



EUROPEAN
COMMISSION

Community research

Realising the New Renaissance. Policy proposals for developing a world- class research and innovation space in Europe 2030

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Chair of ERAB

PHEE ANNUAL CONFERENCE 2011



BACKGROUND

- Initiated by Commissioner, nominated by EC (similar to ERC ScC procedure), fully operational 1st Q, 2008 (mandate ends 2-2012)
- Requested to think:
 - out of the box, long term, not process
 - on demand and own initiative:
 - *The contribution of FP7 instruments to the establishment of a genuine European Research Area (February, 2009);*
 - *Networks of Excellence (December, 2009);*
 - *What ambition and policy design for the Research and Innovation Plan? A conceptual contribution from ERAB, integrating its view on the future of Research and ERA with the Innovation agenda (March, 2010);*
 - *The role of Venture Capital for the R&I strategy (April, 2010);*
 - *The role of public procurement for the R&I strategy (April, 2010);*
 - *The communication 'Simplifying the implementation of the Research Framework Programmes' COM (2010) 187 (May, 2010);*
 - *Achieving Cohesion in European Research and Innovation. Excellence and Cohesion: Two sides of the same policy coin (July 2010).*
 - *Supporting High Risk – High Gain Research and Innovation. (December 2010)*



ERAB's key Question:

What should ERA look like in 2030 and how will it be achieved?

3 fundamental drivers:

- Globalisation of the world and of the world of science (European researchers feel acute global pressure)
- Virtualisation (more than e-science, → mode 2)
- Grand challenges

→ European research (policy) system as it is not seen as appropriate to make the changes needed.



New Renaissance

- In order to cope with the challenges ahead we need a ‘New Renaissance’. – A new way of thinking about research
- The ‘New Renaissance’, is a paradigm shift in how we think, live and interact, as well as a paradigm shift regarding the role and place of science in society.
- The ‘New Renaissance’ calls for our *rationality* and *creativity* - the fundamentals of science - to face the challenges and to help “*inventing*” a new way of living.
- The ‘New Renaissance’ needs a thriving and open ERA by 2030.



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ERA 2030: ERAB's STRATEGIC VIEW

October 2009

http://ec.europa.eu/research/erab/publications_en.html



6 strategic approaches for ERA

1. A united ERA across Europe
 2. An ERA driven by societal needs to address the 'Grand Challenges'
 3. An ERA based on a shared responsibility between science, policy and society
 4. An ERA of open innovation between all public and private stakeholders
 5. An ERA to deliver excellence
 6. An ERA of cohesion across the continent
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The ERA is necessary

Action required by 2030 on 6 fundamental themes

The European Research Area comprises many people and institutions – but unless they work together, in a borderless marketplace for talents and ideas, they will be ineffectual.

We are concerned by the fractured state of the ERA today: still too much driven by inward-looking national priorities, too much centralism and sub-optimal institutional and legal frameworks. In view of the challenges our planet and Europe face, we must act, and act now. Otherwise, Europe will not only become marginalized in a global market, but will fail to contribute to solving our greatest challenges. As a result, bold leadership along six policy themes is needed to achieve a fully functioning ERA by 2030:

1. A united ERA to permit ideas and people to move freely across a dynamic and open society.
2. An ERA driven by societal needs to address the 'Grand Challenges', such as climate change, energy supply, water resources, ageing societies, healthcare and sustainable prosperity for all.
3. An ERA based on a shared responsibility between science, policy and society, where public policy is based on evidence and underpinned by a 'new social contract' between science and society that emphasizes responsibility for action as well as freedom of thought.
4. An ERA of open innovation between all public and private stakeholders so as to strengthen our research base and our economy.
5. An ERA to deliver excellence where risk-taking in research, regardless of its public or private origin, will be the guiding principle for the ERA policy.
6. An ERA of cohesion across the continent to allow all European research actors to take part in the knowledge-based society.



A united ERA to permit ideas and people to move freely across a dynamic, open society

The ERA Milestones

We will know the ERA is a united market for research in 2030 when we see:

- The EU's share of ERA-wide public, non-military research funding doubles to 10%.
- A significant increase in the coordination of scientific research grant programmes across the ERA, to at least 10% of funding from a very low base today.
- Mobility triples, with up to 20% of EU doctoral candidates working outside their home country.
- The fiscal regime for R&D and innovation incentives is optimized across the EU.



