REPORT ON RESEARCH,
INNOVATION AND TECHNOLOGICAL
PERFORMANCE IN GERMANY

COMMISSION OF EXPERTS
FOR RESEARCH
AND INNOVATION

EFI

# REPORT

2026 2027 2028

2029 2030 2031

2032 2033 2034

This is a translated version of the original German-language
'Gutachten zu Forschung, Innovation und technologischer Leistungsfähigkeit Deutschlands',
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# EXECUTIVE SUMMARY

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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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This report is also the result of the highly competent and dedicated work of the staff of the Commission of Experts' Office and the staff of the Commission Members.

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# Executive Summary

# A Current Developments and Challenges

## A 1 Implementation of the High-Tech Agenda Germany

Given their importance for the competitiveness of the German economy and for Germany's technological sovereignty, the focus of the High-Tech Agenda Germany (Hightech Agenda Deutschland, HTAD) on selected key enabling technologies sends an important message. In international comparison, Germany's strengths lie primarily in the fields of climate-neutral energy generation and climate-neutral mobility. However, Germany is relatively weak in the key enabling technologies of artificial intelligence and microelectronics. This applies less to research than to the ability to produce inventions in the development and application of key enabling technologies.

With the levers identified in the HTAD, the Federal Government has identified the key starting points for strengthening the research and innovation system (R&I system) in Germany. Their consistent implementation could contribute to a significant increase in R&I activities. However, an ambitious R&I policy alone is not enough to increase the competitiveness of companies in Germany. A vital prerequisite for this is the creation of attractive general conditions for entrepreneurial activity.

As part of the 360-degree high-tech monitoring planned by the Federal Government, the financial efforts of the Federal Government in implementing the HTAD should be disclosed. In this annual report, the Commission of Experts presents concrete proposals for a methodological approach in this regard. Capturing the output side of key enabling technologies is particularly challenging in monitoring. The Commission of Experts recommends examining the diffusion of key enabling technologies with the help of web-based semantic methods, for example.

## A 2 Security-related Research and Innovation

Policymakers need access to expertise on security-related challenges and the corresponding policy options in order to act in an informed and strategically adept manner in an environment of changing threats. The Commission of Experts therefore recommends establishing and expanding institutions of excellence in the field of security-related research and teaching.

New technological solutions to security policy challenges are not necessarily produced by established players. Structures for networking and consulting activities can help to tap the potential of players who have not previously been active in the security sector. The Bundeswehr's new innovation centre, for example, offers the opportunity to improve cooperation and exchange between players in the R&I system and the Bundeswehr. The Bundeswehr should also develop a strategy for start-ups originating from the Bundeswehr.

R&I policy aspects should be given greater consideration in procurement processes for the Bundeswehr. It is important to actively use the legal opportunities for innovation-orientated procurement and to create the organizational conditions for this.

In addition, breakthrough innovations in the defence sector should be promoted by expanding the Federal Agency for Disruptive Innovation SPRIND or by establishing an independent agency.

## A 3 European R&I Policy

In 2025, the EU Commission presented its proposal for a 10th Framework Programme for Research and Innovation (FP10) and announced that it would be closely linked to the planned European Competitiveness Fund (ECF). The aim is to boost the EU's competitiveness.

The Commission of Experts supports this goal. Linking the ECF and FP10 could lead to the expansion of industry- and application-orientated research. In addition, linking the two programmes could strengthen the transfer from research to application in the short term, thereby contributing to greater growth among the companies receiving funding. However, it carries the risk of neglecting basic research and the promotion of new ideas and groundbreaking innovations, which are an important basis for securing long-term competitiveness and growth. The linking of the two programmes should therefore be carried out with a sense of proportion.

The Commission of Experts also recommends promoting disruptive innovations together with European partner countries. The planned introduction of ARPA-like mechanisms in the European Innovation Council (EIC) would be a possible step in this direction, but it requires two things: The EIC must be developed into an independent organization that is not controlled by the European Commission. It also needs a group of independent programme managers comparable to the ARPA institutions. Without this political and operational independence, the promotion of disruptive innovations should be driven forward by institutions outside existing EU structures.

