ECHORD++

European Clearing House for Open Robotics Development Plus Plus
(Coordinator: TUM, Prof. A. Knoll)

ICRA2014

How to implement performance measurement in ECHORD Plus Plus?

Marie-Luise Neitz

Technische Universität München (TUM)

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Opportunities for data generation

Data collection to track state of the art and define benchmarks

Experiments Small-scale RTD projects with high market relevance

Robotics Innovation Facilities (RIF) Shared infrastructures

PCP Pilots Competitive technology development for public services

The challenge

"The impact of technology development programmes is a multi-faceted topic which involves both short and long terms aspects, hard and soft issues, and which must be addressed using a mix of techniques."

Patrick Courtney

The challenge:

The system implemented in E++ has to be effective, has to reflect the format, but at the same time transparent, lightweight and easy to implement.

Contributions of E++ instruments

- Three different instruments generate a huge amount of comparable data to define the state-of-the-art (also from an industry perspective), performance indicators and benchmarks
- Can serve as a test bed to try out performance indicators and see if they work
- Involves a huge number of different stakeholder groups (industry, academia, public bodies, students, associations, networks etc.) who might influence the view on performance indicators due to their different interests
- The scenarios show a huge overlap with the key application domains defined in the MAR so that it should be possible to link performance assessment to the key system ability targets and parameters as by the MAR

Experiments

Total EU-contribution: 9.582 Mio. €
32- 34 experiments selected via Open Calls

Experiment types, scenarios and research foci set the frame for the proposals

Performance indicators to:

+ Assess the quality of the proposals (guide for applicants on www.echord.eu)
+ Assess the quality of the research done in the experiments
+ Assess the technological, scientific and economic impact of the experiments short, medium and long term

Pilot PCPs within E++

Total EU-Contribution: 2.732 Mio €

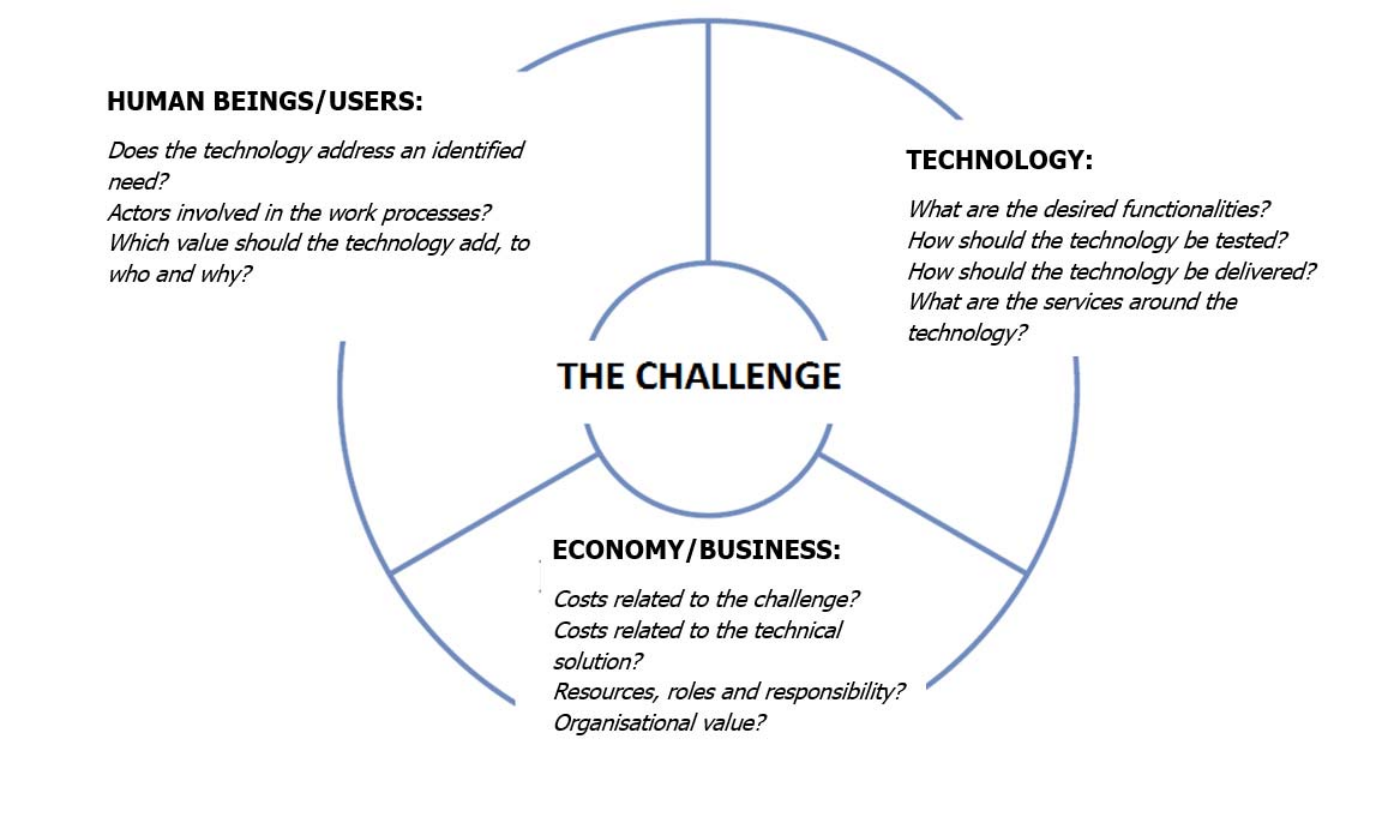
Focus on integration of public bodies in product development