An ERA driven by societal needs to address the 'Grand Challenges'

The ERA Milestones

We will know the ERA is driven by societal problems in 2030 when we see:

- A third of public, non-military research is geared to grand societal challenges, with a multi-disciplinary approach.
- 30% of all scientists, including humanities and social sciences, are trained in research fields relevant to the Grand Challenges.
- Multi-disciplinary academic training is generalized to educate our research community into the complexity of the Grand Challenges, without diminishing the importance of discipline-based expertise.
- The tools of 'e-science' are deployed throughout the ERA, permitting international collaboration so that all researchers will see themselves as part of the global research system.



An ERA with shared responsibilities for science, policy and society

The ERA Milestones

We will know the ERA is a shared responsibility in 2030 when we see:

- The EU has a fully functioning, independent Chief Scientific Advisor, supporting its decision-making with the best available evidence, horizon-scanning and future scenario planning.
- A more educated citizenry is trained in science and technology issues to be able to participate in policy debate.
- All outputs of public, non-military funded research will be available via 'open access' to all concerned and interested.
- Half of all scientists and research policy makers, across all disciplines and at all levels of the science system, are women.
- The EU spends up to three times as much as in 2005 on its higher education, or 3.3 % of GDP.
- A universal code of scientific ethics is adopted by the whole European research community, enunciating social responsibilities as well as intellectual freedoms.



An ERA of open innovation between all public and private stakeholders

The ERA Milestones

We will know the ERA is a common market and thriving place for open innovation in 2030 when we see:

- A pan-European 'Open Innovation' charter is signed by all major stakeholders.
- A pan-European label, 'Open Knowledge Institution', for higher education and research acts as a gold standard for excellence in innovation in the ERA.
- Overall R&D funding rises to 5% of GDP, of which industrial R&D accounts for 2/3.
- 2% of public procurement ERA-wide is earmarked for innovative and pre-commercial technologies, and is open to European-wide competition.
- Mobility of researchers between the public and private sector is high, and industrial funding of academic research accounts for 1/3 of the overall research budget.
- Risk capital available for early-stage technology development triples, to 0.15% of GDP.



An ERA of excellence where risk-taking will be the guiding principle for ERA research policies.

ERA Milestones

We will know the ERA is a place of excellence in 2030 when we see:

- 50% of EC research funding is going to frontier, high-risk research and development.
- Europe increases its share of top-ranked universities up to 40% of the top-20 and top-100 rankings and increases its most-cited research world wide by a third.
- Funding for public, non-military research is increasingly concentrated in research-intensive institutions.
- At least 50 of our innovation clusters, out of about 2,000 clusters large and small today, are world leaders in scale and quality.
- The governance system for European research funding will be based on a set of arms-length agencies, as part of an 'ERA of Agencies'.



An ERA of cohesion across the continent

The ERA Milestones

We will know the ERA is cohesive in 2030 when we see:

- The share of the EU budget devoted to research triples to 12%
- At least 30% of the structural funds are used exclusively for research and technology development (including fostering partnerships, supporting pre-commercial procurement and investing in large-scale research infrastructures where needed) – double the current allocation.
- More than 75% of the overall EU budget is oriented towards investing in its future as a knowledge-based society.
- The major research institutions of the well-developed regions of Europe work in partnerships, based on excellence, with those of the lesser-developed regions.
- Half of the adult population has achieved tertiary education – double today's rate.

77 recommended actions to realise 27 milestones

ERAB Vision: goals by 2030	Recommended Actions	Impact by 2030
<p>1. The EC's share of ERA-wide public, non-military research funding doubles to 10%.</p>	<p>1.1 The current funding for thematic research programmes is maintained to at least the present levels (Cooperation programme).</p>	<p>The innovation gap with the US and other innovation leaders is reduced to zero and Europe acts as a role model in research and innovation with respect to addressing the "Grand Challenges", such as climate change, energy supply and ageing societies. Europe increases its share of top-ranked universities (see theme IV) and becomes more attractive for private investment on research.</p>
	<p>1.2 The overall research budget is increased by adding a tenth of a percentage point to VAT, for the benefit of research into grand challenges.</p>	
	<p>1.3 30% of the Structural Funds are used for research, development and innovation (RDI), 10% of the Common Agricultural Programme budget goes specifically to agricultural research dedicated to agri-based issues in food, health and energy.</p>	

This was the basis for big stakeholders' conference in May 2010 (under the Spanish EU Presidency), where MGQ challenged ERAB to come up with the top 10 integrated recommendations for action (finalised in 9-2009 and to be made public 20-10-2010 as ERAB's 2nd annual report).



