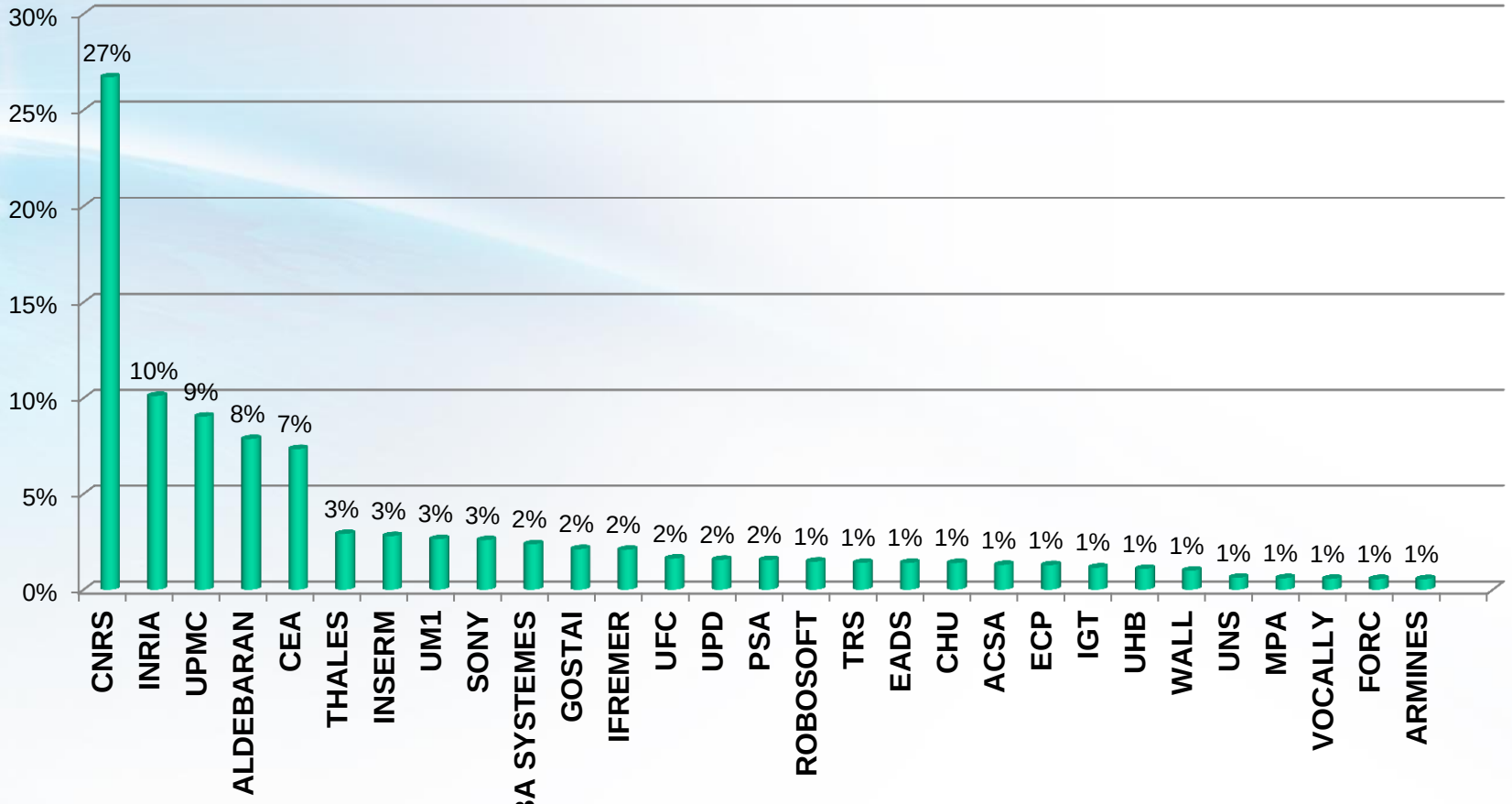


REC: Research Organisations / PRC: Private for Profit (excluding Education)
HES: Higher or Secondary Education / PUB: Public body (excluding Research and Education)

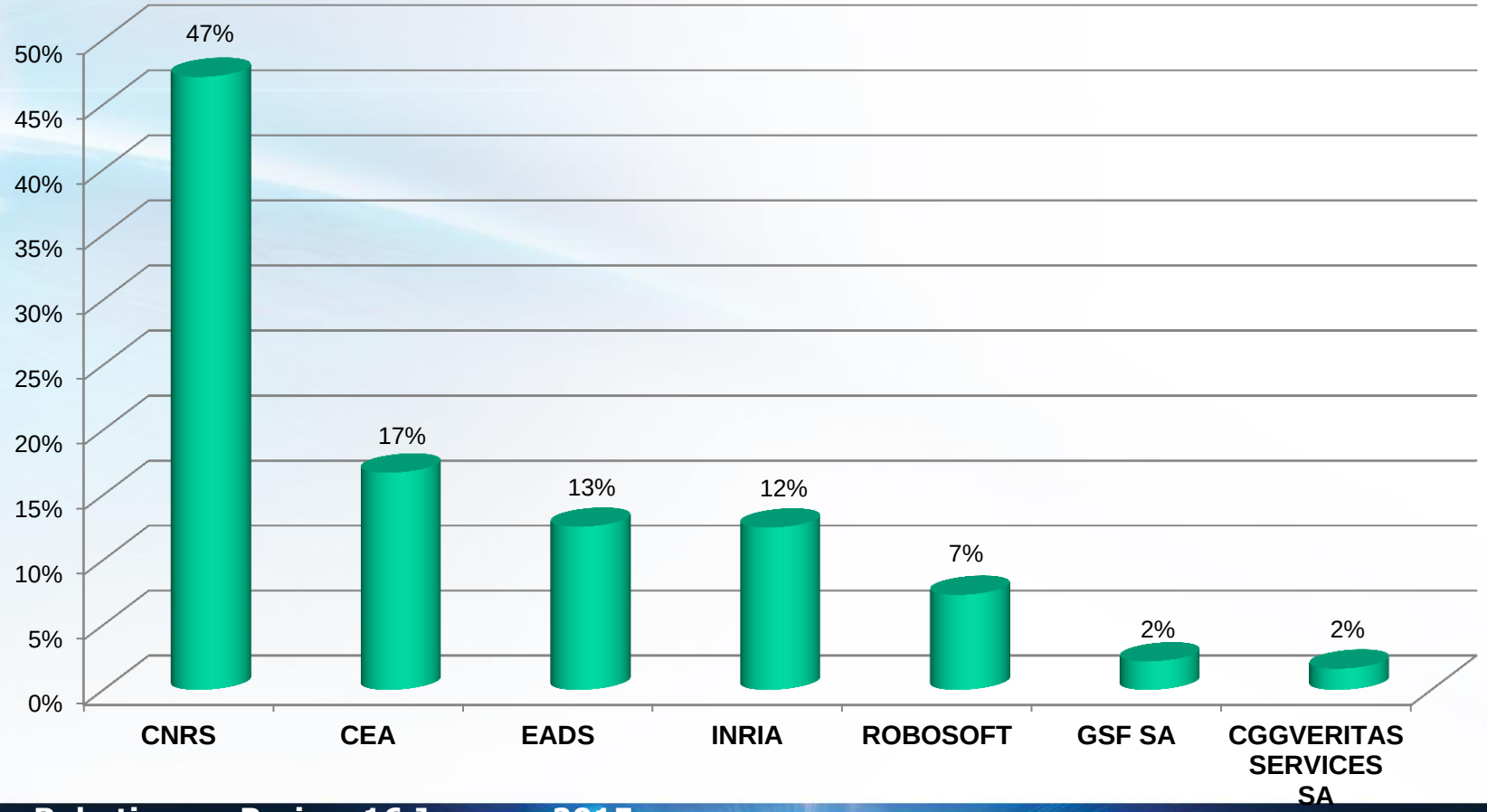
H2020: CALL1 - ICT23 Robotics French participation: Type of organisations