## A 4 A 28th Regime for the European Single Market

The European single market remains highly fragmented, presenting challenges for start-ups and scale-ups wishing to expand into other EU countries. The European Commission plans to overcome the patchwork of national regulations with a so-called 28th regime. In this context, the term '28th regime' refers to a uniform legal form for companies at EU level, which would be created in

addition to the existing company law regulations of the 27 Member States. Various concepts have been put forward for its design.

The Commission of Experts considers the existing concepts to be important approaches to overcoming the fragmentation of the single market, at least in part. It recommends that the design of a 28th regime be geared to the needs of start-ups and scale-ups and that no complicated access criteria be formulated. Furthermore, a new legal form for companies should be implemented by means of a regulation rather than a directive to ensure its uniform design in all EU Member States.

If no majority can be found for a 28th regime within the EU, or if implementation by regulation cannot be enforced, the Commission of Experts recommends implementation within a coalition of the willing or as part of a joint German-French harmonization initiative.

# B Core Topics 2026

## B 1 Innovation in the German Mittelstand

The German Mittelstand, which consists of owner-managed companies, is characterized by long-term orientation, strong regional embeddedness, and a high level of entrepreneurial responsibility. Companies belonging to the Mittelstand are predominantly small and medium-sized enterprises (SME) and are less frequently active in research- and knowledge-intensive industries than non-Mittelstand companies.

Controlling for structural characteristics such as firm size and sector affiliation, Mittelstand companies were more successful than comparable non-Mittelstand companies in introducing product or process innovations over the period from 2005 to 2023. Moreover, despite significantly lower innovation expenditures, they realized higher shares of turnover from product innovations.

Innovative companies are more productive than non-innovative companies with comparable characteristics. This productivity gap is more pronounced in the Mittelstand, particularly when companies invest simultaneously in innovation and digitalization. However, innovation activities and productivity in the Mittelstand are constrained by bureaucratic burdens, skilled labour shortages, and the economic risks associated with innovation projects. To strengthen

innovation performance, the Expert Commission therefore proposes measures to improve the framework conditions in these areas.

The Expert Commission recommends, among others, the following measures:

— The application process for the R&D tax allowance should be further simplified, for example through leaner initial applications, simplified follow-up applications for previously approved projects, and (partly) automated data collection in line with the once-only principle.

— The Federal Government's Modernization Agenda and the Federal Modernization Agenda should be pursued and implemented decisively to reduce bureaucratic hurdles and simplify and digitalize administrative procedures.

— Knowledge and practical experience should be systematically incorporated into the design of specific regulations. To this end, the increased use of practice checks (Praxischecks) is recommended.

— Effective regulatory reduction should be guided by the cost–benefit ratio of individual regulations in the context of the overall regulatory framework, rather than by the sheer number of regulations. Practice checks (Praxischecks) should be preferred over rigid rules such as one-in-one-(two)-out, as the latter fail to adequately reflect the administrative burden associated with individual rules.

— The once-only principle must be implemented promptly and consistently. Instruments such as rule mapping can help identify and reduce unnecessary reporting and documentation requirements.

— The immigration of qualified skilled workers must be simplified and the associated procedures accelerated. The Work-and-Stay Agency envisaged in the coalition agreement could integrate all procedures related to entry, recognition of qualifications, credential assessment, and the issuance of residence permits. Key success factors include a practice-oriented design, regular evaluation, and tangible relief for skilled workers, students, and companies.

## B 2 Competition and Innovation in the German Higher Education System

Competition in the German higher education system has intensified significantly as a result of the increased formal autonomy of universities and the associated shift towards 'output-orientated' management. In the field of research, competition for third-party funding is particularly fierce. In its current form and implementation, it is associated with considerable personnel and resource requirements and can disadvantage particularly innovative project ideas.