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ERAB 2nd report – October 2010

SHORT-TERM (immediate action)

- 1 Create a single **EU-wide patent** and an **Open Innovation Charter**
- 2 Agree on a fast track timeline for a **full and widespread implementation of pre-commercial procurement** of Research and Development (R&D).
- 3 **Concentrate Research & Innovation (R&I) funding** around a selection of themes relevant for "Europe 2020"
- 4 Create an annual "**City/region of Innovation in Europe**"
- 5 Make an **EU Framework Directive on Research & Innovation** focusing on creating a single market for RDI.

MID-TERM (3-5 years)

- 6 **Fully implement pre-commercial procurement** of Research and Development (R&D) around a few commonly agreed big projects
- 7 **Concentrated and streamline** all R&D funding in the Eight Framework Programme (FP8) by minimising management obligations for all funding schemes and by earmarking 30% of the Structural Funds and 10% of the Common Agricultural Policy (CAP) for RDI projects
- 8 **Foster an acceptable degree of risk taking and excellence** throughout **all** RDI programmes
- 9 Create a **European Venture Capital fund** capable of investing in early stage "proof of concept" and business development prior to commercial investment

LONG-TERM (5+ years)

- 10 Make **result and risk-oriented funding** of research and innovation projects the dominant criterion for R&I funding of the EC

TIME TO GO GLOBAL

Europe takes the lead to address the Global Challenges: « A DAVOS for RDI »

3. Concentrate RDI funding around a selection of themes relevant for "Europe 2020: A strategy for smart, sustainable and inclusive growth".

▶ ERAB recommends that a focused, fast and efficient implementation of a limited number of high impact research programmes is pursued.

4. Create an annual "City/Region of Innovation in Europe".

▶ ERAB recommends that, analogous to the European Capital of Culture, the European Union should award the title of the European Capital/Region of Research, Development and Innovation in open competition.

5. Issue an EU Framework Directive on Research & Innovation focusing particularly on creating a single market for Research Development and Innovation.

▶ ERAB recommends that the EC sets out its big ambitions in a Framework Directive. This directive should allow action to:

- Harmonise and strengthen public and pre-commercial procurement schemes;
- Create a European Research Certificate/Passport to enhance mobility of researchers;
- Support pan-European Graduate/Research Schools focused on Grand Challenges, including the possibility of developing a high level European/International PhD;
- Foster flexible cross border research funding;
- Establish a European Peer review College for projects addressing Grand Challenges.



Implications for Research Training

- Retain in depth Ph.D. Yet increase integration with other disciplines to tackle Grand Challenges
- European Graduate Schools and Summer Schools
- Increase mobility and the possibility of a European Ph.D.
- Train researchers in the full impact of e-science and e-infrastructures
- The role of the data scientist and training in data management (likely to be mandatory in the future).
- Adding richness to publications
- Living in “Grid,” “Cloud,” “Social Networking Space”



RIDING THE WAVE

HOW EUROPE CAN GAIN FROM THE RISING TIDE OF SCIENTIFIC DATA A VISION FOR 2030

**Final Report of the High Level Group on Scientific Data,
October 2010**



eResearch: data everywhere

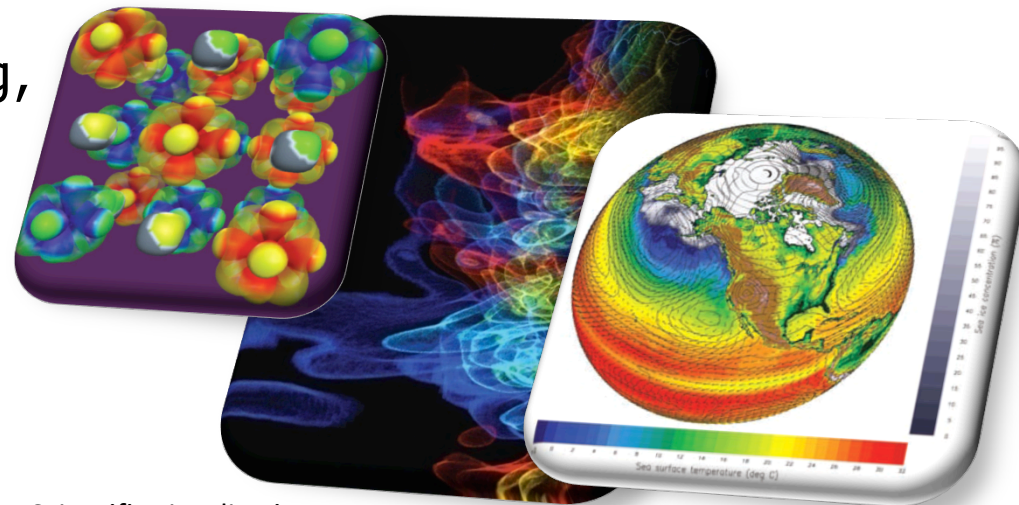
- **Data collection**
 - Sensor networks, global databases, local databases, desktop computer, laboratory instruments, observation devices, etc.
- **Data processing, analysis, visualization**
 - Legacy codes, workflows, data mining, indexing, searching, graphics, screens, etc.
- **Archiving**
 - Digital repositories, libraries, preservation, etc.



