Co-funded by
the European Union

Human Brain Project

Innovation management

Innovation management tools in HBP and the EBRAINS context

Gonzalo León & Guillermo Velasco
Innovation & Technology Transfer Node
Human Brain Project
Universidad Politécnica de Madrid

April 2021

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

PROGRAM DAY 1

- Introduction
  - ✓ What is innovation?
  - ✓ Innovation taxonomies
  - ✓ Open and closed innovation
- Exploitation in the context of H2020 and Horizon Europe
  - ✓ Evolution from Horizon 2020 to Horizon Europe
  - ✓ The European Innovation Council
- IMTs used in HBP and the EBRAINS context

PROGRAM DAY 2

- Business intelligence
  - ✓ Technology and market watch
  - ✓ Risk assessment
  - ✓ Foresight and technology roadmapping
- IP strategies
  - ✓ Licensing strategies
  - ✓ Co-ownership and co-exploitation
- Quick overviews of IMT figures in HBP

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

PROGRAM DAY 1

- Introduction
  - What is innovation?
  - Innovation taxonomies
  - Open and closed innovation
- Exploitation in the context of H2020 and Horizon Europe
  - Evolution from Horizon 2020 to Horizon Europe
  - The European Innovation Council
- IMTs used in HBP and the EBRAINS context

PROGRAM DAY 2

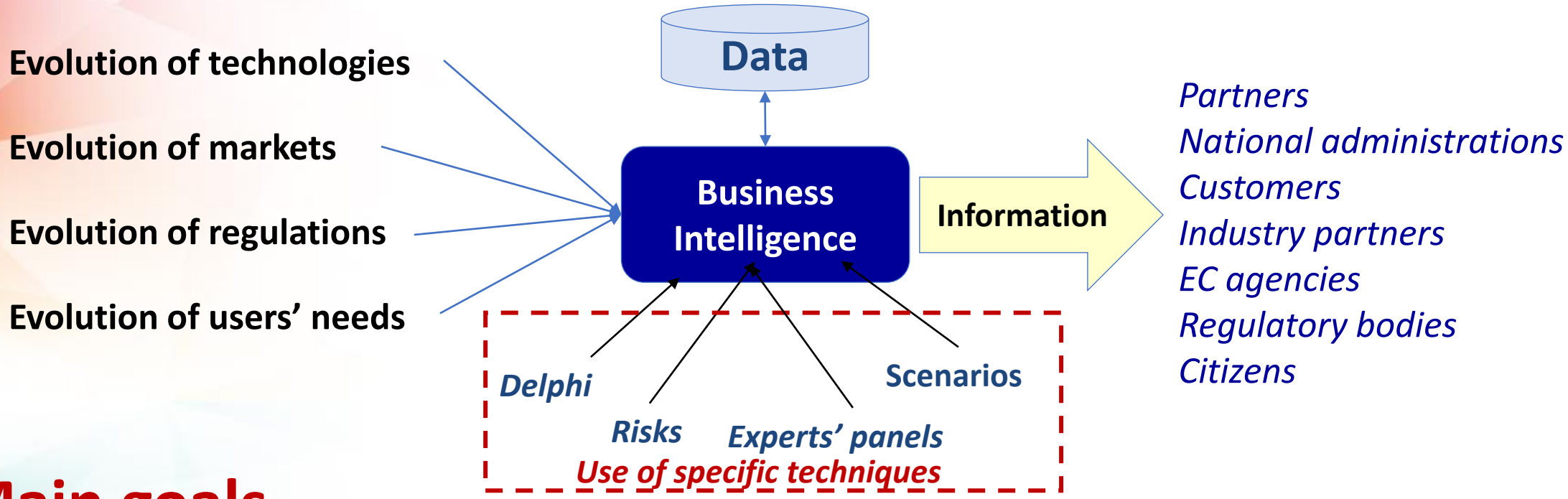
- Business intelligence
  - Technology and market watch
  - Risk assessment
  - Foresight and technology roadmapping
- IP strategies
  - Licensing strategies
  - Co-ownership and co-exploitation
- Quick overviews of IMT figures in HBP

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Corporate strategy for innovation (I)

Co-funded by the European Union

Human Brain Project



Main goals

- To provide the governance bodies of the entity with processed and curated data on technology areas and market related structures
- To compare and analyse the offer of products and services in front of other potential alternatives
- To make predictions on the evolution of markets and technologies in the field of interest by geography and application.

Is my health market ready to accept a full digitalisation of products and services?

Is the neuroscience market ready?

Are neurology services in hospitals ready?

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

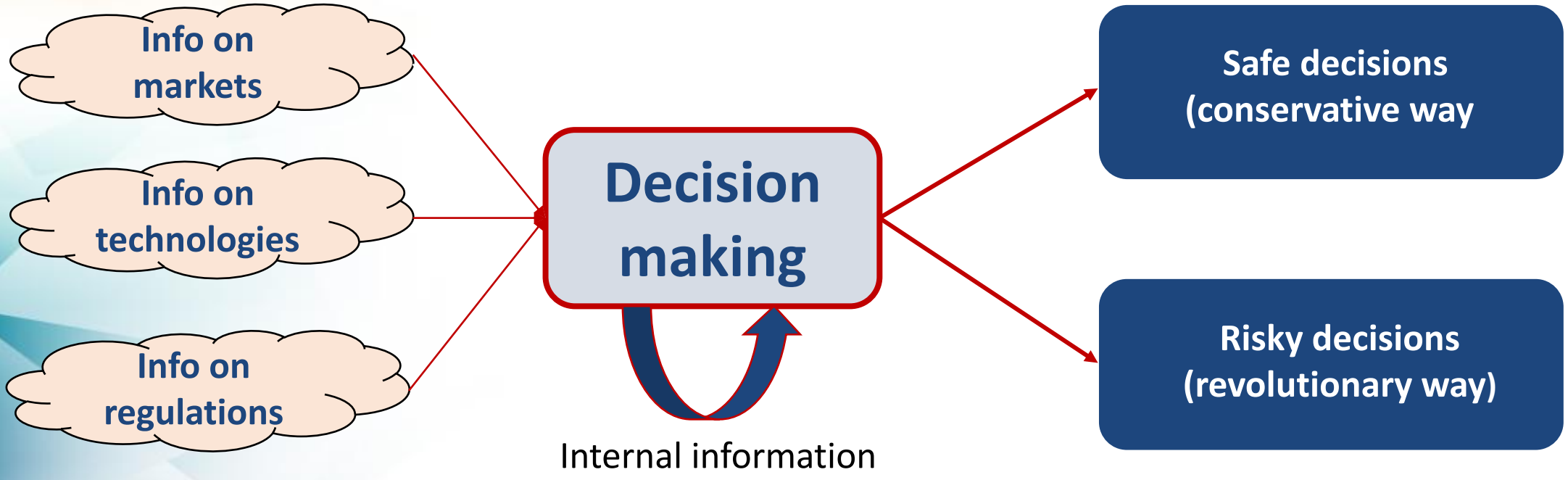
Decision -making in innovation processes (I)

Co-funded by the European Union

Human Brain Project

Innovation success requires to combine the right identification of customers' needs, with the technologies to address them, the necessary funding, and implement an adequate business structure

- **Organisations like individuals assume risks**



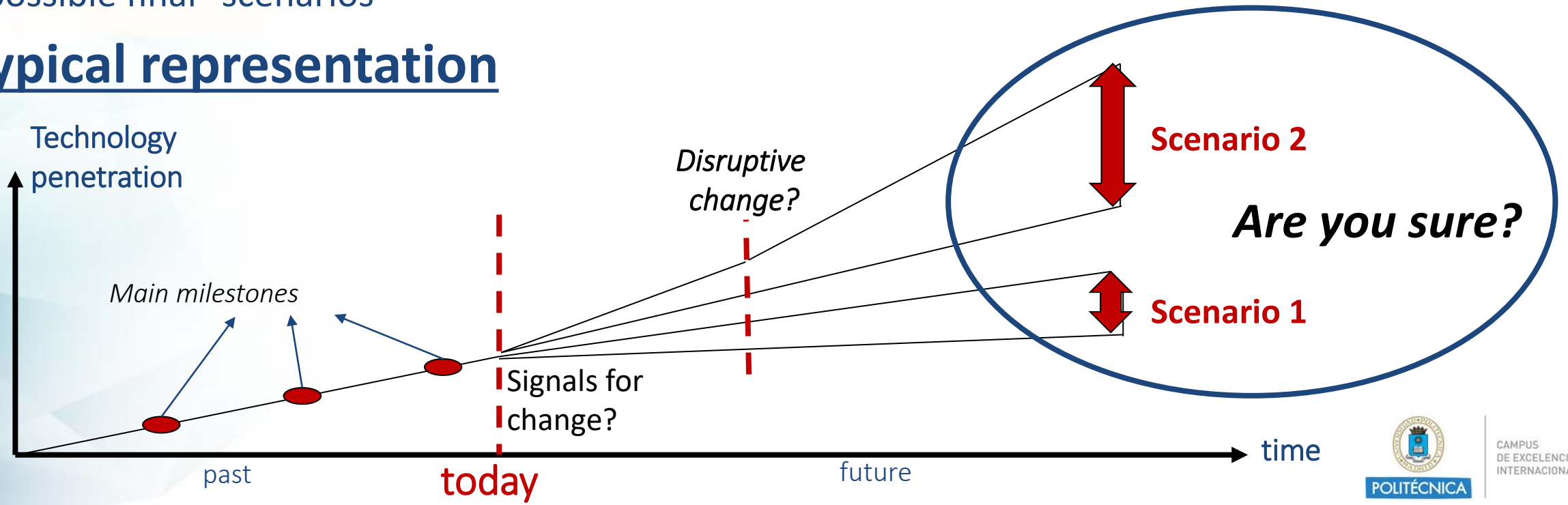
POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Decision -making in innovation processes (II)

Co-funded by the European Union

Human Brain Project

- Organizations prefer to think in the evolution over time of their technologies through the elaboration of ***"technology roadmaps"***
  - ✓A **technology roadmap** is a visual representation of the evolution of a technology (or related technologies) over time
  - ✓Main **milestones** (e.g., disruptive changes) are detected or estimated in the future to feed-up possible final "scenarios"
- **Typical representation**



POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Decision -making in innovation processes (III)

Co-funded by the European Union

Human Brain Project

Could you imagine the "smartphone" in 2025?

Evolutionary view

Performance improvement of components which exist today

- *1-week battery life*
- *Folded smartphone (large screen)*
- *3D camera*
- *AI powered software*
- *Standardized plug-in*
- *Smart connection to wearables*
- *Embedded cyber-security*

Revolutionary view

Totally new concept which does not exist today

- *Smartphone integrated in the user's lens with AR/VR capabilities*
- *No keyboard (only voice communication)*
- *Holographic screen/projection*
- *Personal communication avatar*
- *Embedded automatic real-time translation*
- *Energy source from body movement*

… and in 2030?

POLITÉCNICA

CAMPUS DE EXCELENCIA INTERNACIONAL

Decision -making in innovation processes (II)

Co-funded by the European Union

Human Brain Project

Could you imagine the "neurosurgery room" in 2025?

… and in 2030?

Evolutionary view

Performance improvement of processes and tools used today

-
-
-
-
-
-

https://nyulangone.org/news/cutting-edge-neurosurgery-unit-sets-stage-transformative-patient-outcomes

Do you see the role of EBRAINS here?

Revolutionary view

New concept which does not exist today

- …
- …
- …
- …
- …
- …

??

… and here?

POLITÉCNICA CAMPUS DE EXCELENCIA INTERNACIONAL

Early signs for innovation (I)

Co-funded by the European Union

Human Brain Project

It's possible to detect if new innovations are coming by paying attention to "early signals"

- Unexpected release of **new products or services** from the perspectives of pre-established companies or from end users
  - ✓ Information from companies
- **Technological improvements** with the ability to cause disruption in one or more fields of application in a given period of time making obsolete the use of previous technologies or solutions
- Identification (or even creation) of **new categories of clients** whose needs were not previously met for various reasons
  - ✓ due to the lack of enabling technology, due to the lack of a viable regulatory framework, etc.

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Early signs for innovation (II)

Co-funded by the European Union

Human Brain Project

Information sources (accessible open sources) which could be used by entities to support their decision making (some are free but other not)

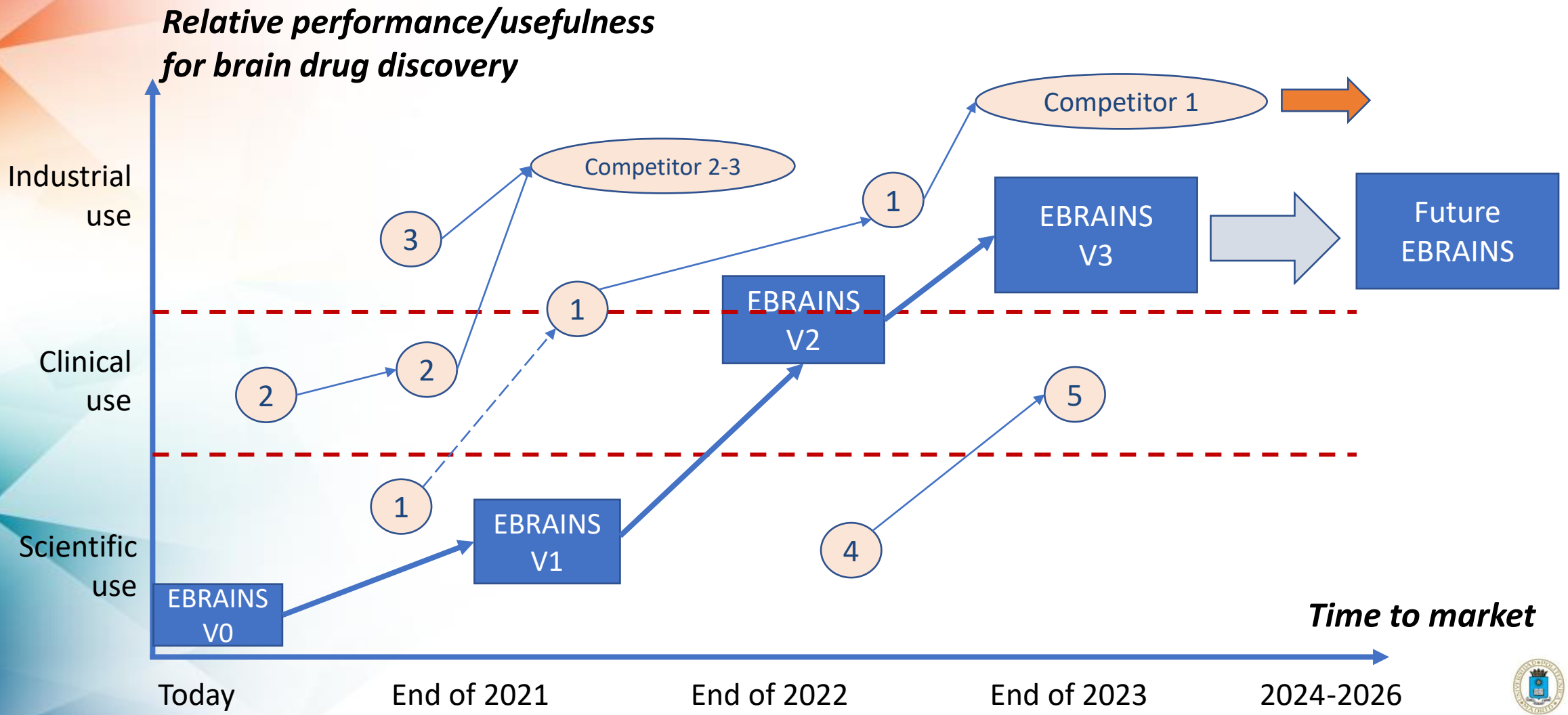
- Academic perspective
  - Articles in journals
  - Congress communications
  - Priorities in R&D programs
  - R&D projects
  - Doctoral thesis
  - Follow up of key researchers
  - Patents
  - Private communications
  - Selected web sites
  - Blogs, newsletters
- Enterprise perspective
  - Specialized magazines
  - Priorities in R&D programs
  - Selected (public) projects
  - Follow-up of key firms
  - Sheet products & White papers
  - Standards
  - Technology fairs
  - Tender specifications
  - Enterprise gurus
  - Selected websites, blogs, newsletters

Early signs for innovation (III)

Co-funded by the European Union

Human Brain Project

Do I need to be worried about the EBRAINS future?



POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Early signs for innovation (IV)

Co-funded by the European Union

Human Brain Project

Surgical navigation tech saw funding and exits

Augmedics

Latest round: Series C (3/30/21) **Amount:** $36M

About: Augmedics' xvision Spine is the first and only AR-based surgical guidance system cleared by the FDA. Augmedics' Series C financing will support the commercial roll-out of xvision in the US, expansion into new markets, and development of new products.

7D SURGICAL

Latest round: Acquired (3/22/21) **Amount:** $110M

About: SeaSpine Holdings acquired its strategic partner 7D Surgical for $110M in March 2021. 7D's machine vision-based image guided surgical system is designed to improve workflow and reduce radiation exposure in spinal and cranial surgeries.

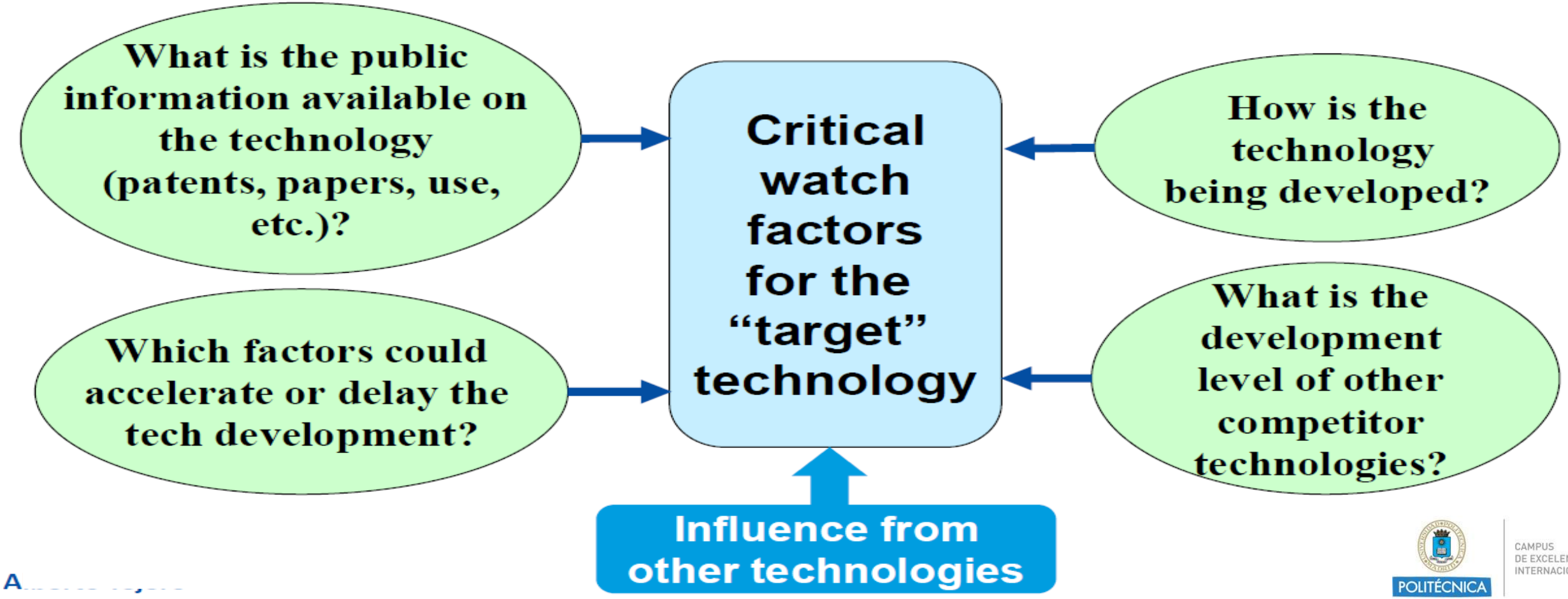
POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Critical watch factors (CWF)

Co-funded by the European Union

Human Brain Project

CWF *are those factors that affect decision-making related to the monitored technology (positive or negative)*