In the field of teaching, competition for students has intensified in view of stagnating student numbers and a growing number of private offerings. However, quality-based competition is limited by a lack of transparency regarding teaching quality, study success and labour market outcomes. At the same

time, applications of artificial intelligence are fundamentally changing the skills required of graduates. Germany is an internationally attractive place to study and has high retention rates for international students, but their integration and transition into the German labour market continues to face barriers.

Technology transfer, as a central pillar of the 'third mission' of universities, is gaining political importance, but in practice it is often not yet treated as a core task. Research-based academic start-ups and patent applications have recently been on the decline, even though research at German universities is increasingly relevant to innovation. Major constraints include inadequately equipped transfer structures, a lack of incentives for transfer activities, lengthy IP negotiations and breaks in the funding chain from research to application.

The Commission of Experts therefore recommends the following measures, among others:

— The strategic capacity of universities to act should be strengthened and their profile building facilitated by aligning funding more closely with the diverse tasks of universities, reducing administrative requirements and speeding up appointment procedures.

— Competitive research funding should be made more agile and less administratively burdensome. Cutting-edge research should be funded consistently and exclusively on the basis of research-related criteria of excellence.

— University teaching should be further developed to meet the changing skill requirements driven by artificial intelligence. Labour market-related indicators for assessing teaching quality should be established across the board, the internationalization of teaching should be expanded, and the transition of international graduates into the German labour market should be facilitated.

— Knowledge transfer should be institutionally embedded as a permanent core task of universities. Successful transfer requires a holistic and actor-inclusive overall strategy that consistently leverages the high innovation potential of excellent research. As part of a 'transfer time' initiative, time should be made available for transfer activities and IP transfer processes should be accelerated. The measures announced in the coalition agreement to improve the framework conditions for technology transfer should be implemented promptly and integrated with the EU funding system.

## B 3 Development and Application of Artificial Intelligence in Germany and Europe

Artificial intelligence (AI) offers enormous potential for innovation and opportunities for economic growth. It promises productivity gains and enables new products, services and business models. For Germany and the EU, the successful development and application of AI is therefore a key lever for securing the international competitiveness of companies, strengthening digital sovereignty and maintaining prosperity in the long term.

The analysis clearly shows that although Germany and Europe have strong research landscapes and have achieved initial success in the application of AI, they lag behind in international comparison, especially with the USA and China, in the development of AI models and the transformation of AI in value added.

To catch up with USA and China and avoid further technological dependencies, the Federal German Government should align its AI strategy with Europe. The aim is to strengthen European digital sovereignty and achieve key elements of value added in Europe. To this end, a powerful AI infrastructure must be established quickly, excellent research and development must be promoted, an innovation-friendly regulatory framework must be created, and the broad economic application of AI in Germany and the EU must be supported.

The Commission of Experts recommends the following measures, among others:

— To increase the total investment volume in AI in the EU, private investment is urgently needed in addition to public funding. To this end, it is essential to create more business-friendly conditions, for example through a 28th regime.

— Germany and the EU should pursue dynamic expansion targets when establishing data centres at European level. To keep up internationally, the EU should set itself the goal of providing 10 to 15 percent of global compute power within the next five years. This requires enabling the private sector to drive forward expansion rapidly. Where data centres are built with public funds, accompanying monitoring must be put in place.

— To strengthen digital sovereignty, reduce security-related dependencies on non-European AI providers and facilitate the development of derivative models, the Federal Government should provide funding to promote private-sector European cooperation on the development of an open-source foundation model. Since the competitiveness of such models requires iterative further development, the EU and its Member States should provide long-term support for the foundation model as anchor customers.

— Germany and its European partners should promote research and development of AI models that offer the potential for the next fundamental breakthrough in global AI development. In light of high electricity costs, research and development into energy-efficient models should be systematically supported.

— A key obstacle to training European AI models is legally secure access to data. To this end, the General Data Protection Regulation should be amended accordingly to facilitate the training of foundation models, and opportunities for the joint training of specialized models should be created (e.g. data trustee models and the legally secure use of privacy-enhancing technologies).

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