

BEYOND THE HORIZON – PERSPEKTIVE 2030

Was muss europäische Forschung leisten

Club Research
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ÜBERBLICK

Wozu europäische Forschung?

Europa im globalen Kontext: von explorativen Szenarien zu normativen Orientierungen

- Zukünftige Kontexte für F&I in Europa
- Europäische Leitziele
- Normative Orientierungen für F&I

Von top-down zu bottom-up: von Targeted Scenarios und Missionen

Konsequenzen für die europäischen FTI Politik: Die Büchse der Pandora

Wozu europäische Forschung?



ERWEITERUNGEN DER ZENTRALEN NARRATIVE

- 60er/70er Jahre: Gemeinsame wissenschaftliche Agenden als Vehikel politischer Integration
 - Gründung von CERN, ESO, EMBO, ESA, COST, ESF
- 80er Jahre: EU im Rückstand gegenüber USA (und später Japan)
 - Erste RPs zur Überwindung des Wettbewerbs innerhalb Europas
 - Fokus auf vorwettbewerbliche Forschung
- 90er Jahre: Wirkungen von Forschung für Innovation (“innovation paradox”)
 - Stärkere Umsetzungsorientierung und Systemansatz
 - Berücksichtigung von Aspekten der Kohäsionspolitik
- 00er Jahre: Europäischer Forschungsraum und mehr
 - Gemeinsamer “Markt” für Forschung in Europa und multilaterale Initiativen
 - European Research Council und European Institute for Innovation and Technology
- 10er Jahre: Gesellschaftliche Herausforderungen und Schlüsseltechnologien
 - Restrukturierung des RP in drei Säulen
 - Dezentralisierung über strategische Partnerschaften

EIN NEUES NARRATIV HINTER FP 9?

- Eckpunkte in bisherigen Dokumente
 - Bestätigung für öffentliche Investitionen in ERC und MSCA
 - Mobilisierung nationaler und privater F&E-Investitionen
 - Market-creating innovation & scaling (Europäisches Paradoxon, EIC)
 - Nachfrageseitige Bedingungen verbessern (Regulierung, Innovation Principle)
 - Räumliche Ungleichgewichte austarieren (Strukturfonds, Wissensinfrastrukturen)
 - Missionen für globale Herausforderungen

DIE THEMATISCHE DIMENSION

- Ausgangspunkt für BOHEMIA Foresight
 - Forschungsergebnisse aus FP 9 werden erst 2030-2040 in Wirtschaft und Gesellschaft wirksam werden
 - Zu welchen sozio-ökonomischen Herausforderungen werde die dann vorliegenden Ergebnisse und Lösungen einen Beitrag leisten müssen?
 - Zukünftige Anforderungen an Forschung und Innovation am Zeithorizont 2035 antizieren ...
 - Globale Herausforderungen?
 - Gesellschaftlicher Wandel?
 - ... unter Berücksichtigung der grundsätzlichen Offenheit zukünftiger Entwicklungen
 - Hohe Volatilität

VIER EBENEN

- Wie verändert sich das Umfeld und damit die Anforderungen an das, was Forschung und Innovation leisten sollen?
 - Kontextszenarien
- Welche leitenden Ziele soll/kann Europa vor diesem Hintergrund anstreben?
 - Vier Transitionen
- Welche Entwicklungen zeichnen sich in Wissenschaft und Forschung ab, mit deren Hilfe man zur Erreichung dieser leitenden Ziele beitragen könnte? Und wie können diese in handlungsleitende Pfade übersetzt werden?
 - Vom Delphi-Survey zu „Targeted Scenarios/Missions“
- Was für Konsequenzen ergeben sich aus diesem Ansatz für die Governance der FTI Politik?

EUROPA IM GLOBALEN KONTEXT

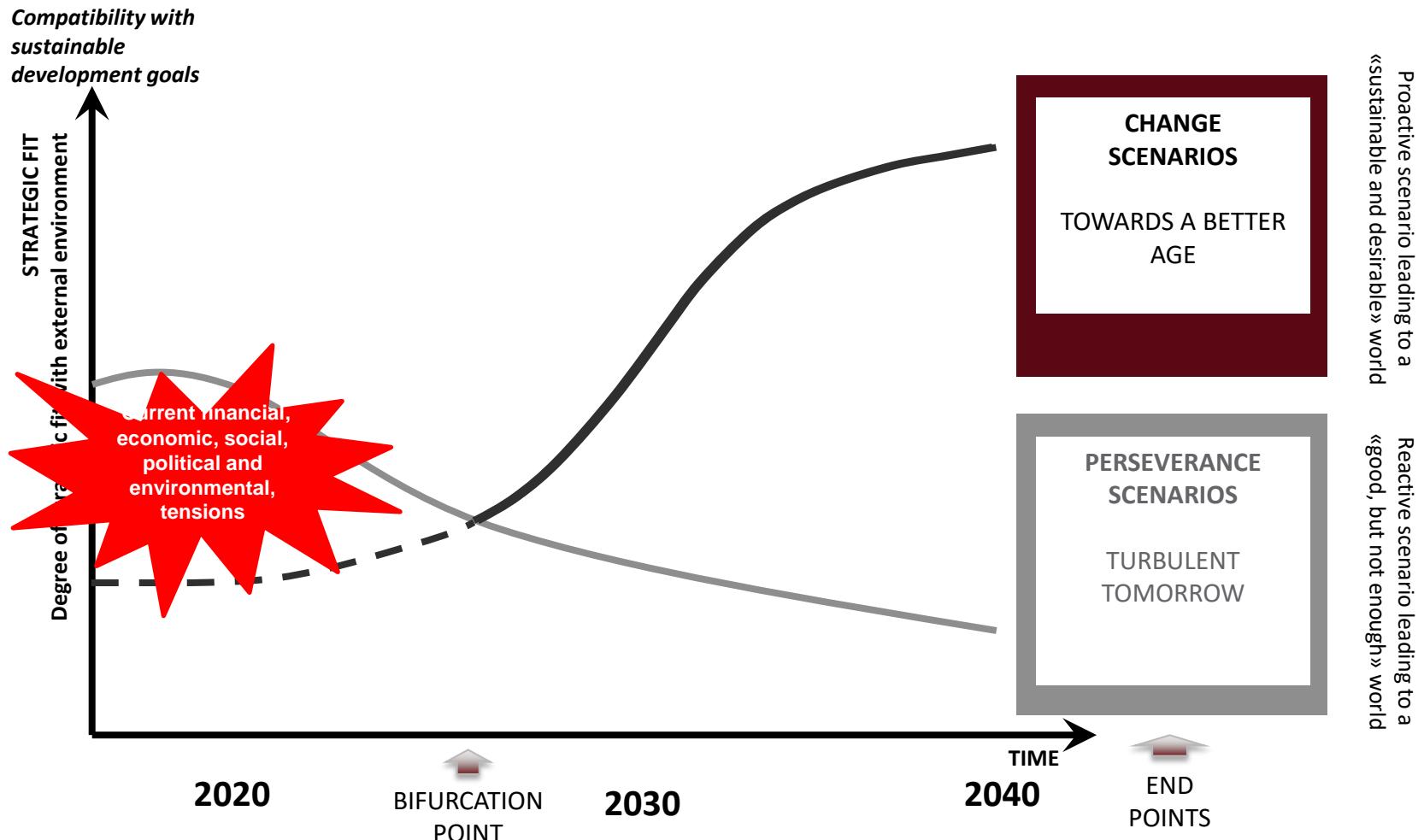
Von explorativen Szenarien zu normativen Leitvorstellungen