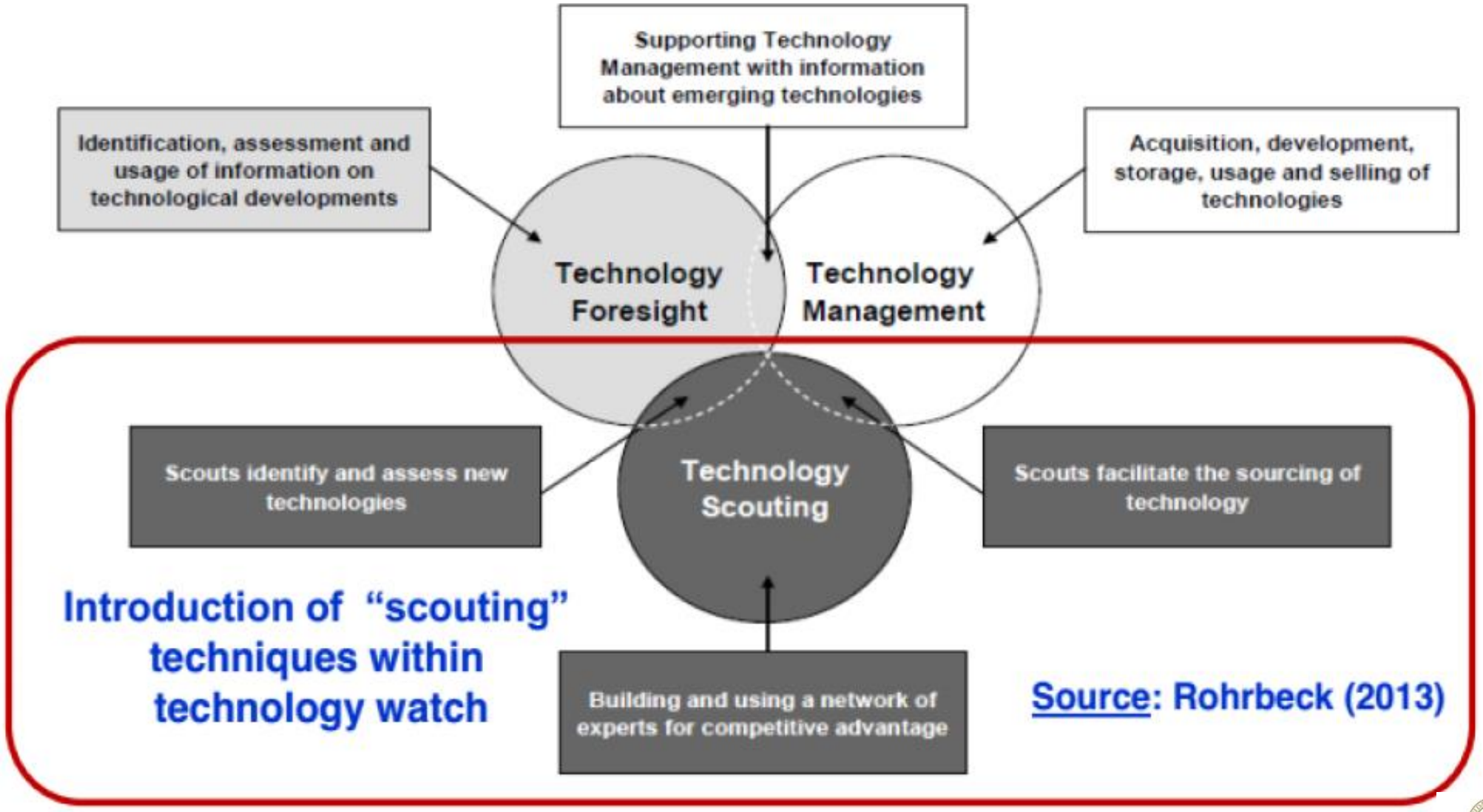


CAMPUS DE EXCELENCIA INTERNACIONAL
POLITÉCNICA

Scouting networks (I)

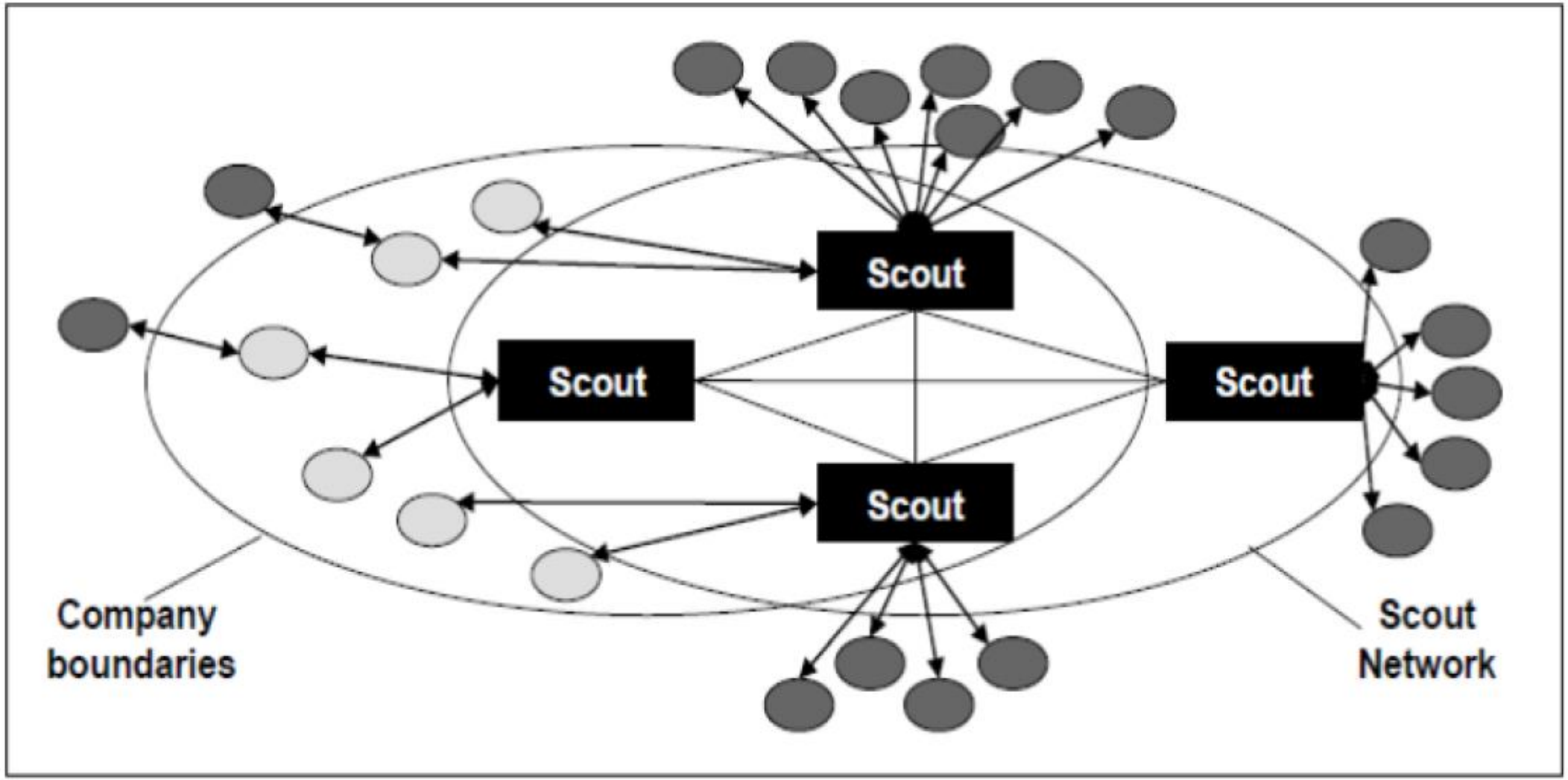
Co-funded by the European Union

Human Brain Project



Scouting networks (II)

Co-funded by
the European Union



Information flow Internal stakeholder Sources Scout Scouts (internal/ external)

Technology watch for HBP-EBRAINS

Co-funded by the European Union

Human Brain Project

These activities would focus on selected technology areas on which EBRAINS could evolve to guarantee the singularity of its services

- **Technology watch** should address:
  - ✓ *Brain atlases*
  - ✓ *Brain simulation tools*
  - ✓ *Brain-inspired computation and AI*
  - ✓ *Brain medical platforms*
  - ✓ *Neurorobotics*
  - ✓ *Brain interfaces (invasive and non-invasive)*
  - ✓ *Brain consciousness*
  - ✓ *Brain imaging*
  - ✓ *Brain ethics*
  - ✓ *Others*

Priorities could be progressively addressed depending on the interests of EBRAINS stakeholders (both internal and external)

Effort should be done in understanding the way that these areas complement each other with cases provided by external users

POLITÉCNICA

CAMPUS DE EXCELENCIA INTERNACIONAL

Market watch for HBP-EBRAINS

Co-funded by the European Union

Human Brain Project

These activities would focus on market aspects that EBRAINS needs to consider keeping its competitiveness

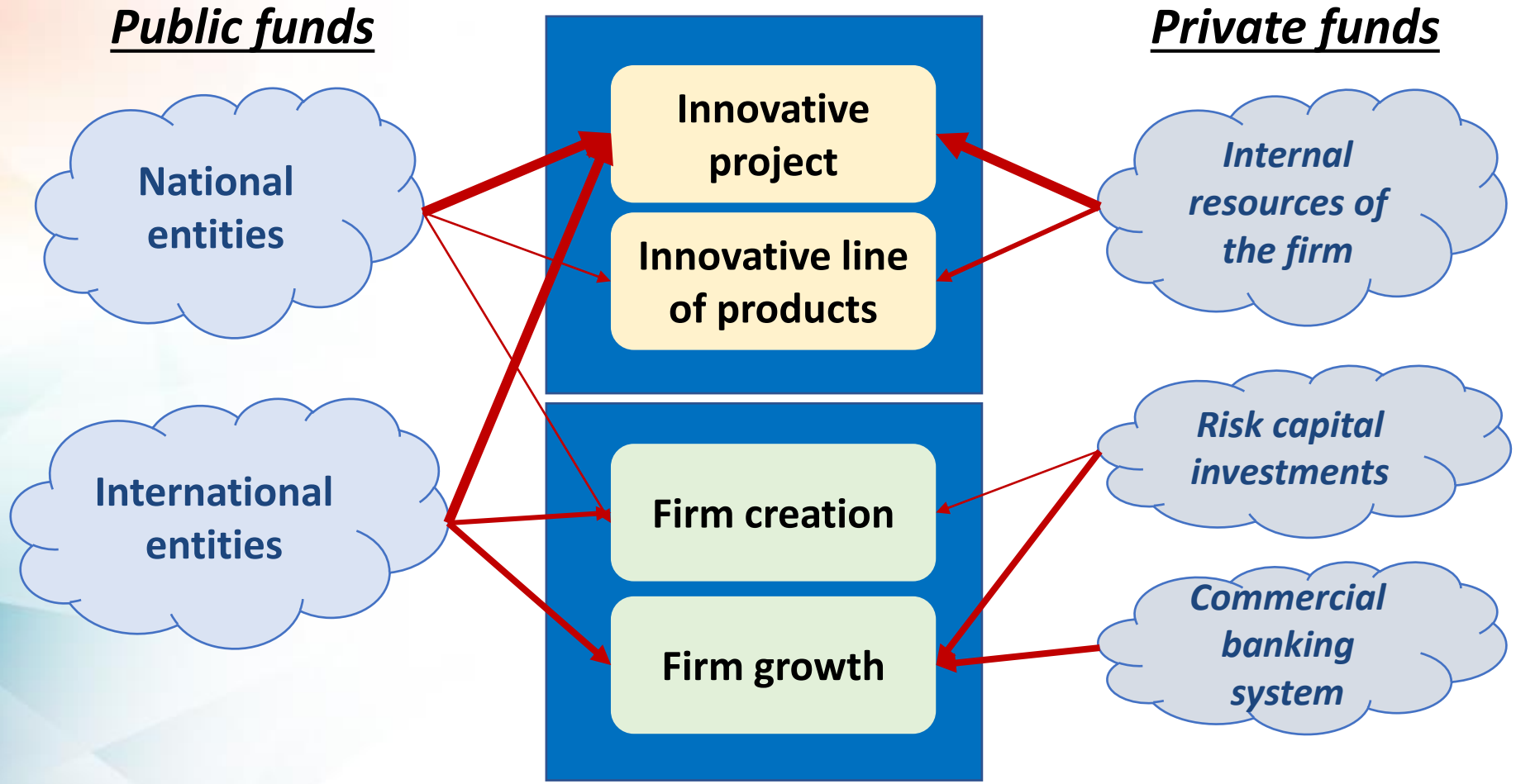
- **Market watch** should address the status and evolution of:
  - ***Brain market segments (situation, CAGR, geography)***
    - ✓ Segments will be assessed in relation to EBRAINS services
    - ✓ Focus on Europe
  - ***Brain companies (types, size, segment)***
    - ✓ Emphasis on start-ups and big pharma
  - ***Brain Investments (public, private)***
    - Investors' behaviour (corporate funds, governmental funds, risk capital entities)
    - Focus on Europe
  - **Brain mergers and Acquisitions (M&A)**

Funding for innovation (I)

Co-funded by the European Union

Human Brain Project

Venture funds are specialized to support different types of innovation activities



POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

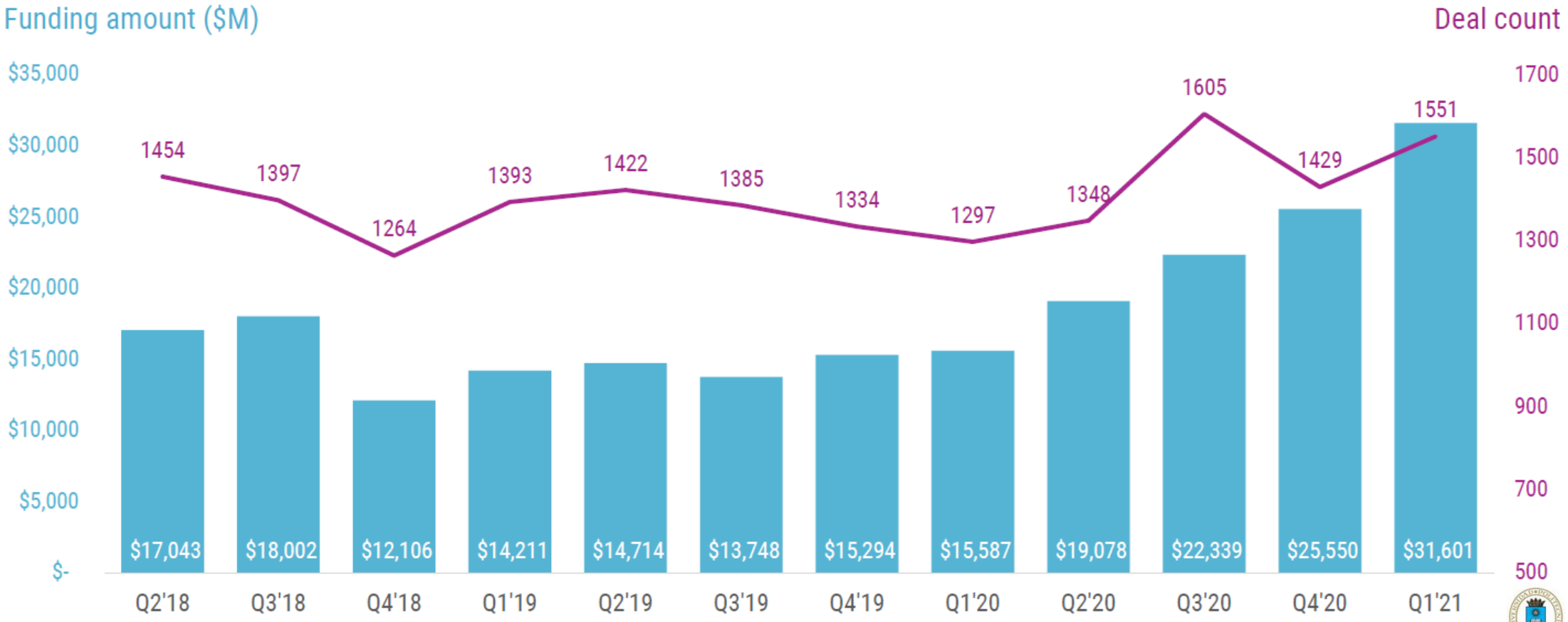
Funding for innovation (II)

Co-funded by the European Union

Human Brain Project

Healthcare funding hit a new high in Q1'21

Quarterly global healthcare funding and deal count, Q2'18 – Q1'21



CBINSIGHTS

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

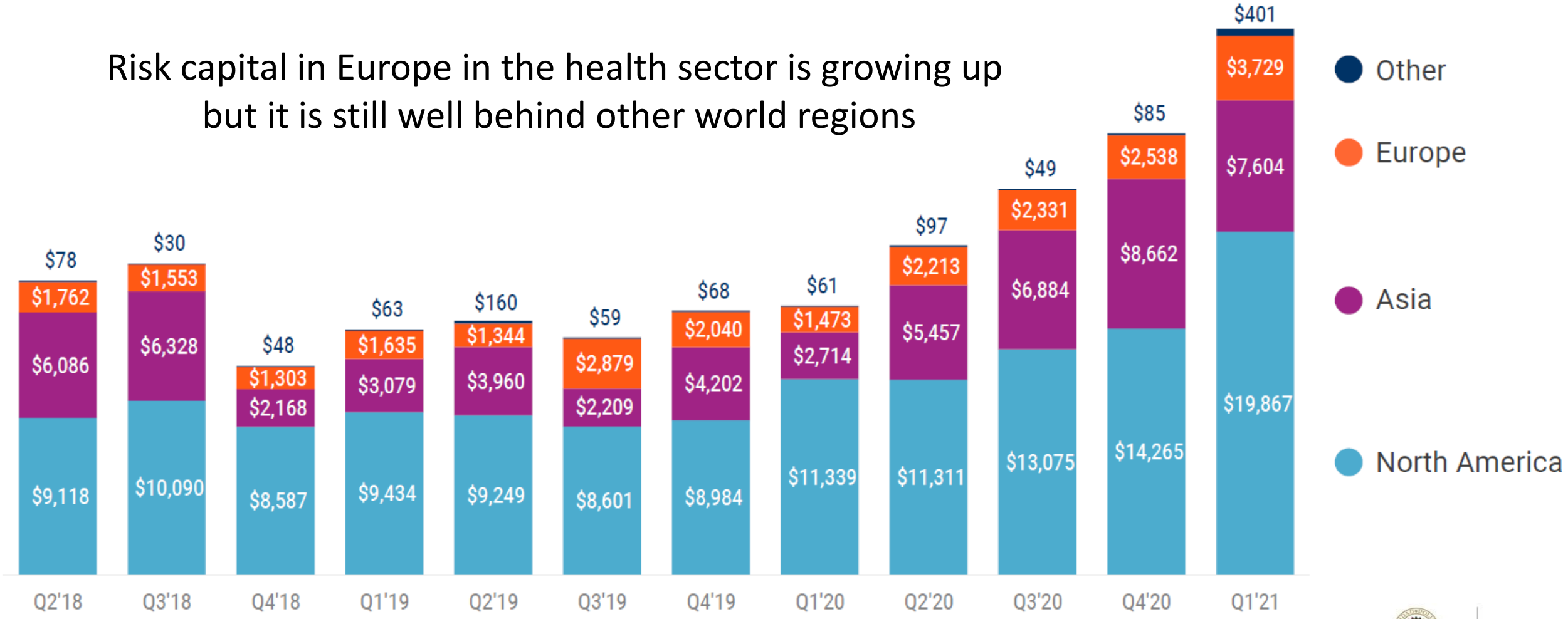
Funding for innovation (III)

Co-funded by the European Union

Human Brain Project

Quarterly global healthcare funding ($M) by continent, Q2'18 – Q1'21

Risk capital in Europe in the health sector is growing up but it is still well behind other world regions



CBINSIGHTS

Note: "Other" includes Africa, South America, and Australia.

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Funding for innovation (IV)

Co-funded by the European Union

Human Brain Project

Big pharma continued to partner with AI companies in drug discovery and development

Iktos announces collaboration with Pfizer in AI for drug design

March 2, 2021 | IKTOS Pfizer

Cambridge Quantum to develop quantum algorithms with Roche for drug discovery and development

January 28, 2021 | CQC CAMBRIDGE QUANTUM COMPUTING LIMITED Roche

Mila collaborates with Astrazeneca to maximize the potential of AI for drug discovery and development

February 16, 2021 | Mila AstraZeneca

Valence Discovery announces multi-target AI-enabled drug design collaboration with Servier

March 24, 2021 | Valence SERVIER

CBINSIGHTS

Regulatory watch for HBP-EBRAINS

Co-funded by the European Union

Human Brain Project

These activities would focus on regulatory issues that influence in the exploitation, management, and economic sustainability of EBRAINS.