SensorMap

Functionality: Map navigation

Data: sensor-generated temperature, video camera feed, traffic feeds, etc.

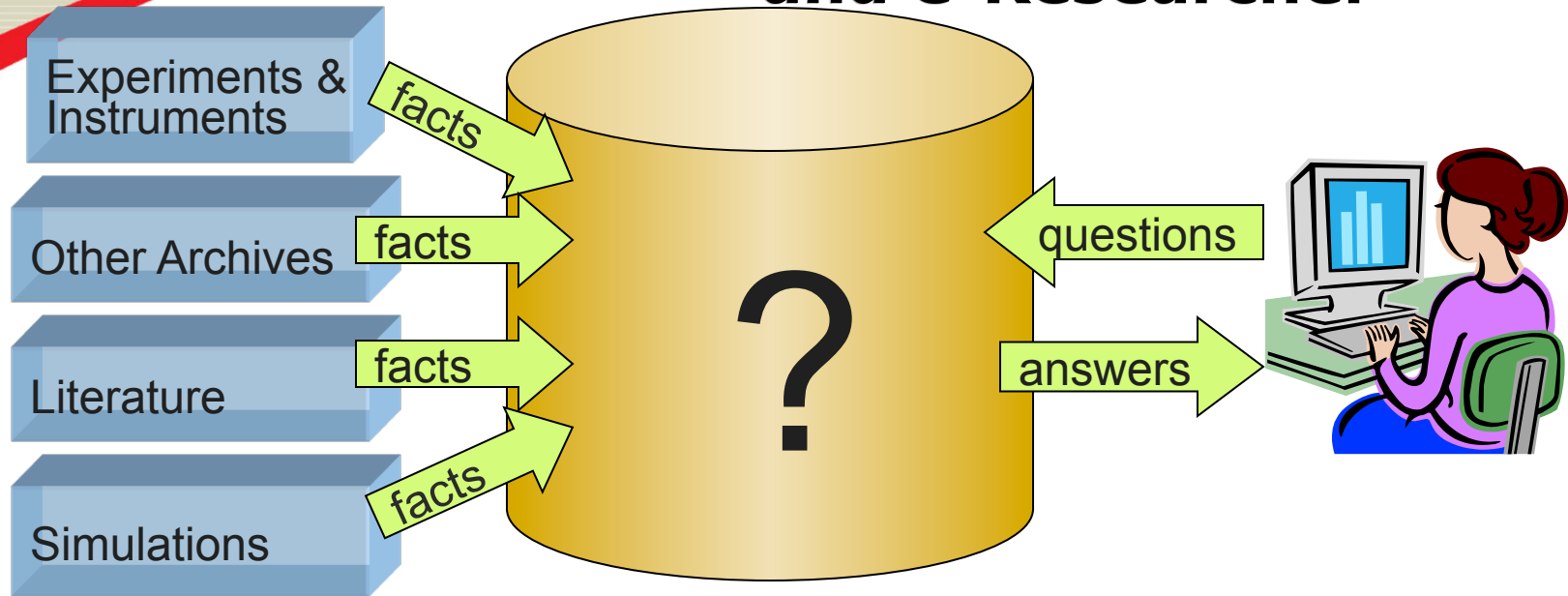


Scientific visualizations

NSF Cyberinfrastructure report, March 2007



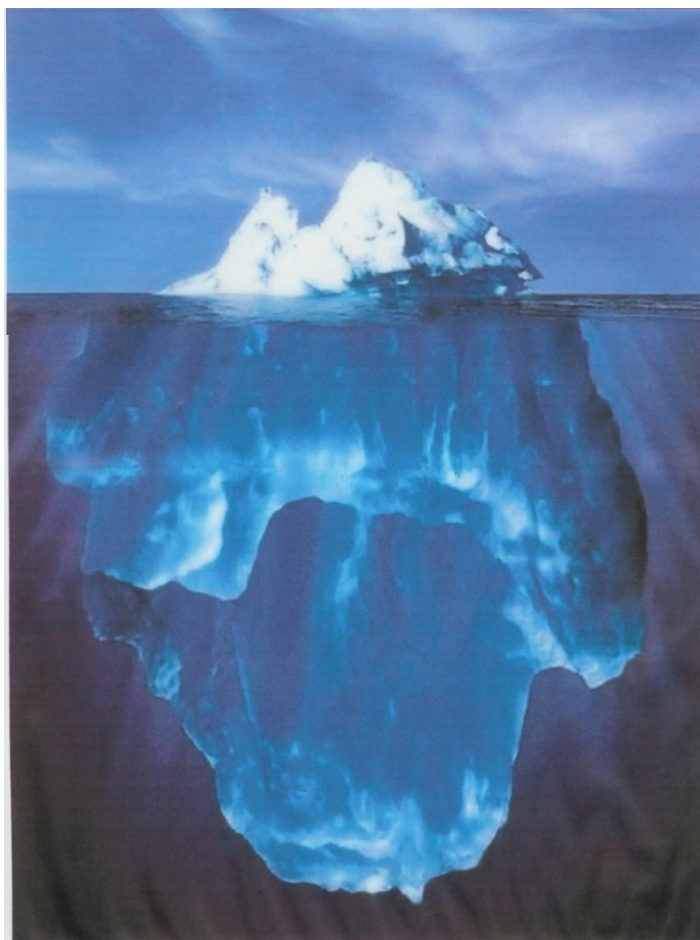
The Problem for the e-Scientist and e-Researcher