ÜBER DEN UMGANG MIT UNGEWISSEIT

- Aufbauend auf der Analyse von Sekundärquellen (Szenario-Studien, Megatrends)
- Sieben zentrale Bereiche, in denen ein breites Spektrum zukünftiger Entwicklungspfade bis 2035/2040 denkbar ist
 - Health
 - Security and Resilience
 - Climate change
 - Environment and ecosystems resources and services
 - Towards a world of cities
 - Accelerating innovation
 - Global political and economic context

CHANGE VS. PERSEVERANCE SCENARIOS



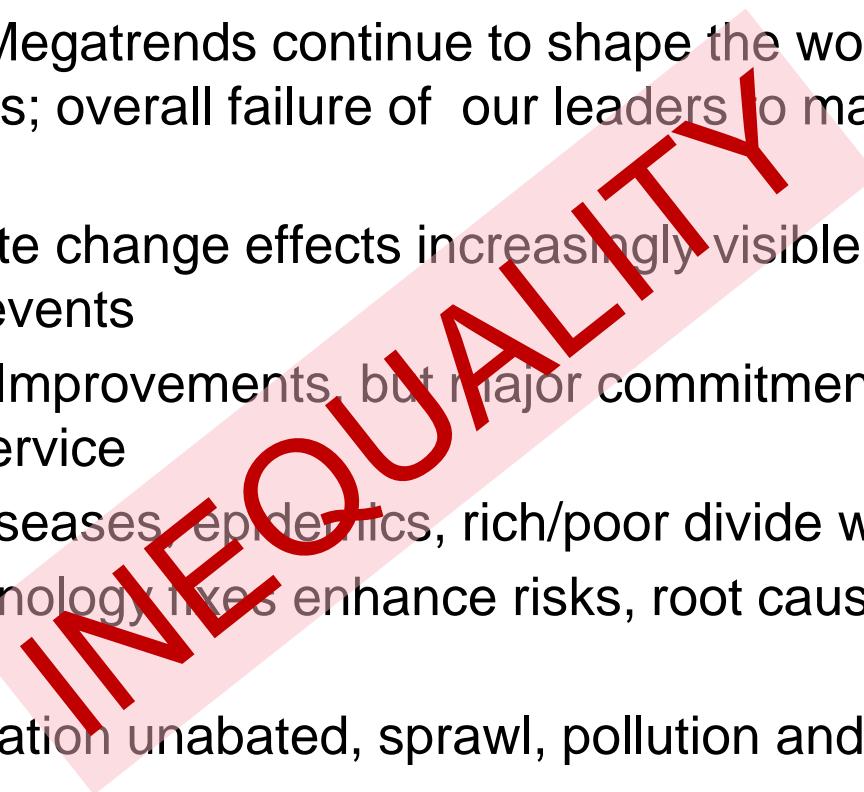
CONTRASTING SCENARIOS OF GLOBAL AND EUROPEAN SCOPE

Two types of scenarios to illustrate possible future paths:

- ‘Perseverance Scenarios’: current structures and institutions persevere, leading to a continuation of current cleavages
- ‘Change Scenarios’: Europe spearheads a structural change to ‘the future we want’

Key areas	Change scenarios	Perseverance scenarios
Climate change	Low carbon transition	Climate calamity
Environment and ecosystems resources and services	Towards a new well-being	The age of over-exploitation
Health	Towards health for all	Health divide
Security and Resilience	Building societal security	Security race
Accelerating innovation	The innovation revolution for everyone	Losing the race against the machine
Towards a world of cities	Urban bloom	Urban jam
Global political and economic context	Transforming our world for the better	Turbulent transitions

A TURBULENT TOMORROW: THE ‘PERSEVERANCE’ SCENARIOS IN SHORT

- **Governance:** Megatrends continue to shape the world and deepen social disparities; overall failure of our leaders to make the right choices
 - **Climate:** Climate change effects increasingly visible, critical shortages, more extreme events
 - **Environment:** Improvements, but major commitments remain little more than lip service
 - **Health:** New diseases, epidemics, rich/poor divide widens
 - **Security:** Technology fixes enhance risks, root causes hardly addressed
 - **Cities:** Urbanisation unabated, sprawl, pollution and congestion feed each other
 - **Innovation:** Fast technological progress drives global economy, SMEs struggle, as do people in the „gig“ economy
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TOWARDS TO A BETTER AGE: THE 'CHANGE' SCENARIOS, IN SHORT