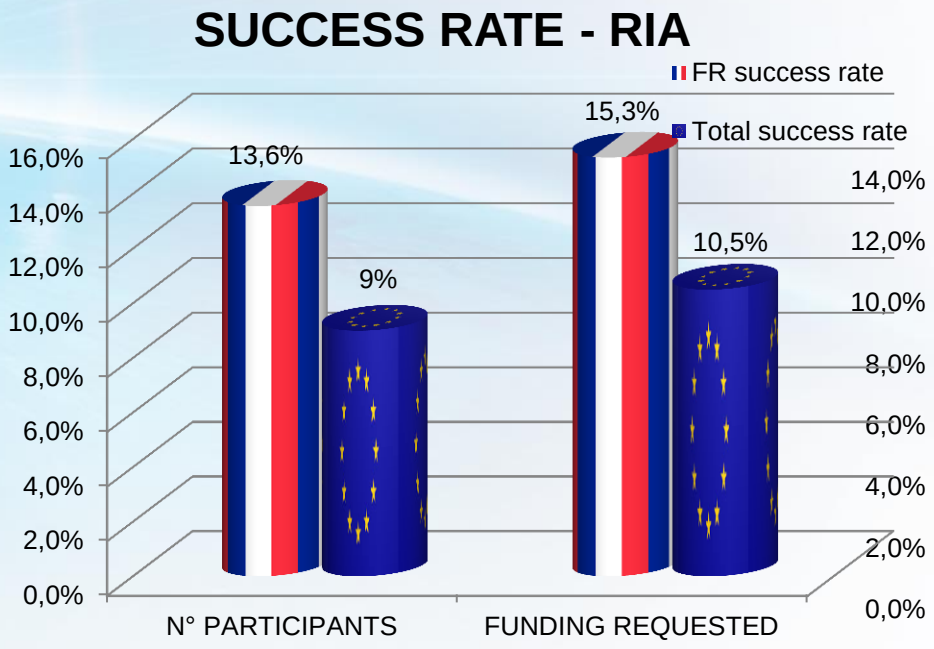
French Participants in FP7 ICT Robotics and FoF

