

RESEARCH, INNOVATION
AND TECHNOLOGICAL
PERFORMANCE IN GERMANY

COMMISSION OF EXPERTS
FOR RESEARCH
AND INNOVATION

EFI

REPORT

2021 2022 2023

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The Commission of Experts wishes to emphasize that the positions expressed in the report do not necessarily represent the opinions of the aforementioned persons.

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Executive summary

A Current developments and challenges

A 1 Impact of the COVID-19 Crisis on R&I

The COVID-19 crisis has hit the global economy abruptly and hard. The lockdowns imposed in Germany to contain SARS-CoV-2 entail massive economic imbalances as well as impairments in the science sector. For the majority of German companies, the current crisis situation negatively affects ongoing or planned innovation projects. SMEs in particular are expecting significant decreases in their innovation spending under the conditions of the COVID-19 crisis.

With short-term emergency measures to maintain solvency and prevent insolvencies on a broad scale, as well as economic stimulus programmes to combat the recession, the German government has provided important political impetus that also benefits the R&I system. However, the Commission of Experts calls for swift disbursement of the announced funds based on reliable eligibility criteria.

In the Commission of Experts' opinion, the crisis can also act as a catalyst for the transition to new technologies and thus improve Germany's long-term competitiveness. To this end, further economic stimulus programmes and growth policy measures should be designed with as much focus on R&I as possible. Against this background, the Commission of Experts explicitly welcomes the Federal Government's intention of using €60 billion from the economic stimulus package for investment and innovation.

A 2 Commentary on Current R&I Policy

In the past year, despite yet also partly because of the COVID-19 crisis, key future issues were advanced in R&I policy that are of great importance for maintaining Germany's competitiveness in the long-term.

The establishment of the Future Fund will strengthen the venture capital market in Germany and aims to improve the financing situation for start-ups. The Commission of Experts calls on the Federal Government to swiftly implement the Future Fund and suggests early and regular evaluations so that the instrument can be adapted where necessary.

The Commission of Experts welcomes the inclusion of the National Hydrogen Strategy and its additional funding of €7 billion as part of the Future Fund. However, it should be borne

in mind that a national market ramp-up should not take place without the simultaneous additional supply of renewable energy.

The Commission of Experts also welcomes the fact that the Federal Government is providing financial support worth €2.65 billion for quantum technologies. The joint initiative of the Federal Government, the Fraunhofer-Gesellschaft and IBM to operate Europe's first universal quantum computer at a German site serves to improve Germany's position in this field.

The Commission of Experts supports the intention to make the state a pioneer in the provision and use of data. It also suggests establishing coordination structures between the responsible agencies to ensure the transparent and standardized provision of data for research as well as more data- and evidence-based policies, and to enable the linking of data across public authorities.

A 3 Priorities for R&I Policy in the Coming Legislative Period

Although overcoming the COVID-19 crisis will be one of the key tasks of the new Federal Government in the coming legislative period, R&I policy must continue to be prioritized. A coherent policy approach for the entire innovation process to which all ministries are committed will be needed.

The Commission of Experts recommends that the new Federal Government aligns its R&I policy with five key priorities in the coming legislative period. High priority must be given to the grand societal challenges and, in particular, to the sustainability goals. It is equally important for the development of prosperity that Germany catches up with existing technological gaps and avoids these in potential key technologies from the outset. To achieve these goals, Germany, as a country poor in natural resources, must have a strong skilled labour base. With regard to R&I investment by private companies, it is moreover necessary to increase innovation participation. Finally, the agility of R&I policy is an important prerequisite for successfully implementing the transformative change desired by society.

B Core topics 2021

B 1 New Mission Orientation and Agility in R&I Policy

R&I policy has the responsibility to help meet the grand societal challenges. The Commission of Experts advocates that the Federal Government focuses more on the policy approach of New Mission Orientation for this purpose. In this approach, the state guides innovation activities in socially agreed directions that private sector actors do not take of their own accord. However, the Commission of Experts believes that the market as a discovery process must not be undermined. It therefore proposes a market-oriented version of New Mission Orientation, characterized by an openness to problem-solving and catalytic market interventions.