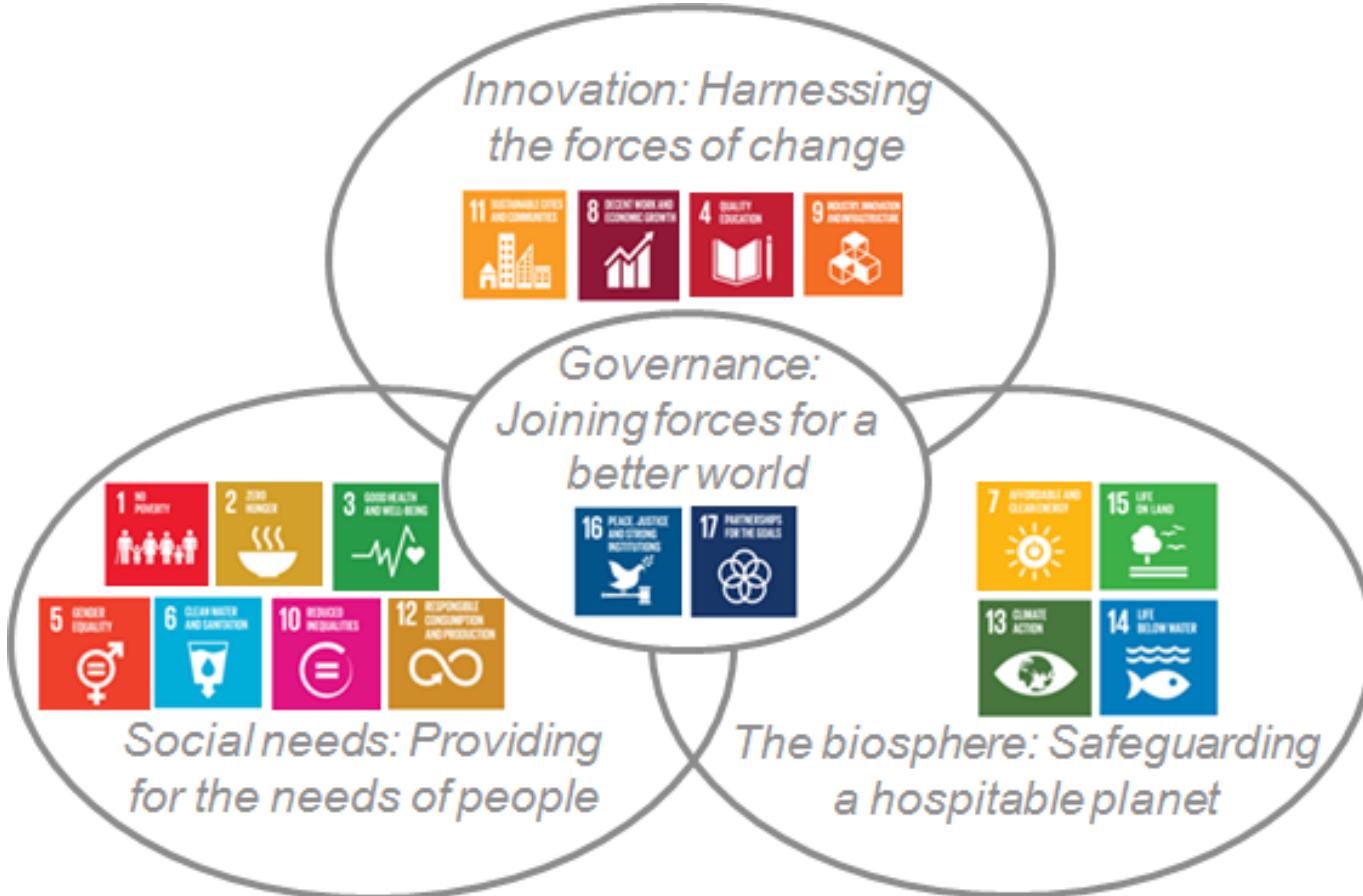
- **Governance:** SDGs drive the world's and Europe's progress
- **Climate Change:** Low Carbon Economy help mitigating Climate Change
- **Environment:** Respecting planetary boundaries with a circular and green economy
- **Health:** Equitable healthcare + regulation => longer healthier life
- **Security:** Security embedded in society
- **Innovation:** Digital job markets & productivity-enhancing technologies open up new work opportunities under socially stabilising framework conditions
- **Cities:** Cities as laboratories of good governance, efficient transport systems and other system innovations realised

WHAT ARE EUROPE'S AMBITIONS WITH REGARD TO THE NEXT FP?

- Two overarching ambitions, namely to contribute to
 - maintaining or even strengthening Europe's global political and economic role
 - achieving the Sustainable Development Goals (SDGs)
 - R&I has an important role to play in meeting these ambitions
 - but taken alone it will not be sufficient to reach the ambitions
 - R&I must be part of a more comprehensive policy agenda and strategy
 - for addressing major future challenges Europe is likely to face in the future
 - Moving the FP out of its isolated 'comfort zone'
- Change scenarios („Transitions“) are needed to meet the two ambitions jointly
- Perseverance scenarios would further erode of Europe's global role
- More demanding and transformative ambitions need to be tied to FP 9

"Europe is at a crossroads: either we keep and strengthen the role as one of the main global actors, or we become an increasingly irrelevant outgrowth on the Asian continent" (Gonzales Report "Europe 2030")

FOUR TRANSITIONS AS ORIENTATING FRAME FOR FUTURE R&I POLICY



THE SOCIAL TRANSITION

- Social needs: Providing for the needs of people
 - Improve the quality of people's lives by providing access to fundamental public services and to substantially reduce inequalities of various kinds.
 - Transition depends on a combination of technological, institutional, organisational and social innovations, which – taken together – represent a complex challenge.
 - Distinctive for this transition area is the key role played by basic, often public, services, including guarantees for access to food, lodging, education, health services, water supply, safety/security, social security, infrastructure, etc.
 - Social needs are personal and perceived by individual people. Accordingly their fulfilment is strongly dependent on behavioural changes at the individual level.

THE ECOLOGICAL TRANSITION

- The biosphere: Safeguarding a hospitable planet
 - Limits to environmental sustainability of our economic model
 - Shift in basic principles of our economic systems in order to create the incentives and structures necessary to respect the ecological boundaries of our planet and ensure the possibility of living in a hospitable world in the future.
 - Effective internalization of the long-term and external costs of economic activities, and the stringent application of the ‘users pay’ principle
 - Enable combinations of technological and organisational innovations (e.g. in the context of a circular economy or regenerative bio-economy).
 - Absence of a global system of common rules, principles and commitments is a major barrier that needs to be removed in order to help overcome global price competition at the cost of the environment.