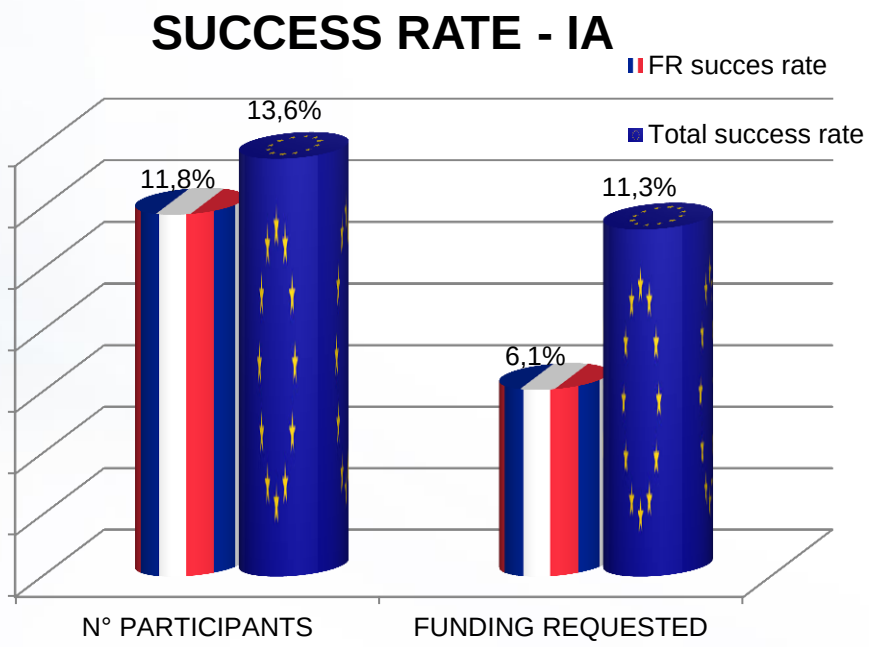


French Participants in ICT-23 Selected Projects



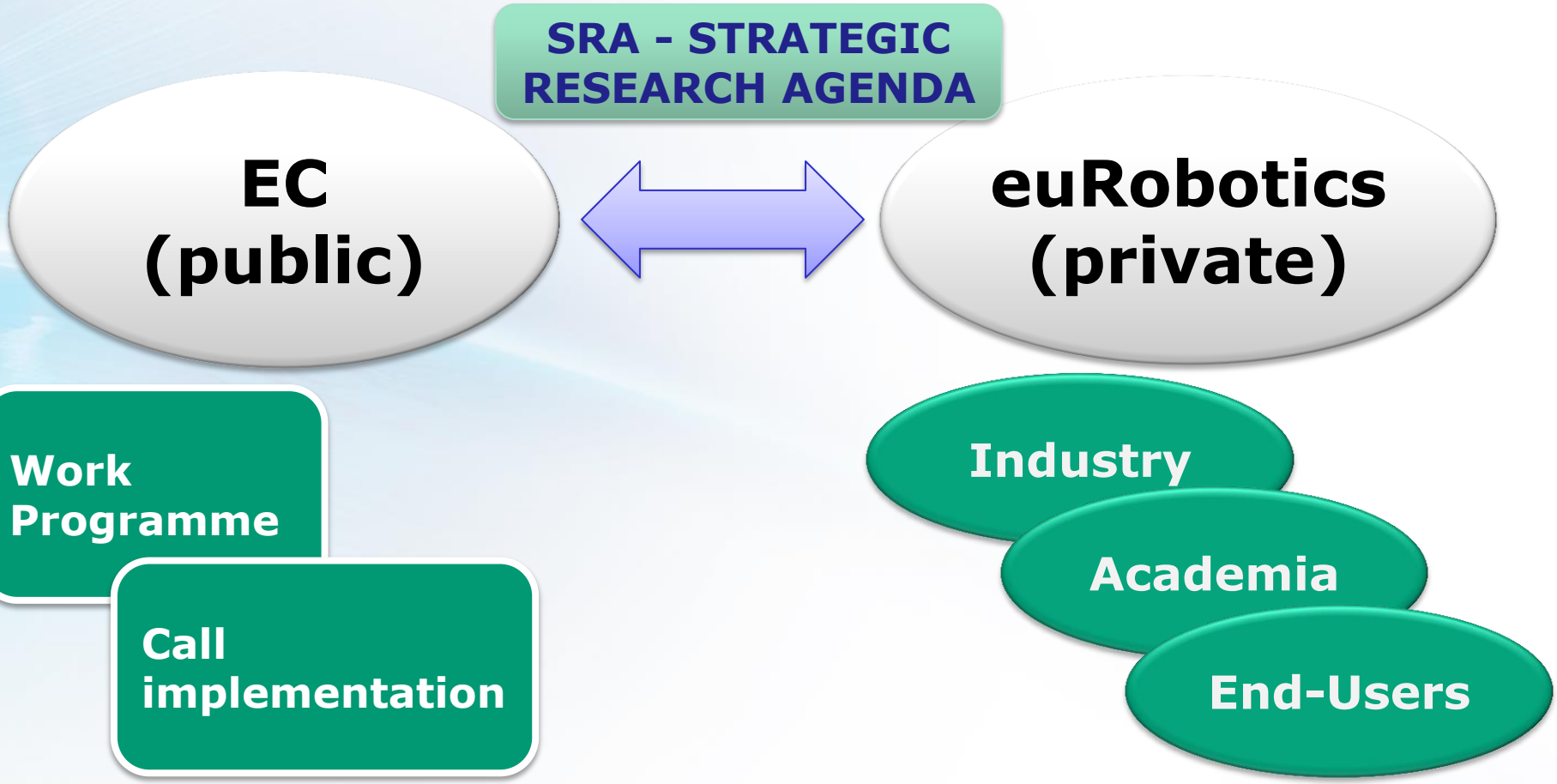
Success rate of French Participants in H2020-ICT23





Next Call – ICT24 – Robotics Background: PPP

PPP in Robotics – SPARC



http://sparc-robotics.eu/about/

SRA = Strategic Research Agenda
MAR = Multi-Annual Roadmap

VISION GOALS

GUIDANCE HOW TO

Essential reading for proposers, providing detailed definitions of technologies and abilities and illustrative examples of the selected priorities.

PPP and the constituency

- The call organisation and operations are run by the European Commission
- The evaluation and selection of proposals does not involve the private side of the PPP – done by the Commission with the help of independent experts
- Proposers need not be PPP members
- PPP membership gives no advantage or preferential treatment in evaluations
- But PPP membership gives an opportunity to be involved in shaping future funding directions

Overview of the Call

Overview of ICT-24 Robotics

Roadmap-based R&I in Robotics **Deadline: 14 April 2015**	• ACTION TYPE • Funding % • Size	**€83m**
ICT24.a – Research & Innovation Actions **Priority market domains: healthcare, consumer, transport** **Advance key technologies for priority domains**	**RIA** **100%** **Small/Large**	**€50m**
ICT24.b - Technology transfer **Industry-academia cross-fertilisation**	**IA 70%** **Large**	**€12m**
ICT24.c - Technology transfer **Robotics use cases**	**IA 70%** **Small/Large**	**€12m**
ICT24.d - Pre-commercial procurement in robotics: especially healthcare	**PcP 70%** **Large**	**€5m**
ICT24.e - Community building and robotics competitions	**CSA**	**€4m**

Impact

- By coupling **research and innovation**, H2020 aims to drive **economic growth** and **create jobs**
- H2020 gives **more weight to impact**
- For Innovation Actions:
  - Impact criterion weighted by a factor of 1.5
  - Impact considered first when tied scores
- Make the **robotics** contribution to **impact** more direct and more explicit than in previous framework programmes.

Expected impact in the WP (1/2)

- Increase Europe's **market share in industrial robotics** to one third of the market and maintain and strengthen Europe's market share of 50% **in professional service robotics** by 2020.
- Increase Europe’s market share in **domestic service robots** to at least 20% by 2020.
- Improve the competitiveness of Europe's **manufacturing** sector, in particular **SMEs**, address pressing technological challenges and the effect of an aging workforce.
- Improve **Technology Readiness Levels** of robotics technologies.
- Increase **Industry-Academia cross-fertilisation** and tighter connection between industrial needs and academic research via technology transfer, common projects, scientific progress on industry-driven challenges.

Expected impact in the WP (2/2)

- **Deploy** robotics technologies in **new application** domains.
- Contribute to an **inclusive society** through robotic technologies (e.g. exoskeleton, advanced prosthesis).
- Address **ethical, legal and societal** issues and engage the wider **public**.
- Create and maintain **world class research** in Europe and achieve excellent standards of publications and research outputs.
- Ensure sufficient numbers of **well-trained professionals** required by the growth of the industry.
- Ensure **wide use of shared resources**.
- Contribute to the **community building** of the European robotics community.

