Part C: Scenario workshops

Report on the first workshop

1 Introduction....3

2 Open research in Europe: Scenarios 5

Market-driven society 6

Europe of regions 10

The European puzzle 15

Europe's inclusive innovative society 20

Summary Final Session....24

Description of the scenario process 27

Workshop July & Agenda 31

Scenario development: development of the scenarios for open research in Europe ..34

Dimensions & key drivers 36

References 44

Report on the second workshop....45

Workshop September & Agenda 46

Photo documentation of the second workshop....49

Report on the first workshop

1 Introduction

The following workshop report is part of the project "Boosting the exploratory power of open research in Future and Emerging Technologies (FET)" commissioned by the European Commission.

This workshop was hosted by the Future and Emerging Technologies (FET) Open Scheme of the European Commission and took place on July 6 and 7, 2011 in Brussels. The workshop explored future perspectives for open research in Europe. It was the first of two workshops to develop options for boosting the exploratory power of open research in Europe. Open research refers to research which is of a non-thematic bottom-up nature, as opposed to research which is called for within thematic funding programmes. The workshop aimed at learning from other European and international approaches to transformative, purpose-driven research funding to suggest ways in which the European Commission may further develop and extend its open non-thematic research funding activities in the future.

The workshop addressed issues that are also part of the current debates on funding of the future Horizon 2020 Research Programme (formerly known as the Common Strategic Framework for EU research and innovation or FP8). In particular it addressed the future options for open non-thematic research in a funding environment that focuses on multiple funding objectives (e.g. principal investigator-driven, collaborative) or societal challenges and the contribution of bottom-up non-thematic funding activities to bringing research and innovation closer together.

The first workshop consisted of three main parts:

- In the morning of the first day, a World Café aimed at exploring key drivers in the context of research funding, i.e. in the macro environment and on the wider scientific and innovation landscape. The World Café format allows an informal but structured exchange of insights, ideas and perspectives.
- The afternoon of the first day was dedicated to the formulation of context scenarios that covered both these wider contextual developments and alternative future models of the funding environments in which open research will be embedded.
- The second day was dedicated to the development of scenarios for open research in Europe and the assessment of the scenarios.

Invited participants were representatives of funding agencies and research institutions as well as researchers. The workshop took place in the context of an ongoing study on "Boosting the exploratory power of open research in Future and Emerging Technologies (FET)" conducted by the Fraunhofer Institute for Systems and Innovation Research ISI, the Austrian Institute of Technology (AIT) and TNO. The outcome of the first scenario-workshop will be used as a basis for a follow-up workshop on "Scenarios for FET-Open", which will take place in September 2011 and will concentrate on the development of short- and mid-term strategies for the development of the FET-Open funding scheme itself within Horizon 2020.

This report presents the results of workshop in the form of the scenarios developed at the workshop.

Focal Issue?

The future of open research in Europe

Time horizon?

Time Horizon: 2025

- The time horizon of the scenarios "Future of open research in Europe" is the year 2025.
- The time horizon of 2025 will be used in a second workshop to explore relevant dimensions for short-term and middle-term adaptive and robust strategies for further developing the FET open funding scheme itself.

2 Open research in Europe: Scenarios



Market-driven society

Key features – the big picture

Europe has set the course for innovation and competitiveness. With its strong belief in free market, non-intervention and greater reliance on market forces, Europe has linked its policies mainly to competitiveness. The major actors collaborate to promote innovation at every level, financially and by providing good framework conditions. Although investments in research and innovations are guided by an economic rationale, this does not mean that environmental or societal problems are not being addressed. Because renewable energies, climate protection technologies or the ageing society constitute markets of their own, innovations for these markets are highly wanted.

The market-driven society is a society with fast innovation cycles and high-speed lifestyles. Some groups of the society drop out of this fast-paced lifestyle and form their own communities. But the majority of the society believes that progress and wealth comes from economic competition and technological leadership.

Key aspects of the European science and innovation landscape in 2025

- Strong focus on economic growth and innovation.
- Highly developed research infrastructures with up-to-date equipment and large-scale research facilities are centralised in strong regions.
- Market-oriented innovations prevail. This includes research on innovations in areas such as climate change, renewable energies and the ageing society. The focus of most innovation activities is on short term marketability.
- The main actors in this scenario are the big, research intensive companies. But also SMEs and small high-tech start-up companies play a role. Publicly funded research

which is mainly done in big research centres complements privately funded research.

- Publicly funded research and innovation is restricted to basic research and activities which are not directly market oriented.
- The traditional paradigm that only economic growth creates welfare is unquestioned; however, a sustainability aspect is introduced, especially with respect to energy sources and climate change issues.

Funding environment (description of the funding environment)

- The major drive for research comes from private companies. This also includes interest in and funding of basic research because of the increasingly cyclic nature of innovation processes. The linear model of innovation (from basic research to application research to marketable products) is not adequate any more.
- Results of research need to be marketable one way or the other.
- Philanthropic research funding becomes more important.
- Big companies are the main actors in research although SMEs also have a role.
- Some similarities to the current research situation in the United States, where a lack of public funding of research results in more private activities. However, the causalities are not clear. Maybe it is vice versa: Because there are vibrant research activities of private firms, the need for publicly funded research is not so big. FP7-type of research funding seems not to fit into this market driven society scenario because it is considered as an instrument to subsidise companies. It might be expected then, that FP7-program type of research funding will be decreased in the future and replaced by other research funding instruments. This might not go without severe conflicts as the budget to support industry research is very high and companies would have to change their research structures completely.
- Publicly funded research is declining because of budget restrictions of the state. As a result of the financial and state debt crises, less money is available for publicly funded research. As a consequence, there is a need to concentrate the remaining research in research centres or research hot spots. Also, there is a need for specialisation into certain fields and research types. Basic research is at the centre of publicly funded research activities because it complements application oriented research by companies.
- Privately financed or sponsored universities become new players in this scenario.
- Highly trained researchers earn more money than in the past.
- The whole research system is more competitive and becomes specialized into basic research and commercially exploitable research.

- Social sciences and humanities (SSH) will lose big in this scenario because of the explicit focus on marketable innovations. However, this is not so clear, because it might be that people in 2025 think it is necessary to keep SSH as a complement to the strong economic thinking within this scenario. As a matter of fact, in the research environment in the United States today, which is the model for this scenario, SSH has its place and has not been abolished in the last years.
- For all researchers, multiple source funding will become more important.
- Knowledge transfer is mainly done by researcher mobility from academia to industry.
- Publicly funded education will remain important as highly trained personnel are absorbed by industry research which in turn also becomes interested in basic research (see above).

Open research

- Industrial research becomes more important in this scenario. As industrial research tends to concentrate upon shorter term results, longer term and 'sideways' activities have to be carried out in publicly funded research organisations. Open research would provide an essential support to longer term success and stability.
- Open research resembles the way it is done by big companies like Google, HP, IBM, Microsoft and others today: It is purpose-driven, but other than that completely free and not related to a research agenda or established research fields.
- In this scenario, a European DARPA exists which is the main actor in publicly funded open research.
- The ERC has also become an important player in this scenario.
- Stronger role of philanthropic research institutes which support open research in narrower challenges (certain diseases, special challenges in theoretical physics, energy research, ageing challenges, etc.).
- Open research is widely regarded as being important and having central impacts. It is acknowledged that open, risky, crazy, revolutionary, transformative, etc. approaches are needed.
- Knowledge transfer between academia and industry occurs mainly via persons and not so much via collaborations.
- Science-based start-up ecosystems will become important.
- Mainly publicly funded institutes will carry out open research. Private companies are also involved but have a minor role as they are mainly occupied with applied research.