THE INNOVATION TRANSITION

- Innovation: Harnessing the forces of change
 - Fundamental change in how societies relate to innovation and its transformative power
 - Individuals, organisations and society at large increasingly accumulate and use knowledge to introduce purposeful change
 - The resulting acceleration in science, technology and innovation challenges social, economic and political institutions, and creates contradictions that result in loss of control, crises and stark ethical dilemmas. (e.g. digitalisation and automation, AI, Synthetic Biology)
 - The challenge lies with the ambivalence of these developments, which offer an enormous potential, but at the same time entail social (e.g. in terms of inequality), economic (e.g. in terms of dependence on single global players) and ethical (e.g. in terms of privacy) challenges.
 - Strong need to learn how to harness these dynamics of change and devise processes to quickly learn how to best exploit their potential to the benefit of society.

THE GOVERNANCE TRANSITION

- Governance: Joining forces for a better world
 - The three previous transitions depend to a significant extent on the ability to build global governance systems through which common rules are established to frame the change processes ahead.
 - The core of this transition is to move from a governance system that builds on the pursuit of national and organisational interests to a system where cooperation and collective global values effectively underpin major political choices.
 - This takes place in an environment of shifting global tectonics, where power spreads towards the south and the east, and from state actors to a much broader variety of actors and stakeholders.
 - The main ambition of this transition is enhance the collective ability to tackle truly global challenges through coordinated action (e.g. climate change, economic disparities and under-development, military and security conflicts, global diseases).

ZWISCHENFAZIT 1

- Die vier Transitionen können als normativer Bezugsrahmen für die europäische FTI Politik (und darüber hinaus) herangezogen werden
- Ihre Umsetzung erfordert eine Harmonisierung von FTI mit sektoralen „downstream“ Policies, die die Leitziele und die nachfrageseitigen Rahmenbedingungen und (öffentliche) Investitionen bestimmen
- Durch diesen integrativen Zugang kann sich F&I policy immer weniger isoliert von anderen Politikfeldern legitimieren
 - Ausrichtung auf Transitionen vs. Notwendigkeit der Offenheit und Exploration von „new frontiers“
- Einbettung in transformative Politikagenden als neues (zusätzliches ?) Narrativ für die thematisch ausgerichtete Forschung
 - Komplementär zu ERC (frontier research) und EIC (fast scaling, market creation innovation), die komplementäre Funktionen im Innovationssystem erfüllen

VON TOP-DOWN ZU BOTTOM-UP

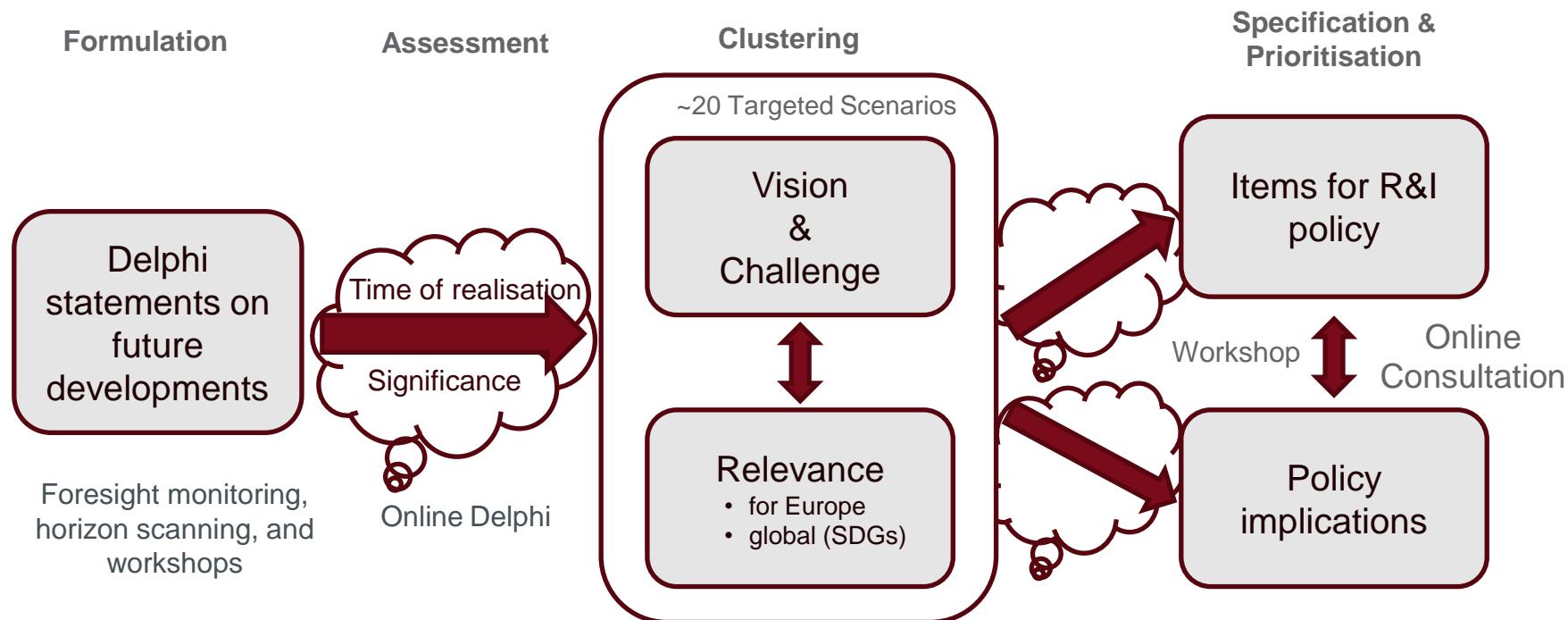
Von Targeted Scenarios und Missionen



DER PROZESS

- „Bottom-Up“ Prozess der Antizipation neuer Entwicklungen in den Bereichen
 - Science and technology
 - R&I practices
 - R&I policy environment
- Real-time, online, argumentative Delphi
 - Ca. 150 statements zu unterschiedlichsten Themen (insgesamt rund 17),
 - Horizon Scanning + ExpertInneninterviews + Workshops
 - Assessments, voting + arguments
 - Ca. 1500 TeilnehmerInnen
- Entwicklung und Validierung von Targeted Scenarios
 - Workshops mit Projektteam und Foresight Correspondents Network
 - Online consultation zu draft Targeted Scenarios liefert Hinweise zu R&I priorities
 - Ähnliche Methodik und Beteiligung wie Delphi-Verfahren

FROM DELPHI TO TARGETED SCENARIOS



FORMAT OF TARGETED SCENARIOS

- Targeted scenario pathways to 2040
- Assessment of relevance for Europe and the four transitions
 - Why is it important for strengthening Europe's global position?
 - Why does it help tackle SDGs?
- Implications for EU policy
 - What requirements does this raise for other policy areas
- Items and priorities for an R&I agenda
 - Directions for an R&I agenda (understanding-oriented research, solutions-oriented research, regulatory science/policy knowledge, scaling up/social innovation)
 - 8-10 priority R&I items from the online consultation
 - 1-3 top priorities per targeted scenario

STRUCTURE OF TARGETED SCENARIOS

Title

Material resource efficiency

Summary

Summary

It is 2040. Sustainable consumption patterns, truly circular production-consumption networks, and shifts to less harmful, often renewable resources have made Europe less dependent on natural resources, more self-sufficient and more competitive in its industries. In addition, environmental degradation has been reversed.