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ICT24.e - Community building and Robotics competitions	**CSA**	**€4m**

ICT 24.a **Research & Innovation Actions (RIA)** to advance key technologies relevant for industrial and service robotics (1/2)

- Advance robotics abilities + key technologies and their combination
  - market domains: **healthcare, consumer, transport**
  - and **enabling robotics** technologies for **disabled people**, esp. people with upper, lower-limb disabilities or amputees, allowing them to gain functionalities with exoskeletons or prostheses
- Demonstrate increased TRL (Technology Readiness Level) relevant for the market domains

ICT 24.a Research & Innovation Actions (RIA) to advance key technologies relevant for industrial and service robotics (2/2)

- Research results must be validated in real-world setting, demonstrating progress in abilities and technologies **relevant** to these market domains
- 100% funding → main focus on RTD, not innovation
- From basic research to more applied research (depending on TRL)

ROBOTICS ABILITIES KEY TECHNOLOGIES AND THEIR COMBINATION

Robotics abilities

- **adaptability, cognitive ability, configurability, decisional autonomy, dependability, flexibility, interaction capability, manipulation ability, motion capability, perception ability**

Key robotics technologies

- **cognition, human-robot interaction, mechatronics, navigation, perception**

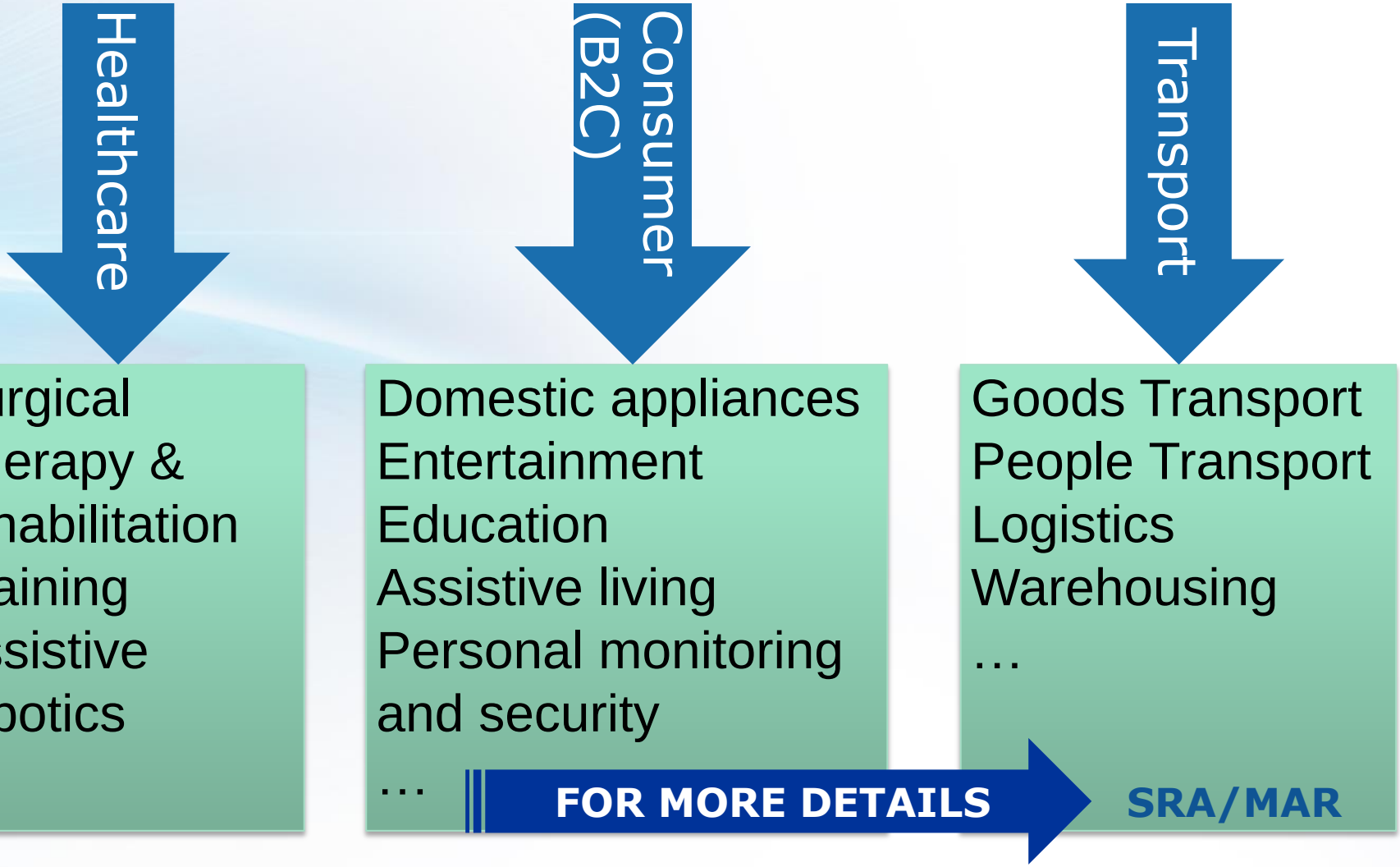
Technology combinations - **NOT EXHAUSTIVE**

- **such as grasping and dexterous manipulation, physical HRI, mobile manipulation, reactive planning and other combinations (more examples in the SRA)**