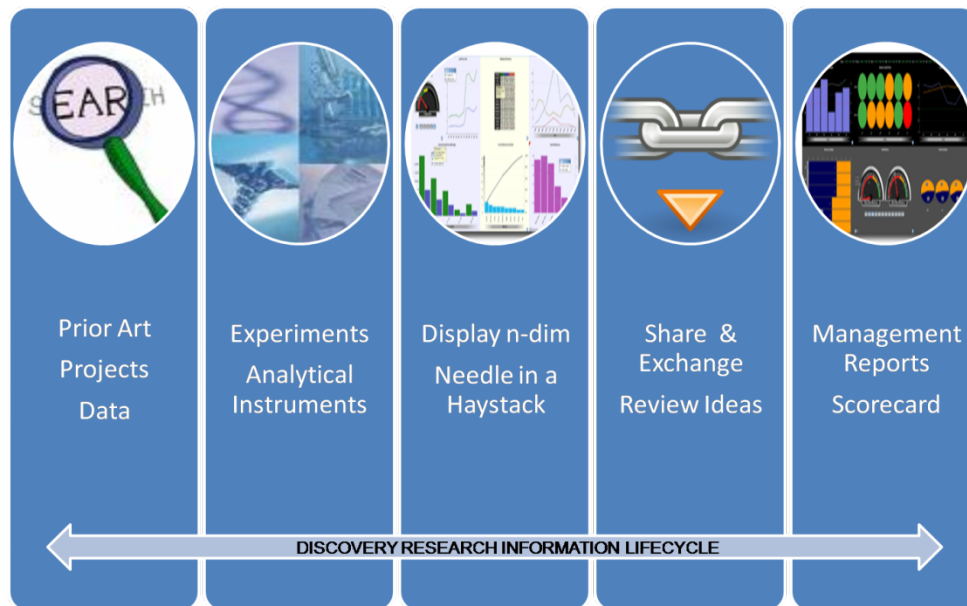
- ◆ Data ingest
- ◆ Managing petabytes+
- ◆ Common schema(s)
- ◆ How to organize?
- ◆ How to re-organize?
- ◆ How to coexist & cooperate with other scientists and researchers?
- ◆ Data query and visualization tools
- ◆ Support/training
- ◆ Performance
 - Execute queries in a minute
 - Batch (big) query scheduling