Scenario

Scenario

It is 2040. The European economy is less dependent on natural resources and more self-sufficient than anytime since the beginning of the century. There have been shifts to less material-intensive consumption patterns, to the closing of material loops through re-use and recycling, to the substitution of material resources by less harmful, often renewable ones, and to environmentally benign resource extraction methods.

Circular economy principles are applied across all systems of production and consumption, from agro-food to electronic goods. Consumer preferences have shifted towards services and products with longer life-time, prompting changes in product and service design (e.g. modular design, design for recycling, etc.), but also in business models (e.g. shift to services, sharing).

The use of rare earths has been reduced by 80% compared to 2016 figures. After having met the targets of the EU circular economy package of 2016, progress slowed down as physical and organizational barriers became more challenging to resolve. The target of recycling more than 90% of all waste physically or energetically has yet to be achieved. Recovered metals from landfills (e.g. aluminium, iron, copper, silver, gold,) contribute substantially to supply, but still provide less than 50% of the EU's demand.

Materials' substitution has implications throughout the entire production process and requires significant investments. Not all candidate materials fulfil initial expectations, for technological and economic reasons as well as for concerns about unexpected health risks. Renewable materials and the bio-economy play a more significant role, for the less harmful environmental effects associated with their use and their contribution to reducing dependency on non-European sources. Their significant economic promise has been used sustainably, managing the environmental consequences of their extraction and use.

Improved extraction and processing methods for all natural resources and environmental remediation techniques (including local geo-engineering) have enabled improvements in the European environment. Combining mining with the deposition of carbon-rich minerals offsets the damage caused by the extraction against climate related benefits. Deep sea mining was seen as a promising option in the times of increasing needs for "rare earths". However, it never quite took off, as it was tangled with environmental concerns and legal issues regarding the right to exploit offshore deep-sea resources, liabilities for environmental damages and the settling of international disputes. In the meantime, substitutability and the circular economy have alleviated the upward pressure in the prices of rare materials.

Relevance for Europe

Relevance for Europe

Dependence on critical materials is a strategic issue, especially when these materials play key roles in important infrastructures, such as defence equipment.

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The environmental damage caused by material extraction and by waste management is an important concern in Europe, as well as globally. By making more out of scarce natural resources, environmental damage is kept within the limits of planetary boundaries.

By strengthening R&I, Europe has the opportunity to play a leading role globally in the provision of solutions for efficient resource use. And so much so that Europe is home to a world-leading environmental services industry, which is set to expand massively into resource management roles in industrial value chains.

Contribution towards the SDGs

Finding alternative solutions to the use of scarce and critical natural resources is core to the achievement of the Sustainable Development Goals No. 12 on Responsible Consumption and Production and No. 3 on Good Health and Wellbeing, but also relevant to all other environment-related goals addressing water supply (6), energy (7), sustainable cities (11), climate action (13), life below water (14) and life on land (15).

Implications for EU policy

There are a number of EU policies that need to progress in sync to promote a more self-sufficient circular economy. Agriculture, Environment, Trade, Industry, Research and Innovation are at the core. Also external policies need to address the strategic implications for countries on which Europe depends for the supply of critical materials and resources.

As an overarching principle, the internalisation of environmental and social costs would provide a strong economic lever and incentive optimising resource efficiency in production and consumption.

More specifically, environmental regulation is an important demand-side driver of change towards realising extensive re-use and re-cycling, as are labour regulations when it comes to improving working conditions in resource-extracting and processing industries.