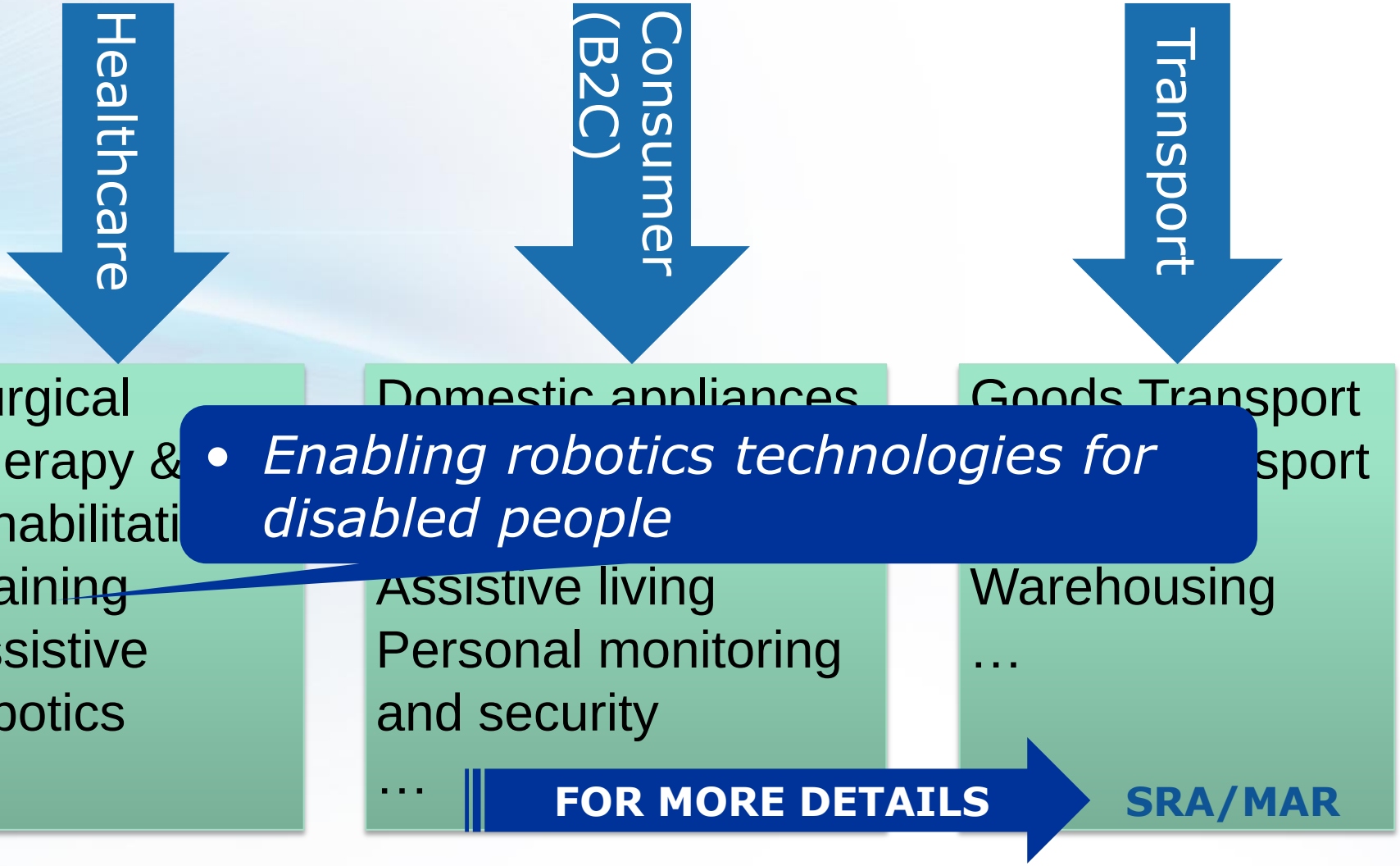
FOR MORE DETAILS → **SRA/MAR**

MARKET DOMAINS

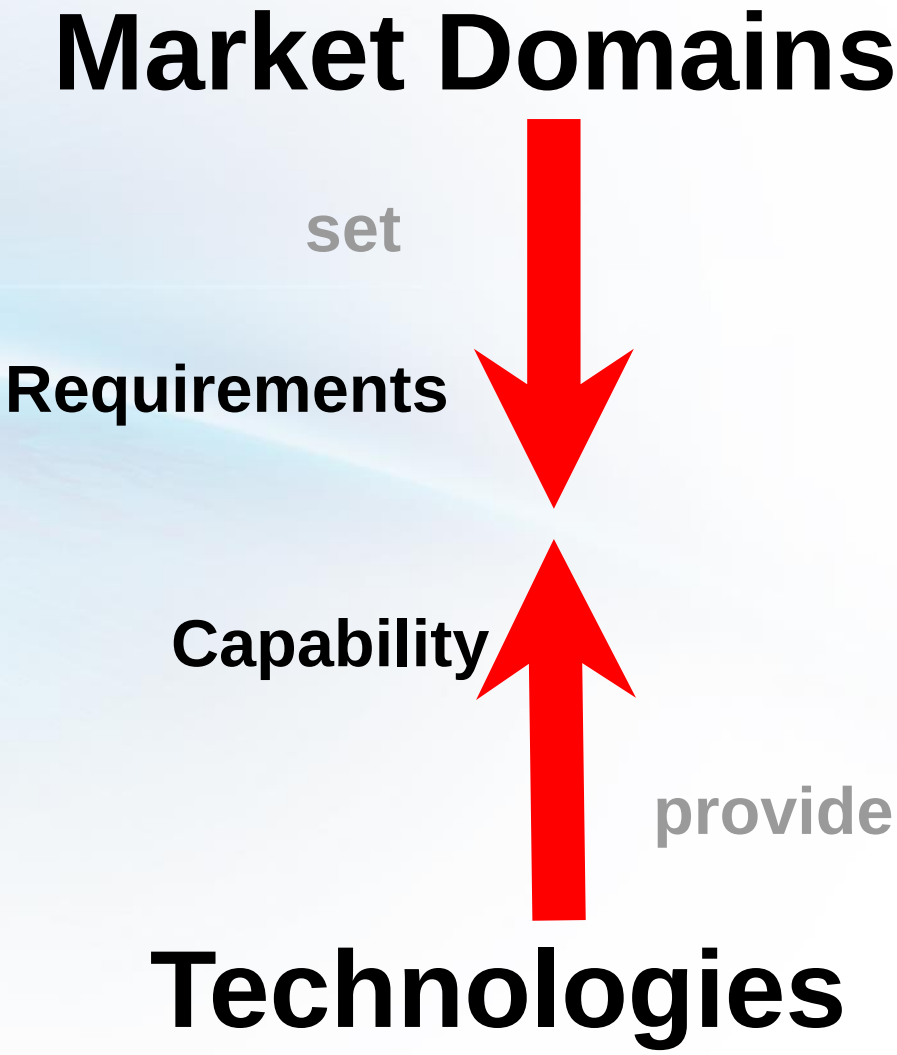
Market domains: ICT 24.a



Market domains: ICT 24.a



Not in isolation but in the context of …



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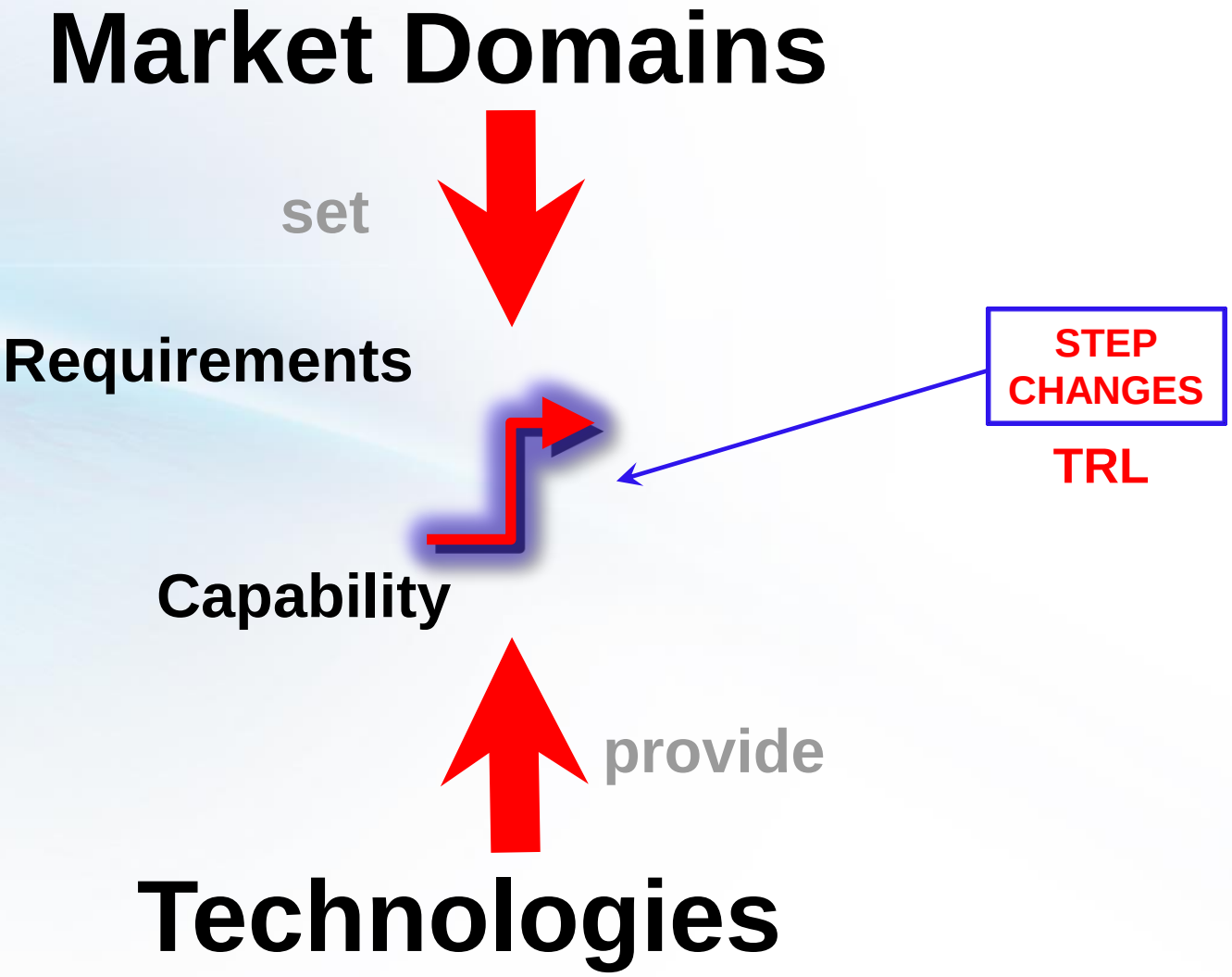

What do I find in the Strategic Research Agenda (SRA) and the Multi-Annual Roadmap (MAR)?

- Detailed definition of Market domains, Technologies and Technology Combinations
- Mapping: application domains vs. abilities vs. technologies

  –> Technology/ability gaps for specific application domains

  –> Prioritised necessary step changes in technologies/abilities
- Use SRA/MAR information to situate your project contribution

Recipe for a good proposal

MARKET DOMAIN

ABILITY

- Step change: current vs. target

TECHNOLOGY/TECHNLOGY COMBINATION

- Step change: current vs. target
- How? Methodology

VALIDATION

- Plans to demonstrate progress/step changes in abilities/ technologies RELEVANT to the selected market domain(s)
- Targeted improvements (TRLs), metrics, validation plans

IMPACT

- Specific Objective(s)
- Concrete plans to reach the objective(s)

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ICT24.e - Community building and Robotics competitions	**CSA**	**€4m**

ICT 24.b Innovation Actions (IA)

Technology transfer – industry-academia cross-fertilisation

- Define **joint** industrially relevant scenarios, **share research infrastructure**, cluster activities
- Not limited to a particular market domain
- 1 or 2 Large project(s)
  - May include open calls for small scale Industry-Academia experiments with industrial platforms
  - Support to third parties can be given (cf. Echord/EuRoc – but different administrative mechanism)

ICT 24.b Innovation Actions (IA)