- Also, think tanks and NGO research will become more important, especially for the social sciences and humanities.
- Most important funders of open research in this scenario are the European DARPA, the ERC and national bottom-up funding organisations like DFG, ANR, NWO or SNF).
- Actions to be taken for this scenario include the following:
-
    - Found a European DARPA with or without a military dimension. Preferably without but a convincing vision needs to be found. It´s main characteristic should be that it is open.
    - Create a vision for European open research which answers the question "Why do we need open research in Europe?" This may include to define, in which research area Europe wants to stay ahead and also for what purpose. In this scenario, the purpose "international economic competitiveness" is sufficient. However, assuming a more sustainability-oriented society, this might not be enough.
    - One mission of open research in Europe could be: To foster advanced technologies and systems to create revolutionary advantages for the European market.
- As national interests and specialities will not go away in the future, there will also be national schemes for open research in the future. Thus, an open research scheme on the European level has to justify, why it is necessary. It also has to position itself and cooperate with national level schemes or has to compete with them in case they have a similar focus.
- Cooperation with national level schemes requires that member states profit from the EU open research scheme. Otherwise they will not support it.


Europe of regions

Key features – the big picture

A number of European technology regions that are already successful, are heavily promoted by European policies as 'engines of growth', making them even stronger, leading to enhanced competitiveness of these regions with regard to the emerging regions outside Europe. The gap between these highly successful EU-regions and the less developed ones widens significantly, even within the advanced member states.

Regional governments have increased their functions and competences in research and innovation systems with respect to the national governments. The regional governments became key players in European science, technology and innovation policy. European research funding encourages regions to network with each other. In doing so it pursues a two-track strategy: successful regions can profit from research funding to leverage existing and already successful activities; weak regions are invited to pursue research strategies that may help developing emerging technologies and scientific ideas. Long-term cooperation can mostly be observed between equally strong partners. Links between strong and weak partners are observed as well but tend to focus around themes that are relevant for both regions. Preserving competitiveness is a major driver for successful regions while weak regions use strategic alliances to catch up.

Many of the less prospering regions face the challenge of how to benefit from emerging developments since they are lacking regional research funding and they are in search for an adequate research and innovation infrastructure. Links between industry and research institutes are not well developed or are focused on traditional technology and product developments. Some regions developed their own strategies based on their own needs. Some are successful in developing social innovation projects and to build up strength in specific research fields such as systemic sustainability innovations.

Key aspects of the European science and innovation landscape in 2025

Within Europe of Regions a top class of successful regions exists. The profile of each of these successful regions can be a diversified one, regions need not necessarily focus on one specific technology cluster but may on the contrary be based upon a few technology clusters at the same time. Linkages with other regions are dependent upon the mutual needs for co-operation between the regions. Competitiveness is driving the research and innovation infrastructure. Regional funds have been made available by regional and national governments, supplemented by industries and companies which have a direct stake in funding research, development and innovation. Regional funding is usually focused at backing the winners within a region, thereby attempting to increase the competitive advantage which already exists. European funding of successful regions is linked to helping these regions to become successful in other regions or parts of the world. Funding can be in the form of mobility funds for exchange of scientific and engineering expertise, but can be in the form of funding transversal developments on the basis of existing technology portfolios as well.

Next to this top class a class of emerging regions can be identified. No apparent difference in quality of scientific expertise can be demonstrated between emerging regions and top-class regions, though the focus of both scientific communities will be different depending on the precise socio-economic context of each region. Braindrain from non-high-class regions to top-class regions occurs but lower class regions with emerging technology clusters have their own attractors for scientists as well. European funding is directed in stimulating these regions to catch up and even to leapfrog existing successful regions by providing incentives for top class research conditions and facilities. European funding functions as 'seed' capital in order to leverage exiting initiatives in emerging regions. European funds are meant to match similar investments by regional research agencies.

Next to strategic funding in emerging clusters European funds are also direct at stimulating contributions by principal investigators and by so-called 'minority groups' (either having a backward position because of ethnicity, gender, age, or geographical origins) and by funding innovative SMEs. These funds are open to all participants fulfilling the conditions (being a principal investigator, belonging to a specific minority group, being an innovative SME). European funding in this manner is meant to uplift the creative contribution of scientists who not necessarily belong to the dominant groups that are already linked to industry and scientific funding mechanisms and to uplift innovative SMEs as well. Again, this approach of European funding is meant to function as 'seed' capital that, when being embedded in fertile scientific ground, may offer the opportunity

to leapfrog existing successful regions through exploitation of bright, new and innovative ideas.

Conditions for scientists and companies differ between the various regions. Successful regions are able to offer interesting facilities and can act as attractors to scientists of other regions or parts of the world. Emerging regions seek their own unique approach to attract scientists. European funding is directed at supporting this process at emerging regions while it supports outreach activities in already successful regions.

Variations of key factors

Key factor: global shift

- Strong impact projection: rapid shift to Asia and other emerging countries

  Both emerging and successful regions are confronted with on-going developments in other parts of the world, such as a rapid shift of centres of scientific activities towards Asia and other parts of the world. This challenge is similar to successful and emerging regions. The European approach is directed at stimulating outreach activities of successful regions (connecting to other successful regions and leading to top class research and innovation activities) and at stimulating emerging regions in finding and exploiting their own scientific and technological 'centre of gravity'.

Key factor: scarcity of natural resources & environmental problems

- Various impacts projection: heterogeneous paths

  Some regions adopt scientific and technological programmes that are based on countering scarcity of natural resources and environmental problems, other regions focus on fully different themes. This is mainly a bottom up process that is not guided or framed by European research activities or funding opportunities.

Key factor: economic growth and welfare

- Various impacts projection: unconnected developments

  While the output of scientific and innovative activities mainly aims to improve economic growth and welfare in this scenario, some other objectives play a role as well. The European contribution tries to strengthen what is already present and to offer fruitful conditions for new and innovative activities in emerging regions. This may help achieving direct economic benefits but the European contribution is directed as well at achieving long term benefits for the region as a whole (combining social and economic benefits).

Funding environment

The funding environment has already been characterised in the foregoing sketch. Summarizing: regional funds are aligned with regional ambitions. Regional authorities and regional stakeholders (industry, social and economic councils) determine short term and long term research and innovation activities and make funding available. European funding directed at successful regions is meant to leverage regional activities towards larger markets or enlarging existing initiatives. European funding directed at emerging regions is meant to create leapfrogging strategies that help regions to surpass other parts of the world by offering innovative and creative new solutions and products and by stimulating high tech and innovative SMEs. For both sorts of regions part of funding is delivered directly to principal investigators while special attention is given to so-called minority groups. A prime example of these minority groups are young researchers who usually do not have the opportunity to supply for research grants by themselves but who may have interesting contributions to make. Another focus group is formed by high tech and innovative SMEs.

Open research

As indicated in the previous sections European funding strategies are essentially open research strategies. No top-down research programmes are formulated at European level, since research priorities are formulated at regional levels. On a regional scale research and innovation activities may be very focused and will have a special orientation in successful regions. Economic benefits are an important determinant of the regional research activities. This may come at the expense of longer term research efforts. The European funding does not a priori differentiate between the origins of parties that apply for research grants and funding, but it aims at leveraging research activities in already successful regions to world-class scale hoping to realise on-going regional competitiveness while it aims at helping emerging regions to leapfrog over already successful regions by stimulating bright and creative research and innovation activities. It offers grants to principal investigators, again on the basis of ideas put forward and without a priori constraints on research themes and it stimulates high tech and innovative SMEs.

In this manner the European strategy functions as 'add-on' to regional research strategies rather than enforcing specific research topics. It enables researchers and regional research institutes to determine on what topics they consider European funding opportunities the most helpful in realising their own ambitions. The schemes offered by the European Commission are thus essentially open but they may pose some constraints which differentiate between requests for funding originating from already successful or

still emerging regions. The open scheme for principal investigators does not make this differentiation, and is really fully open to any kind of scientific idea submitted.