Regulatory watch should address:

- *Acts and governmental decrees published all over the world, that could affect human brain research and innovation.*
- *EU directives affecting EBRAINS and its consolidation at national level.*
- *R&D and innovation programmes.*
  - *Priorities*
  - *Open calls*
- *Responsible research recommendations in the field.*
- *Global organizations evolution*
- *Institutional and/or governmental changes*
- *Impact of standards (de facto and de jure).*

Outputs for decision-making

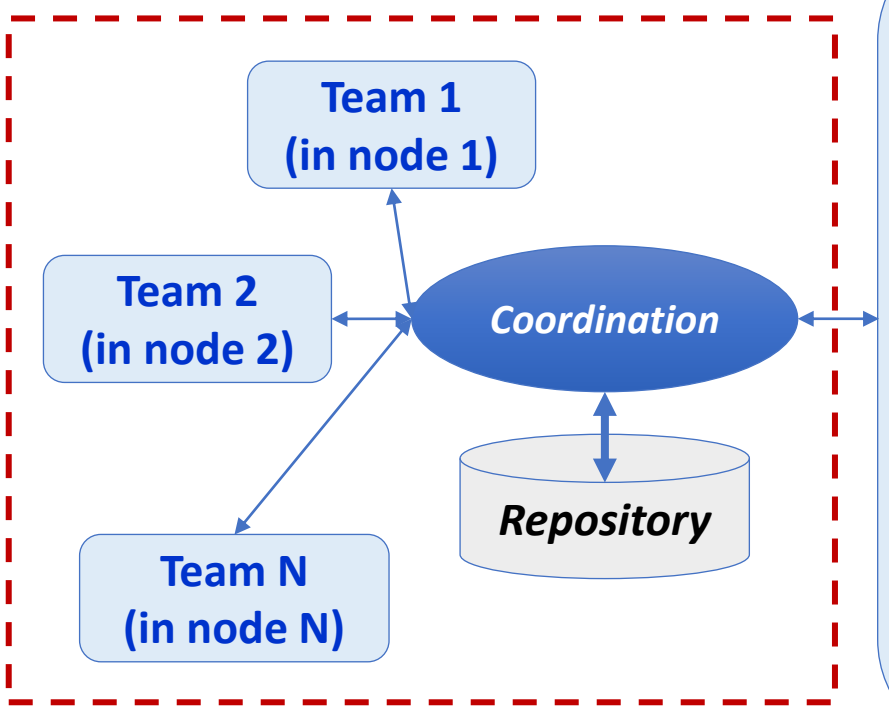
Co-funded by the European Union

Human Brain Project

Processed information will be available for decision making through *periodical reports*

Types of reports

- ✓ **Technology watch reports** to help EBRAINS stakeholders to anticipate technology evolution and to define new priorities
- ✓ **Market watch reports** to help in the analysis of opportunities for EBRAINS exploitation of services, and the creation of spin-offs and partnership with other companies. Interest will be focused on Europe
- ✓ **Regulatory watch reports** that help to anticipate relevant regulatory changes and impact on brain research and innovation



Diffusion of intelligence information

- Periodical Intelligence briefs
  - On-line distribution
- Dedicated web page
  - Internal use.
  - External use (by registration).
- Specific webinars and presentations
  - Internal debates.
  - SWOT analyses.
  - Oriented to customers' segments.

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

PROGRAM DAY 1

- Introduction
  - What is innovation?
  - Innovation taxonomies
  - Open and closed innovation
- General view of Innovation Management Tools (IMT) used in R&I projects
- Exploitation in the context of H2020 and Horizon Europe
  - Evolution from Horizon 2020 to Horizon Europe
  - The European Innovation Council
- IMTs used in HBP and the EBRAINS context

PROGRAM DAY 2

- Business intelligence
  - Technology and market watch
  - **Risk assessment**
  - Foresight and technology roadmapping
- IP strategies
  - Licensing strategies
  - Co-ownership and co-exploitation
  - Business intelligence
- Quick overviews of IMT figures in HBP

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by the European Union

Human Brain Project

Concept of risk management

Risk management is a technique used to help managers in dealing with risks in any engineering project

Widely used in research and innovation projects to mitigate the exposure to risks

Risk in project management refers to any event that can modify the intended outcome of the project

Risk identification

Information

Risk analysis

Information

Risk mitigation

Information

Risk monitoring

POLITÉCNICA

CAMPUS DE EXCELENCIA INTERNACIONAL

Phases for risk management in innovation projects

Co-funded by the European Union

Human Brain Project

Risk management implies the systematic application of specific procedures during the development of an innovation project which could reduce its success

1. **Plan the Risk**: describe the tasks to manage the risks
2. **Identify Risks**: What risks and description
3. **Qualitative Risk Analysis**: Prioritize the risks
4. **Quantitative Risk Analysis**: Measure the probability and impact of the risk.
5. **Plan Risk Responses**: Procedures to mitigate project threads to reduce their impact.
6. **Control Risks**: Monitor identified or new risks, execute response as planned. Evaluate the effectiveness of the response plan.

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Risk identification

Co-funded by the European Union

Human Brain Project

Brainstorming exercise with people from all areas of the entity (and external experts) to ensure multidisciplinary views

Interviews to selected people from stakeholders

Experiences and lessons learned from previous projects

Consolidated and reusable experience

Risk identification

Project documentation

List of identified risks with an initial rationale and description

POLITÉCNICA

CAMPUS DE EXCELENCIA INTERNACIONAL

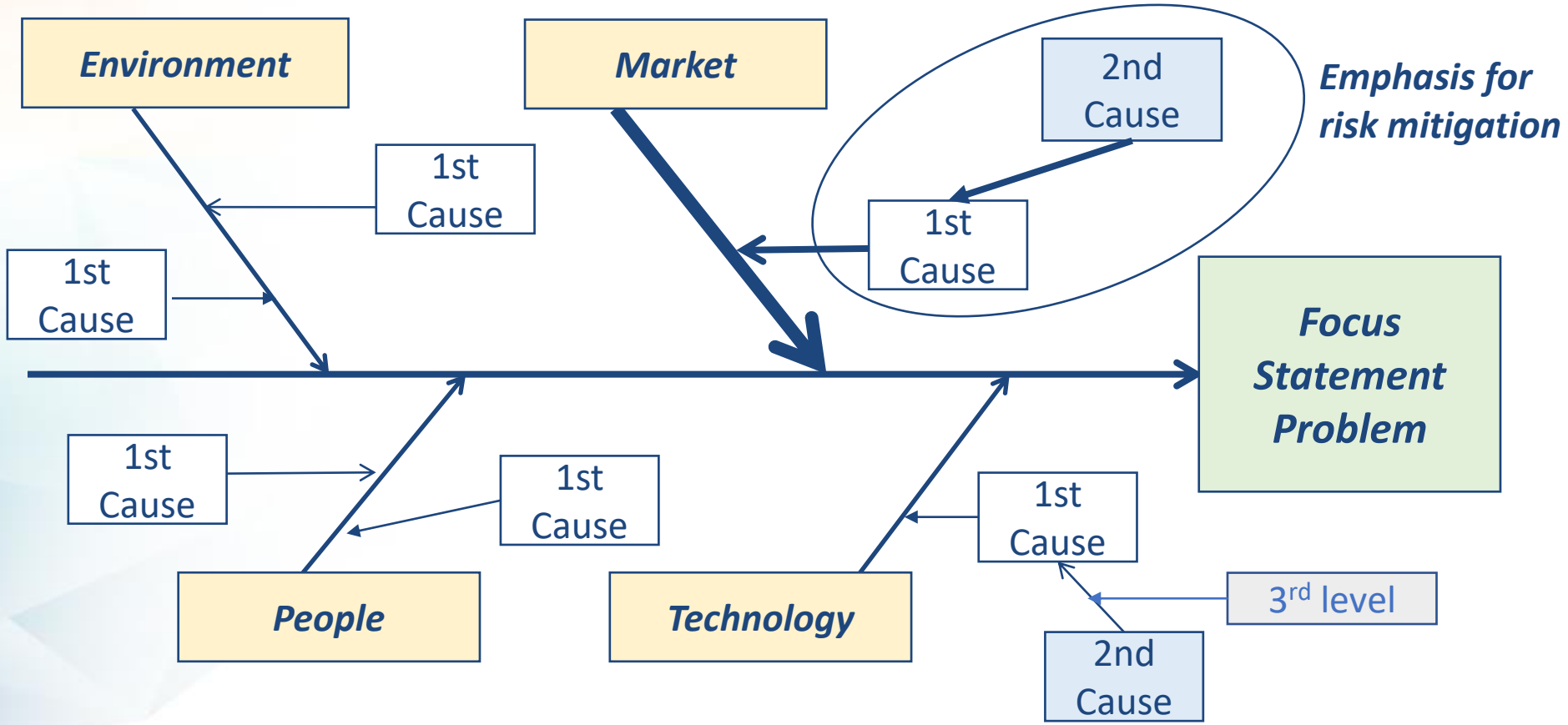
Qualitative risk analysis (I)

Co-funded by the European Union

Human Brain Project

Fishbone analysis (cause-effect, Ishikawa diagram)

The intention is to think in the causes provoking the identified risks in several levels (primary causes, secondary, etc.) until rationale is clear and to give a qualitative analysis of the relative importance of each of them



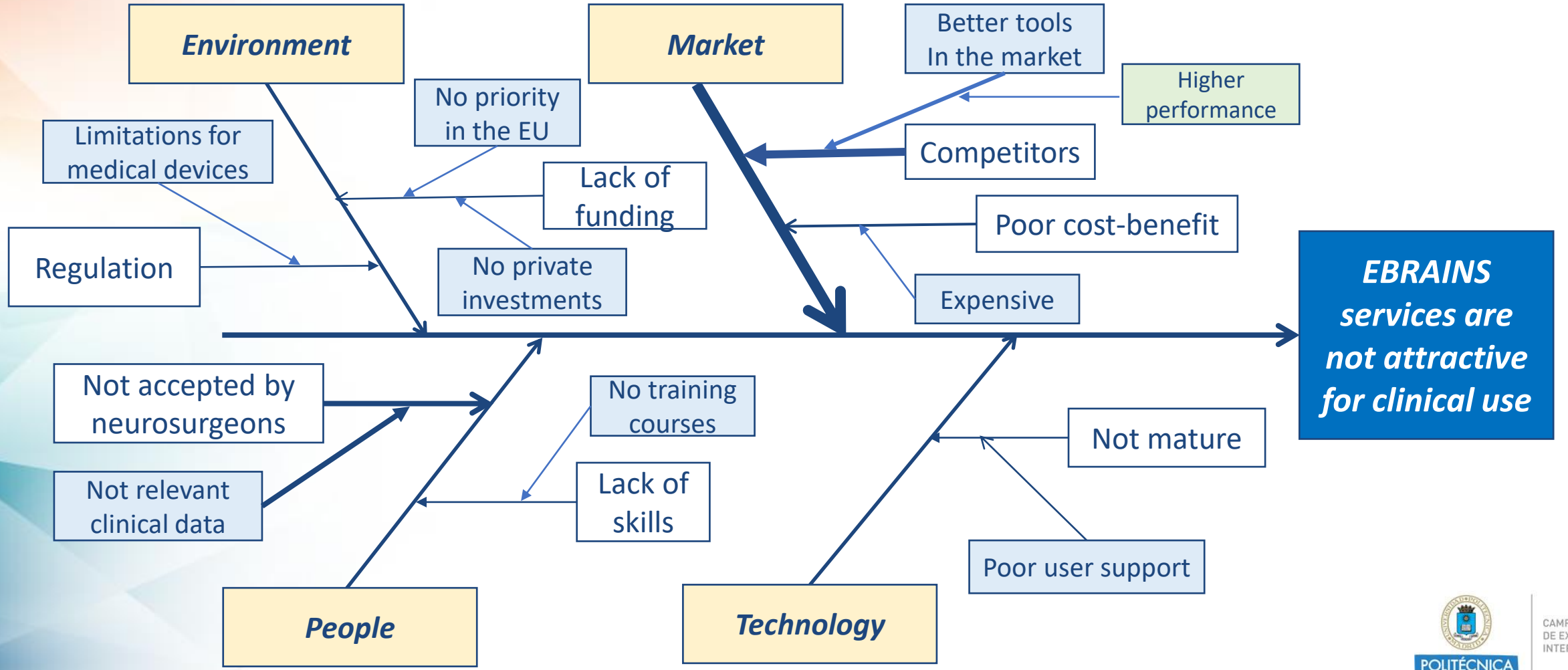
POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Qualitative risk analysis (II)

Co-funded by the European Union

Human Brain Project

Example of Ishikawa diagram in the context of EBRAINS



POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

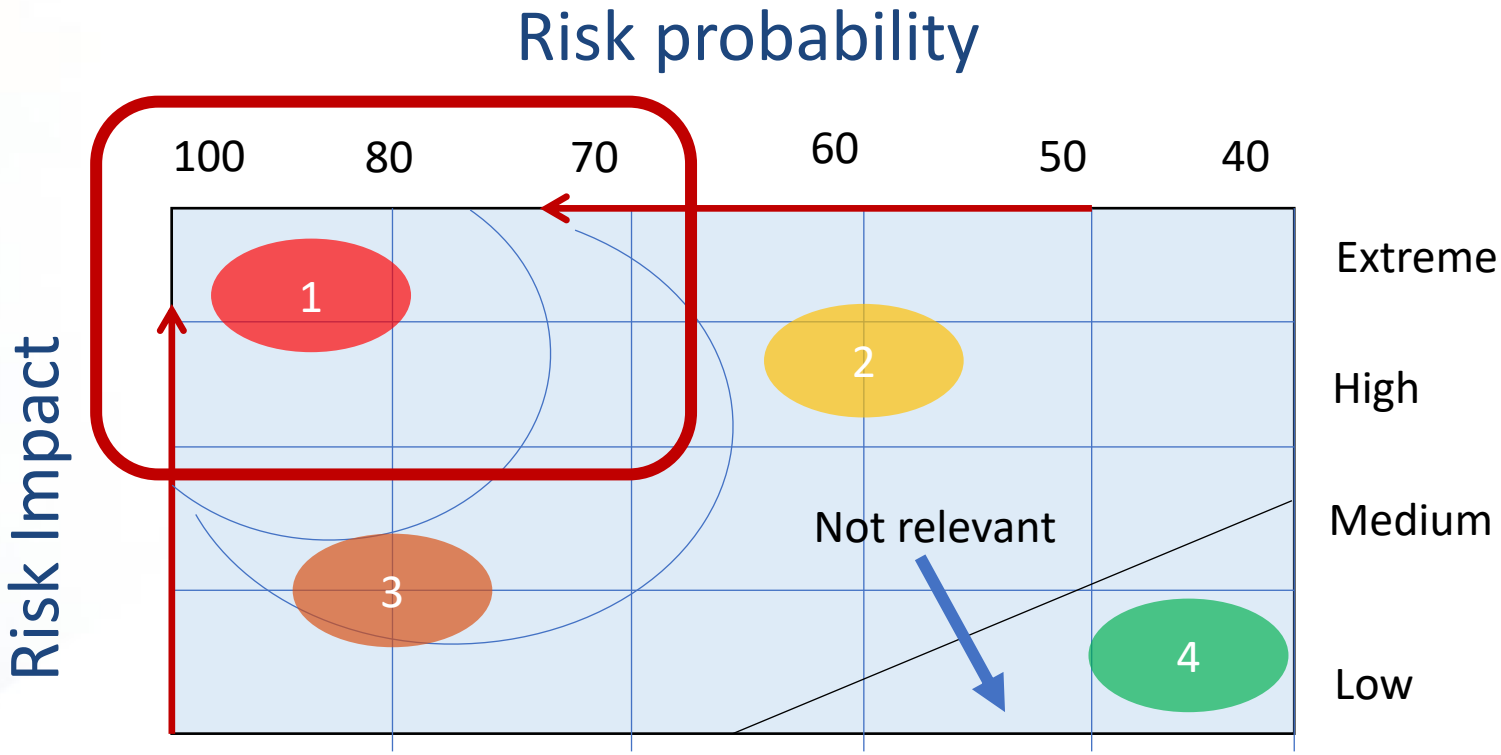
Co-funded by
the European Union

Human Brain Project

Quantitative risk analysis (I)

From qualitative to quantitative risk analysis

Risk exposure = impact x probability



POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

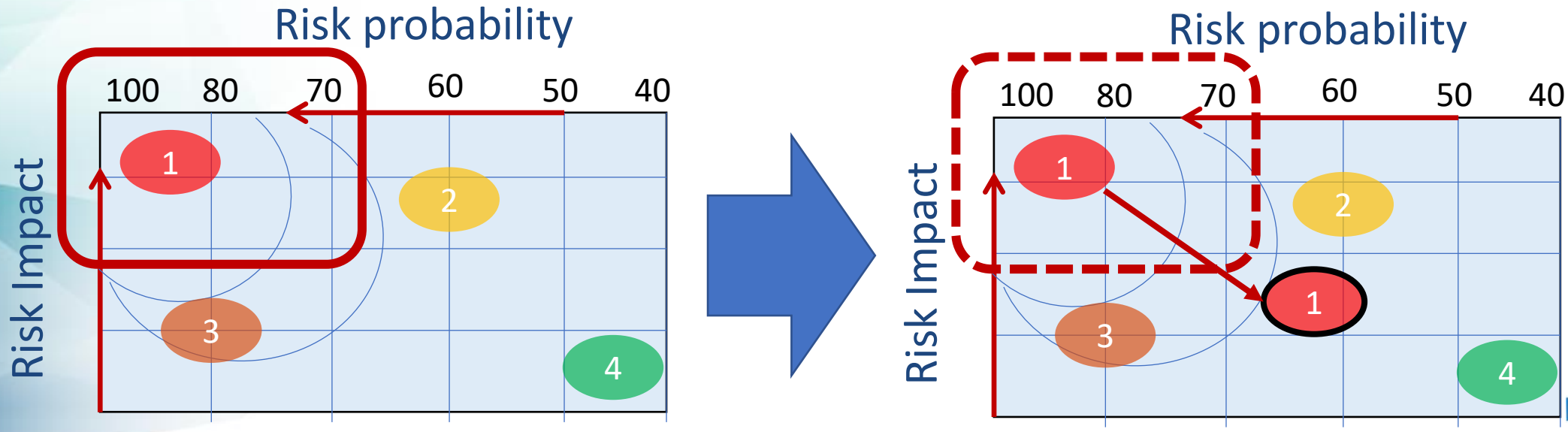
Human Brain Project

Quantitative risk analysis (II)

Mitigation plans for selected risks

Activities which are necessary to reduce the exposure of the risk in one innovation project acting on identified primary and secondary causes

- Reduce the probability of occurrence
- Reduce the impact in case of occurrence



POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Risk mitigation

Define mitigation plans for selected risks

Activities necessary to address in case of appearance the most relevant risks (i.e. those risks with higher exposures retained for action):

- **Write one mitigation plan for each risk**
  - ✓ Consider risks as independent (simplification)
- **Activities are based on the analysis of the Ishikawa diagram for the risk**
  - ✓ Actions to reduce the causes before their occurrence
  - ✓ Actions are triggered by early signals
- **Implementation**
  - ✓ Responsible (risk manager)
  - ✓ Budget allocation
  - ✓ Intermediate steps and outputs
  - ✓ Recalculation

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Risk monitoring and control

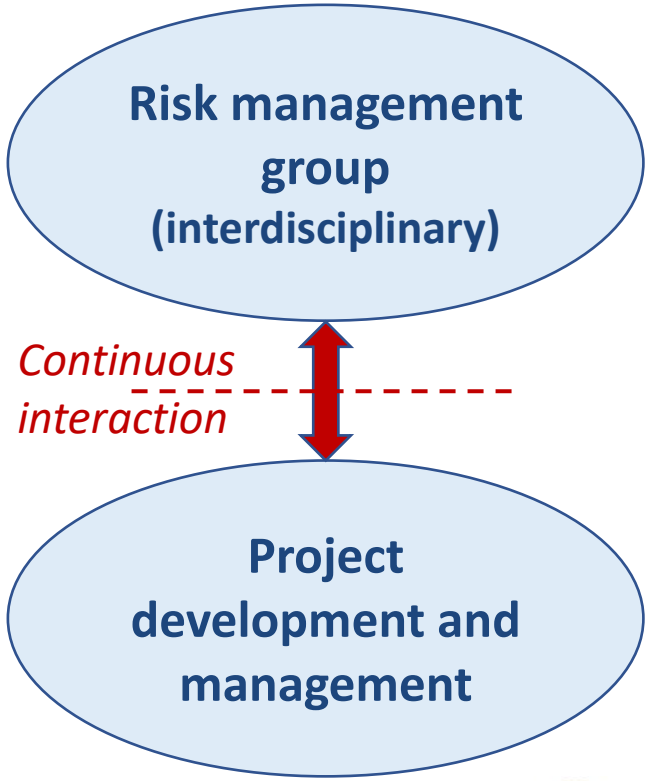
Co-funded by the European Union

Human Brain Project

Periodical review of selected risks and the efficiency of mitigation plans

Responsibility of the risk management group

- ✓ **Detect the occurrence of identified risks** (use early signals related to that risk)
- ✓ **Detect new risks** (not initially detected)
- ✓ **Recalculate qualitative & quantitative analysis** (probabilities and impacts)
- ✓ **Check the efficiency of mitigation plans** (in case of use)
- ✓ **Update mitigation plans** (Propose new actions)



POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

PROGRAM DAY 1

- Introduction
  - What is innovation?
  - Innovation taxonomies
  - Open and closed innovation
- **Exploitation in the context of H2020 and Horizon Europe**
  - Evolution from Horizon 2020 to Horizon Europe
  - The European Innovation Council
- IMTs used in HBP and the EBRAINS context