Technology transfer – industry-academia cross-fertilisation

- Financial support to third parties – conditions in Annex K
  - Proposals using this mechanism are to detail the objectives and results to be obtained and include the following:
    - a closed list of the different types of activities that qualify for financial support
    - the persons or categories of persons which may receive financial support
    - the criteria for awarding financial support
    - the criteria for calculating the exact amount of the financial support
    - the maximum amount to be granted to each third party (may not exceed €60,000 for each third party, unless it is necessary to achieve the objectives of the action)

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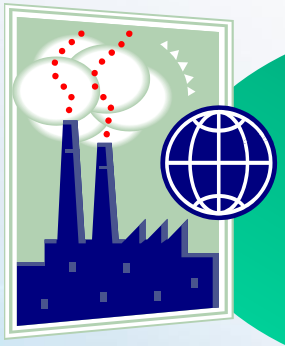
ICT 24.c Innovation Actions (IA)

Technology transfer – Robotics use cases

- Proposals focusing on transferring latest research results from the laboratory to the industry/users
- The expertise covering the complete lifecycle must be present in proposal (from research to integration to users)
- Concrete plan to reach impact carefully explained
- Business case made
- User driven proposals and not technology push – users needed in the consortium
- All market domains

Typical consortium



End users

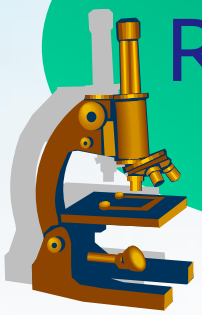
- Define user needs
- Provide real-world test environments
- Validate results

- Integrate solutions for real-world problems
- Generalise results
- Market outreach

- Supply state-of-the-art technology
- Conduct experiments

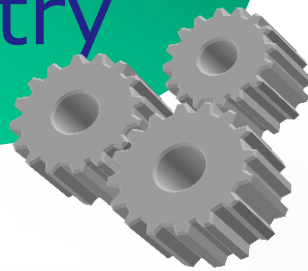
Validation

Research



Technology transfer

Robotics industry



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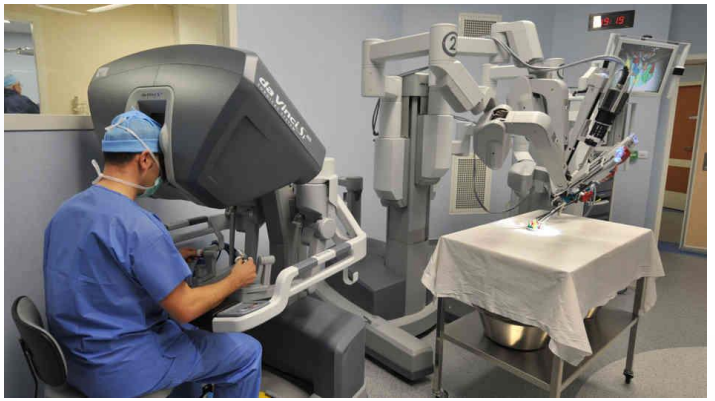
ICT24.e - Community building and Robotics competitions	**CSA**	**€4m**