The European puzzle

Key features – the big picture

In 2025, the European scientific and funding landscape remains almost unchanged. Gradual shifts can be observed but the whole system remains unaffected. Science and innovation are high on the agenda of the EU and its member states, that attempt to optimize their own positions in the global network in the short term. Governments spend a substantial part of the budgets on research, education and innovation.

Overall, Europe is still doing well in 2025. Yet its contribution to scientific breakthroughs and its innovation capacity is gradually declining. Tensions between regional, national and European actors with regard to different policy fields including the field of science, technology and innovation policy lead to deadlocks. Cooperation at EU level is affected by national policies in many member states that focus on overcoming their own specific problems. Internal dynamics are determining the power of national and regional governments and play an important role in knowledge production and diffusion. Therefore, significant differences in research and innovative capacities are still remaining in Europe.

Key aspects of the European science and innovation landscape in 2025

- No major changes are observed in the European Research funding landscape. Bottom-up research remains important on the national level where the national funding agencies mainly focus on disciplinary organised research.
- Top-down calls are dominating the European research funding. Funding for many areas is adequate, but it is not able to boost long-term and high risk research for future breakthroughs. Some scientists complain about the lack of autonomy and to be forced to do research that does not follow their best ideas.

- Following one's own research agendas and presenting the next breakthrough ideas is possible for a minority of European researchers. The lack of attractive funding opportunities is leading to a slow, comprehensive decline of the EU's capacity for breakthrough research compared to other world regions
- Bottom-up funding schemes on the European level and the national level, such as the long-term successful FET-Open enable researchers to develop novel and fragile ideas that challenge current thinking. These successful and well regarded funding schemes are improving their funding model continuously and look for further simplification to develop lighter and faster procedures.
- High profile researchers but also young scientists keep moving into countries where research conditions are better than in Europe.
- As talented scientists keep moving away from Europe, the competitiveness of some European countries will suffer. In turn this may lead to a smaller research sector in these countries instead of more activities to increase research conditions.
- The widening of the gap between member states is not adequately and timely addressed by the EU.
- No impact of FP8
- Because of the many internal difficulties, the EU finds it difficult to change its structures or to change its overall way.
- Instead of more efficiency and more innovativeness, in this scenario, stability, resilience and robustness are key factors.
- Key actors in this scenario are the same as today, however the position and importance of individual states changes.
- New members to the EU may not change a lot within the EU. However, a big new member like Turkey will have unforeseen consequences.

Variations of key factors

Key factor: global shift

- Low impact projection: Emerging countries are no longer emerging countries, they have succeeded in catching up and are about to overtake western industrialized countries in terms of new research results and innovations.
- Within Europe there are multiple speeds of development. Because the differences are similar to the ones today, some European countries will be at the top of research while others remain relatively low-level.

Key factor: scarcity of natural resources & environmental problems

- Low impact projection: further exploitation

Key factor: economic growth and welfare

- Low impact projection: traditional paradigm prevails

Funding environment

- Concerning the national level, the gap between member states will widen. Weaker member states will further reduce funding.
- Member states will probably not open up their national funding markets.
- There will be larger research clusters across nations, for example a Scandinavian research market can be envisioned.
- On the EU level, there will only be a rhetoric of simplifying research funding schemes. In fact, the attempt to simplify program structures and application formalities only leads to an even higher administrative burden. As a consequence, still the big companies profit from EU research funding programs and SMEs will not participate. There will be a whole business "consultancy" for writing proposals. The money spent for these consultancy services will not be available for research.
- On the joint national and EU-level, funding will increasingly be outsourced to specialized agencies. The co-funding will become even more problematic for the weaker countries as they are not able to provide the other 50% funding.
- Private charity research funding will become more important, especially for research addressing societal challenges. There will also be increasing joint activities of private charities and the EU.
- BRICS countries will start funding European cutting edge research and will also attract European researchers. The counter-trend to outsource research into BRICS countries because of lower cost levels remains in certain research areas but is overall on the decline because the emerging countries have caught up in very many fields.
- There is a gap between research funding and venture capital funding.
- Knowledge transfer is possible and uses the same instruments as today.
- Form this scenario, the following actions need to be taken:
    - Motivate member states to participate stronger in EU decision making.
    - Simplification shall be organised as a continuous learning process and include researchers and SMEs. It shall also acknowledge the fact that time-to-market cycles are substantially shorter than they were before. Also, fill the gap between project approval and continuous development.
    - Better match the different levels of national, EU and joint models of research funding.
    - Open up programs for countries outside the EU and strengthen existing cooperation.
    - Be more open to new approaches like open innovation processes and adapt publication and patent system accordingly.

Open research

- Within the "European puzzle"-scenario, open research continues its current existence which means that it exists but that it is not of major importance. Within the scenario, no substantial enlargement or increase is planned. However, science remains important within the EU.
- As the overall conditions for research remain basically what they are today, in this scenario, only small and internal changes within the European administration of research projects are foreseen.
- New member states might be in favour of open research because they do not have extensive experiences with large targeted projects. Also, open research for them might be cheaper as large-scale top-down research projects.
- The flow of intellectual capital to the United States is a fact today. In the future some intellectual capital might go to China or Singapore. However, du to the cultural differences this might not be so strong.
- Open research may be affected in this scenario in two ways: Open research may come out as one remedy and instrument for survival in a crisis. Or, open research may not be realised exactly because of the crisis, as there is no money available to start a new instrument.
- In effect, four balances have to be regarded with respect to open research in this scenario:
    - Blue sky vs. purpose-driven research (both can be "open")
    - Open vs. targeted research
    - Research funding vs. funding of other areas (for example agriculture)
    - EU vs. national policies vs. industrial interests.
- The institutional conflicts between the EU and the member states have not dramatically changed in this scenario. EU funding of research has increased, which includes open research.
- European open research might be a vehicle to (temporarily) stabilise the innovation systems in new member states. However, in the long run there is the risk of losing wisdom.
- Main actors in the field of open research in this scenario are universities. Industrial research plays only a minor role.
- Industry rather specializes in purpose-driven open research (Flagship type of research).
- One of the status quo 'attractors' are for example represented by the Commission bureaucracy which attempts to preserve the status of its senior personnel and their

units, Directorates, etc. The system, being risk averse, tends to focus on shorter term 'industrial' gains, neglecting the long term and unexpected. Here Open research is very important in opening horizons for future growth rather than the incipient stagnation that status quo prefaces.

- Increasing regionalism militates against the collaborative ethos of the current Europe. Anything which increases mixing and cross border, e.g. trans-regional activity can be seen as an important counter to the thread of factionalism. Collaborative research can make a welcome, but admittedly small contribution to this essential mixing. For this reason open collaborative research can make a valuable contribution to the European aim.

Europe's inclusive innovative society

Key features – the big picture

Europe's inclusive innovative society is a highly educated society. Policy is characterized by a greater diversity of policy actors. Public policy plays a strong role in setting the course for science-based innovation and for innovation-driven societal development. A variety of key actors have moved with their policies towards the principles of sustainable development and away from the dogma of resource-intensive growth. Science-driven technological innovation and social innovation are not longer seen as conflicting, but as entangled and complementary. Europeans are highly involved in research and in innovation projects. Actors from academia, business, politics and culture collaborate in research and innovation processes. Since innovation is no longer guided mostly by an economic rationale, but by the combination of exploratory research, adventurous creativity and inventive practises, transdisciplinary research has become a key factor for science driven innovation.

"Science-based responsible innovation is the key." By 2025, this slogan is not only widely used, but also implemented. Public policy is based on a broad concept of innovation that goes far beyond technological and product-oriented innovation. Funding programmes are experimenting with various formats to link research communities inside and outside academia with companies, users and citizens. "Open science and innovation communities" are established, "open innovation labs" are run by universities and municipalities. Do-it-yourself Science communities are common in many research fields. Once mainly related to biology, they are now an important movement in many research fields. Some of these communities are trying to create systems with zero power requirements or cure diseases. Others wouldn't mind if they changed the world somehow, but their interest in DIY science is driven more by a pure fascination with the subject and to explore how things work.