PROGRAM DAY 2

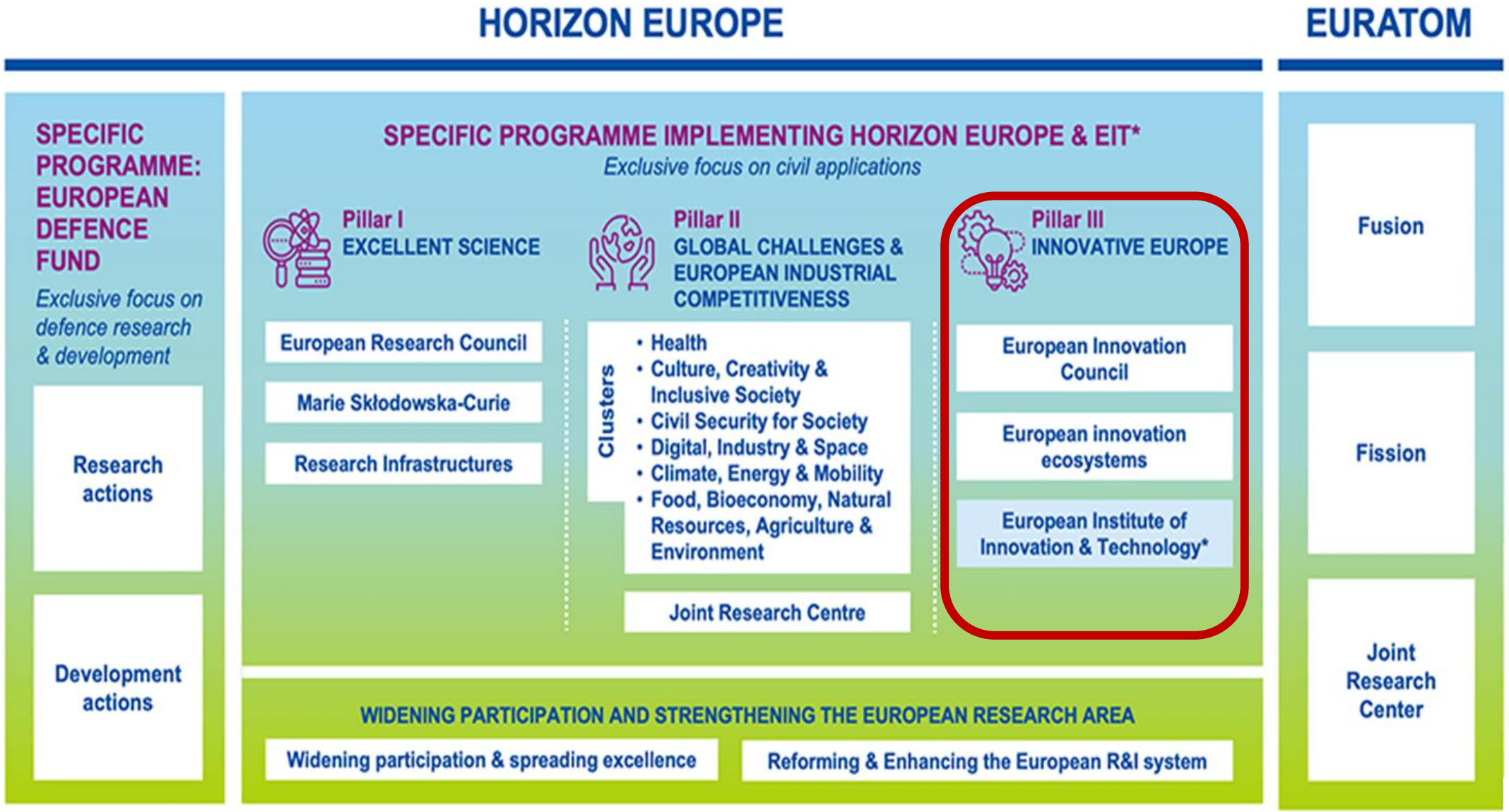
- Business intelligence
  - Technology and market watch
  - Risk assessment
  - Foresight and technology roadmapping
- IP strategies
  - Licensing strategies
  - Co-ownership and co-exploitation
- Quick overviews of IMT figures in HBP

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Structure of Horizon Europe

Co-funded by the European Union

Human Brain Project



* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

POLITÉCNICA

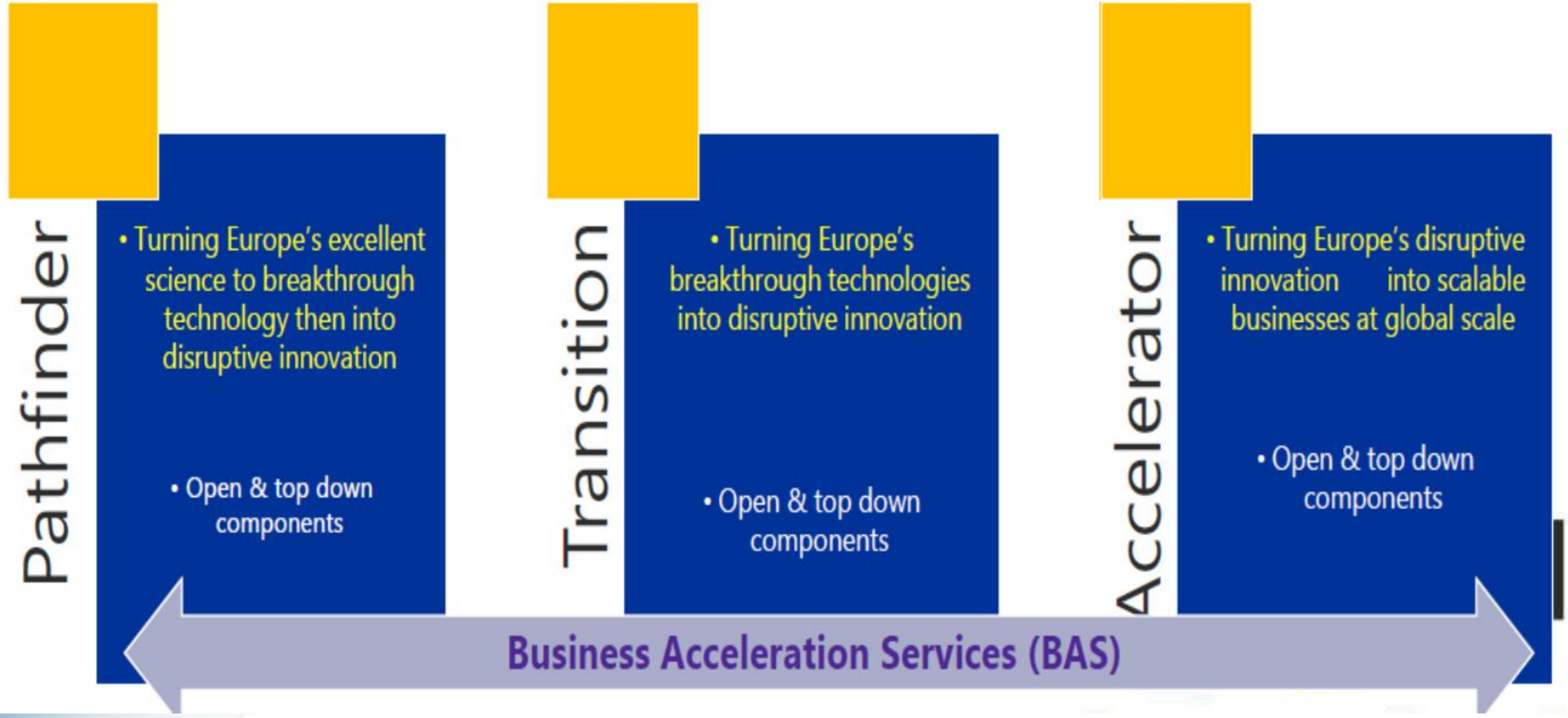
CAMPUS DE EXCELENCIA INTERNACIONAL

European Innovation Council

Co-funded by the European Union

Human Brain Project

EIC: Integrated, agile support across the full innovation spectrum from early stage research to start-up and scale-up.



POLITÉCNICA

CAMPUS DE EXCELENCIA INTERNACIONAL

European Innovation Council

Co-funded by the European Union

Human Brain Project

Pathfinder Challenges for 2021

Pathfinder Challenges
1. Awareness inside
2. Tools to measure & stimulate activity in brain tissue
3. Emerging Technologies in Cell & Gene Therapy
4. Novel routes to green hydrogen production
5. Engineered living materials

Call opening:
15 June 2021

Deadline:
27 October 2021 at 17.00.00 CET

POLITÉCNICA

CAMPUS DE EXCELENCIA INTERNACIONAL

European Innovation Council

Co-funded by the European Union

Human Brain Project

	Pathfinder Challenges
Total budget	€132 million
Proposals (indicative)	Up to €4 million
Funding rate	100% of eligible costs
Opening	15 June 2021 – and publication of Challenge Guides
Deadline	27 October 2021 at 17.00 CET
Length of proposal	25-page proposal (Part B, Sections 1-3)
Applicants	1. Single legal entities in a MS/AC (conditions apply) 2. Consortia: - If 2 partners: from different MS/AC, otherwise - Min. 3 partners from 3 different MS/AC (of which at least 1 partner in a MS) (unless differently stated in the Challenge chapter)

POLITÉCNICA

CAMPUS DE EXCELENCIA INTERNACIONAL

European Innovation Council

Co-funded by the European Union

Human Brain Project

Transition challenges for 2021 (II)
Medical Technology and Medical Devices: from Lab to Patient

The starting point in the project should be a preliminary prototype of a medical device or technology (TRL3-4)

The endpoint deliverables in the project should be a completely functional version of the technology suitable in its end-of-project state for clinical validation (TRL 5-6), supported by a sound and implementable commercialisation strategy.

*Proposals submitted to this call can target **any technology** addressing important health needs in the direct clinical treatment and care of patients*

EU contribution of € 2.5 million and duration of up to 3 years (but other amounts and durations possible)

POLITÉCNICA

CAMPUS DE EXCELENCIA INTERNACIONAL

European Innovation Council

Co-funded by the European Union

Human Brain Project

Novelty: investments in shares!!

Investment component

- The EIC Fund invests at **early stage** (seed, start-up, scale-up) from €0.5 to 15 million.
- The Fund may reserve **follow-on capital** to invest in subsequent series.
- The Fund usually targets **minority ownership** stakes (from 10 to 25%), and up to a blocking minority in cases identified by the EC as of strategic interest for the EU.
- Investments will normally be made with a long average perspective (7-10 years) with a maximum of 15 years.
- The EIC Fund will manage the investment component for proposals retained for either blended or investment-only support.

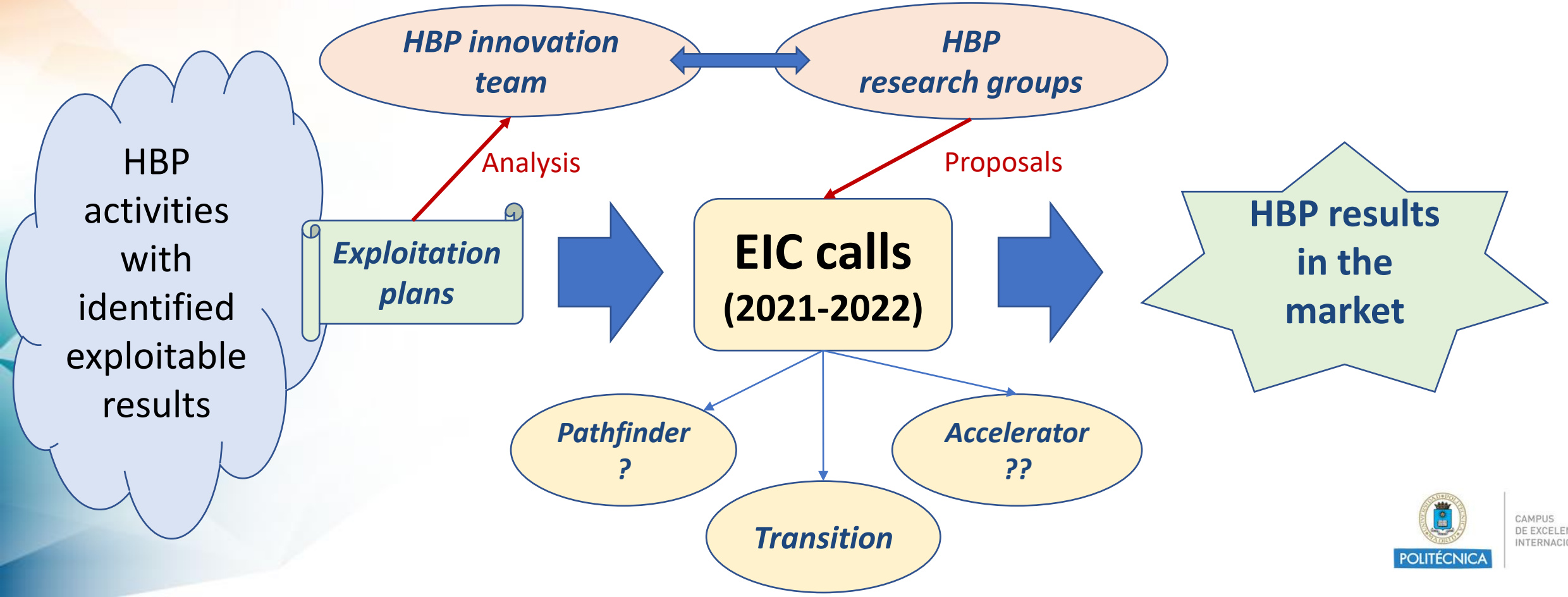
POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Support from HBP innovation team (I)

Co-funded by the European Union

Human Brain Project

The potential support should be focused on the exploitation of HBP results and for improving the EBRAINS offer of services



POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Support from HBP innovation team (II)

Co-funded by the European Union

Human Brain Project

Set of potential activities

- ***To discuss with proposers on the ideas to be submitted***
  - ✓ *Products, processes, services (or a combination)*
  - ✓ *Maturity levels (bottlenecks)*
- ***To analyse market opportunities***
  - ✓ *Based on technologies from HBP*
- ***In case of spin-offs***
  - ✓ *To support the discussions with entrepreneurs on business models*
  - ✓ *To propose alternatives for IP access*
  - ✓ *To discuss possible competitors*
- ***To review the proposal to EIC calls***
  - ✓ *For Pathfinder call*
  - ✓ *For transition call*

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Questions

POLITÉCNICA

CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

PROGRAM DAY 1

- Introduction
  - What is innovation?
  - Innovation taxonomies
  - Open and closed innovation
- Exploitation in the context of H2020 and Horizon Europe
  - Evolution from Horizon 2020 to Horizon Europe
  - The European Innovation Council
- IMTs used in HBP and the EBRAINS context

PROGRAM DAY 2

- Business intelligence
  - Technology and market watch
  - Risk assessment
  - **Foresight and technology roadmapping**
- IP strategies
  - Licensing strategies
  - Co-ownership and co-exploitation
- Quick overviews of IMT figures in HBP

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Technology Foresight

"It seems an odd thing to me that though we have thousands of professors and hundred of thousands of students of history working upon the records of the past, there is not a single person anywhere who makes a whole-time job estimating the future consequences of new inventions and new advices. There is not a single professor of Foresight in the world"

H.G. Wells (1932)

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

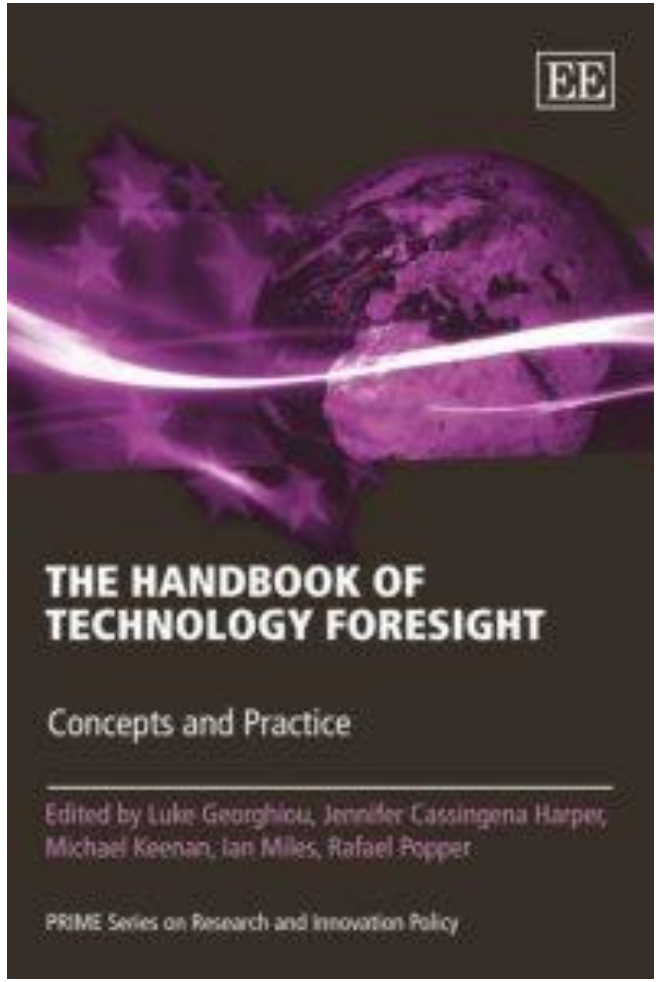
Co-funded by
the European Union

Human Brain Project

Origins of Foresight

The initial use of futures studies for supporting strategic decisions dates from the end of the Second World War, in a context where US **military planning** techniques were gradually adopted by industrial and technological sectors.

The term ‘Foresight’ specifically emerged from the Science Policy Research Unit (SPRU) at the University of Sussex (Irvine et al, 1984). SPRU’s research programme STAFF (Social and Technological Alternatives for the Future) is deemed the seminal **connection of the concept with Innovation studies** (Miles, 2008).



POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

What is Foresight?

"Foresight is a highly participative instrument of intelligence that makes use of anticipated **representations of plausible futures** to generate possible solutions to current policy issues" (Velasco, 2016)

"**Technology foresight** is the process involved in systematically attempting to look into the longer-term future of science, technology, the economy and society, with the aim of identifying the areas of strategic research and the emerging of generic technologies likely to yield the greatest economic and social benefits" (Martin, 1995)

The European Commission understands foresight as a '**systematic, participatory, future intelligence gathering and medium-to-long-term vision-building process aimed at present-day decisions and mobilising joint actions**' (EC, 2002).

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by the European Union

Human Brain Project

Strategic intelligence tools

Looking for past, present or future “evidences”?

Past **Future (Forward-looking activities)**

Time

Ex-post policy evaluation

Benchmarking

Horizon scanning

Ex-ante policy evaluation

Technology impact assessment

Roadmapping

Trends, forecasting, predictions, interpolations

Foresight (15-20 years)

Woman with Flowers, Leo Gestel

Marzella descanso, Ernst Ludwig Kirchner

Co-funded by
the European Union

Human Brain Project

What makes Foresight different from other conventional tools as strategic planning?

- More participation
- Long term dynamics, forward looking
- Build capacities
- Networking
- Legitimacy
- Rationality and divergent/ creative thinking combination
- Capture trends (external evidences and weak signals)
- Enlighten directors and others
- Use of future scenarios

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

What makes Foresight different from technology watch, horizon scanning or trend analysis?