Future Directions for EU R&I policy

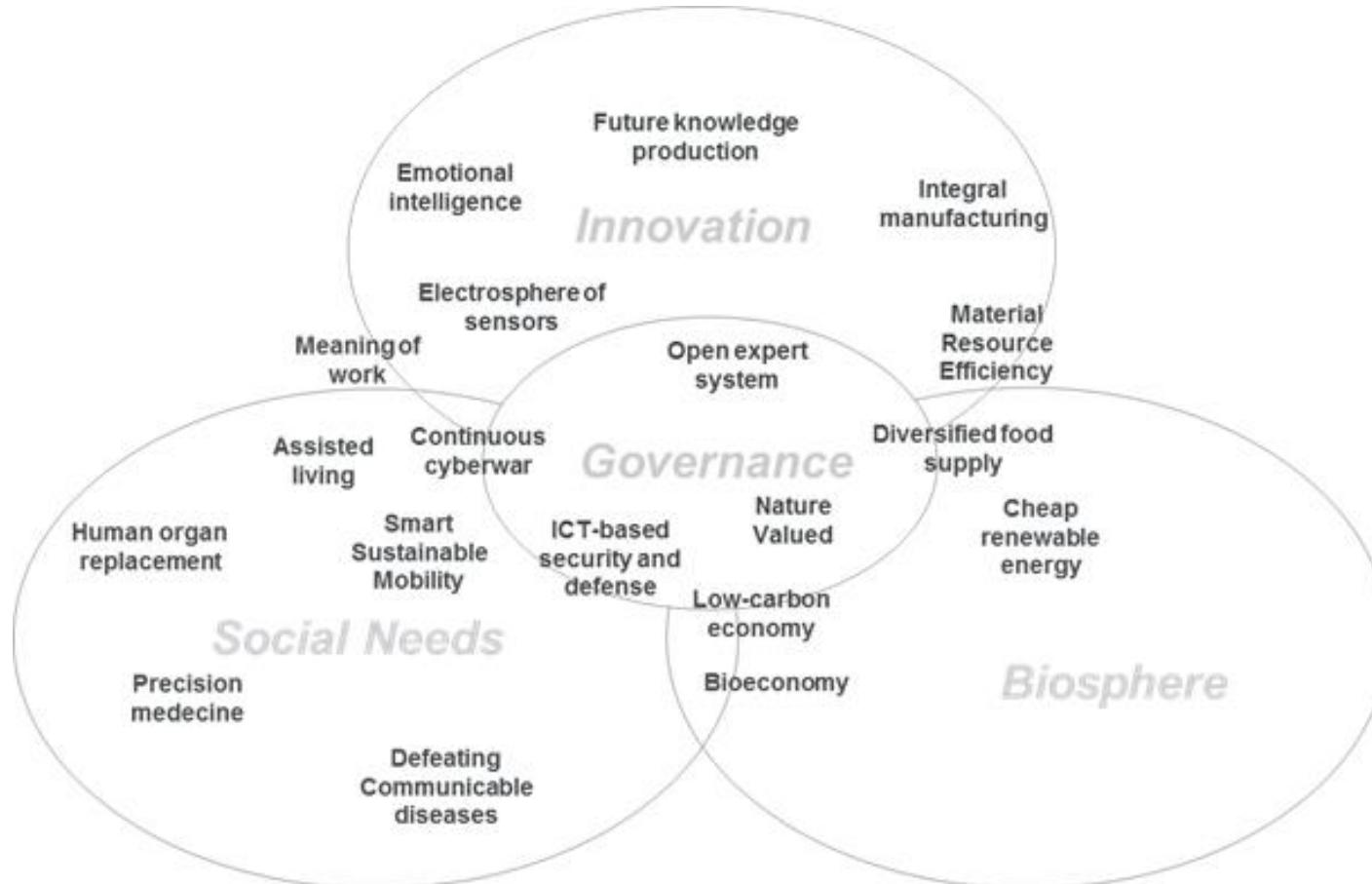
- Environmental impact assessment
- Solutions for more efficient and sustainable use of materials in products over the entire life cycle
- More cost-efficient technologies for extraction of valuable materials from waste
- Circular industrial systems design
- Behavioural changes on the supply and demand side in response to incentives
- "No-waste" policies. Everything has to be brought back without loss of quality.
- Science-based approach to regulatory and policy decision-making
- Eco-efficient materials
- Use of solar energy for generation of electricity and storage to chemical energy
- New substitutes for rare materials
- Research focusing on renewable materials and their split up/recycling in early development process

Relevance for SDGs

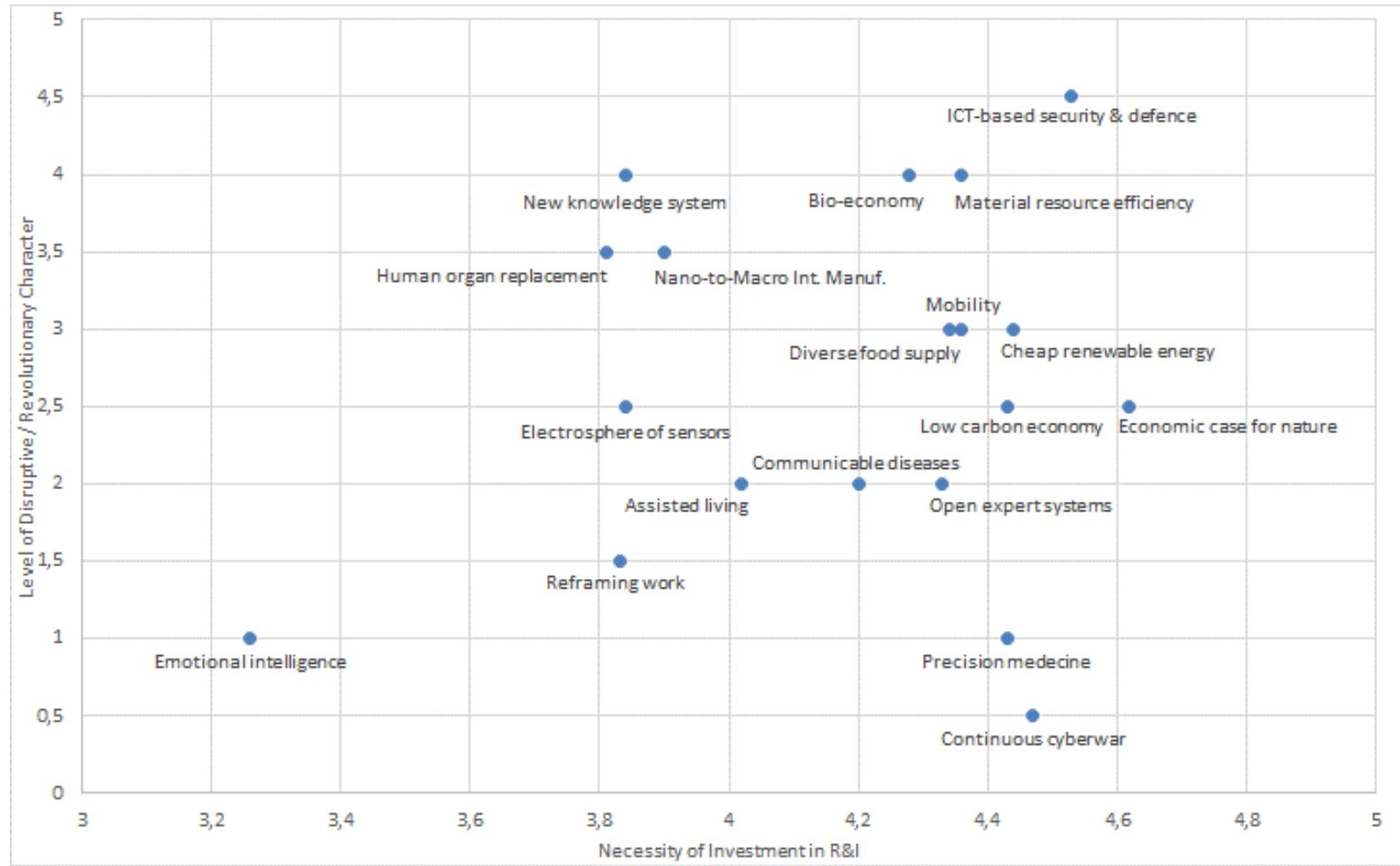
Implications for EU policy

Future R&I directions

EMBEDDING OF 19 TARGETED SCENARIOS IN THE FOUR TRANSITIONS



THE PORTFOLIO OF TARGETED SCENARIOS (2)