Europe h as stopped the brain drain of scientists, researchers and potential high-tech innovators. Many researcher become innovation refugees' in the Europe Union especially women from countries where women' rights are limited. Europe acts in some areas as a magnet to researcher from all over the world by establishing a funding system that links different kind of research with innovation. With these modalities and opportunities an innovation ecosystem has been established that supports breakthrough ideas, talent of all ages, international cooperation and a high-tech sustainability-oriented ecosystem.

Key aspects of the European science and innovation landscape in 2025

- Science and innovation are not driven mainly by market forces. Science is conducted in the public interest and science is perceived and organized as a societal infrastructure.
- There is a strong focus on tackling Grand Challenges through science-based innovation.
- A variety of funding programs all over Europe make it possible for researchers, entrepreneurs, Members of NGOs to be involved in research projects and innovation processes – inside and outside academia and companies.
- An innovation-oriented European procurement market stimulates research as well as innovative products and services.
- Open access to scientific knowledge, the open source movement in the IT-sector and the open innovation models broaden up to a more general open-innovation dynamic in the whole economic sector.
- Responsible research and innovation is a key driver for the direction of funding. Concepts of responsible development of emerging technologies have been implemented into funding policy and regulation.
- The interactions between society and research, especially in the context of sustainable development, have intensified in both directions: different groups of society encourage research and obtain specific results.
- As scientists, social scientists and researchers from humanities are collaborating in high-risk & high-impact research and innovation there is no longer a polarity between technological innovation and social innovation.

Variations of key factors

Key Factor: Global Shift

- Trend break Projection: stronger position of Europe

Key factor: scarcity of natural resources & environmental problems

- Strong Impact Projection: global transition

Key Factor: economic growth and welfare

- Strong impact Projection: Changing Growth Paradigm

Funding environment

- The funding landscape is characterized by a large fraction of directed research funding tackling societal goals and for tackling grand challenges.
- An open research part for each Grand Challenge is established.
- Open Research is important for many reasons. One is its function as a 'early warning system':
- A high recognition of the importance of basic research ensures that there is a balance of funding.
- Diversity of resilience.
- Priorities in research are co-defined with society. Involving non-scientist in priority-setting and in defining research agendas will contribute to the democratization of knowledge production and is a requirement of responsible science-based innovation. The bottom-up priority setting includes a variety of stakeholders and non-scientists, including the 3th sector.
- Evaluation criteria should include societal relevance even for open research. There is a strong need for new criteria for evaluation of research and the evaluation of research proposals.
- Tackling Grand Challenges by directed research funding includes mechanism to identify the Grand Challenges of the future and to develop instruments for an ongoing dialogue with different stakeholders with regard to funding for dealing with them.

Open research

- Open research is vital in an open society such as Europe's inclusive innovative society.
- Open research is endorsed by society, is renewed, and is basis for societal resilience.
- There is a high importance of "bottom-up" as a societal design principle – in research as well as in other domains.
- Open research is highly transdisciplinary and research is characterized by a high social awareness.
- Funding organizations maintain a strong dialogue with stakeholders, bringing together researcher and different groups. Stakeholders are regularly informed about

research activities and play a key role in shaping research agendas and deriving policy implication.

- Non-scientists are more educated to 'understand' dynamics in science and scientists are more educated to communicate their research, the results of their research and the potential consequences connected with their work.
- Open research is embedded in open governance of science. Open governance of science is transparent, inclusive, and 'not a closed shop'.
- Open research acts as an 'early warning system'.
- The funding system can be characterized by a high diversity of mechanism to support 'open' research with regard to the scale of projects and the with regard to the involved actors. However there is an overemphasis on small projects.
- Publishing modes changed, open publishing is the main way of publishing.
- A variety of factors are taken into account to assess the contribution of open research.
- Open research is enabled and supported by an informed and educated society.

Summary Final Session

The final plenary discussion focused on question related to the development of the FET Open scheme itself and raised questions for the next scenario workshop that will take place in September 2011.

Initial questions

- What do the scenarios tell us about the commonalities across the scenarios?
- How is FET Open differentiated from ERC (and from EIT)?
- What do decision-makers want to know about open research in order to strengthen FET Open? Also from other schemes!
- Should FET Open be expanded beyond ICT? Why? And how?
- Should FET Open be associated to the Science or to the Competitiveness Pillar, or to both? And how?
- Can a European DARPA-type institution be justified on the ground of some clear failures argument?
    - Some features of DARPA (100% funding) may not be possible in Europe
- What are the criteria for selection in FET-Open?
- What are the appropriate instruments for implementing FET-Open? How should they look like?

Discussion

1. Why is FET Open so small? How can it be made more visible?

- The budget target could be up to 1 Bio Euro/a → but is high budget really the purpose of FET Open?
- The example of ERC: ERC really changed the scene. Why? Can FET learn from the ERC experience?
    - Strong constituencies mobilized and backing ERC
    - Large number of potential beneficiaries
- A solid justification is needed for increase the budget substantially
    - A 2-legs system is needed, with ERC being one and FET being the other leg (see also below)
    - FET Open shows that this kind of programme can be managed well at EU-level
    - Is the programme effective? Difficult to show due to the inherently open character of FET-Open, in particular on socio-economic impacts
    - How much could it be expanded with loosing quality? How large is the pool of good ideas? Is there an upper threshold?
    - Is there a need for FET Open in the first place? Can we demonstrate a kind of market or system failure?
- Controversial elements of a future FET-Open

- Should a venture capital element be included?
- Should the principal investigator approach be adopted?
- Link with the other FET-schemes or go it alone?

2. The relationship ERC-FET-EIT

- ERC is frontier research, curiosity-driven, based on individual grants
- FET open is about science-driven innovation (?), purpose-driven
- The innovation notion could bring it too close to what the EIT is doing

3. The broadening of FET-Open
   - Should FET Open be spread to other areas beyond ICT?
   - There are certainly some invariants that could remain the same even for 'clones' of FET Open
   - Such 'clones' should have porous boundaries in any case
   - Divide by conventional technology areas or rather by purposes?

4. What should we say to decision-makers to support FET Open? What are its benefits?

- Open Research as a pool for more targeted actions, and at an early stage ("early warning function")
  - Support to emerging communities and technologies
  - Have a more systematic process without losing sight of the important of "a good hunch"
  - How to transfer results of screening to "proactive"? Little systematic connection so far.
  - Sharing results of screening with other funders (e.g. at MS level) and programme committees
  - Have more trust in the scientific staff
- Socio-economic impact
  - Monitoring of impacts would be important
  - Also social and scientific impact should be considered, not only economic ones
  - Good narratives can be helpful and convincing in the absence of hard data
  - Focus on long-term impacts and monitoring

Issues for next Workshop

- The relationship ERC – FET – EIT: how to delimit their respective missions in a systematic way?
- Consolidation of the justifications and rationales for having an (expanded) FET-Open programme
- The link between FET-Open and FET in general
- Selection criteria for FET-Open projects
- How should appropriate instruments for furthering FET-Open objectives look like?
- Organisational model of a future FET: Expansion vs. 'cloning'?
- How to realize the "early warning" or "pool" function of FET-Open?

Description of the scenario process

This part of the final interim report documents the working steps and the methodology of the scenario part of the project "Boosting the exploratory power of open research in Future and Emerging Technologies (FET)".