	Highly/moderately developed	Slightly developed
Moderately visible	CONSOLIDATED TRENDS/ PRACTICES Social & tech watching systems 	EMERGING TRENDS & CHALLENGES Horizon scanning / weak signals for emerging trends detection 
Low visibility	HIDDEN TRENDS/ PATTERNS Big data analysis 	INTUITIONS, FUTURE INSIGHTS Foresight & citizens panels for future trends Identification 

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Technology Foresight methods

QUALITATIVE	QUANTITATIVE	SEMI-QUANTITATIVE
1.Backcasting	20. Benchmarking	26. Cross-impact / structural analysis
2.Brainstorming	21. Bibliometrics	27. Delphi
3.Citizens panels	22. Indicators / time series analysis	28. Key / Critical technologies
4.Conferences/workshops	23. Modelling	29. Multi-criteria analysis
5.Essays /Scenario writing	24. Patent analysis	30. Polling / Voting
6.Expert panels	25. Trend extrapolation / impact analysis	31. Quantitative scenarios / SMIC
7.Genius forecasting		32. Roadmapping
8.Interviews		33. Stakeholder analysis
9.Literature review		
10.Morphological analysis		
11.Relevance trees /logic charts		
12.Role play / Acting		
13.Scanning		
14.Scenario /Scenario workshops		
15.Science fictioning (SF)		
16.Simulation gaming		
17.Surveys		
18.SWOT analysis		
19.Weak signals /Wildcards		

Source: Popper (2008)

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by the European Union

Human Brain Project

Foresight: how to make future scenarios

1. List key drivers (TEEPSE)
2. Define different status of each variable
3. Create scenarios by choosing different routes

	Factor projection A	Factor projection B	Factor projection C
New rationales for societal progress and related RTDI governance	Jobs & growth	Human well-being (e. g. happiness, quality of life, Human Development Index)	Sustainability (scarcity of resources, environment, limits of growth, long-term carrying capacity)
Relative share of emerging economies in RTD spending	Continued growth of share	Hyperspending / expected relative growth	Relative decline
Macro-economic stability	Europe muddling through in a relatively unstable world (financial / fiscal policies remain the same)	Increase of stability in Europe and the rest of the world	Increase of European instability in a relatively stable world
Global balance of power	Worldwide democracy on the rise - "global Europe"	Persisting rivaly between political systems (multipolarity)	Isolated (democratic) Europe
Social movements	Increased importance of social movements	Less importance of social movements	-

Scenario 3: Sustainability **Scenario 2: Human well-being** **Scenario 1: Jobs & growth**

POLITÉCNICA CAMPUS DE EXCELENCIA INTERNACIONAL

Four scenarios on European RTDI governance in 2030

Co-funded by the European Union

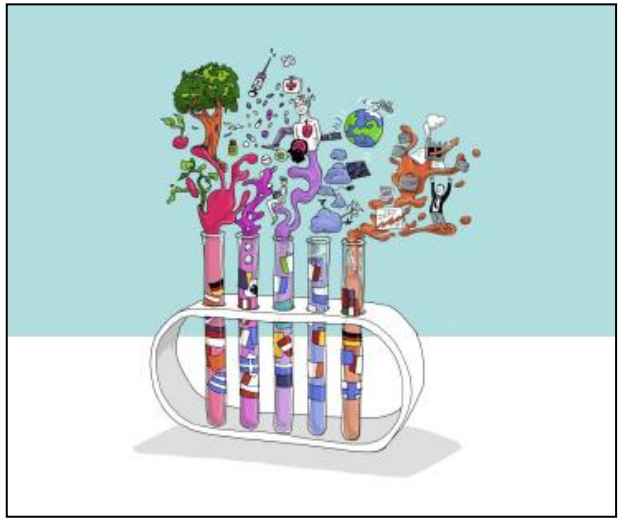
VERA Forward Visions on the European Research Area

Objective:

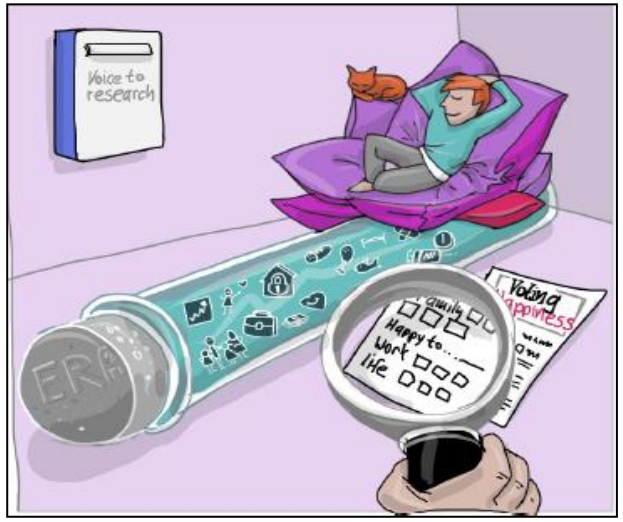
to provide sound recommendations on **research, technology development and innovation (RTDI) policies and their governance and coordination across ERA**

1. Global market coordination for jobs and growth

2. Intergovernmental action for Grand Challenges



3. Public participation for human well-being



4. Integrated expertise for sustainability

http://www.eravisions.eu/scenarios

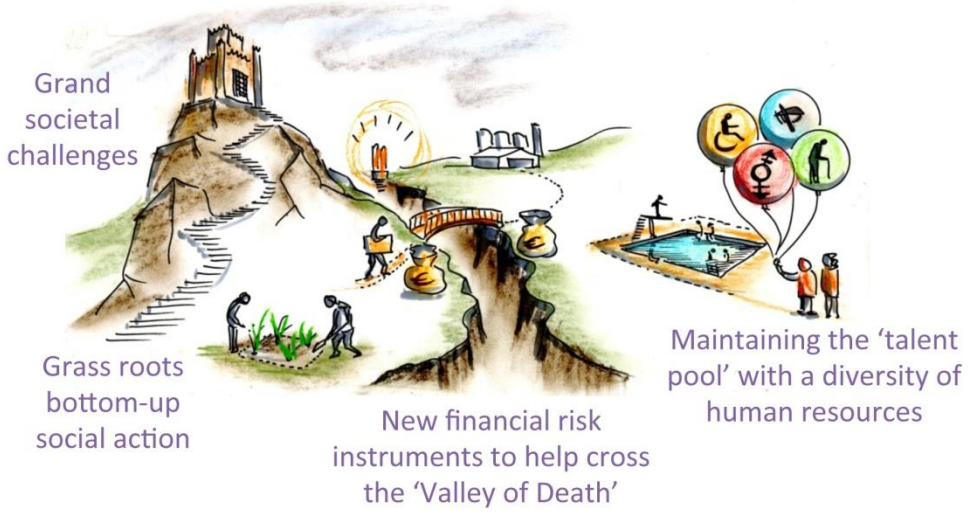
DOCTORAL THESIS:
UNDERSTANDING THE GENERATION OF RESEARCH AND INNOVATION POLICY ADVICE WITH FORESIGHT PROCESSES:

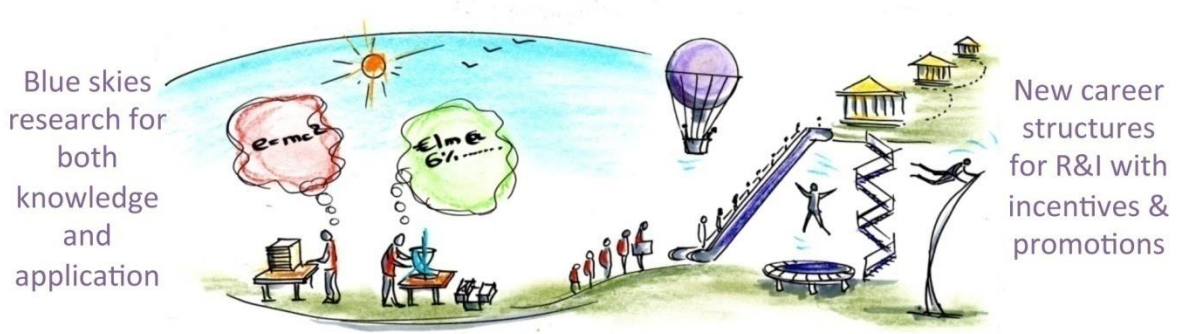
https://www.research.manchester.ac.uk/portal/en/theses/understanding-the-generation-of-research-and-innovation-policy-advice-with-foresight-processes(cbfdf17f-64a4-44fb-b36a-5ad312f66d31).html

ADVICE

H2020 lensing
excellent science bundle

- **Orientate regional specialisation efforts towards a better utilisation of existing regional R&I infrastructure and knowledge base**



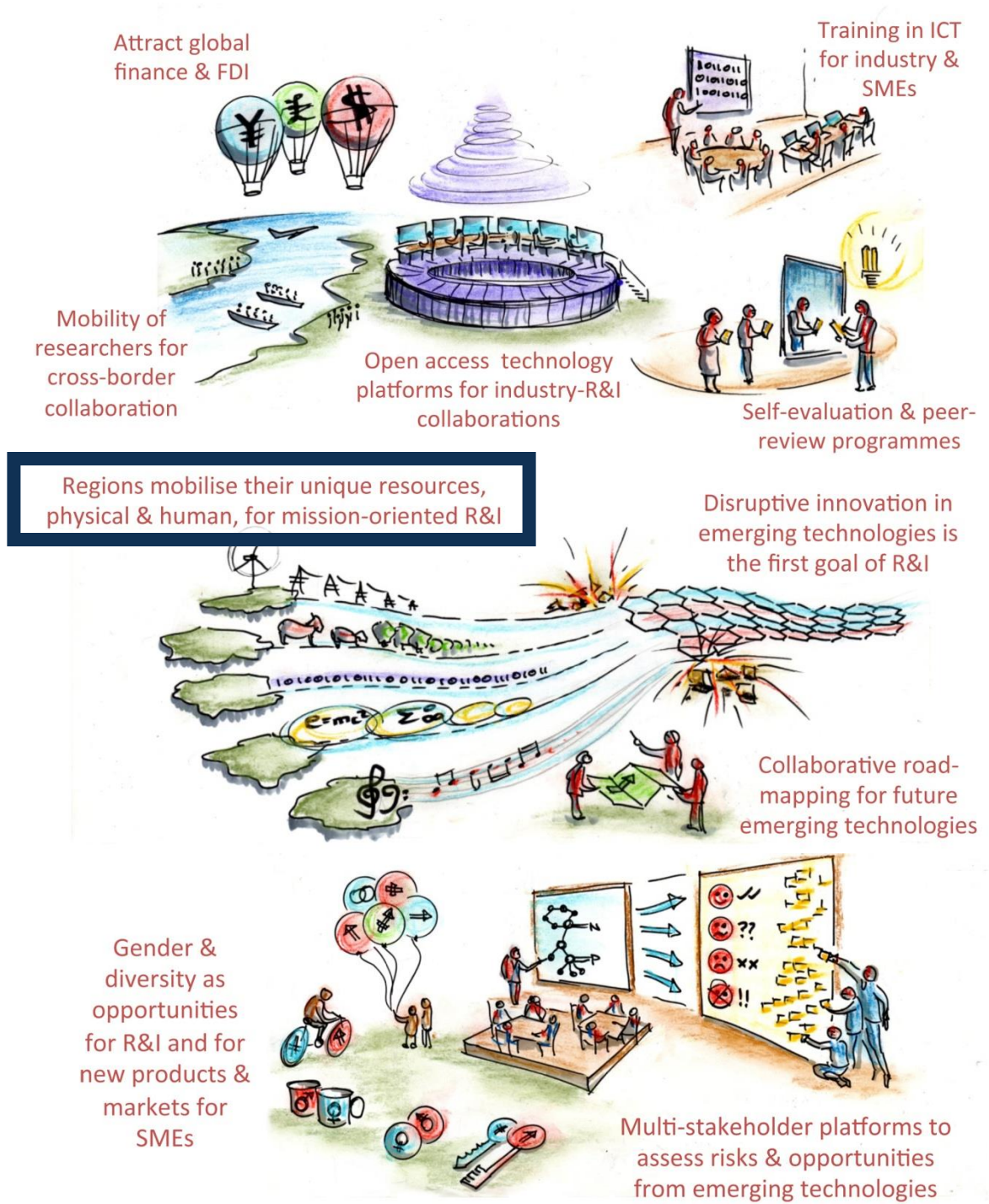


VERA Project
Drawings: Joe Ravetz

ADVICE

H2020 lensing
industrial leadership bundle

- **Intensify R&I regional efforts on those emerging areas where regions have strong capabilities**

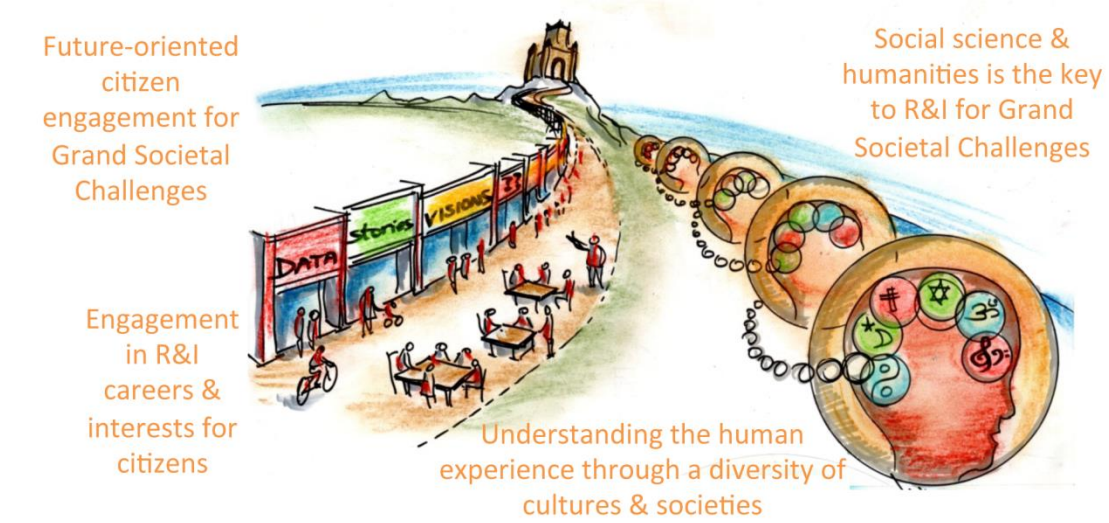


VERA Project
Drawings: Joe Ravetz

ADVICE

H2020 lensing
societal challenges bundle

- **Create mechanisms to better identify the regional diversity of local problems and needs, so as to grasp how national, European and global challenges are interpreted and experienced differently across regions and transregional spaces**

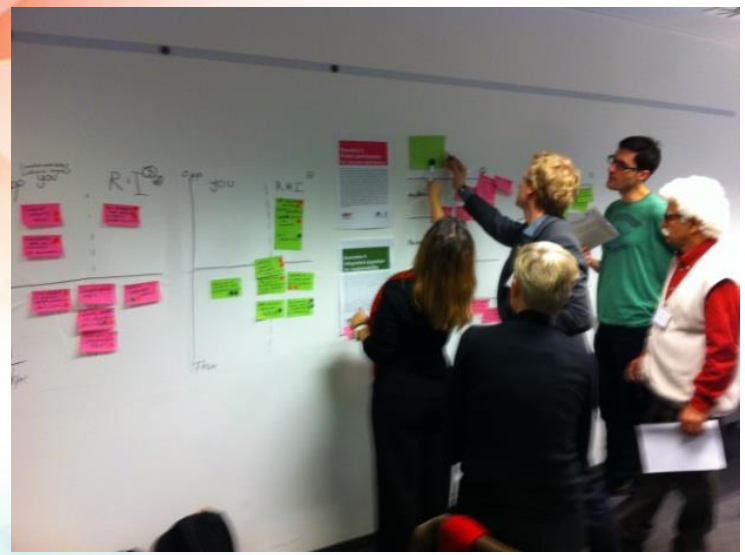


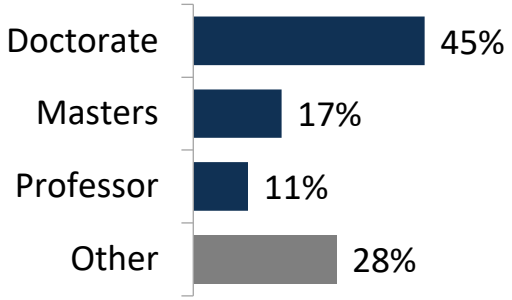
VERA Project
Drawings: Joe Ravetz

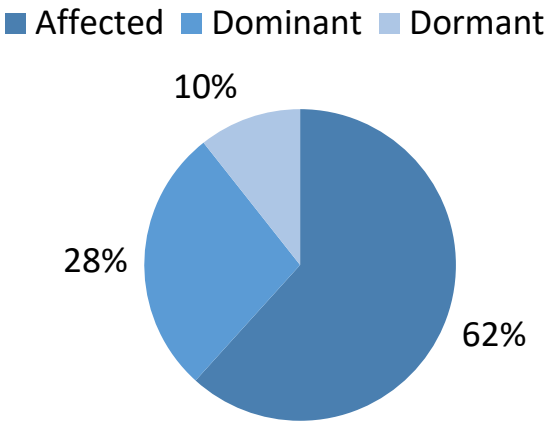
Foresight workshops: stakeholders' participation

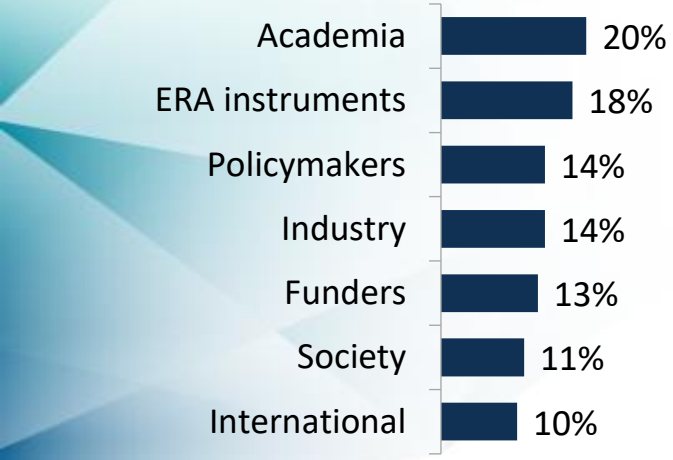
Co-funded by the European Union

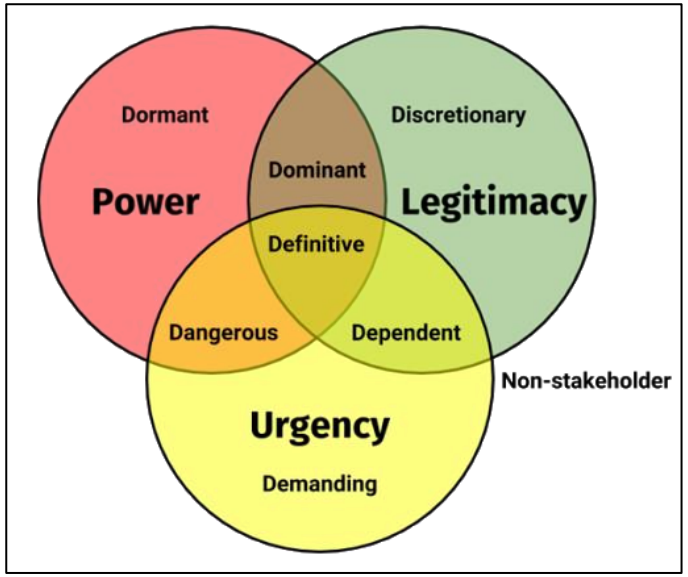
VERA Forward Visions on the European Research Area











Stakeholders salience model
Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997).

Co-funded by
the European Union

Human Brain Project

Roadmapping: basic concepts

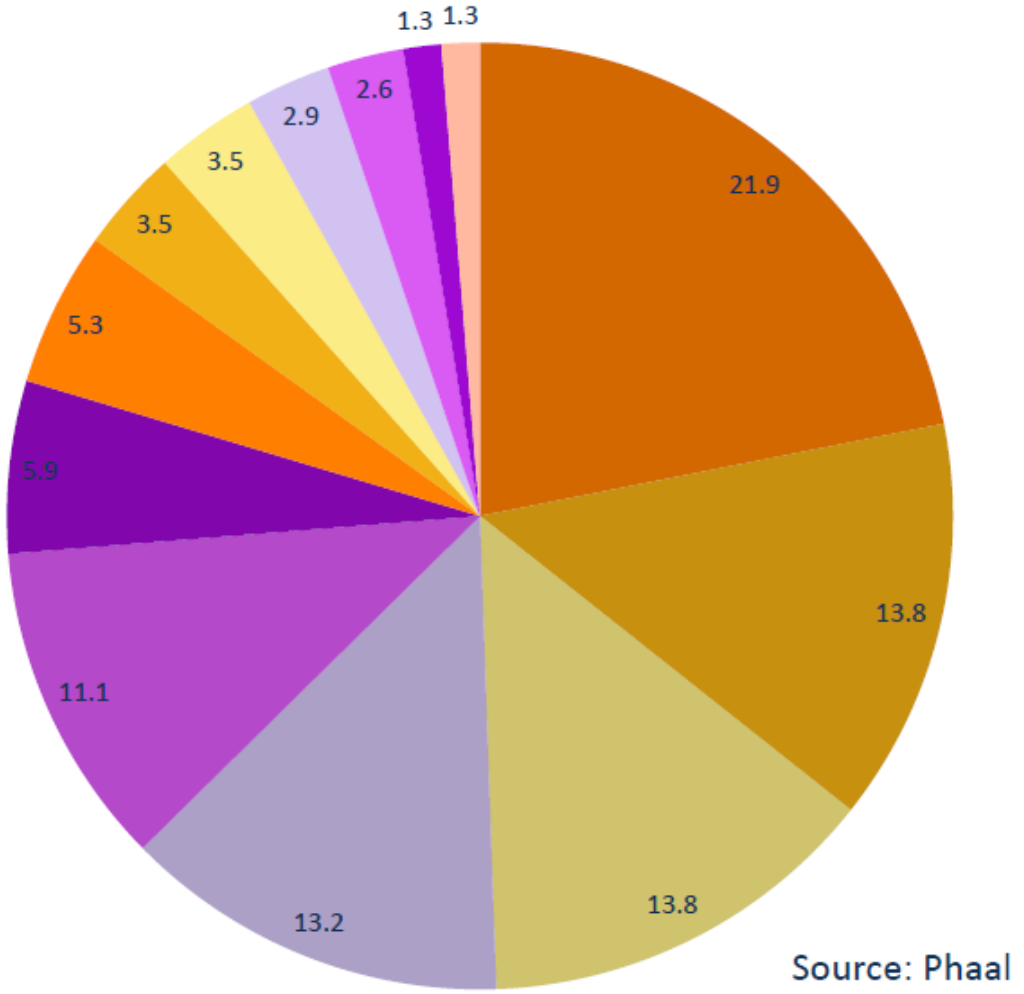
Roadmapping is a technique that helps to outline the future of a field of technology, generating a timeline for development of various interrelated technologies and (sometimes) including factors like regulatory and market structures. It is widely used by high-tech industries.