ICT 24.d Pre-Commercial procurement (PcP)

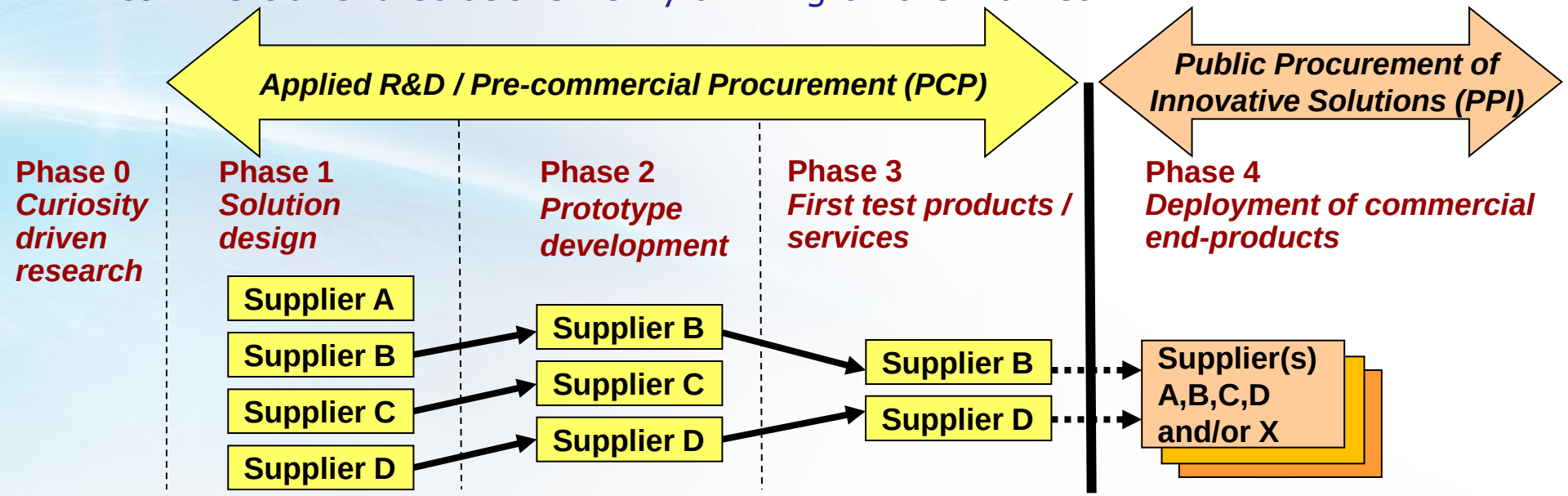
- Demand driven innovation led by public procurers in areas of public interest, including pre-commercial procurement of innovative robotics solutions for the healthcare sector

- Gathering public procurers with common needs
- One large project (up to €5m) including 2 major components
  - Refining requirements; selection of suppliers and evaluation of progress
  - RTD work to be procured
- End-user integration absolutely essential
- Concept of PcP Pilots exists in ECHORD++
- Examples: SMART@FIRE, SILVER
- More specific information on PCP: http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-e-inproc_en.pdf



How does PCP/PPI work?

- **PCP** to steer the development of solutions towards concrete public sector needs, whilst comparing/validating alternative approaches from various vendors
- **PPI** to act as launching customer / early adopter / first buyer of innovative commercial end-solutions newly arriving on the market



PCP: specific approach to procure R&D services enabling:

- price/quality products that better fit public sector needs
- earlier customer feedback for companies developing solutions
- better take-up/wider commercialisation of R&D results

Overview of ICT-24 Robotics

Roadmap-based R&I in Robotics **Deadline: 14 April 2015**	• ACTION TYPE • % fund. • Size	**€83m**
ICT24.a – Research & Innovation Actions **PRIORITY Market domains:** **healthcare, consumer, transport** **Advance key technologies for priority domains**	**RIA** **100%** **Small/Large**	**€50m**
ICT24.b - Technology transfer **Industry-academia cross-fertilisation**	**IA 70%** **Large**	**€12m**
ICT24.c - Technology transfer **Robotics use cases**	**IA 70%** **Small/Large**	**€12m**
ICT24.d - Pre-commercial procurement in robotics: healthcare	**PcP 70%** **Large**	**€5m**
ICT24.e - Community building and Robotics competitions	**CSA**	**€4m**

ICT 24.e Coordination Actions (CSA)

Community building and Robotic competitions

- Supporting the European robotics community
  - Networking, education, outreach, public awareness, technology watch, standardisation, and industry-academia collaboration, links to national programmes and initiatives.
  - Ethical, legal, societal and economical aspects
- International cooperation (intra or extra-EU)
  - impact to be demonstrated, matching resources expected
- Coordinating work on the next generation of cognitive systems and robotics
- Robotic competitions: towards smarter robots
  - budget for one competition

Proposals are **not** meant to cover all the points

Additional information

Background documents

1. SRA / MAR

   http://sparc-robotics.eu/about/

2. Q&A document (continually updated)

   http://ec.europa.eu/digital-agenda/en/news/information-day-horizon-2020-call-1-and-2-objective-ict-23-and-ict-24-robotics

3. Infoday Presentations, January 2014
   http://ec.europa.eu/digital-agenda/en/news/information-day-horizon-2020-call-1-and-2-objective-ict-23-and-ict-24-robotics

4. ICT proposers day Firenze, 9–10 October, Robotics

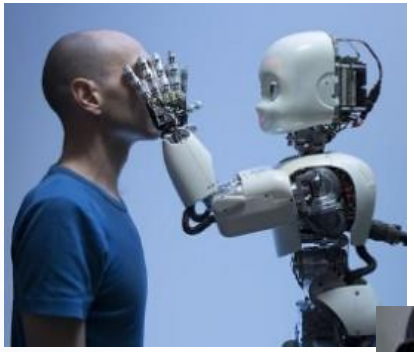
   https://ec.europa.eu/digital-agenda/en/ict-proposers-day-9-10-october-2014

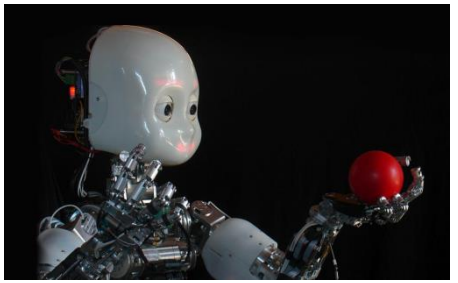
5. Brokerage event, Brussels, 9 December 9