The modified concept takes into account the request for modification discussed in two meetings in Brussels and Budapest and the further work process. The main modification was with regard to the basis of scenarios and the process of selection:

- As discussed in Brussels on March 15th the aim of the scenario process is not only FET open, but open research in Europe in general.
- As discussed in Brussels in Budapest on May 5th the scenario development process should be based on the scenario sketches of the tender.
- To meet both requirements, the first Workshop focused on "Scenarios for open Research in Europe" in general. The output of the first workshop serve as an input for the second workshop on "Scenarios for FET open", were the focus is, to develop short-term and middle-term adaptive and robust strategies for the development of the FET open funding scheme itself.
- Instead of starting with the development of a broader variety of scenarios and selecting and fleshing out a selection of these, the scenario process.
  - started with the assessment and further development of scenarios for open research in general (that was also the focus of the first Workshop in July 2011).
  - Will provide an assessment of their exploratory power with regard to FET Open, the next step is focusing on the development of promising scenarios of FET open in 2025 (that is the focus of the second workshop in September 2011).

This Annex documents the background of step 1 and 2 of the scenario development.

What is the focal Issue?

The future of open research in Europe & the development of FET Open

What is the time horizon?

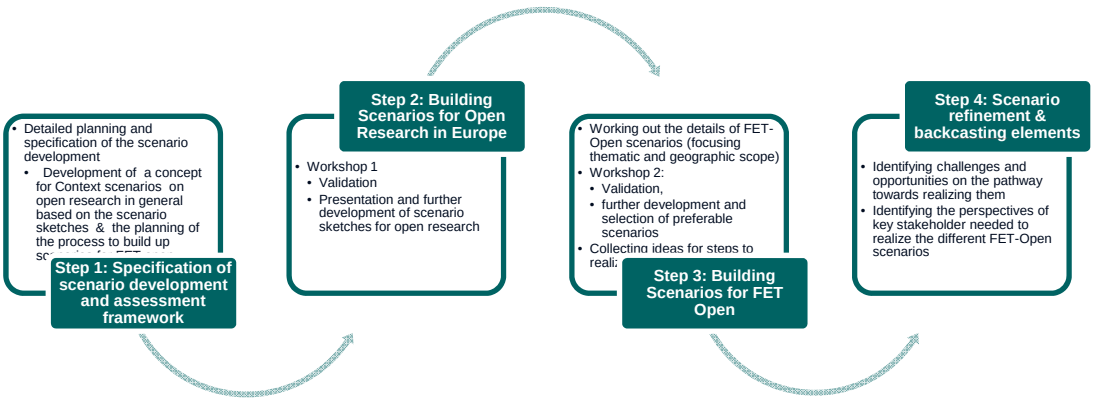
Time Horizon: 2025

- The time horizon of the scenarios "Future of open research in Europe" is the year 2025.
- The time horizon of 2025 will be used to explore relevant dimensions for short-term and middle-term adaptive and robust strategies for the development of the FET open funding scheme itself.

WP2: Scenario development and analysis

The scenario development and analysis consist of four steps.

- **Step 1: Specification of scenario development and assessment framework**
  - Detailed planning and specification of the scenario development
    - Development of a concept for Context scenarios on open research in general based on the scenario sketches & the planning of the process to build up scenarios for FET open
- **Step 2: Building Scenarios for Open research**
  - Workshop 1
    - Validation
    - Presentation and further development of scenario sketches for open research
- **Step 3: Building scenarios for FET Open**
  - Working out the details of FET-Open scenarios (focusing thematic and geographic scope)
  - Workshop 2:
    - Validation
    - Further development and selection of preferable scenarios
    - Collecting ideas for steps to realise the preferable options
- **Step 4: Scenario refinement & backcasting elements**
  - Identifying challenges and opportunities on the pathway towards realising them
  - Identifying the perspectives of key stakeholder needed to realise the different FET-Open scenarios



Step 1: Specifications of scenario development and assessment framework

The first task was to develop a concept for

1. Scenarios on open research in general based on the scenario sketches in the tender
2. The planning of the process to build up scenarios for FET open in the next steps

The scenarios are combinations of developments in the context of open research.

The next task was to identify main scenario dimensions and associated key drivers for open research in general. This stage included desk research, especially a review of literature, analysing the survey results and expert interviews.

A set of crucial scenario dimensions and associated key drivers were identified that cover general trends and tensions, the scientific landscape, the policy and funding environment.

Step 2: Building scenarios for open research

Scenario workshop 1 (WS 1a)

Date: July 6th and 7th, 2011.

It will be a workshop where context scenarios will be prepared for. 15-18 external experts will be invited. The experts will be research planning experts who know about the funding landscapes and drivers in research.

The workshop will cover the following topics.

- Validation of the results of Work Package 1
- Validation of the results in regard to main dimensions and key drivers
- Discussion and further development of the Scenarios

In preparation of the second workshop the results of the first workshop and the scenarios will be assessed, evaluated and refined with regard to the development of FET open scenarios.

Step 3: Building scenarios for FET Open

The third step of WP2 covers the process of building scenarios for FET open. Based on the results of the first workshop, details of FET-Open scenarios (focusing thematic and geographic scope) will be worked out.

The main dimensions and key drivers will be identified in regard to the FET Open programme itself. A preliminary list of dimensions contains openness, the funding base, instruments, targeted audience and success criteria. Other dimensions will be explored through survey, the first workshop, literature and expert opinion.

To interpret the different FET-scenarios an assessment framework will be developed after the first workshop that captures the main aspects of "exploratory power" as well as the challenges, opportunities and other requirements to be met on the way towards realising the different FET-Open scenarios. The assessment framework will therefore also consider organisational and institutional aspects.

Scenario workshop 2

Scenario workshop: 19th and 20th September 2011. Focus of this workshop will be on the assessment, discussion and further development of the drafted FET open scenarios. The group will partly be the same as in workshop 1 with additional researchers and policy experts.

- Working out the details of FET-Open scenarios (focusing thematic and geographic scope),
- Validation,
- Further development and selection of preferable scenarios.
- Collecting ideas for steps to realise the preferable options.

Step 4: Scenario refinement & backcasting elements

- Identifying challenges and opportunities on the pathway towards realising them.
- Identifying the perspectives of key stakeholder needed to realise the different FET-Open scenarios.

Workshop July & Agenda

First day, July 6, 2011		
10.00	Registration and welcome tea/coffee	
11.00 – 11.45	**Introduction**	
	Setting the Scene	Paul Hearn, FET-Open Unit, European Commission
	Welcome	Mario Campolargo, Director, Emerging Technologies and Infrastructures, EC
	"Exploring the Future: Scenarios for open research in Europe: overview and outline of the workshop"	Matthias Weber, AIT
11.45 – 13.15	**Key factors & drivers: the macro environment, scientific landscape and innovation landscape**	
	World Cafe on key factors & drivers	World cafe tables (groups)
13.15 - 14.00	Lunch break	
14.00 – 14.15	Key factors & drivers: macro environment, scientific landscape and innovation landscape	plenary discussion
14.15 – 16.00	**Context scenarios and related key drivers in regard to funding environments**	
	Presentation of scenario sketches covering macro environment, scientific landscape and innovation landscape (context scenarios)	project consortium
	Revision of scenario sketches	working groups
	Discussion and selecting of key factors & drivers: funding environment	working groups

16.00 – 16.15	Coffee break	
16.15 – 17.00	**Results of day one**	
	Fishbowl (presenting results)	presenters from working groups
	Outlook scenario building	Matthias Weber, AIT
19:00	Evening event: Dinner L'ATELIER EUROPEEN, http://www.atelier-euro.be/home.php, 28 rue Franklin, 1000 Brussels.	

