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Community Research

PATHFINDER initiative on

*Measuring
the Impossible*

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Objectives

Interdisciplinary research
Novel investigative methods

Significant advance in the scientific basis
for rigorous measurements of phenomena

Intrinsically multidisciplinary and mediated by
human interpretation and/or perception





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PATHFINDER: Mandate

*“support research on specific topics that are identified during the course of implementation of FP6 on the basis of their **urgency** and **potential** for future **societal, industrial or economic** relevance.”*





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Why this initiative ?

...becomes a general concern for science, business and public authorities ...

Science - strong cross-over between physical, biological and social sciences

Business - products and services appeal to consumers according to parameters of quality, beauty, comfort which are mediated by human perception

Public authorities - provide citizens with support and services whose performance is measured according to parameters of life quality, security or well being





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Measuring the impossible

“Measure what is measurable, and make measurable what isn’t”

Descartes (1596-1650)





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Measuring the impossible

**“ If you can not measure it
and/or what it means”**

then

=> how can you improve it ? ”





Measuring the impossible

- It is simply impossible to find out what a test measures, without knowing how it works
- Tables of correlations are unable to fill this gap, because what is lacking is not data, but theory
- A radical shift in orientation is needed in our thinking about measurements and validity





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Measuring the impossible

Food industry – chemical and physical analysis
combined with empirical psychometric studies
moved to

...a more systemic understanding of the ways in
which the physical world is mediated via the
senses and the internal processing of signs in the
human brain





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Measuring the impossible

- But, is it possible to measure the role of memory in the appreciation of food?
-Or the food-addictive behaviour?

Predicting food selection

How to make “healthy choice the easy choice” ?





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Specific Target Research Projects (STREPs)

- Fundamental scientific advances supported by interdisciplinary research and novel investigative methods for the measurement of intrinsically multidimensional phenomena, and which are mediated by human interpretation and/or perception.





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STREP Characteristics

- Focus on measurement
- Multidimensional phenomena
- Mediated by human interpretation and/or perception
- Interdisciplinary research
- Novel investigative methods
- Concrete and tangible objectives
- Well posed problems and measurement challenges
- Long-term impact in terms of advancing science





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Co-ordination Action

- to act as a forum for the development and exchange of ideas of active players
- to promote a wider understanding of the implications of research across the various relevant disciplines, as regards measurement
- to bring together experts in metrology, material scientists, biologists, psychologists, cognitive neuroscientists, sociologists, ergonomic experts to take up work in this “field”
- to provide a degree of coordination and interaction between the research projects ultimately selected in this initiative





Specific Support Actions (s)

- to assist in the mapping and development of the definition of the field in question, assessing future development prospects and trends in the field.
- to discuss the contextual aspects of the measurement (social, institutional, economic, political, etc)
- to re-think assumptions about measuring systems and how uncertainties are treated.





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1st Call

Results:

30 proposals

It corresponds to 50% of
PATHFINDER submissions

2 CA	0
4 SSA	0
24 STREP	6

(20% success rate / ~ 11M€)





Recommended PROJECTS

BioEmergences – towards the measurement of the individual susceptibility to diseases or responses to treatments

BrainTuning – to resolve the neural determinants of music emotions. What are the biological determinants of music appreciation?

Closed – Objective measurement of functional-aesthetic sound qualities of artefacts

Fuga - Measuring the human experience of media enjoyment – the fun of gaming

MONAT – Measurement of Naturalness

SysPAQ – Measurement of perceived air quality





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Ethical Issues:

Use of animals and GMOs (replacement, reduction, refinement) / research with children and infants

Informed consent procedures

Personal data protection and anonymisation

Long term storage of sensitive data

Social implications of research





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Scientific areas involved (1)

e.g.

BioEmergences (6 academic + 1 industrial partner) biology, toxicology, computational vision, applied mathematics, cognitive science, computer science, optics/physics)

BrainTuning (6 academic partners) cognitive neuroscience, computational modelling, music acoustics, neuroimaging, psychology, music perception)

CLOSED (3 academic + 1 industrial partners) – acoustics, computer science, signal processing, neurosciences,





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Scientific areas involved (2)

e.g.

FUGA (6 academic partners) applied psychology, computer science, human-computer interaction, communication, psychotherapy, experimental psychobiology, media technology

MONAT (6 academic + 1 industrial partners) cognitive neurosciences, psychology, metrology, mathematical modelling, sensor technology, neuroimaging

SysPAQ (7 academic + 3 industrial partners) aerodynamics, civil engineering, sensory perception, psychology, materials, analytical chemistry, instrumentation, indoor climate technology





Feedback for first call

(+)

- **Successful call** with many interesting projects integrating different fields of science
- **Projects of very high quality** with the participation of highly renown institutions and scientists

(-)

- A topic as complex as “Measuring the Impossible“ needs **time to develop**
- Some problems with the **scope** and the **instruments**





Feedback for first call

CA - (2) - complexity; cluster of 3 STREPs

SSA - (4) - research with one or two partners

STREP – (18)

(NO Relevance + YES excellence) - 2

(~ Relevance + ~ excellence) - 5

(OK Relevance + ~ excellence) - 4

(NO Relevance + NO excellence) - 7





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Second call

- Focussed on perception/interpretation
- Problems => last call => resubmissions
tailoring





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We are looking forward to the measurement environment in 20 years, which is expected to involve a strong component of interpretation and perception

“Hard and soft sciences interdisciplinarity should be developed and the distances and similarities between them urgently discussed”

Measuring the Impossible is a good example and a fantastic opportunity to create excellence is a very interdisciplinary topic