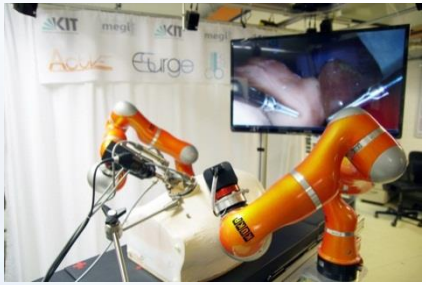
   http://sparc-robotics.eu/brokerage-day-for-ict24-2015-robotics-2/

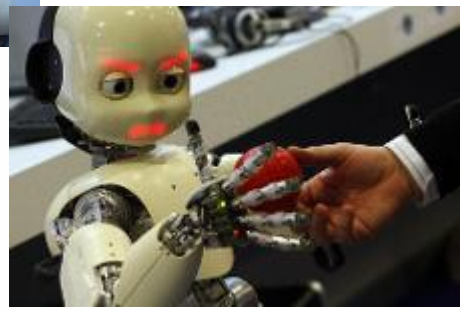
Current project portfolio

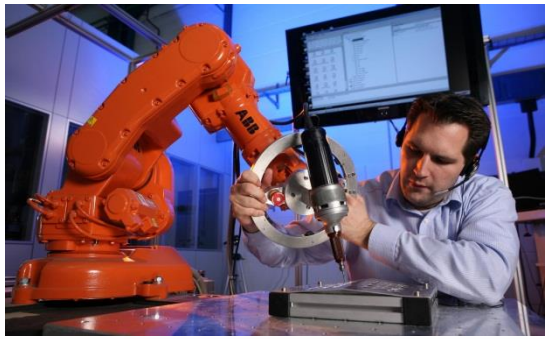
(project factsheets - Robotics)











http://cordis.europa.eu/fp7/ict/robotics/

http://ec.europa.eu/digital-agenda/en/node/72886

H2020 ICT-23: summaries of selected projects:

https://ec.europa.eu/digital-agenda/en/news/first-robotics-projects-h2020-starting

Other Robotics-related calls & Opportunities

H2020 Challenge and topic	M€
ICT (Information and Communication Technologies)	
• ICT 24 2015 Robotics	83
• ICT 30a 2015: Internet of Things and Platforms for Connected Smart Objects - covers multiple devices potentially including robots	50*
• ICT 34 2015 ICT contribution to pilot for co–investments by business angels in innovative ICT firms- including robotics #this is funded also by Access to Risk Finance section 3.1 Piloting Co-Investments by Business Angels in Innovative ICT Firms	15+15*
• ICT 37 – 2014-2015 Open Disruptive Innovation Scheme (implemented through the SME instrument) – open to any ICT-related topic	**
FET (Future and Emerging Technologies)	
• FETOPEN 1 – 2014/2015: FET-Open research projects - open to any science & technology topic	**
• FET Flagships: 2b Human Brain Project FET Flagship Core Project – includes neuro-robotics (membership of Framework Partnership Agreement and specific conditions apply)	89*
NMP (Nanotechnologies, Advanced Materials, Biotechnology, Advanced Manufacturing & Processing) DEADLINE – FEBRUARY 4th 2015	
• FoF 9a – 2015: ICT Innovation for Manufacturing SMEs (I4MS) - including "Highly flexible and near-autonomous robotics systems (application experiments") (one of three areas of technologies which are targeted for the Innovation actions)	35*
• FoF 11 – 2015: Flexible production systems based on integrated tools for rapid reconfiguration of machinery and robots	77*

** Figures refer to the WP main topic, not to sub-topics on robotics.*
*** Funding schemes open to any topic*

H2020 Challenge and topic	M€
SC 2 Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy	
• Blue Growth BG-7-2015: Response capacities to oil spills and marine pollutions - including the use of specialised vessels and underwater (autonomous) vehicles	8*
SC 4 Smart, green and integrated transport	
• MG.3.6-2015 Safe and connected automation in road transport - automated and progressively autonomous driving applications	23*
SC 5 Climate action, environment, resource efficiency and raw materials	
• SC5-11-2014/2015: New solutions for sustainable production of raw materials c) Deep mining on continent and in sea-bed [2015]- new highly-automated technological sustainable solutions	48*
SC 7 Secure societies – Protecting freedom and security of Europe and its citizens	
• FCT-3-2015: Forensics topic 3: Mobile, remotely controlled technologies to examine a crime scene in case of an accident or a terrorist attack involving CBRNE materials	44.26*

** Figures refer to the WP main topic, not to sub-topics on robotics.*
*** Funding schemes open to any topic*

Projects Open to additional Participants or Offering shared facilities:

EuRoC http://www.euroc-project.eu/

ECHORD ++ http://www.echord.eu/

SMERobotics http://www.smerobotics.org/

FoF I4MS – European Robotics Challenges - EuRoC

- **Three industry-relevant Challenges**
  - Open call framework
  - Three stages of increasing complexity (incl. application experiments)
  - Benchmarking and performance evaluation on shared resources

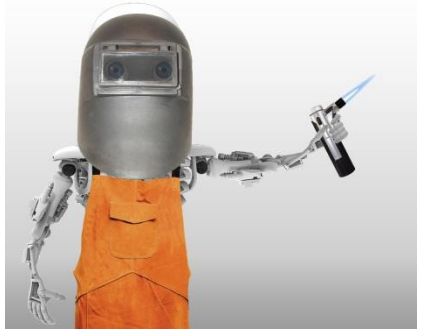
Reconfigurable Interactive Manufacturing Cell (RIMC)

Shop Floor Logistics and Manipulation (SFLM)

Plant Servicing and Inspection (PSI)

ECHORD ++

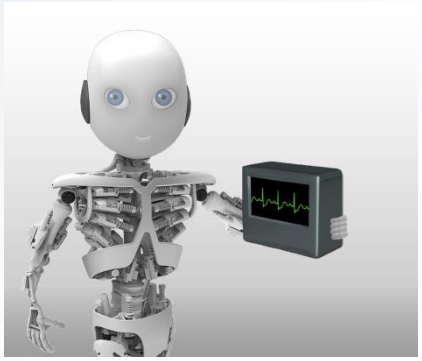
http://www.echord.eu/



ECHORD++ European Clearing House for Open Robotics Development Plus Plus

Experiments | Facilities (RIFs) | PDTI | News | Services | About Us

RIF = Robotics Innovation Facility -> CEA LIST



PDTI - Public end-user Driven Technological Innovation

THANK YOU