



Innovation policy, information society, telecommunications

# The Technology Campaign of the Federal Ministry of Economics and Technology

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Federal Ministry  
of Economics  
and Technology

Innovation policy, information society, telecommunications

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## Foreword



The global success story of German industry is based on a certain mentality: a desire to seek out opportunities, and an openness to technology. Numerous innovative entrepreneurs and clever inventors laid the foundations for the record economic upturn of the last few months. If the German economic miracle is to continue, we now need to take advantage of the momentum of this upswing. Germany's future lies not in backward thinking, but in stimulating the future. I have therefore launched a new Technology Campaign in order to provide this stimulus.

This Technology Campaign aims to further improve the environment for research and development. For example, our technical rules and regulations should become more competition-oriented. And we need fresh ideas to help our companies attract highly skilled workers.

Germany's innovative "Mittelstand" – its sector of small and medium-sized enterprises – stands for creativity and inventiveness. For this reason, the Federal Ministry of Economics and Technology will continue to expand the support it provides to innovative SMEs – as well as streamlining this assistance to make it even more effective.

A handwritten signature in black ink that reads "Rainer Brüderle". The script is cursive and elegant.

Rainer Brüderle

Federal Minister of Economics and Technology

## Introduction

The continuous development of new, globally recognised products and services is a driving force for growth and jobs in Germany. A key role is played by the 100,000-plus innovative companies and a highly-developed research infrastructure which is closely networked with the business community. Research work is particularly valued in Germany. 2.8% of the country's GDP is spent on research and development (R&D) – one of the highest rates in the world. 63% of all companies are innovative enterprises – one of the highest proportions in Europe. Germany also plays a leading role on the world markets in the field of technology. But the competition is getting increasingly tough. Many countries – particularly in Asia, such as China, South Korea and India – are catching up, including in highly sophisticated fields of technology.

If Germany is to remain a world leader in terms of technology, it needs to make itself fit for the future. Above all, it needs to tackle structural weaknesses, especially in the education system and in terms of new start-ups. With regard to spending on education as a proportion of GDP, our rate of 4.7% is below the OECD average of 5.7%. The proportion of venture capital to GDP is also well below average: in Germany, the figure is a mere 0.05%, compared with an OECD average of 0.11%.

This **Technology Campaign** aims to provide a fresh impetus in order to maintain Germany's high standard of technology in the future. The Campaign is embedded in the German Government's High-Tech Strategy. This initiative of the Federal Ministry of Economics and Technology aims to further enhance the policy framework and to foster applied research in small, medium-sized and large companies. It is also intended to supplement the Ministry's activities in other key fields of policy affecting such companies, e.g. support for international trade and investment, securing raw materials, and attracting skilled workers.

In the context of this Technology Campaign, the Federal Ministry of Economics and Technology will:

- ▶ **further improve the environment for research and innovation,**

- ▶ **lastingly strengthen the research and innovation capacities of small and medium-sized enterprises,**

- ▶ **orient the support available for key technologies to the challenges of the future, and**

- ▶ **make technology policy more transparent and efficient.**

As Germany moves along this path into the future, the decisive steps have to be taken by the business community. The Economics Ministry aims to serve as a partner for business and wishes to support the private sector as it travels along this path. But the prime task for the state must be to provide a pro-competition and pro-innovation policy environment; state aids can only play a subordinate role.

The development of new technologies may entail risks which private companies or inventors cannot cope with on their own. In such cases, there can be a supplementary need for government backing in order to provide adequate incentives for research and development. This point is also highlighted by the Council of Economic Experts. Public assistance for R&D is justified only when market mechanisms do not work, especially in the field of basic research, but to a lesser extent also in the field of close-to-market R&D. The closer the research is to the market, the lower the assistance. That is the fundamental philosophy underpinning the technological assistance provided by the Federal Ministry of Economics and Technology.

Following this basic orientation, the Federal Ministry of Economics and Technology will **increase the budget funding for measures relating to technology policy from 2.3 billion euro in 2010 to 2.8 billion euro in 2013**. This represents a near doubling of the technology budget in the last ten years. The budget of the Central SME Innovation Programme (ZIM) alone is growing from 313 million euro in 2010 to 528 million euro in 2013. Another focus is on the key technologies which are of special relevance to tackling climate change, such as energy technology, IT, and aerospace. For the first time, a separate specific

budget is being provided for electric mobility. This budget increase is taking place in tandem with budget cuts in other policy fields, so that the Ministry's overall budget is actually shrinking. In this way, we are undertaking a structural shift from subsidies oriented to the past across to investment in Germany's future.