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Roadmapping



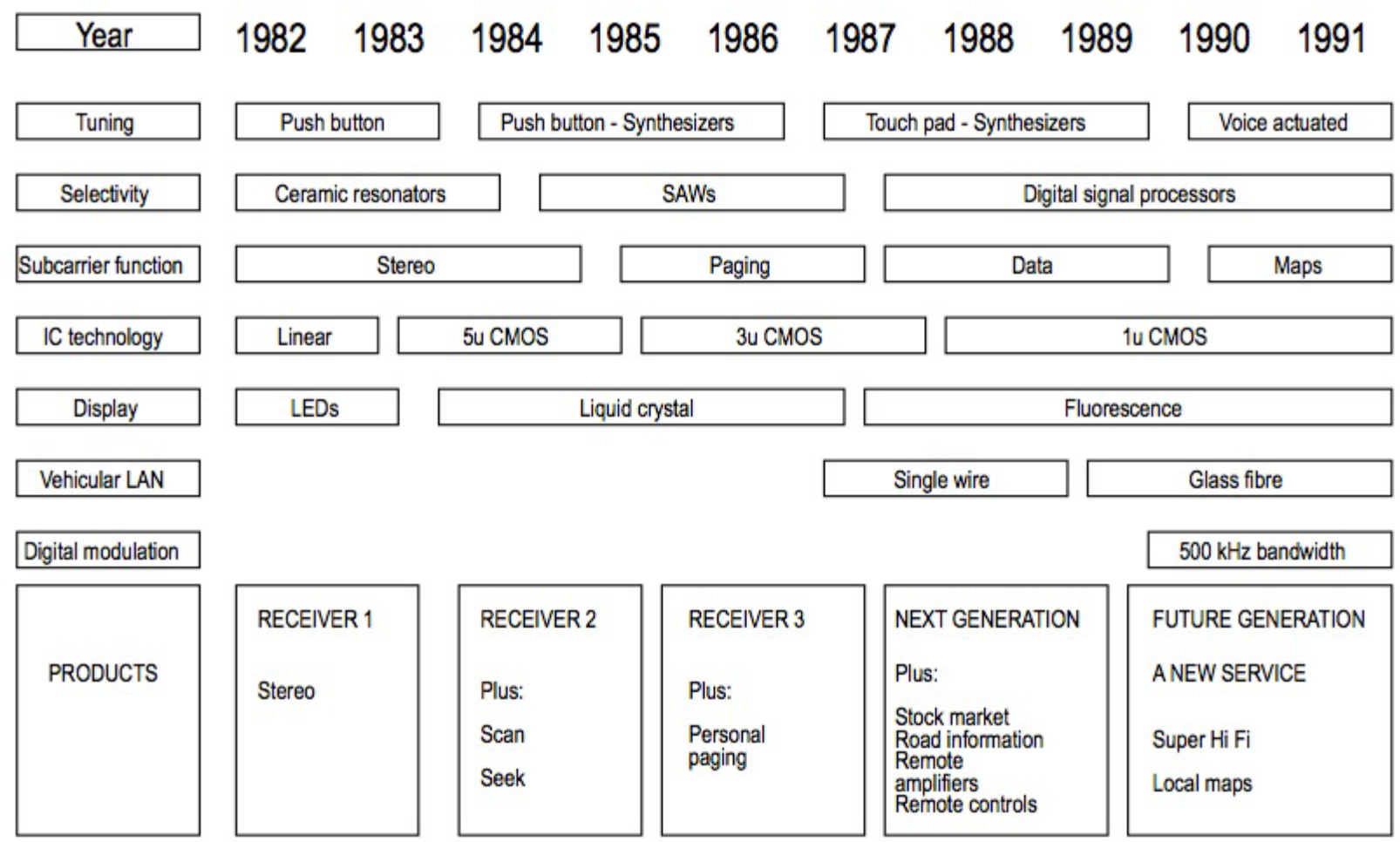
see also Willyard and McClees, 1987; EIRMA, 1997; Kostoff and Schaller, 2001; Saritas and Oner, 2004; Phaal et al., 2004

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

First technology roadmap (Motorola)



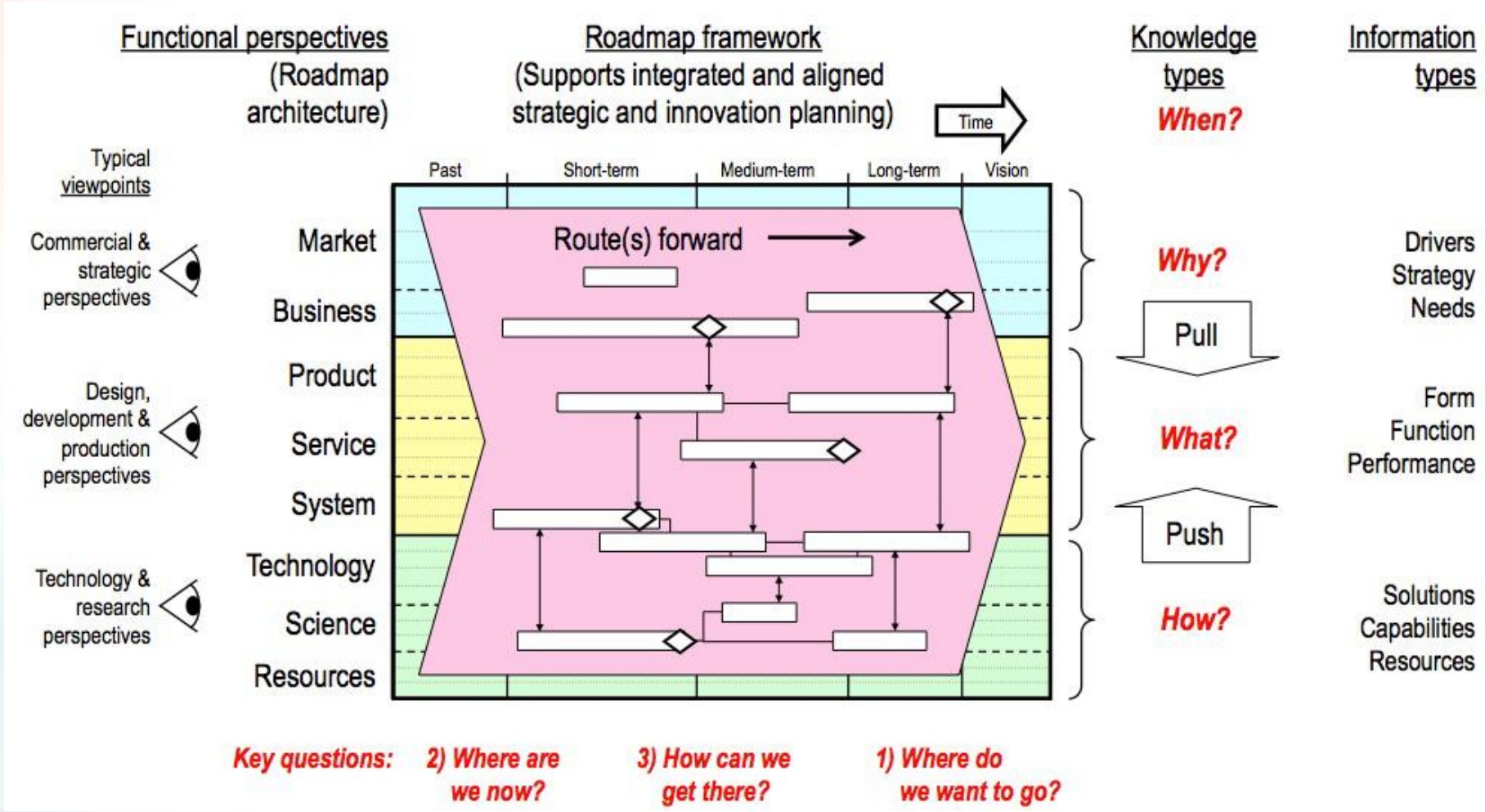
Willyard, C.H. and McClees, C.W. (1987), “Motorola's technology roadmap process”, *Research Management, Sept.-Oct., pp. 13-19.*

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Roadmaps: the concept



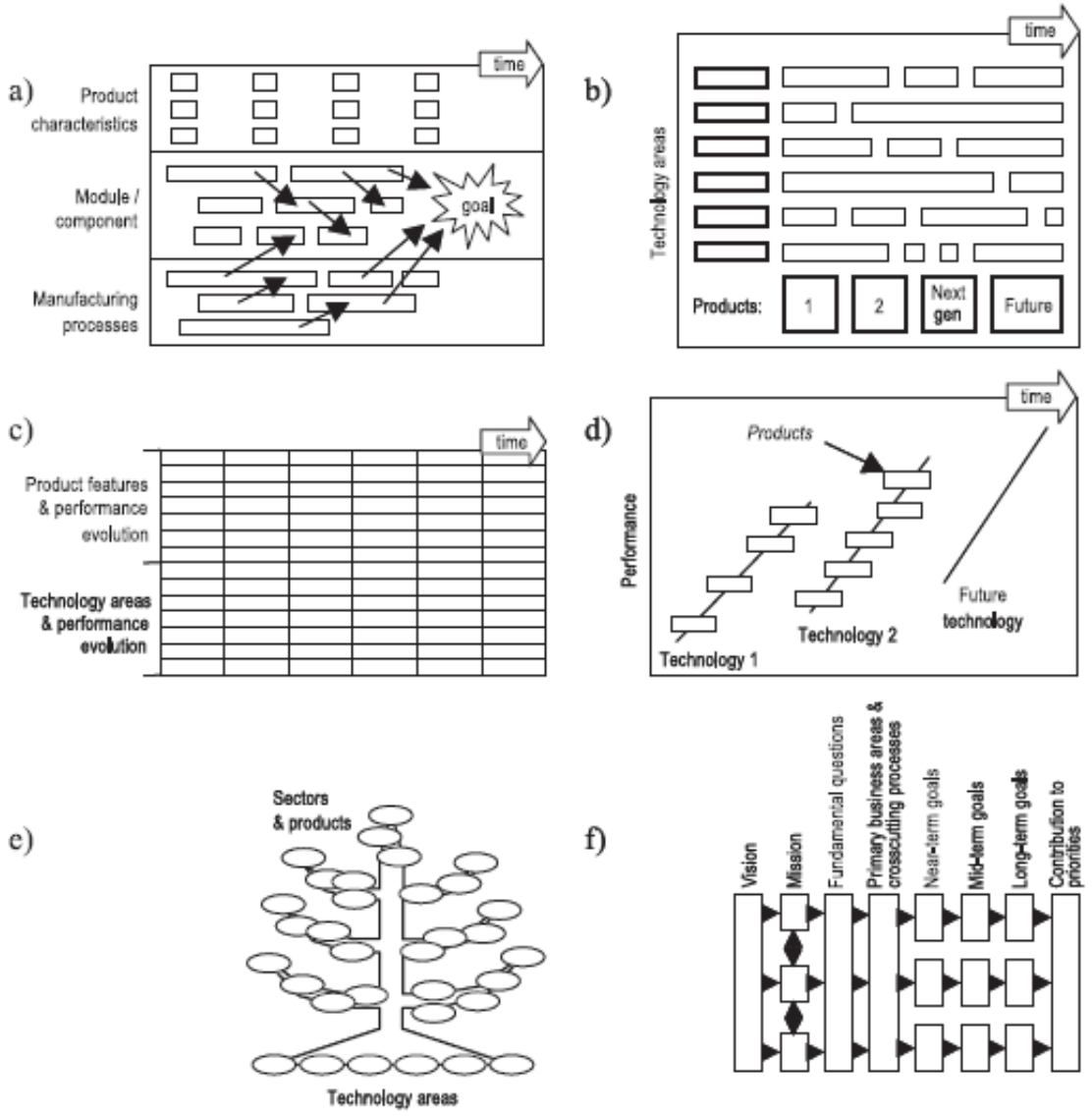
Adapted from Groenveld (1997) and Phaal et al. (2004)

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Roadmaps: multiple representations



a) Múltiple layers
b) Bars
c) Table
d) Graphs
e) Images
f) Flow diagram

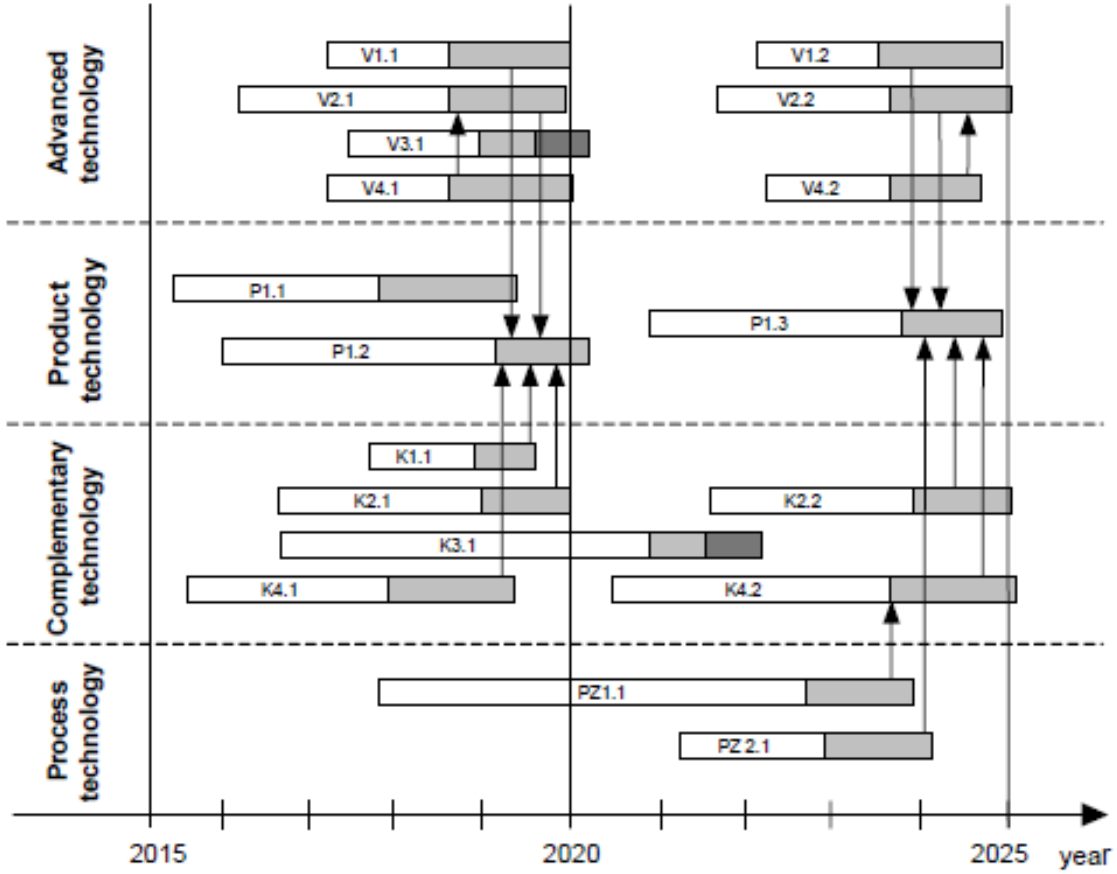
(Phaal et al., 2004)

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Roadmaps: examples, fuel cells



V1	Methanol service station	V2	LH_2 Service stations	V3	GH_2 Service station
P1	Performance fuel cell			V4	Production capacity
K1	Methalon-Tank	K2	GH_2 Krytank	K3	GH_2 Hybrid tank
PZ1	Precious metal/electrolyte	PZ2	Production process	K4	Reformer

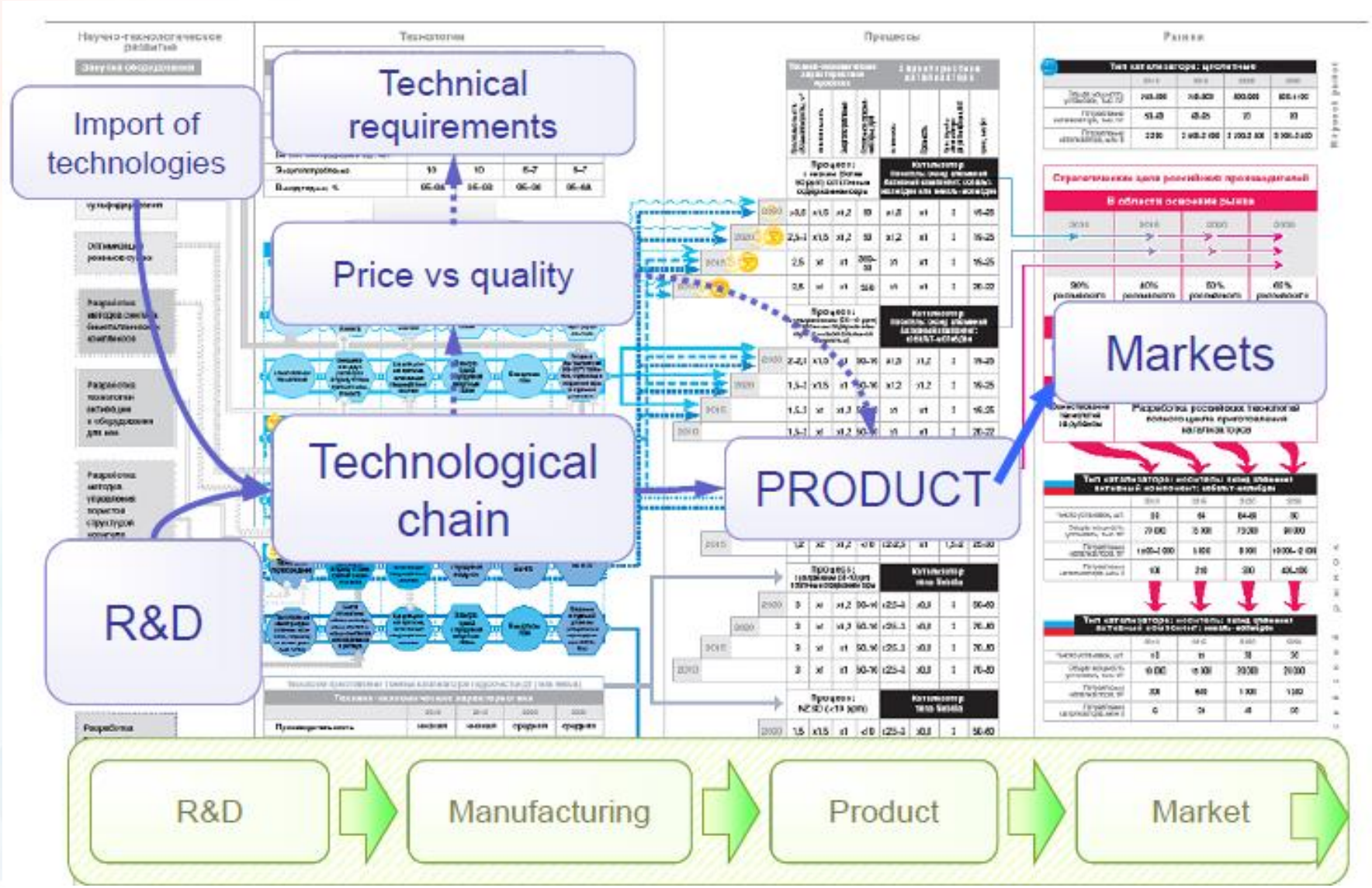
Geschka, G. & Hahnen H. in Martin G. Moehrle, Ralf Isenmann, and Robert Phaal (2013)