Second day, July 7, 2011		
08.45 – 09.00	Coffee	
09.00 - 10.45	**Development of scenarios for open research**	
	Presentation of revised context scenarios and related funding environments	chairs of the working groups
	Development of scenarios for open research	working groups
10.45 – 11.00	Coffee break	
11.00 – 12.00	**Refinement of scenarios for open research**	
	Open research under the scenarios developed	working groups
12.00 – 12.45	Lunch break	
12.45 – 13.45	**Scenario assessment**	
	Assessment of scenarios (working groups)	working groups
13.45 – 14.00	Coffee break	
14.00 – 14.45	**Contributions of open research**	
	Fishbowl (presenting results from the working groups)	presenters from working groups
14.45 - 15.00	**Wrap-up and next steps**	

Date and location

6 and 7 July 2011

DG Information Society at Av. de Beaulieu 25, ground floor

Avenue de Beaulieu/Beaulieulaan 25

1060 Bruxelles (metro Beaulieu)

The workshop included the following methods and formats to facilitate collaborative dialogue:

World cafe

The World Café is a creative method for facilitating collaborative dialogue and the sharing of knowledge and ideas to create a living network of conversation and action. Participants discuss the key dimensions & key drivers of change in small groups around the café tables. At regular intervals the participants move to a new table. One table host remains the whole session at the table and summarises the previous conversation to the new table guests. In this way the proceeding conversations can uptake ideas generated in former conversations with other participants. At the end of the process the main ideas are summarised in a plenary session. The world cafe is planned also as a warm-up at the workshop.

Fish bowl / Open chair

Fishbowls involve a small group of people (usually 5-8) seated in circle, having a conversation while a larger group of listeners is seated around. Fishbowl processes provide a creative way to include the broader group (or in other settings: the public) in a small group discussion. Fishbowls are usually used for ventilating "hot topics" or sharing ideas or information from a variety of perspectives. For the scenario workshop the method is used to bring together the views from the different working groups. A member of each working group will take a seat in the circle, and two more chairs are open to "visitors" (i.e., members of the audience) who want to ask questions or make comments. Although largely self-organising once the discussion gets underway, the fishbowl process usually has a facilitator or moderator.

Scenario development: development of the scenarios for open research in Europe

What are scenarios and why use them?

As the future is a terra incognita, we can think, debate and shape the future only by exploring possibilities.

What are scenarios?

A scenario is a story that illustrates the vision of a possible future. It describes some possible significant events, the driving forces and the main actors, and it communicates how the world of the future is expected to function. Building and using scenarios can help to think and explore what the future might look like and the likely challenges of shaping it.

Scenarios are intended to outline a basis for strategic dialogue. They are a method for exploring potential implications of and possible responses to different developments. They will provide us with a common language and concepts for thinking and debating about current trends and events, and a shared basis for exploring future uncertainties and making more informed decisions.

Why use scenarios?

Scenarios can be used to think about specific uncertain aspects of the future and to explore ways in which these might evolve. Because there is no single way to such future journeys, we will create sets of scenarios. These scenarios all address the same crucial questions and all include those aspects of the future that are seen as likely to persist, but each scenario describes a different way in which the uncertain aspects of the future could play out.

Scenarios are based on assumptions, creativity, and intuition, but crafted as analytical configurations. They are written as stories that make potential futures seem convincing and vivid. Scenarios do not provide a consensus view of the future, nor do they deliver predictions. They are used to describe a context and how this context may change.

Scenarios are intended to form a basis for strategic dialogue and to support decision-making – they are a method for considering potential implications of and possible responses to different events and developments. In the case of the scenarios for the future of open research in Europe they provide a basis for exploring future uncertainties in the environment of the programme to support decision-making. The time horizon of

the scenarios for open research is 2025. The scenarios will be used to explore relevant dimensions for short-term and middle-term adaptive and robust strategies for the development of the FET open funding scheme.

Scenario sketches

To trigger the discussion in the scenario workshop, the participants received scenario drafts[1]. They were meant only as examples to stimulate creative thought.

The four preliminary scenarios included key features of open research and some key aspects of the European science and innovation landscape in 2025. Each of the scenario sketches included variations of the key factors to the context of research and innovation in Europe.

The uncertainty of a key factor was expressed in alternative variations / projections, which represent possible developments in the context of open research. For each key factor, these alternative pathways of possible futures have to be mutually exclusive, at least for the most probable and plausible evolutions of the key factor. The key factors and their projections provided an initial overview of the context and of Europe's future scientific and innovation landscape. A short description of the preliminary key factors and their future variations / projections is documented in this part.

---

[1] The context scenario sketches are based on other scenarios that are developed within the last years, addressing the future of research in Europe.

Kuhlmann, Stefan. 2001. "Future governance of innovation policy in Europe -- three scenarios." *Research Policy* 30:953-976., the main sources for scenario elements are scenarios depicted in "The world in 2025"

European Commission, Directorate-General for Research. 2009. "The world in 2025 : rising Asia and socio-ecological transition." in *EUR (Series) ; 23921.*, edited by R. European Commission. Directorate General for. Luxembourg :: Office for Official Publications of the European Communities., in the Fraunhofer "Scenarios for the European research landscape 2025"

Dönitz, Ewa, Lothar Behlau, Elna Schirrmeister, and Andrea Kulas. 2010. " Envisioning future research horizons. Scenarios for the European research landscape 2025." Fraunhofer-Gesellschaft, München.

Dimensions & key drivers

A set of crucial scenario dimensions and associated key drivers were identified that cover general trends and tensions, the scientific landscape, the policy and funding environment. Dimensions and key drivers will be discussed, added, and selected at the first scenario workshop. This list of dimensions, factors and drivers is far from complete, but show the kinds of issues to address.

Key factors in different dimensions

The main objective in the first stage was to understand, which key factors might influence the development of open research in European and how the key drivers connected with these drivers could evolve in the future. Generally, key factors are characterised

- By their impact (low/high) and
- The degree of uncertainty as to how they will develop.

The degree of uncertainty of a key factor is expressed in alternative variations/projections or impact projections. Different projections represent possible developments in the dimension of this key factor.

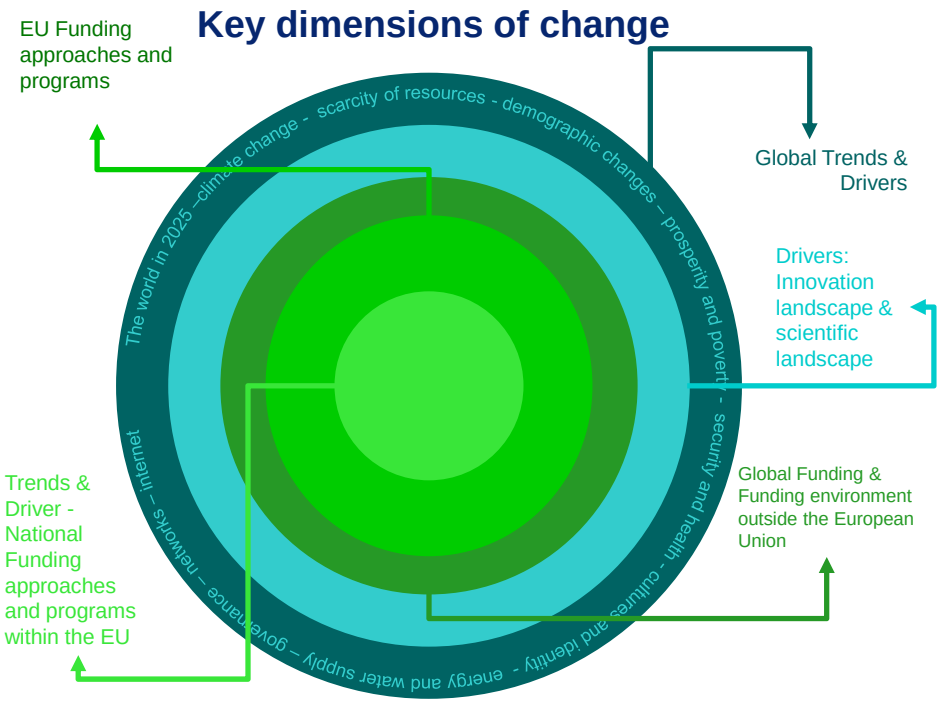
The changes will be analysed within the following dimensions:

Environmental analysis

- Global key factors, trends & drivers
- Key factors & drivers: Innovation landscape & scientific landscape

Development of the funding environment

- Key factors & drivers: global funding & funding environment outside the European Union
- Key factors & drivers: EU funding approaches and programmes
- Key factors & drivers: trends & driver - national funding approaches and programmes within the EU



Global key factors & drivers of change in the macro-environment

Key factor: global shift

Asia will become the first producer and exporter of the world, the other BRIC countries (Brazil, Russia, India) will catch up with Europe and the US. The centre of gravity of world production will move towards Asia.