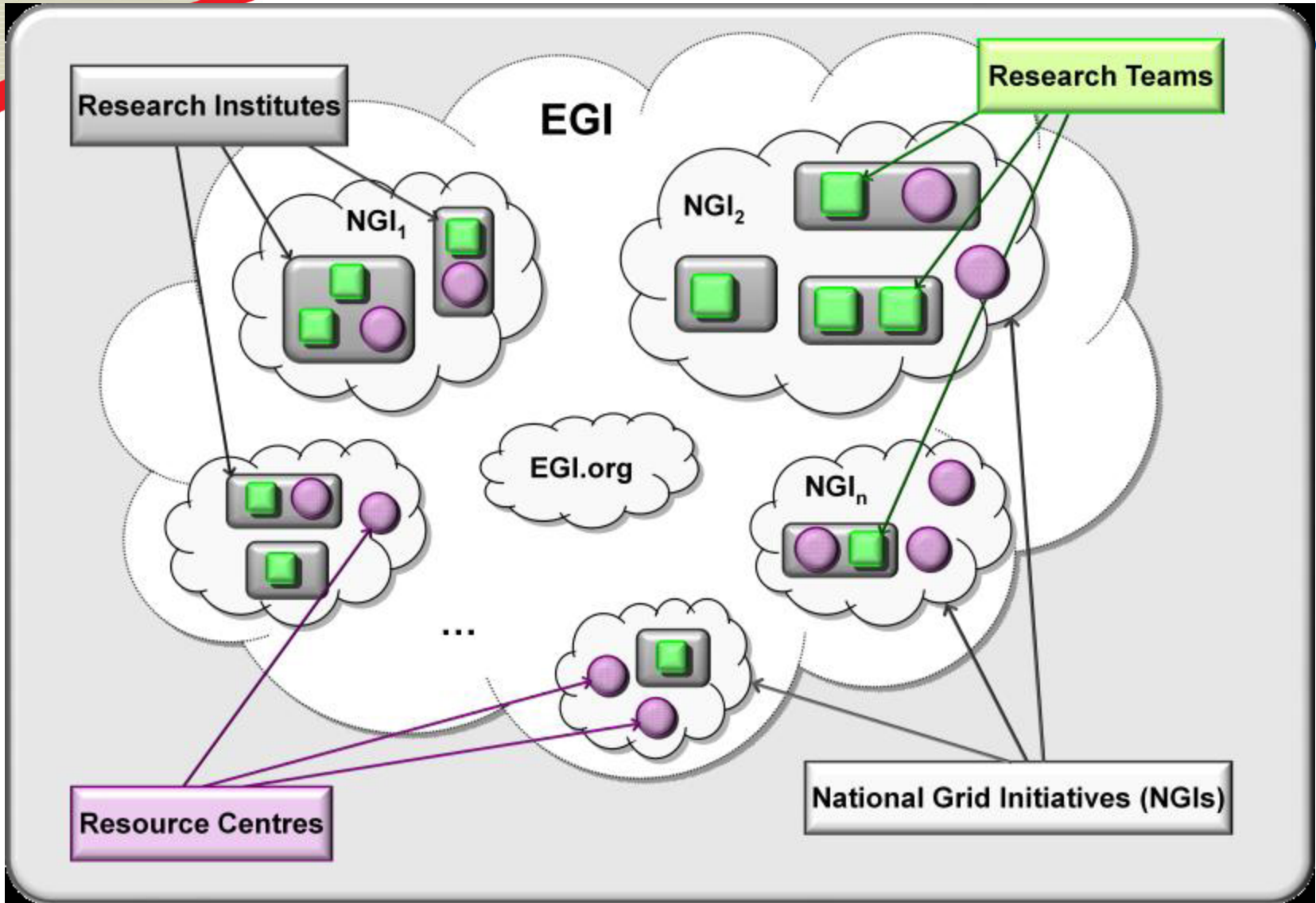


Facilitating the move from static summaries to rich information vehicles

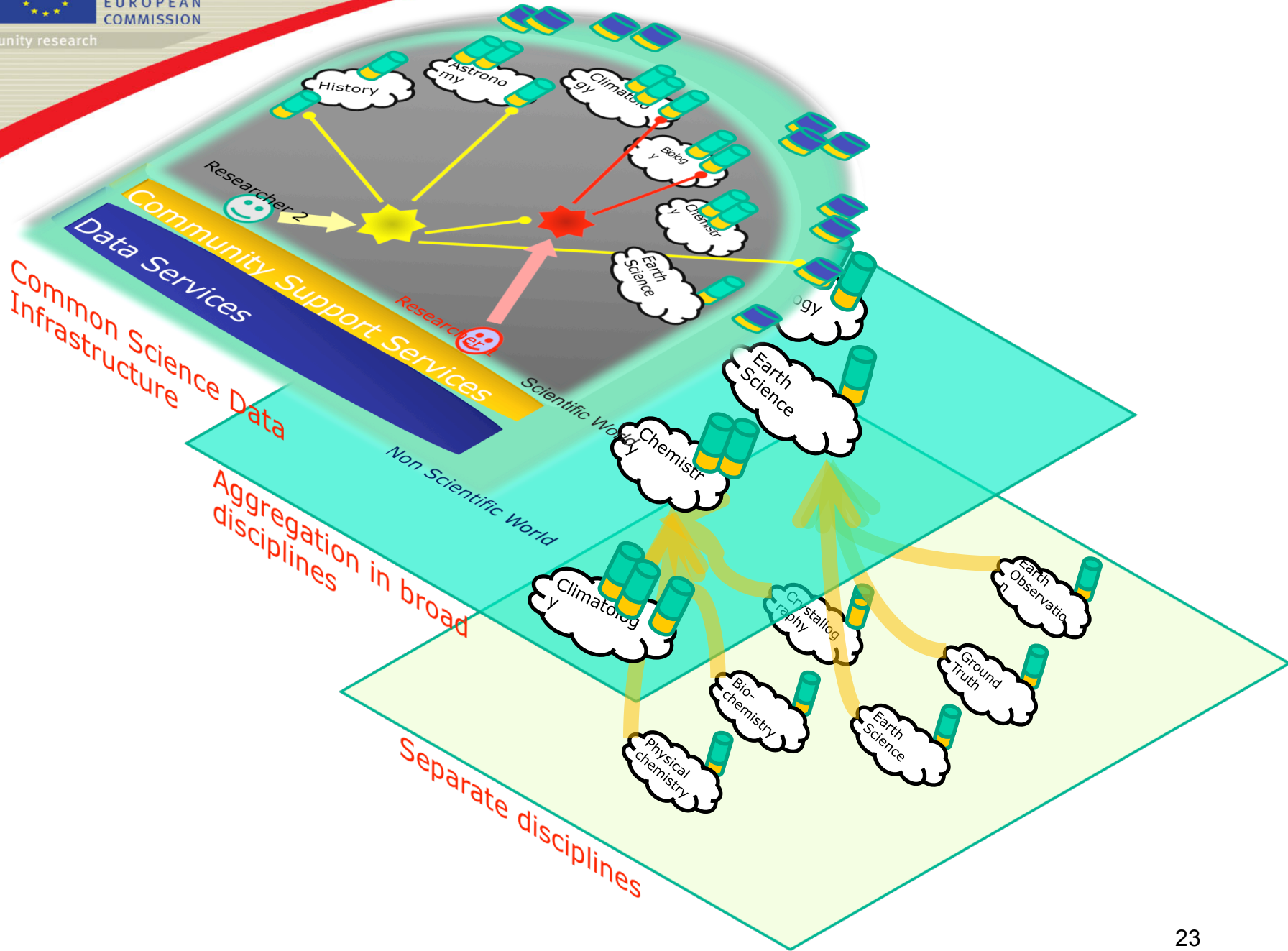


- Pace of research is picking up...rapidly
- The status quo is being challenged and researchers are demanding more
- Why can't a research report offer more ...