Scenarios addressed: **URBAN ROBOTICS** and **HEALTHCARE**

Performance indicators to:

+ Define the right challenge to be addressed in the Open Call for RTD proposals in both scenarios
+ Assess the quality of the research done in the competing RTD consortia (set by the core consortium together with independent experts

Assess the impact of a challenge in healthcare



Basis of a survey to be sent out to a database of more than 1000 stakeholders in healthcare – Blue Ocean Robotics

Challenges in Urban Robotics

16 potential challenges in 9 key areas have been identified. The impact of a new robotics technology will be assessed by public bodies in urban robotics (mainly associations and clusters)

Social & Cultural Impact:

+ Does this challenge improve citizens' independence, accessibility and mobility?
+ Does it improve quality of life and offer better public services?

Environmental Impact:

+ Does this challenge address resource efficiency?
+ Does it show potential for sustainable growth?
+ Does it improve sustainable mobility?

Challenges in Urban Robotics

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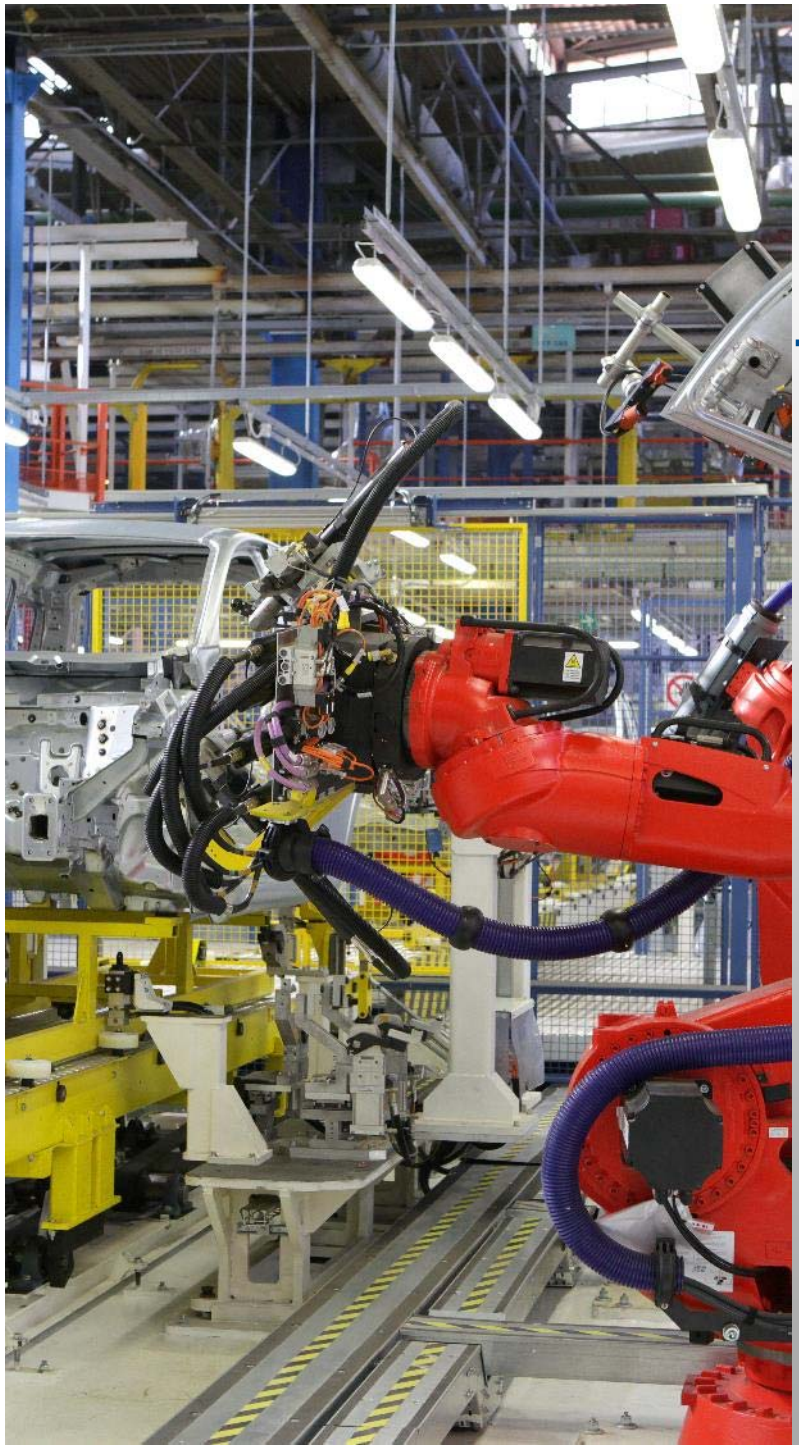
Economic Impact:

+ Does this challenge increase the support to small and medium enterprises?
+ Does it increase or improve employment opportunities?
+ Does it give a positive relation cost/benefit?

Innovation Impact:

+ Does the proposal give a positive relation risk/benefit?
+ Does it give a positive evaluation of the product life cycle?
+ Does it present capacity to integrate systems and synergies?

E++ partner in charge: UPC



Robotics Innovation Facilities (RIF)

RIFs are facilities for bringing researchers and industry in direct contact with current and new users of robotics technology!

Performance indicators to:

+ assess the quality of the proposals received to apply for use time on a RIF
+ assess the quality of the research done at a RIF
+ assess the impact of the stay at a RIF afterwards

The sources available

+ The **impact assessment of ECHORD** realized by Patrick Courtney on behalf of the European Commission based on interviews and surveys among the experimenters of ECHORD

+ A **study on the excellence of academic research of robotics in Europe** – a study carried out by TNO on behalf of the European Commissions – prelimiary results are available, the final study will be available soon (end of June)

+ The Performance Indicators used by the **51 ECHORD experiments**.
Best pratice examples will be used as benchmark.

+ The Performance Indicators suggested in **137 eligible proposals** received for the first Open Call for experiment proposals (Call closed mid-April, evaluations ongoing)

PIs for output, outcome and impact

+ Performance related to the **outputs, or direct results of research**: e.g.
  - newly developed knowledge and technologies,
  - scientific publications,
  - number of researchers involved,
  - newly developed instruments and methods;
  - new facilities, patents;