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

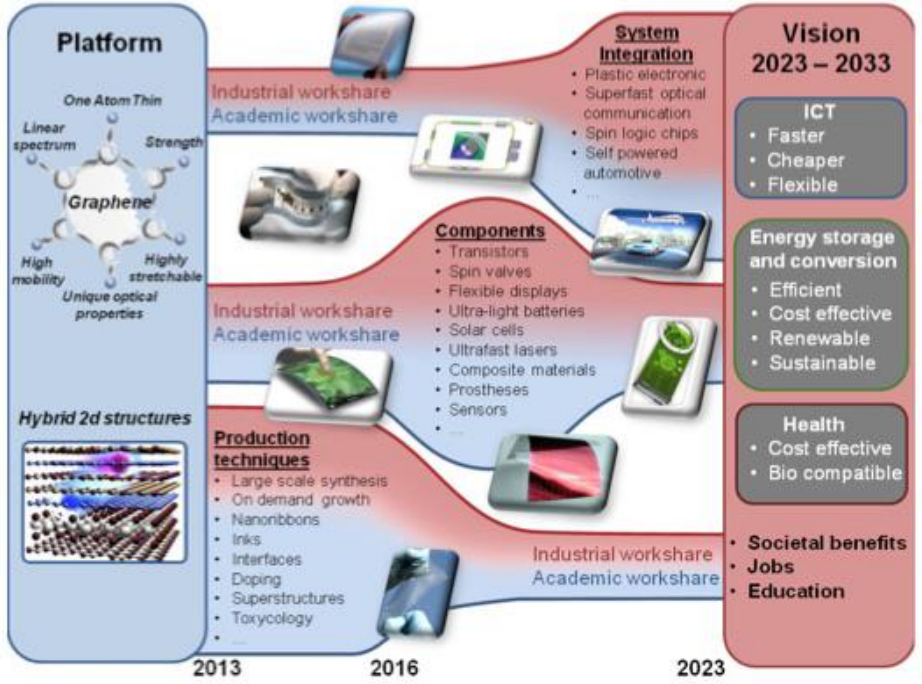
Co-funded by
the European Union

Human Brain Project

Roadmaps: Russian Foresight 2030

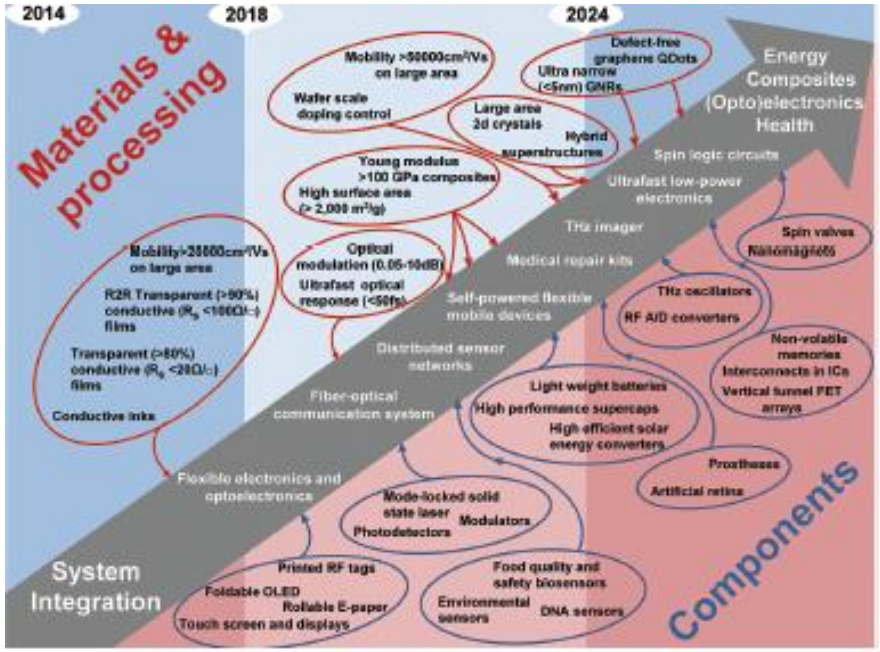


POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL



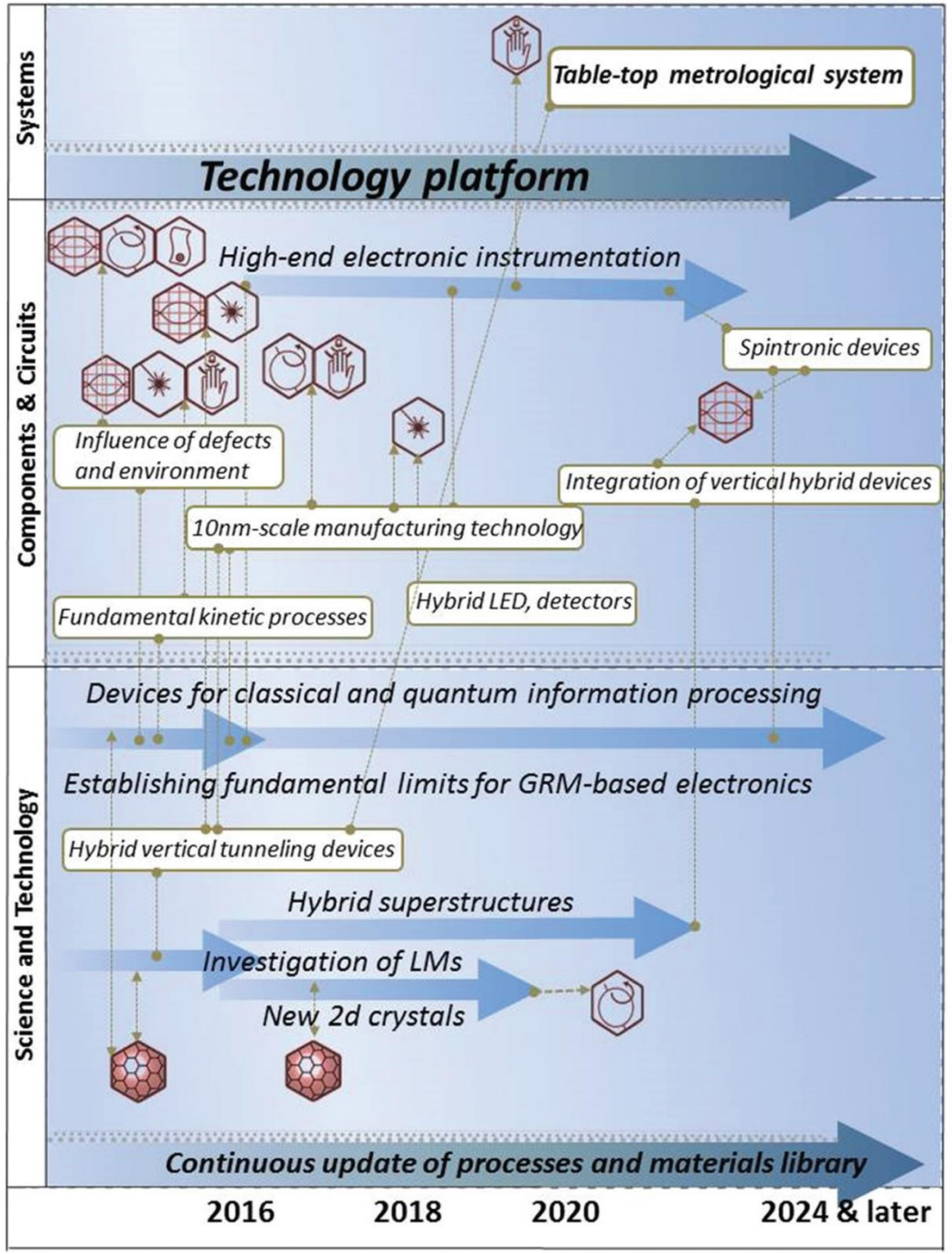
Communication roadmap for EU Graphene Flagship (Kerr & Bonaccorso, 2012). In Nanoscale, 2015, 7, 4598

“Science and technology roadmap for graphene, related two-dimensional crystals, and hybrid Systems”



Graphene timeline for fundamental research and development of materials and components

- Fundamental research
- Health and environment
- Production
- Electronic devices
- Spintronics
- Photonics and Optoelectronics
- Sensors
- Flexible electronics
- Energy storage and generation
- Composites
- Biomedical applications

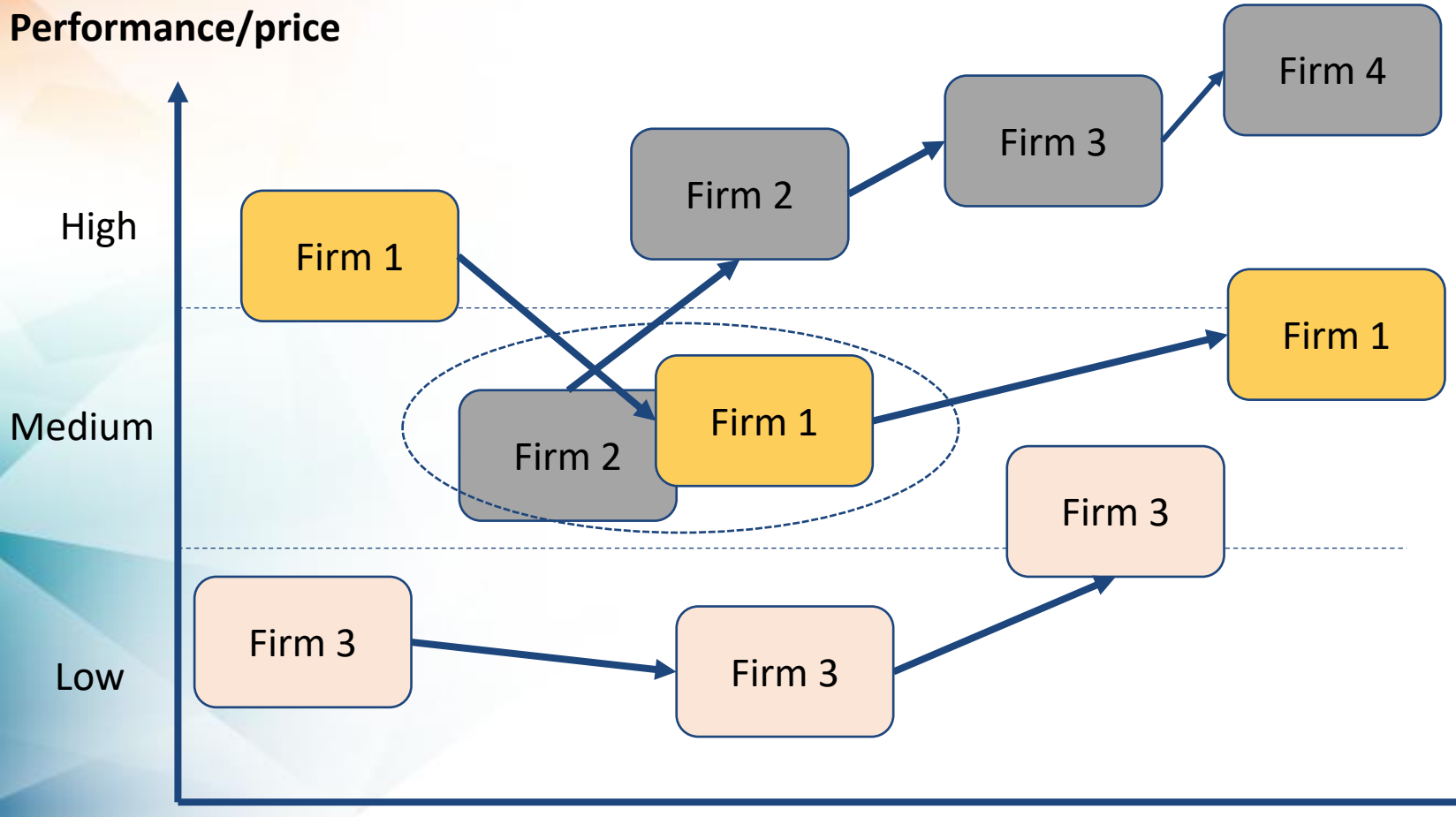


Roadmaps for market decisions

Co-funded by the European Union

Human Brain Project

Do I need to compete in a very crowded market space fighting for the same customers with the same type of products?



The analysis of the market in terms of main actors, products, investments and technology used is an essential step in decision making for innovation

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Conclusions

1. While Foresight helps to discuss on future visions, with room for **creative** and **radical** ideas, roadmapping is a complementary tool to make **rational** and **time-based** technology or market decisions
2. Both disciplines reveals overlooked **linkages** between objectives and activities in the institution/ organization
3. Both disciplines foster internal and external **cooperation**
4. Roadmapping improves **coordination** and **management** activities
5. Roadmaps should be regularly **monitored** in order to correct deviations
6. Foresight is an excellent tool for networking and knowledge transfer
7. Roadmaps are powerful **communication tools**, specially when it is combined with future scenarios

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Questions

POLITÉCNICA

CAMPUS
DE EXCELENCIA
INTERNACIONAL

PROGRAM DAY 1

- Introduction
  - What is innovation?
  - Innovation taxonomies
  - Open and closed innovation
- Exploitation in the context of H2020 and Horizon Europe
  - Evolution from Horizon 2020 to Horizon Europe
  - The European Innovation Council
- IMTs used in HBP and the EBRAINS context

PROGRAM DAY 2

- Business intelligence
  - Technology and market watch
  - Risk assessment
  - Foresight and technology roadmapping
- IP strategies
  - Licensing strategies
  - Co-ownership and co-exploitation
- Quick overviews of IMT figures in HBP

Co-funded by the European Union

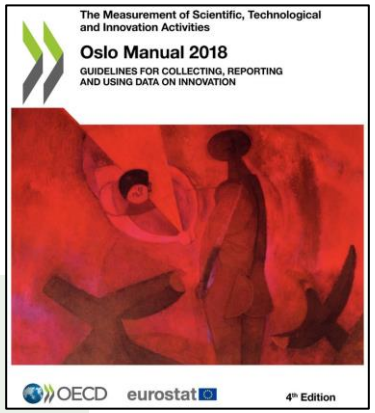
Human Brain Project

IP strategies

Exploitation, protection and ownership are highly-connected concepts

Ownership

Exploiting research results or technologies requires to have property rights on these results

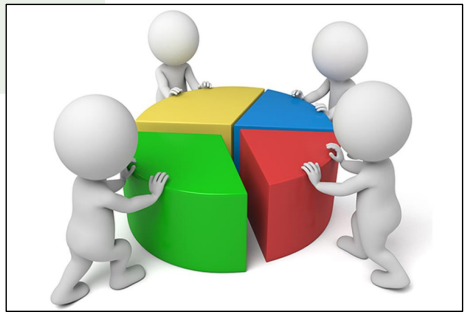


IP Protection

Exploitation

WIPO
WORLD
INTELLECTUAL PROPERTY
ORGANIZATION

Protecting technologies implies to develop/test the technology and anticipate some plans (even preliminary) for exploitation



Ownership

Conceiving and developing the technology enable researchers and (co)developers to protect and exploit the tool

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

IP strategies

Protection of results: what is Intellectual property?

According to the World Intellectual Property Organization (WIPO) the intellectual property (IP) are **unique, value-adding creations of the human intellect** that results from human ingenuity, creativity and inventiveness. The IPR is the legal right based on the relevant national law, i.e., intellectual property is the concept associated to the different rights you hold to **protect** your ideas and any sort of intellectual creations.

WIPO
WORLD
INTELLECTUAL PROPERTY
ORGANIZATION

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

IP strategies

IP modalities

a. **Patents** protect inventions (which can be products or processes).
b. **Copyright** protects creations such as, software, literature or artworks. Recognized automatically, they have effect since the date of creation.
c. **Database** Rights protect data sets which have been systematically arranged, organized and accessible.
d. **Trade secrets** protect confidential knowledge that is valuable and identifiable, including experiments, scientific methods or formulations.
e. **Designs** protect the shape and aesthetics of objects.
f. **Trademarks** protect brands, the value of which is based on the reputation and quality of the product or services offered.

Note that while some IP modalities can be clearly applied to the HBP results, others have little application in HBP

WIPO
WORLD
INTELLECTUAL PROPERTY
ORGANIZATION

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

IP strategies

Conditions to get a patent

1. NOVELTY: an invention is new/novel if it was not known (by means of written or oral description, by use, or in any other way) to the public before the date of filing of the patent application or the priority date claimed, at global level. This implies to develop a coherent plan for publications, conferences, that does not limit patenting opportunities

2. INDUSTRIAL APPLICATION: the invention needs to be able to be used or made in any kind of industry. There is no industrial application if the invention is just used in personal/private context.

3. 'NON-OBVIOUS': invention should not be obvious for a person with standard skills in the field

WIPO
WORLD
INTELLECTUAL PROPERTY
ORGANIZATION

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by the European Union

Human Brain Project

IP strategies

Public disclosure (1/2)

- A result such as software, hardware, service, process, model or database is new when it is not part of the prior state of the art, i.e. the result **has not been disseminated to the public before the date of applying for such a protection.**
- Public disclosure of a result (dissemination to the public) assumes that **enough information is given to enable a skilled person in the related industry** to reproduce hardware, software, service, or process results, or to utilize databases or models without adequate permission.
- Sharing your result with other actors for business purposes (e.g. employees or partners) is not considered a public disclosure, since it is not revealed in the industrial context where available technologies are discussed. However, such exchange should be covered by a **confidentiality agreement** to avoid having the result fall in the public domain. Similarly, revealing results confidentially to some people (like lawyers) are not considered public disclosure, as they would not fall in the public domain and would not be part of prior state of the art.
- To avoid public disclosure, it is recommended not to publish articles, press releases, conference presentations, posters, proceedings, lectures or blog posts, etc. **before you file the patent application.**

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

IP strategies

Public disclosure (2/2)

- Before **negotiating with companies** on a specific technology (i.e. disclosing information about such a technology), it is recommended to review any other licenses already granted to other parties for that technology (which could potentially alter our negotiation power) and consider the signing by the company of a **non-disclosure agreement (NDA)** that provides some confidentiality.

- The risk of information leakage is very difficult to mitigate or eliminate. In this respect, it is recommended **to avoid selling products that incorporate the invention before filing the patent application** or implementing any other protection strategy.

- In case of a technology that has a very short lifetime, a strategy to exploit the solution and reduce the risk of imitation is to become the **first to introduce the technology to the market**, i.e. to offer very quickly the technology to final users

- Making no efforts either in protecting or keeping in secret your result is obviously incompatible with owning any **exclusivity rights on that result** and, in addition, implies that competitors will quickly learn the details of your technology.

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by the European Union

Human Brain Project

IP strategies

Patent rights

- **Territoriality:** right granted by national/regional patent office
- **Exclusivity:** exclusive right granted for the invention
- **Time limitation:** in general, 20 years from filing date of application

- **NATIONAL** applications (country by country)
  - **Priority date**: filing date of the very first patent application for a specific invention. 12 months for claiming this "priority right"
- **EUROPEAN** application (European Patent Office)
  - Applications for European patents CENTRALLY (parallel applications that reduce costs)
  - After granting, patents to be maintained INDIVIDUALLY in each country
- "**INTERNATIONAL**" application (PCT)
  - Seeking patent protection simultaneously in a large number of countries (more than 150) by filing a single "international" patent application instead of filing several separate ones
  - NOT a granting procedure: granting remains under national/regional offices
  - EFFECT: written opinion on invention's potential patentability for starting to pursue the grant of your patents directly before "national phase".

WIPO
WORLD
INTELLECTUAL PROPERTY
ORGANIZATION

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

IP strategies

Reasons for patenting your technologies

1. Avoid copies or **imitations**
2. Get exclusive **rights** for the exploitation of your innovation: commercialise the rights and licenses during 20 years
3. Avoid or limit the commercial using, selling, redistributing of your solutions by **third parties** (in the countries where the patent is granted)
4. Increase the **intellectual capital** of the company or organization
5. Facilitate **internationalisation** of technology
6. Enable **technology transferring** and opportunities for **exploitation**
7. Promote a culture of **innovation** in the organization
8. Provide **competitive advantages** to the organization
9. Better position to apply for **financing**
10. Access to **new technologies** and **markets** through **cross-licensing**
11. Provide **legal mechanisms** to defend your innovation against claims and potential intruders
12. Improve the **corporative image** of the organization

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

IP strategies

Alternative options to patenting

PUBLISH THE INFORMATION

- It is cheap
- Prevent others to patent the same technology

BUT…
- It does not provide exclusivity
- Information is revealed to competitors

TRADE (INDUSTRIAL) SECRET

- It is cheap (just the cost of maintaining confidentiality)
- The invention is not revealed

BUT…
- Risks of reverse engineering or imitation
- It is difficult to maintain/renovate the agreement
- Secrets often are revealed

DO NOTHING !

- Very cheap and easy

BUT…
- No exclusivity
- Competitors will manage to discover the technology details

Human Brain Project

Co-funded by the European Union

Human Brain Project

Software protection

How are software rights protected?

- Non disclosure agreement (NDA)
- Contractual clauses
- Registering in public notary
- Licensing, including the use of non-profit bodies that provide protection services, e.g. creative-commons

BUT:

Software may be patentable if it produces a "technical effect" (novelty, non-obvious and industrial application also apply)

In USA, a software invention may be patentable if it produce a "tangible and useful effect".

The authorship of a software is automatically recognized as a copyright (Berne Convention)

Co-funded by the European Union

Human Brain Project

Software protection

What is a software license?

- License is generally just a permission to use a software
- It does not result in change in ownership (developer or publisher)
- It is implemented through a legal contract, i.e., subject to terms and conditions
- The terms of a software license have to be accepted before the software can be used

What should include a software license?