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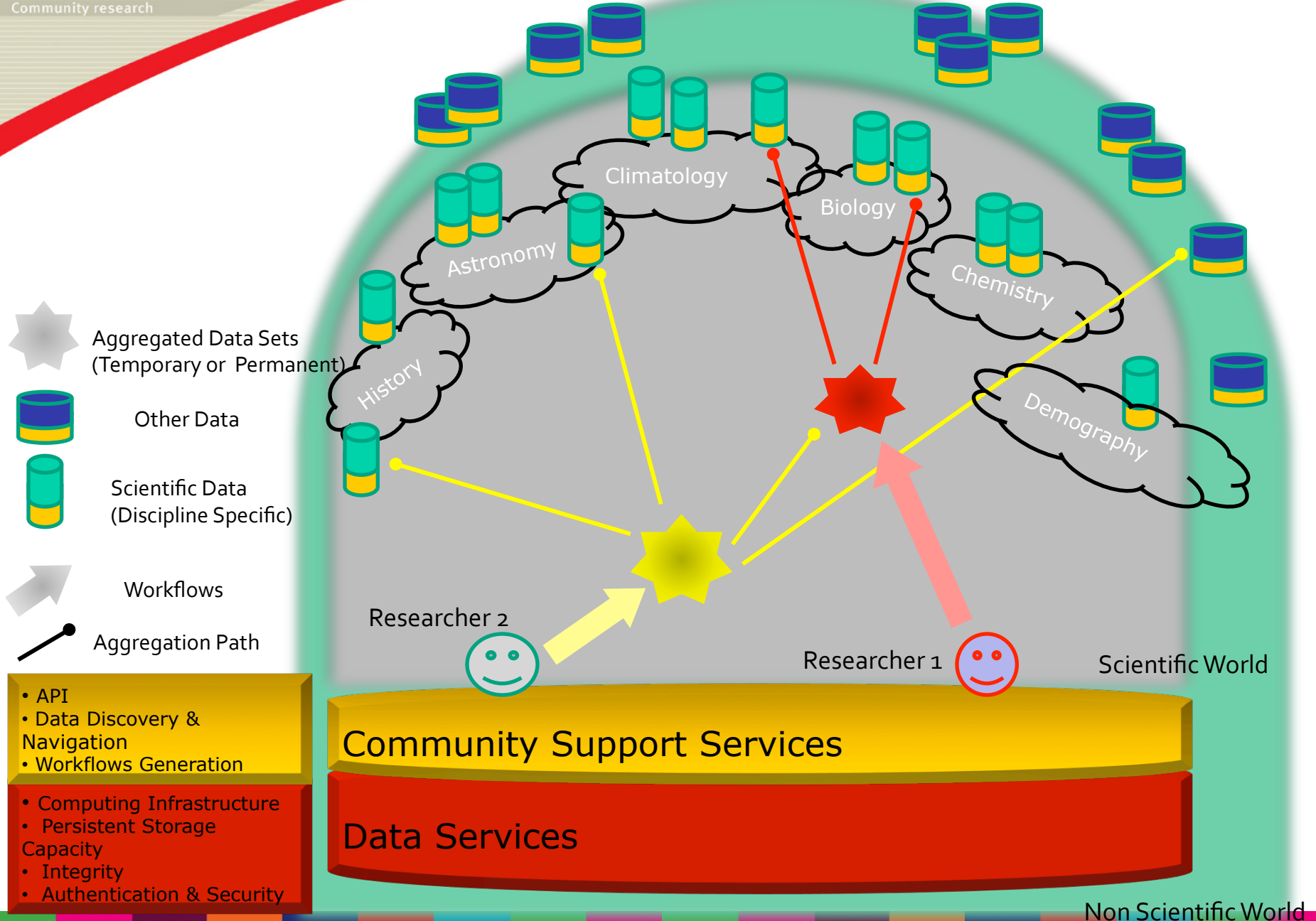




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Source: High-level Group on Scientific Data



- API
- Data Discovery & Navigation
- Workflows Generation

- Computing Infrastructure
- Persistent Storage Capacity
- Integrity
- Authentication & Security

Non Scientific World



Scenario IV: Science and the student

Roger is working on an international PhD. It's a relatively new programme, in which a student applies to become a member of an international team working on a big problem that affects all people. His group is comparing many forms of nonverbal communications between cultures. It has several hundred members and his university tutor is one of the nodal points contributing expertise in 'synergistic communication between biological components.'

Others in the network are using archaeological evidence to study communications between ancient Mesopotamian and Hellenic cultures; some are studying computer-computer interactions between different systems; yet more are studying communications in refugee camps.

Each node contributes to the whole. Results are communicated as they happen, and there are daily, virtual-presence planning sessions. Roger had to sign a contract not to misuse data or contribute anything that is not for the common good – such as externally sourced information that he has not thoroughly checked for provenance.



TIME TO GO GLOBAL

Europe takes the lead to address the Global Challenges: "A Davos for Research, Development and Innovation"

- ▶ ERAB recommends that Europe should take the lead in inviting all global stakeholders to participate on an annual basis to make top-level policies and monitor progress on common Research and Innovation (R&I) actions for tackling the Global Challenges.
- ▶ ERAB recommends that the EC starts putting together ideas on the modus operandi of such a forum that can then be discussed with high level officials from other regions.

This group should be set up immediately with a time line for the first meeting of the forum to be held within two to three years and thereafter the forum should meet on a yearly basis to start new programmes and to review progress.

FP8?

Or whatever it will be called!

- UK Consultation ended last week
- EC Consultation due to start on 7th February
- ERAB has already submitted its consultation questions to the process based on the 2nd annual report
- Budgetary Committee of European Parliament discussing revision of Financial Regulations to support high risk – high gain research
- Consolidation of consultation conclusions in mid June
- ERAB has been asked to respond to the proposals



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