EXAMPLE 1: HUMAN ORGAN REPLACEMENT

- The scenario in a nutshell
 - Most human organs and tissues can be replaced. The majority of organs and tissues are bio-printed, produced by additive manufacturing or breeding (e.g. organoids).
 - Human organ or tissue replacement is accessible and affordable for all European citizens so that the average life expectancy increases.
- Relevance for EU
 - Continuously growing demand for human organs
 - Ethical issues associated with market for human organs
 - Improvements in the performance of artificial organs to improve quality of life
 - Vision and perspective for European medical device industry
- Contribution to SDGs
 - SDGs: healthy lives and well-being for all, reduce inequalities within and between countries

EXAMPLE 1: HUMAN ORGAN REPLACEMENT

- Implications for EU policy
 - Regulation and health policy regarding innovation in and application of artificial organs
 - Ethical standards for transplants and human enhancement
 - Regulation of health insurance systems to ensure equal access to advanced transplants
- Future direction of EU R&I policy
 - Breeding of tissues and organs (theory and practice)
 - Avoiding immune reactions to organ replacement
 - Solving ethical dilemmas regarding human enhancement (e.g. age limits for organ exchange)
 - Providing and controlling product safety/ toxicity
 - Using epigenetics and genetic engineering for creating organs
 - Developing new gene technologies for human organs
 - 3D and (later) 4D printing of human organs
 - Creating pathways to ensure non-discriminatory access for all people to future artificial organs and organ replacement procedures

EXAMPLE 2: TOWARDS A MORE DIVERSE FOOD SUPPLY SYSTEM

- The scenario in a nutshell
 - Major efforts during the 2020s succeed in making our food supply systems more sustainable, secure, efficient, healthy and inclusive.
 - In view of a growing world population and environmental pressures on land and water, these efforts are not sufficient.
 - A second pillar of food supply, based on a range of novel types of food production methods, complements the prevailing food supply system in the course of the 2030s.
- Relevance for EU
 - Security and quality of food supply of a growing world population
 - Environmental protection
 - Competing forms of land use
 - Industrial opportunities in new forms of trusted food
 - Artificial food as bridge to medical and nutritional healthcare
- Contribution to SDGs
 - Counter-acting shortage and price increases of food, by complementing and diversifying current food supply streams
 - SDGs: Zero hunger, climate action, life on land

EXAMPLE 2: TOWARDS A MORE DIVERSE FOOD SUPPLY SYSTEM

- Implications for EU policy
 - Agricultural, environmental and health policies
 - Circular economy policies to reduce food waste
 - New types of trusted health and safety standards/regulations
 - Internal market and competition policy for influencing distribution channels
- Future direction of EU R&I policy
 - Understanding and managing systems of sustainable agriculture and aquaculture
 - Alternative sources of protein: exploitation and processing
 - Environmental impact assessment of agricultural practices
 - Healthy and sustainable diets
 - Organisational and social innovations for optimising food supply systems from farming to consumption
 - Improvement of farm and food system management through better informed agro-ecological practices
 - Advancement of genetic engineering technologies applied to plants, animals and microbes
 - Integrated social experimentation with novel foods (involving citizens)
 - Precision agriculture and breeding: from research to demonstration

TOP PRIORITIES ACCORDING TO PARTICIPANTS IN ONLINE CONSULTATION

- 1-3 top priorities per targeted scenario
- 5-10 other priorities

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Targeted scenario	Top priority R&I directions
Assisted Living	E-health solutions including tele-medicine, measuring health data and transfer
	Research on assistive technologies and the impacts of their application
Bio-economy	Developing and testing new circular bio-economic processes
Nature Valued	Building models for a sustainable circular economy based on renewable resources and renewable energy
Cheap Renewable Energy	Methods, practices and solutions to promote energy saving and reduction of energy consumption
	Exploration of energy storage solutions, beyond batteries
Continuous Cyberwar	Tools for monitoring, evaluation and responding to threats
Defeating Communicable Diseases	Effective public health education about communicable diseases, incl. Prevention, treatment, hygienic questions, disinfection
Emotional Intelligence Online	Developing standards and codes of behaviour concerning the use of individuals' emotions for commercial and public purposes, as well as for emotional data sharing and privacy
	Research and development in cybersecurity, particularly in relation to the online sharing and use of information about individuals' emotions
Human Organ Replacement	Breeding of tissues and organs (theory and practice)
CT-Based Security and Defence	Understanding the roots causes of security challenges
Low Carbon Economy	Exploitation of new business models for circular economy and promotion of sustainable lifestyles

TOP PRIORITIES ACCORDING TO PARTICIPANTS IN ONLINE CONSULTATION

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Material Resource Efficiency	Environmental impact assessment
Smart Sustainable Mobility	Research on battery efficiency, energy storage and recovery technologies
Towards a More Diverse Food Supply System	Understanding and managing systems of sustainable agriculture and aquaculture
Nano-to-Macro Integral Manufacturing	Understanding the impact of 3D printing on individual health and safety and on the environment, across various industries
Decision-making supported by open expert systems	Development of better machine-learning algorithms
Precision Medicine	Making use of biotechnologies for personalised medicine
Reframing Work	Research on new variants of entrepreneurship through collaborative research
The Electrosphere of Sensors	Development of new sensors based on a better understanding of the relation between sensing and knowing
Towards a New Knowledge System	Adapting educational techniques to online environments, and piloting various solutions (e.g. distributed online courses with tutoring, navigating through the stock of knowledge)
	Understanding the neural basis of knowledge acquisition, and the relation of cognition to experience more generally
	Devising intellectual property models and practices in open knowledge systems, and experimenting with new forms of IP sharing

MISSION-ORIENTED APPROACH TO IMPLEMENT TARGETED SCENARIOS

- MO R&I initiatives
 - **large scale** interventions
 - **clearly defined goal** within a **well-defined timeframe** with an important R&I component
 - can be **public** or **private** (though they mostly are public, there is often a PPP element)
 - are **ambitious, exploratory** and **ground-breaking** (that's one of the reasons why there need to be missions!)
 - are often **cross-disciplinary**, affecting a number of **industrial sectors** and **social contexts** ('cross-cutting')
 - target a **concrete challenge/problem** (often with a sense of urgency)
 - need a **mix of policy instruments** to be effective (R&I are not sufficient)
- Hence, while missions share a lot of characteristics with other types of 'systemic policies', the main differentiating feature is their level of **directionality and intentionality with respect to specific targets**