- Strong impact projection: rapid shift to Asia and other emerging countries

  Asia overtakes the United States and Europe in the area of research. Research is developing outside the countries traditionally considered as leaders. "If the recent trends continue, in 2025, the United States and Europe will have lost their scientific and technological supremacy for the benefit of Asia (China and India will have caught up with or even overtaken the Triad). [2]

2 Cf. European Commission, Directorate-General for Research. 2009. "The world in 2025 : rising Asia and socio-ecological transition." in *EUR (Series) ; 23921.*, edited by R. European Commission. Directorate General for. Luxembourg :: Office for Official Publications of the European Communities.

- Low impact projection: emerging countries catch up

  The EU will succeed in some important scientific fields such as engineering sciences, chemistry and pharmacology. But European Countries will be - with some specific exceptions - behind the USA in an increasing number of emerging fields. The research and innovation gap between the Europe and the emerging economies is slowly decreasing. Due to extensive public funding programs in research and high investments in infrastructures and future technologies, many of the emerging countries are succeeding in catching up.

- Trend break projection: stronger position of Europe

  As European governments realise a large number of incentive programs and provide extensive funds, many cross-national research programs are carried out and high investments made into high performance research infrastructures. Europe becomes the world's preeminent innovation centre. Emerging countries fail to improve their R&D infrastructures and do not take innovation projects to the next level.

Key factor: scarcity of natural resources & environmental problems

This key factor implies the hypothesis of an accelerated scarcity of natural resources (including oil, gas, rare materials) and related environmental problems that will affect research in general.

- Strong impact projection: global transition

  The growing scarcity of natural resources and the increase of environmental problems lead to a global transition and a shift towards future research that is directed at a more thorough understanding of the mechanisms driving innovations in the presence of natural resource scarcity. This goes along with more sustainable consumption patterns. Alternative design and production concepts are oriented to the strategies of zero emission and eco-efficiency. Some countries are forerunners; others follow and adopt sustainable production and consumption patterns. The simultaneous effects of increasing scientific and technical knowledge and decreasing resource inputs globally largely are an important factor for the chances of long-run sustainable development.

- Low impact projection: further exploitation

  Resource scarcity does not affect research, technological development, innovation, and consumption patterns. Environmental problems are tackled mainly isolated. Global production is still based on an extensive exploitation of natural resources, ignoring the long-term effects on the environment.

- Various impacts projection: heterogeneous paths

  In some regions the technology option is preferred: research, technological development, and innovation, stimulated by markets, with full internalisation of external cost, are triggering efficiency increases and reduce demand per unit of production. The approaches differ from region to region and from industry, in parts as a result of differences in the availability of scarce resources and/or environmental problems.

Key factor: economic growth and welfare

Economic growth (as conventionally measured by quantitative indicators) is widely seen as base to increase welfare. In the last years there are debates how to change from competitiveness to sustainability, integrating economic, as well as social and environmental aspects and finding new indicators for innovation and well-being.

- Strong impact projection: changing growth paradigm

  As sustainability aspects and alternative well-being indicators and values become more important, the growth and welfare paradigm is changing. Social welfare is no longer exclusively measured by the gross domestic product, the ideas and concepts of measuring and implementing 'progress, wealth and well-being', went beyond GDP. Activities in research, technology development and business increasingly are driven by alternative concepts.
- Low impact projection: traditional paradigm prevails

  The GDP has maintained a firm position as a dominant indicator for economic growth and social welfare. Other aspects, such as ecological and social sustainability aspects are of little importance. Research and innovation is oriented on national and regional competitiveness Research and innovations are evaluated within this framework.
- Various impacts projection: unconnected developments

  The heterogeneous paths of different countries and regions lead to unconnected developments and tensions between countries and regions.

Key factors & drivers in the scientific landscape

Open research aims to explore and shape an uncertain landscape of future developments in science and technology. This landscape can evolve differently and may be characterised by quite different features. As a consequence, the most appropriate models for Open research in Europe may look differently as well.

The development of the scientific landscape is characterised by tensions that need to be considered for the future of open research. These tensions may be handled through existing funding approaches, but may also require adjustment or new funding approaches.

Exploiting scientific opportunities versus contributing to societal needs

The mediation on the orientation on which research and also open research should be focused is taking place in a field of tension between exploiting scientific opportunities on the one hand and contributing to the solution of societal problems and challenges. This tension has become even more prominent in recent years, with the debate about Grand Challenges being expected to play a major role in determining priority-setting in research. In the survey of this project this tension is also present. Asked to describe the ideal funding scheme for their research, the opinions are covering the whole spectrum of this factor: From 'pure' basic ressearch ("As a scientist I first of all want to understand how nature works. Therefore I mainly focus on basic research.") to a strong orientation at societal needs ("Problem solving research that provides useful solutions is of much more value than undertaking basic research for the sake of producing new knowledge which may have zero benefit to society.").

Collaboration versus competition

There are two clearly overarching trends in policy-making. Firstly, it has become clear that most societal challenges require collaboration if we are going to solve them and collaboration is one of the clearest policy targets e.g. driving EU level R&D policy. At the same time, however, most of the countries and international structures emphasise the significance of competition as a means to allocate scarce resources. These two trends might be in severe tension with each other. Competition is an obstacle to collaborate, even though it may also give rise to e.g. construction of consortiums in highly competitive situations. These new structures are at the same time inclusive and exclusive as some of the potential collaborators are necessarily out of formal collaboration arrangements. This dual tension is creating structures, which emphasise formal collaborative relationships with its rights and responsibilities and less informal exchange of ideas and information, restricting the flow of free ideas and possibilities of open innovation.

Intellectual propepty, economic exploitation and open access to knowledge

Associated to the previous tension is the issue of intellectual property vs. open access to knowledge. The interest of exploiting scientific knowledge for economic or societal purposes has been growing, often based on an economic rationale of exploiting intellectual property rights. This stands in contrast with the tendency of opening up research to other actors and stakeholders. There are quite opposed views with regard to open access to scientific knowledge on the hand and discussions on criteria for excluding access to content that is judged sensitive on the other hand.[3]

While there is currently a clear consensus that scientific research has economic benefits there is also a more or less implicit tension between those extensive expectations and possibilities of research to meet those expectations. The impacts of research take place usually after long period of time and the benefits are rather indirect than direct by nature.[4] Misunderstanding of possibilities and increasing national competition pressures may lead to increasing utility pressures, which, however, cannot be met due to their unrealistic nature.

Tensions within scientific institutions

There is a rather clear tension between the academics' traditional wish for extensive self-regulation and governments' and other actors' interest to guide research. At the same time tensions may emerge between the new kind of scientific research (that has to be efficient, productive and utilizable) and the traditional connection between free inquiry and teaching (benefiting from each other). Other kinds of tensions affecting also knowledge production may emerge between contract researchers and those who enjoy regular academic employment because their working conditions differ significantly from each other. Since temporary staff's legal position is usually inferior to that of regular staff, the situation may lead to exploitative relations, increasing tensions and finally damages to the functions of university.

---

3 Singer, E. 2004. "Scientists stumped by dual push for open access, secrecy." *Nature Medicine* 10:1006-1006.

4 Salter, Ammon J. and Ben R. Martin. 2001. "The economic benefits of publicly funded basic research: a critical review." *Research Policy* 30:509-532.