- Terms & conditions – how the software can be used or restricting certain actions
- Obligations – no copying unless permitted by the terms and conditions
- Terms of warranty and indemnification against any damage caused to data owing to use of software
- Liability of each party
- User's rights in cases of specific situations or circumstances
- Geographic restrictions

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Software protection

Type of software based on utilisation restrictions

- PUBLIC DOMAIN
- NON-PUBLIC DOMAIN (COPYRIGHT)
  - PROPRIETARY SOFTWARE
  - FREE SOFTWARE (FS)
  - FREE AND OPEN-SOURCE SOFTWARE (FOSS)
  - OPEN-SOURCE SOFTWARE (OSS)
    - PERMISSIVE
    - COPYLEFT (VIRAL SOFTWARE)
- HYBRIDS

Co-funded by
the European Union

Human Brain Project

Software protection

Public domain software

- To be placed in the public domain, the author have to disclaim the copyright and other rights on it
- Software in the public domain thus can be modified, distributed, or sold, even without any attribution by anyone

Co-funded by
the European Union

Human Brain Project

Software protection

Propietary software

- Licensed by the holder only under very specific conditions
- Modifications and redistribution of software are not allowed
- Only the use of software is permitted
- The source code is not provided
- May be free (freeware) or require a fee
- Shareware is used for trial and evaluation, and requires upgrading to use some advanced features

Co-funded by
the European Union

Human Brain Project

Software protection

Free software and open-source

- **Free software (FS)** is a software that users can safely run, adapt, and redistribute without legal restraint.
- **Open source software (OSS)** is a software with source code that is publically available under a license that gives users the right to study, change, and distribute that software.
- **Free and Open source (FOSS)** allows to use, copy, study, modify the software, and the source code to be openly shared so that people are encouraged to voluntarily improve the design of the software

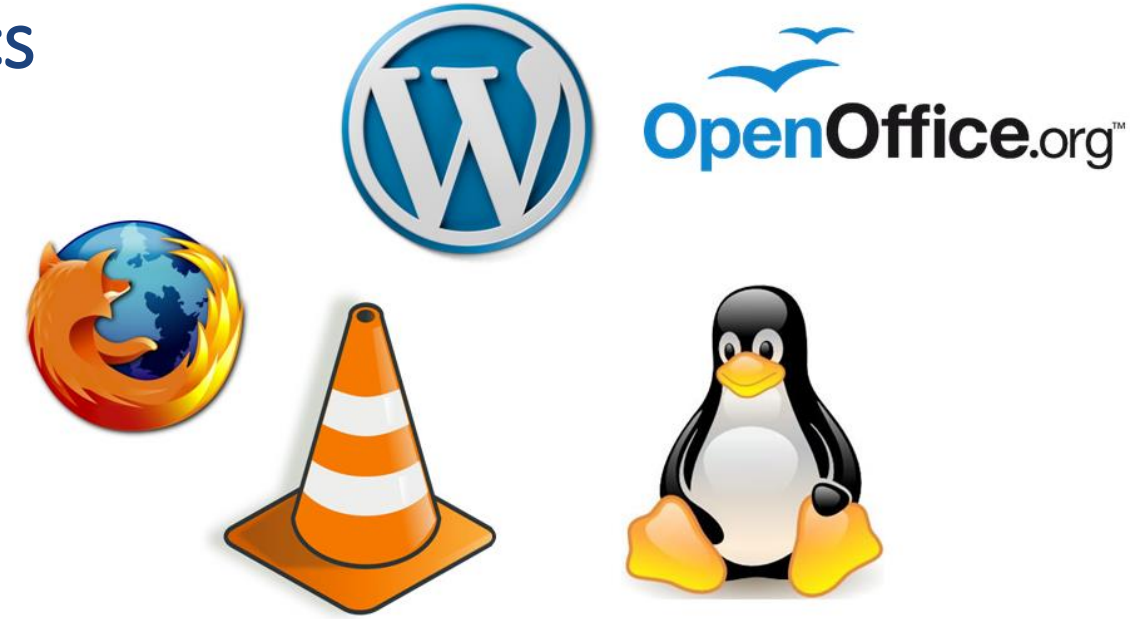
Co-funded by the European Union

Human Brain Project

Software protection

Open-source software: characteristics

- Free redistribution
- Source code availability
- It enables wider and more effective inspection and detection of errors (multiple 'eyes')
- Facilitates software improvement and personalization
- Modified and derived works are allowed (sometimes requiring the same terms as the original license)
- Integrity of the Author´s source code (allowing patch files)
- No discriminations against persons or groups
- No discrimination against fields of endeavour
- Distribution of license: rights attached apply to all to whom the program is redistributed, with no additional licenses required
- License must not restrict other software
- License must be technologically neutral



Co-funded by the European Union

Human Brain Project

Software protection

Open-source software: permissive and copyleft modalities

PERMISSIVE OSS

- Provides a royalty free license to do virtually anything with the source code: using, copying, modifying, merging, publishing, distributing, sublicensing, and/or selling
- Provides **very basic requirements for distribution** of the source code
- Often specifies that there are **no warranties**
- More open for **commercial** use
- Examples include: Apache, BSD, MIT, W3C, etc.

COPYLEFT (VIRAL) OSS

- More restrictive conditions for distribution
- **Source code and binaries** are available
- Some copyleft licenses may require that **modifications** are **indicated**
- **Modifications** have to be **also covered by copyleft modality** (thus avoiding potential sublicensing restrictions risks inherent to the permissive mode)
- Example include – General Public License (GPL), Lesser General Public License (LGPL), Mozilla Public License (MPL), etc.

PROGRAM DAY 1

- Introduction
  - What is innovation?
  - Innovation taxonomies
  - Open and closed innovation
- Exploitation in the context of H2020 and Horizon Europe
  - Evolution from Horizon 2020 to Horizon Europe
  - The European Innovation Council
- IMTs used in HBP and the EBRAINS context

PROGRAM DAY 2

- Business intelligence
  - Technology and market watch
  - Risk assessment
  - Foresight and technology roadmapping
- IP strategies
  - Licensing strategies
  - **Co-ownership and co-exploitation**
- Quick overviews of IMT figures in HBP

Co-funded by
the European Union

Human Brain Project

Ownership

A. Results are the property of the **HBP partner generating it**.

B. If a **third party** has a claim to results (e.g. personnel of an HBP partner can claim ownership on a result because of national law) the HBP partner has to make sure its own rights and obligations are not affected by those third party rights.

C. Results are owned either solely by one HBP partner or jointly by **two or more HBP partners**. Two or more HBP partners own results jointly if : (a) they have jointly generated them and (b) it is not possible to (i) establish the respective contribution of each partner, or (ii) separate them for the purpose of applying for, obtaining or maintaining their protection.

D. Other **partners from within the HBP consortium not having participated** to the development of the HBP result can ask for a right of use (Access Rights) on such results when those are needed either (i) to implement the HBP workplan or (ii) to exploit their own results. The HBP partner owning a result may impose conditions for such use but in principle, they cannot refuse granting a right of use if the other requesting partner can demonstrate the need to use the results.

Extracted from the Framework Partnership Agreement Consortium Agreement (FPA-CA)

POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Ownership

E. If **background IP of an HBP partner is also needed** for either (i) implementing the HBP workplan or for (ii) exploiting another partner's own results, the HBP owning partner needs to grant a right of use of such background (provided that background has been listed as included background in the HBP Consortium Agreement). The HBP owning partner can also impose conditions on the use.

F. The HBP results developed by one or more partners can be commercially exploited by those partners on conditions which they set themselves as a group and with the exception that **they cannot sell exclusive licenses** as the HBP Consortium Agreement provides that all partners have a right to use the results.

G. The fact that an HBP result uses **background data or software from a third party** may impose a specific license on the HBP result.

Extracted from the Framework Partnership Agreement Consortium Agreement (FPA-CA)

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

Questions

POLITÉCNICA

CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by
the European Union

Human Brain Project

PROGRAM DAY 1

- Introduction
  - What is innovation?
  - Innovation taxonomies
  - Open and closed innovation
- General view of Innovation Management Tools (IMT) used in R&I projects
- Exploitation in the context of H2020 and Horizon Europe
  - Evolution from Horizon 2020 to Horizon Europe
  - The European Innovation Council
- IMTs used in HBP and the EBRAINS context

PROGRAM DAY 2

- Business intelligence
  - Technology and market watch
  - Risk assessment
  - Foresight and technology roadmapping
- IP strategies
  - Licensing strategies
  - Co-ownership and co-exploitation

- Quick overviews of IMT figures in HBP

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL

Co-funded by the European Union

Human Brain Project

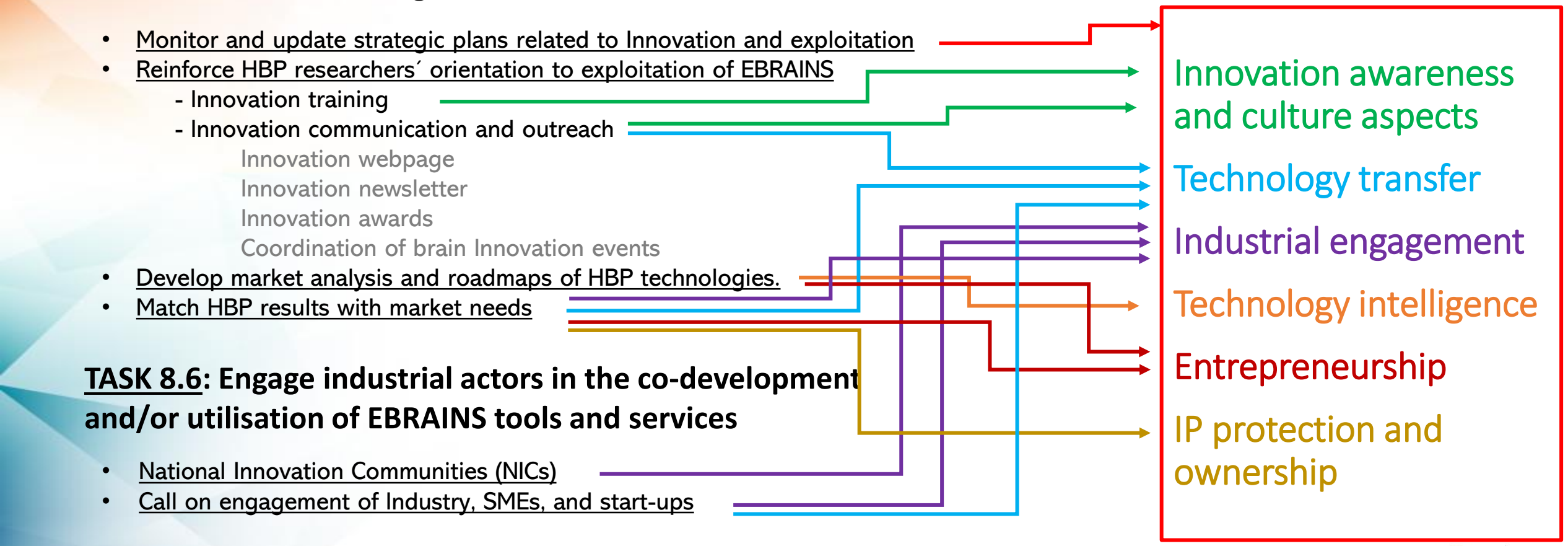
A quick overview (reminder) of our tasks and IMTs

TASK 8.5: Facilitate technology transfer processes and accelerate the exploitation of HBP services and tools through EBRAINS

- Monitor and update strategic plans related to Innovation and exploitation
- Reinforce HBP researchers´ orientation to exploitation of EBRAINS
  - Innovation training
  - Innovation communication and outreach
    - Innovation webpage
    - Innovation newsletter
    - Innovation awards
    - Coordination of brain Innovation events
- Develop market analysis and roadmaps of HBP technologies.
- Match HBP results with market needs

TASK 8.6: Engage industrial actors in the co-development and/or utilisation of EBRAINS tools and services

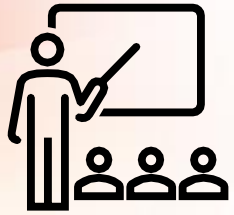
- National Innovation Communities (NICs)
- Call on engagement of Industry, SMEs, and start-ups

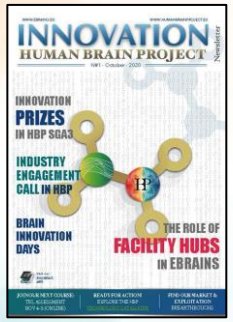


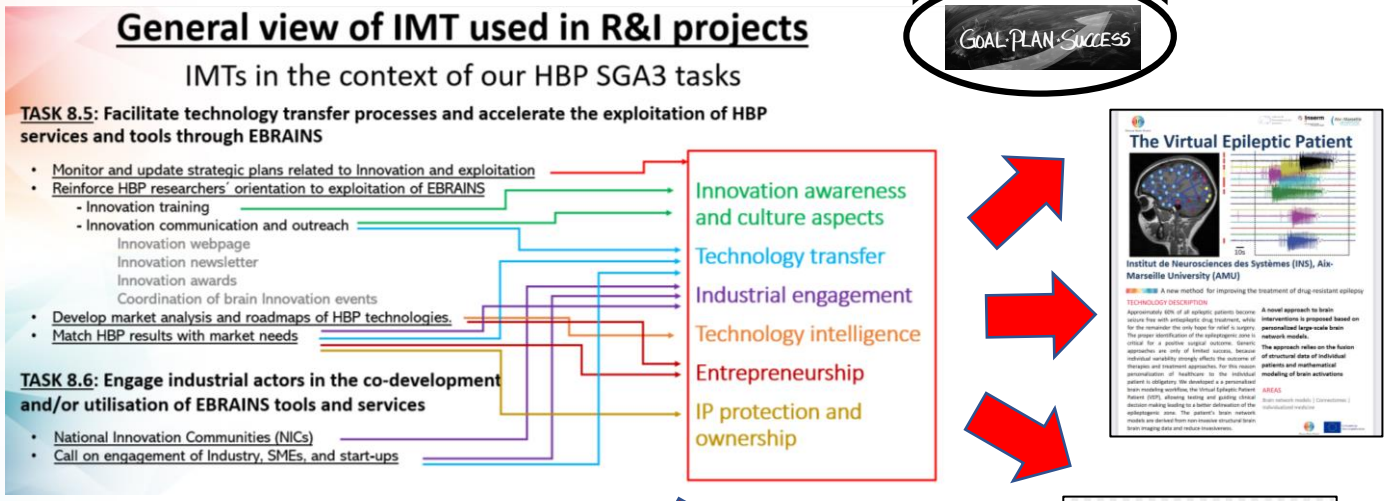
POLITÉCNICA
CAMPUS DE EXCELENCIA INTERNACIONAL

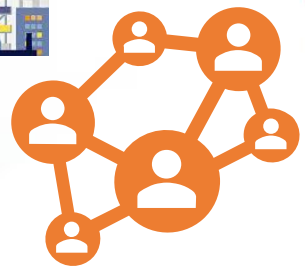
Co-funded by the European Union
Human Brain Project

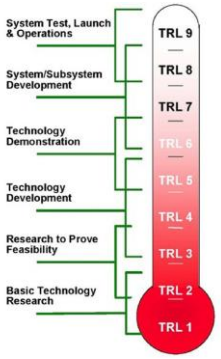
A quick overview of IMT related figures









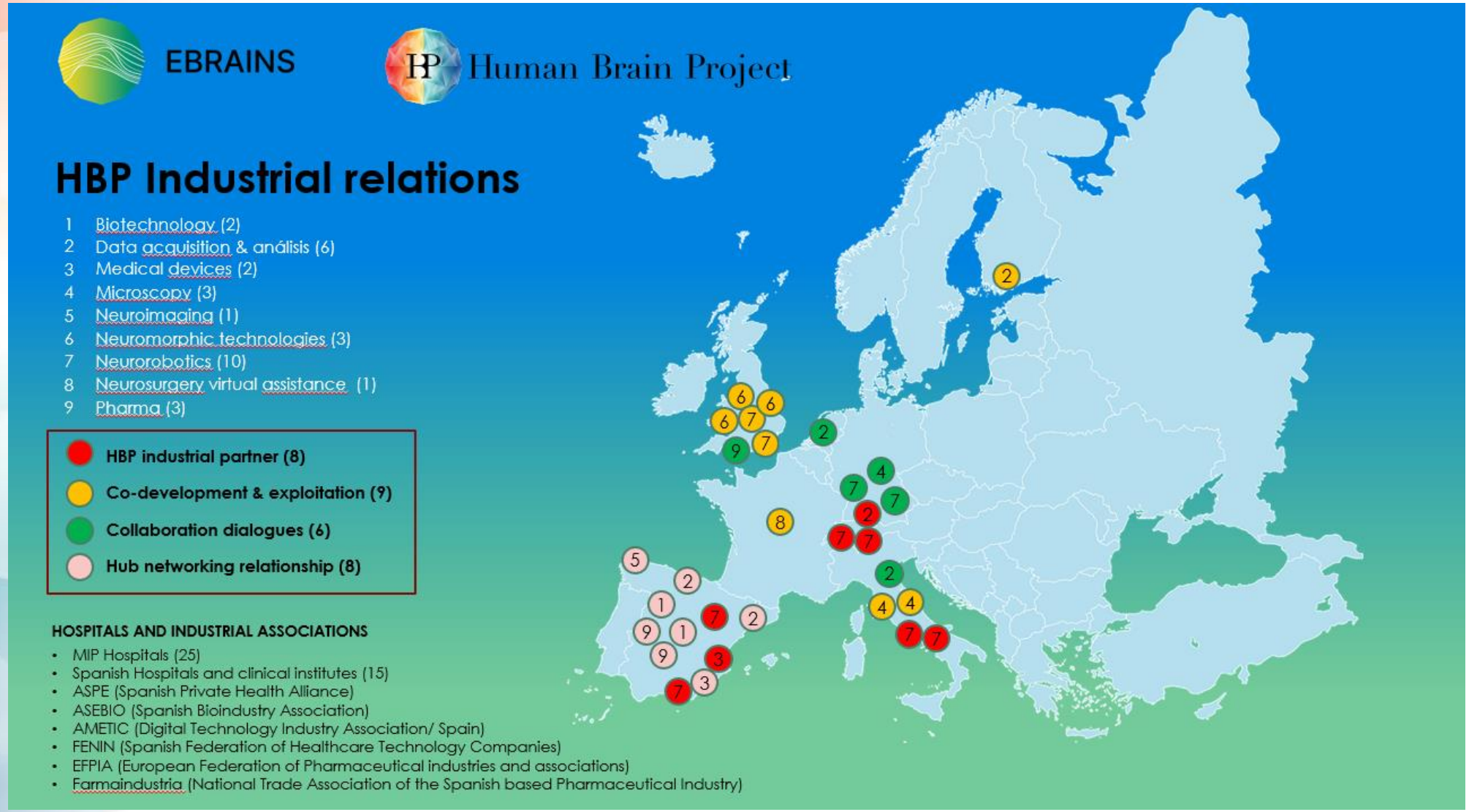


- 20-23 Exploitation plans ✓
- 29 Technology sheets ✓
- 7 Market analyses ✓
- 21-24 TRL assessments ✓
- 1 Solution workshop ✓
- 1 National Innovation Communities ✓
- 4 Industry partners (call) ✓
- 1 Innovation awards ✓
- 3 Newsletter ✓
- 4 Training courses ✓

Co-funded by
the European Union

Human Brain Project

A quick overview of industrial dialogues: towards the exploitation of HBP tools



A quick overview of exploitation plans received up to now

WP1 The Virtual Mouse Brain
WP1 Personalized in-silico Brain Networks
WP2 Neuromorphic-based neuroprosthesis (The Stroke Interface)
WP2 Clinical trials studying the effects of tPCS, tDCS and apomorphine on patients with disorders of consciousness
WP2 Perturbational Complexity Index algorithm
WP2 SWAP: Analysis pipeline, applicable to experimental data and simulations, for the study of Slow Waves, Brain States, Transitions and Complexity
WP4 KnowledgeSpace
WP4 MIP
WP4 HIP
WP4 QuickNII and VisuAlign
WP4 Nutil
WP4 QUINT
WP5 Neurorobotics Platform
WP5 Elephant
WP5 NEST and NEST Desktop
WP6 BrainScaleS-2 single chip system
WP6 SpiNNaker
WP6 Slurm plugin for co-scheduling of compute and storage resources
WP9 Globalsay

A quick overview of our timeline

	2020				2021											
	SEP	OCT	NOV	DIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21
Training courses (tentative)			TRL course Software lic. course	Exploitation plans course				Innovation management course			TRL course Exploitation plans course		Research & Innovation funding course		Technology watch, foresight course	
Market analysis (tentative)	NMC		VEP					NMC (SNN)		MIP Brain start-ups mapping	Brain Atlas NEST HBP tools for pharma			tbd	tbd	
TRL assessment				Continuous assessment of maturity: TRL checklist fulfilled						Continuous assessment of maturity: TRL checklist fulfilled						
Exploitation plans							Exploitation plans completed						Exploitation plans completed (UPDATED)			

Co-funded by
the European Union

Human Brain Project

Thanks

Questions ?

Contact email:
gonzalo.leon@upm.es
guillermo.velasco@upm.es

Gonzalo León & Guillermo Velasco
Innovation & Technology Transfer Node
Human Brain Project
Universidad Politécnica de Madrid

POLITÉCNICA
CAMPUS
DE EXCELENCIA
INTERNACIONAL