DIFFERENT TYPES OF MISSIONS

- Various typologies are used (narrow/broad, accelerators/transformers, etc.); here one example:
 - **Umbrella missions:** broad and generic frame covering various missions under a common roof (e.g. German High-Tech Strategy)
 - **Scientific missions:** Scientific target, but with limited application orientation (e.g. Understanding the human brain)
 - **Targeted technological missions:** the „classical“ type, with a clearly specified solution, often tied to a technological artefact (e.g. Apollo, Concorde)
 - **Transformative missions:** wicked, often poorly understood problems, adaptive goal-oriented solution-seeking (e.g. Energiewende, Dutch transition policies)
- **Several targeted scenarios** tend to fall under the category of **transformative missions**, but with elements of the other types

ZWISCHENFAZIT 2

- Targeted scenarios verbinden technologische mit organisatorischen und institutionellen Innovationen, sowie deren Umsetzung
- Sie sind eingebettet in und verstärken umfassendere Transitionen
- Sie formulieren Anforderungen an andere Politikfeldern, die erfüllt werden müssten, um die Umsetzung der Targeted Scenarios zu ermöglichen
- Als integrative Themen sollen sie unterschiedliche Stakeholder und Akteure mobilisieren helfen
- Unterschiedliche Arten von Forschung und Innovation müssen für die Realisierung der Targeted Scenarios zusammenwirken
 - Understanding-oriented
 - Solution-oriented
 - Regulatory science and experimentation
 - Social and organisational innovation for scaling
- Der missionsorientierte Ansatz kann als Modell für die Umsetzung von Targeted Scenarios herangezogen werden

KONSEQUENZEN FÜR DIE GOVERNANCE DER FTI POLITIK

Die Büchse der Pandora



FAZIT: TOWARDS TRANSFORMATIVE GOVERNANCE

- **Globale und gesellschaftliche Herausforderungen bleiben eine zentrales Thema für die europäische (F&I) Politik**, über die – so die Hoffnung – sich europäische Akteure eine globale führende Rolle bei der Bereitstellung von neuen Lösungen sichern sollen
 - Die angestrebten Transitionen bringen einen hohen **transformativen Anspruch** mit sich, der nicht von der F&I Politik allein eingelöst werden kann
 - Mit den **Missionen/Targeted Scenarios** versucht die EU-Kommission, dem Anspruch der Transitionen – zunächst für den Bereich der F&I Politik - zu konkretisieren und überprüfbar zu machen
 - Die Begründungen für Missionen/Targeted Scenarios müssen ihre **Verankerung deutlich stärker in übergeordneten oder sektoralen Politkfeldern** finden
 - Durch die sich abzeichnende Integration von KETs und Societal Challenges unter dem Dach von Missionen/Targeted Scenarios werden sowohl **inter- als auch transdisziplinäre Forschungsansätze** erforderlich sein

FAZIT: TOWARDS TRANSFORMATIVE GOVERNANCE (2)

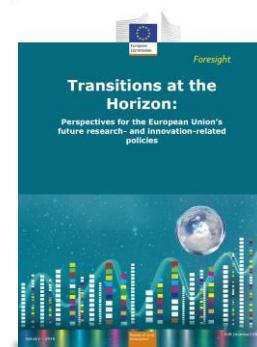
- Wenn die EK ihr eigenes Konzept ernst nimmt, stellt dies deutlich **höhere Anforderungen an die Governance** der EU F&I Politik (und darüber hinaus)
 - Der transformative Anspruch erfordert eine engere Abstimmung mit „downstream“ **sektoralen Politikfeldern** und deren nachfrageseitigen Instrumentarien („Policy Mix“)
 - Die Abstimmung zwischen **nationaler und europäischer Ebene** umfasst nicht nur die FTI-Politik, sondern aufgrund der Umsetzungs- und Investitionskompetenz auf nationaler Ebene auch deren sektorale Politiken
 - Für die Umsetzung der Missionen oder Targeted Scenarios wird ein **starke koordinative Führung** benötigt, die – je nach Thema – von eigenen Agenturen oder auch strategischen Partnerschaften mit entsprechenden Steuerungsstrukturen wahrgenommen werden könnte

FAZIT: TOWARDS TRANSFORMATIVE GOVERNANCE (3)

- Das „**Alignment**“ betrifft F&I Akteure, Stakeholder und Mitgliedsstaaten
 - Missionen können als „**focusing devices**“ auch leitend für industrielle und andere gesellschaftliche Stakeholder sein, die ihre Investitionen und ihr Verhalten an den politischen Missionen ausrichten
 - Aufgrund der höheren wirtschaftlichen und gesellschaftlichen Relevanz von F&I ist eine **frühzeitige und transparente Einbindung von Stakeholdern** zu Fragen der Ausrichtung/Orientierung der Forschung erforderlich
 - Der Aufbau größerer Strukturen für die Umsetzung der Targeted Scenarios/Missions hat massive **Auswirkungen für die Beteiligungsmöglichkeiten kleinerer F&I Akteure** (und deren Heimatländer)
- Innerhalb des Rahmenprogramms werden die **Verknüpfungen zwischen den ehemals deutlich getrennten Säulen** intensiviert
 - Umsetzung erfordert intelligente **Kombination und Integration verschiedener Arten von Forschung** (Understanding, Solutions, Regulation/Experimentation, Social Innovation/Scaling)
 - **Neue Ansätze für Monitoring, Integration und Adaptierung** längerfristiger Programme mit z.T. noch unklaren Lösungsansätzen erforderlich

BOHEMIA RESULTS

- **Phase 1:** Extensive review of available foresight to produce meta-scenarios relevant for Europe and deeper insights in topical fields (published in June 2017)
- **Phase 2:** Delphi survey to gain insights on future technologies, societal issues, and R&I practices based on the scenarios (published in November 2017)
- **Phase 3:** Analysis to combine meta-scenarios and Delphi results into targeted scenarios; online consultation and policy recommendations (published in May 2018)



The report describes a range of futures we might be facing in the 2030s, and suggests ways how research might create options for Europe to cope and flourish.

This report describes the full results of the Delphi survey, covering 150 statements about the future of research and innovation in Europe

The report describes four transitions as orientating frame for future European R&I policy, and positions 19 targeted scenarios as candidate missions on that landscape.

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