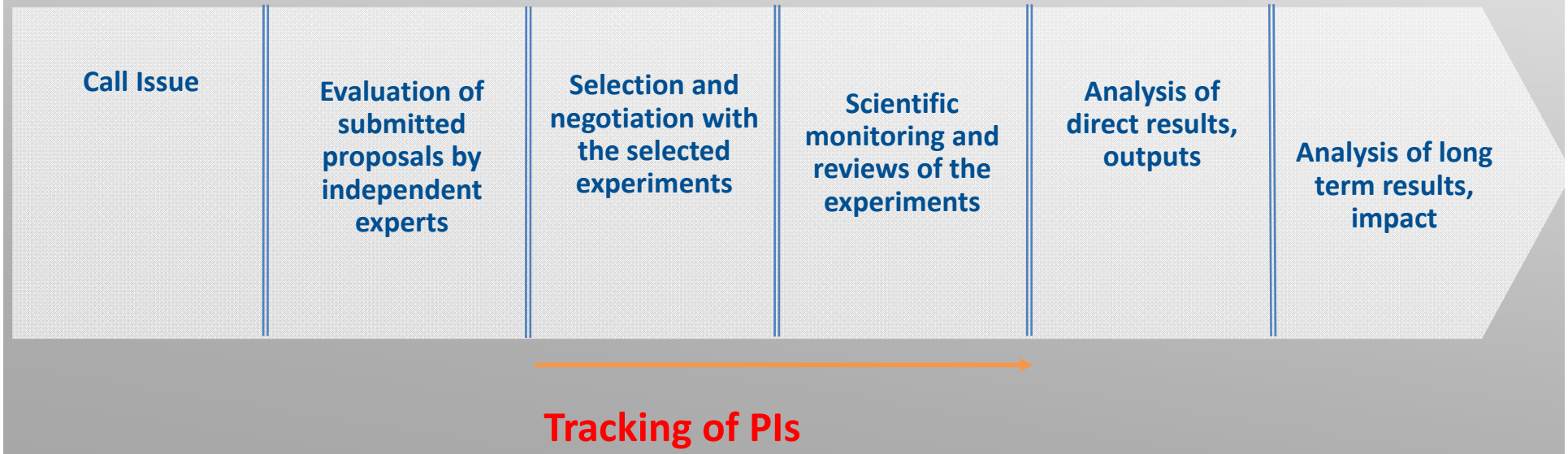
+ Performance related to the **outcomes, or changes and benefits resulting from the use of the output:** e.g.
  - use of scientific publications by other in citations,
  - licenses, new follow-up projects,
  - breakthroughs,
  - contributions to strategic research agenda's,
  - new networks and research collaborations;

PIs for output, outcome and impact

+ Performance related to **the impact, or the longer term effects on the broader environment:** e.g.
  - contribution to competitiveness,
  - job creations,
  - innovation capabilities in the industry,
  - contribution to solutions for societal challenges.

ECHORD++ Experiments in a nutshell

- The PIs suggested by the applicants will be analysed by experiment type, research foci and scenarios
- PIs will be negotiated with the experiments selected. Essential are a strong deliverable at an early stage, videos rather than reports to demonstrate results and a small no. of technological, economic, scientific PIs



The outcome

+ As a result of this exercise it must be possible to state for each of the experiments in one sentence the impact it wants to create, for instance:

  “Trials of the new software will demonstrate the improved dynamic performance of the robot and provide benchmarking data and increase expected sales by approximately 10% in welding robots”

+ The targets set have to be transparent, reachable, measurable and precise.

+ The portfolio of targets of each of the research teams (experiments selected, RTD consortia working on PCP Pilots, RIF users) will specify the technological, economic and scientific targets for E++. These will be combined with PIs for the project as a whole (for instance number of SMEs gained, number of public bodies interested in participation, time to grant, time span between the submission of the Cost Claim and the actual payment etc.

Scenarios and research foci

Research foci:

- Key Issues in Practical Machine Cognition
- Advanced Perception and Action Capabilities
- Multiple Cooperating Mobile Manipulators
- System Architectures, Systems and Software Engineering Processes and Tools

Scenarios:

- Cognitive Tools and Workers for Cognitive Factories
- General Purpose Robotic Co-workers
- Cognitive Logistics Robots
- Medical Robotics
- Agricultural and Food Robotics
- Urban Robotics (Amenment pending)

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We would be highly interested in having an exchange on this topic with you!

Thank you.

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