Key factors & drivers in the innovation landscape

The innovation landscape is changing and new pattern of innovation are getting more and more attention. Many analytical terms and models such as open innovation and open science[5], communities of scholars[6] and innovation communities[7] are indicating new forms of collaboration within the research area and with regard to the relations between research and innovation. References to the scenarios in the tender are only depicted for internal discussions – they will not be part of the scenarios presented at the workshop.

Key factors & drivers in the funding environment

Open research is a mission of several public funding programmes on the national, European, international level and also a mission of several private sector research programmes (e.g. foundations). Currently, open, bottom-up funding schemes are rather small compared to thematically focused, top-down funding schemes, but this may change in the future. Also novel combinations of broadly defined thematic areas (e.g. focused on Grand Challenges) within which a largely bottom-up approach to research funding is implemented are possible. Moreover, exploratory research is also conducted in institutionalised form, for instance in leading-edge basic research organisations (e.g. Max-Planck Society).

In the scenario development process, current influential factors and potential new areas of influence (e.g. global data for global research) will be identified. Beside the factors listed below, the interactions and potential tensions between open research on different levels are discussed (influence of European open research on national funding agencies, wild cards).

Openness of funding

- Rise of top-down funding versus Rise of Bottom-up funding

---

5 Fry, J., R. Schroeder, and M. den Besten. 2009. "Open science in e-science: contingency or policy?" *Journal of Documentation* 65:6-32, Mukherjee, A. and S. Stern. 2009. "Disclosure or secrecy? The dynamics of Open Science." *International Journal of Industrial Organization* 27:449-462.

6 Watson, R. 1994. "CREATING AND SUSTAINING OF GLOBAL COMMUNITY OF SCHOLARS." *Mis Quarterly* 18:225-231.

7 Von Hippel, Eric. 2006. *Democratizing Innovation*: The MIT Press.

Time-horizon of funding

- Focus on short term funding versus Re-rise of long-term oriented funding of research

Internationalisation of funding

- Globalisation of funding versus national funding
- Internationally competing funding agencies versus internationally cooperating funding agencies

Funding of basic research and applied research

- Rise of demarcation lines between basic research and applied research versus Further blurring Boundaries of Basic research and applied research

Research institutions

- Universities are the main institutions were exploratory research is located versus private Institutions including companies are the main institutions were exploratory research is located

References

Dönitz, Ewa, Lothar Behlau, Elna Schirrmeister, and Andrea Kulas. 2010. " Envisioning future research horizons. Scenarios for the European research landscape 2025." Fraunhofer-Gesellschaft, München.

European Commission, Directorate-General for Research. 2009. "The world in 2025 : rising Asia and socio-ecological transition." in *EUR (Series) ; 23921.*, edited by R. European Commission. Directorate General for. Luxembourg :: Office for Official Publications of the European Communities.

Fry, J., R. Schroeder, and M. den Besten. 2009. "Open science in e-science: contingency or policy?" *Journal of Documentation* 65:6-32.

Kuhlmann, Stefan. 2001. "Future governance of innovation policy in Europe -- three scenarios." *Research Policy* 30:953-976.

Mukherjee, A. and S. Stern. 2009. "Disclosure or secrecy? The dynamics of Open Science." *International Journal of Industrial Organisation* 27:449-462.

Prendergast, Patrick J., Sheena Brown, and John Britton. 2008. "Research programmes that promote novel, ambitious, unconventional and high-risk research: an analysis." *Industry and Higher Education* 22:215-221.

Salter, Ammon J. and Ben R. Martin. 2001. "The economic benefits of publicly funded basic research: a critical review." *Research Policy* 30:509-532.

Singer, E. 2004. "Scientists stumped by dual push for open access, secrecy." *Nature Medicine* 10:1006-1006.

Von Hippel, Eric. 2006. *Democratizing Innovation*: The MIT Press.

Watson, R. 1994. "CREATING AND SUSTAINING OF GLOBAL COMMUNITY OF SCHOLARS." *Mis Quarterly* 18:225-231.

Report on the second workshop

Based on the outcomes of the first workshop, a second expert workshop was carried out on 19 and 20 September 2011 at the University Foundation in Brussels. The participants of the workshop were mainly the same as in workshop one, e.g. they were representatives of funding agencies and research institutions as well as researchers. The results of the second workshop are documented in the following section.

The main aim of the second workshop was to discuss crucial issues that are part of the current debates on funding of the future Horizon 2020 Research Programme (formerly known as the Common Strategic Framework for EU research and innovation or FP8), and in particular what the future options for FET Open in the context of European open non-thematic research are. We have asked: “What is the contribution of bottom-up non-thematic funding activities to bringing research and innovation closer together" and “what could be the role of FET-Open in a broader European open research agenda?"

The second workshop consisted of four main parts

- Part 1: In the morning of the first day, working groups explored key dimensions and drivers of open research funding. The working groups were conducted as a World Café to allow an informal but structured exchange of insights, ideas and perspectives.
- Part 2: The afternoon of the first day was dedicated to the development of FET Open / Open research scenarios, especially alongside two dimensions: the spatial scope of FET Open / open research and its thematic specification of funding versus a generic model/scheme of funding
- Part 3: The second day was dedicated to the further refinement of the FET Open/ open research scenarios within the European open research landscape.
- Part 4: Backcasting of scenarios.

Workshop September & Agenda

Day 1: Monday, 19 September 2011		
10.00	Registration and welcome tea/coffee	
11.00 – 11.45	**Introduction**	
	Setting the Scene: FET Open and Horizon 2020	Paul Hearn, FET-Open Unit, European Commission
	"Exploring the Future: Scenarios for FET-Open" overview and outline of the workshop"	Matthias Weber, AIT
11.45 – 13.15	**Part 1: Dimensions of boosting the explorative power of FET-Open**	
	Working groups on dimensions: spatial scope of FET Open / Open research, thematic specification of funding versus generic model, small or big, funding mechanism, peer-review systems and processes, FET Open/ Open research for excellence in the science base; FET Open/ Open research tackling societal challenges; FET Open/ Open research for boosting competitiveness	World cafe tables (groups)
13.15 - 14.00	Lunch break	
14.00 – 14.15	Dimensions of boosting the explorative power of FET-Open	plenary discussion
14.15 – 16.00	**Part 2: FET Open/ open research in 2025 in different context scenarios**	
	Development of scenario sketches & selecting of one or two promising scenarios	working groups
16.00 – 16.15	Coffee break	
16.15 – 17.00	**Plenary discussion: synopsis**	
	Promising scenarios for FET Open / open research in 2025	presenters from working groups

	Outlook scenario refinement and backcasting	Matthias Weber, AIT
19:00	Evening event: Dinner	

Day 2: Tuesday, 20 September 2011		
08.45 – 09.00	Coffee	
09.00 - 10.30	**Part 3: Development of scenarios for FET open / open research**	
	Intersections and interfaces of FET open / open research schemes, guiding principles, funding mechanism, conditions required, expected outcomes	working groups
10.45 – 11.00	Coffee break	
11.00 – 12.00	**Part 4: Backcasting of scenarios**	
	Stepwise backcasting of the most promising scenarios with the focus on Horizon 2020 Framework Programme for Research and Innovation (how differentiate them from ERC/EIT, how to expand FET Open/open research beyond ICT, how are the scenarios connected to the science or/and to the competitiveness Pillar?	working groups
12.00 – 12.45	Lunch break	
12.45 – 13.45	**Refinement of scenarios for open research**	
	The micro level: selection of reviewers, selection of proposals, priority setting etc.	working groups
13.45 – 14.00	Coffee break	

14.00 – 14.45	**Main conditions for boosting the exploratory power of FET Open / open research**	
	Presentation of results from the working groups & plenary discussion	presenters from working groups
	Plenary discussion	
14.45 - 15.00	**Wrap-up and next steps**	

Date and location

Monday, 19 September 11-17 hrs and

Tuesday, 20 September 9-15 hrs.

Club University Foundation in Brussels, rue d'Egmont 11, Brussels

Photo documentation of the second workshop