Successful implementation of this policy approach requires agile policymaking. The Commission of Experts welcomes that R&I policy has already become more agile in recent years but calls on the Federal Government to incorporate agility in political activity even

more systematically. To this end, the Commission of Experts recommends the following measures:

- When formulating missions, the Federal Government should ensure close cooperation between the various ministries and active involvement of stakeholder groups, expert panels, citizens, as well as the Länder and municipalities.
- Concrete objectives must be derived from the missions. These must have a time frame, and their fulfilment must be measurable. The time frame should be based on the missions' objective and not on the duration of legislative periods.
- When implementing missions, it is necessary to strengthen horizontal coordination within and between ministries. This can be accomplished by inter-ministerial task forces and, within ministries, by inter-departmental project teams or mission-related units within the organizational structure. These are each to be equipped with their own decision-making authority and budgets.
- Innovation-oriented public procurement should be further expanded and increasingly aligned with the socially agreed missions.
- In terms of a positive error culture, policy learning should be implemented more strongly to ensure that goal adjustments, readjustments of the organization and measures and even complete discontinuation are possible and accepted when implementing missions.
- For the purpose of policy learning, it makes sense to create more scope for reflection and freedom and to free up staff capacities in ministries and project executing agencies to this end.

B 2 Adaptation of Vocational and Continuing Education and Training to Digital Transformation

As a result of the digital structural change, many employees in Germany will have to change jobs in the coming years and reorient themselves professionally. In addition, job profiles in many existing workplaces will continue to change. To maintain professional action competence, it is therefore necessary to develop not only better digital core skills, but increasingly also traditional core skills such as problem-solving ability, creativity, initiative, and adaptability. It is therefore necessary to adapt vocational education and training (VET) to the requirements of the digitalized world of work and to strengthen job-related continuing education and training (CET). Against this background, the Commission of Experts recommends:

- The Federal Government should work towards ensuring that all training regulations are adapted to the changes brought about by digitalization and kept sufficiently up to date. Advice and assistance for implementing a VET design adapted to digitalization should be expanded – especially for SMEs.
- Training and continuing education of VET instructors and teachers must be geared even more closely to the new content-related and methodological requirements resulting from digitalization. An urgently needed complementary measure is to equip vocational schools with high-performance digital infrastructure across the board.
- The supply of additional qualifications during VET should be further expanded and be opened to job-related CET.

- Output-oriented criteria should be given strong weight in the accreditation and approval of CET providers in the field of publicly funded job-related CET.
- To support SMEs in job-related CET, the establishment of local and regional networks that organise efficient inter-company solutions should be promoted.
- Instruments to support preventive adjustment qualifications that facilitate an employee's well timed transition to a new employer should be tested. They must be designed such that both the previous and the new employer are involved adequately.
- To improve the information base for career and educational decisions, initiatives for a comprehensive monitoring of occupational skills that supports more tailored education and training should be advanced.

B 3 Gene Editing and CRISPR/Cas

The CRISPR/Cas gene scissors are a tool for gene-editing that gives new impetus to basic medical research and enables new therapeutic approaches for many diseases. By altering genetic information in a targeted manner, it becomes possible to directly remedy the causes of hereditary diseases. Particularly great potential lies in the field of somatic gene therapy. To exploit the potential associated with CRISPR/Cas, further major advances are needed both in research as well as in the translation of research results into application. The Commission of Experts therefore recommends the following measures:

- Approval procedures must be designed – always under the maxim of maintaining safety and ethical justifiability – in such a way that the administrative burden on researchers is reduced.
- To ensure that approval procedures can continue to be completed as quickly as possible in the future, staffing levels within the approval authorities must be adjusted at an early stage to the expected increase in approval procedures.
- Bundling of related applications and approval procedures should be made possible. In addition, efforts should be made to harmonize approval procedures across the Länder.
- In particular, interdisciplinary collaborations and working groups should be initiated and promoted that support translation and generate innovations through early interaction between research and clinical practice.
- For advising researchers and networking with various stakeholder groups, the establishment of a German Gene Therapy Centre should be discussed, which can assume the role of a competence centre for the translation of basic research and preclinical research into clinical application.
- The feasibility of clinical trials should be improved by more advantageous framework conditions, such as faster, more efficient, and less small-scale approval procedures.
- The framework conditions for the provision of private venture and growth capital should be improved.
- It is important to regularly inform society about the potential and risks associated with CRISPR/Cas and to continue the associated social discourse.

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