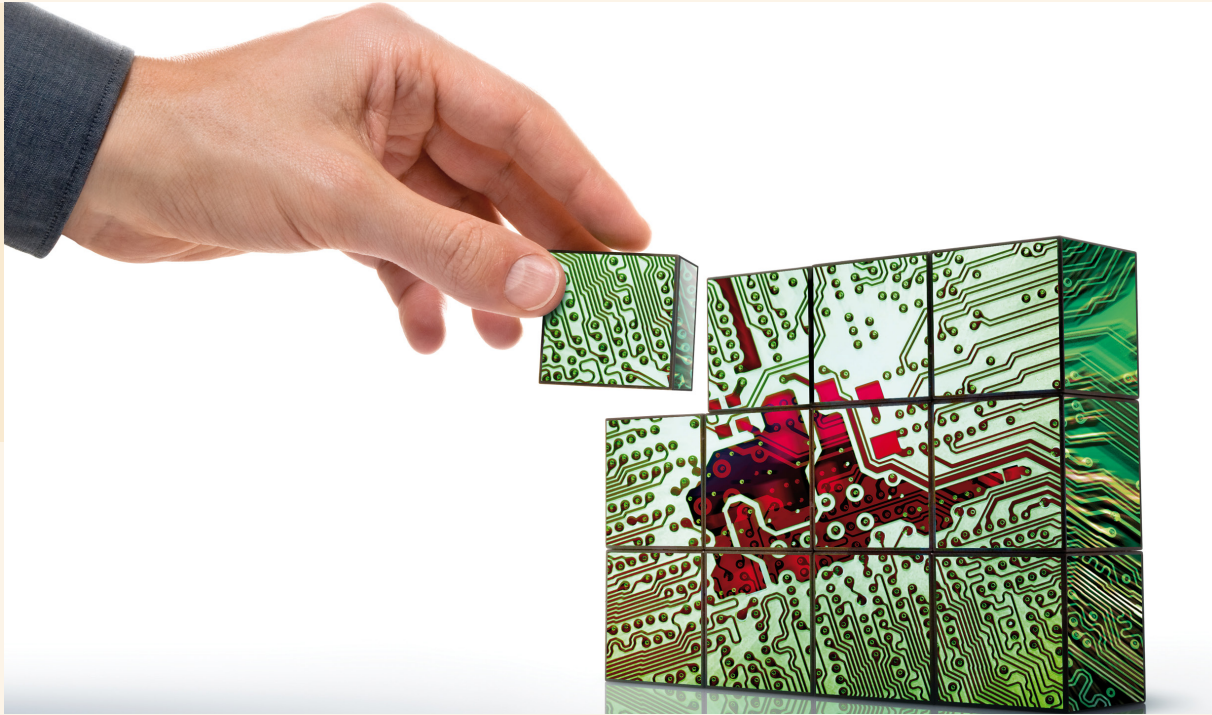
In order to squeeze even more out of the funding, the Ministry is for the first time screening all the technology policies as part of a new, overarching strategy on government assistance. A special working group will test the efficiency of all the government programmes. On the basis of this screening, some of the programmes will then be merged to form larger, coherent programme families, whilst others will be discontinued. In this way, funding will be freed up for

the key policy fields mentioned above; at the same time, the structure of the programme portfolio is to be simplified.

Government assistance for commerce and science in the field of technology policy needs to enjoy the support of society in general. For this reason, a successful technology policy needs to promote an open-minded attitude to technology whilst ensuring high German and European product safety standards. New technologies can conquer disease, tackle climate change and improve many people's lives. We need to gain public acceptance of innovation and new technology. Here, we need to overcome many barriers. Technology-phobia per se and backward-looking thinking will not get us anywhere. On the contrary: people who only see the risks will miss the opportunities.



# 1. Improving the environment for research and innovation



The Economics Ministry will further improve the environment for research and innovation. Companies need rules for their decisions on innovation and investment which foster competition to generate the best ideas and which take account of the latest technological developments. The rules should be so flexible that they leave a lot of scope for creativity and risk-taking.

► A pro-active **venture capital market** is an important precondition for successful high-tech start-ups. However, Germany's venture capital market is weak compared with other countries, and there is a particular shortage of private-sector venture capital for new entrepreneurs and young technology firms.

The **High-Tech Start-Up Fund** provides venture capital for innovative start-ups. It has already enabled numerous highly promising start-ups to get going. In order to safeguard the success achieved by this fund, the Ministry will advocate a follow-up fund to cover the period after summer 2011. Once again, there should be a private-public partnership involving leading German technology firms. For this we need further industrial investors to be willing to put up a substantial proportion of private-sector money for the

fund. Without that, it will not be possible to achieve a smooth continuation of the successful work done by the High-Tech Start-Up Fund.

Germany needs internationally competitive tax rules for venture capital. The Economics Ministry will therefore work with the Finance and Research Ministries on **possible tax concessions for venture capital funding**. The idea behind this is to incentivise private investors (business angels) to put money into young high-tech firms. In particular, the focus will be on providing a limited tax exemption for capital gains if these are reinvested in innovative young companies.

As part of the EXIST Initiative, the Economics Ministry will support **higher education institutions** as they develop their own **start-up strategies** and launch **private-sector spin-offs**. Research ideas can only be transformed into successful enterprises if universities and colleges have a culture of entrepreneurship.

► Companies need **highly skilled experts** if they are to flourish. But Germany's pressing need for engineers is not being met – there are already 100,000

vacancies. And the gap is likely to widen even further in the coming years.

The Economics Ministry's **Skilled Workers Initiative** aims to make better use of the potential on the domestic market, and to attract more foreign skilled labour.

For example, we aim to attract more women into mathematical and technical occupations (known in Germany as "MINT occupations"), to shorten the procedures for recognising foreign qualifications, and to motivate young people to study engineering. Also, we have set up labs for school students in some research facilities in which our scientists can whet young people's appetites for technology.

In order to facilitate the immigration of engineers from abroad, there is an urgent need to alter Germany's residence rules so that the income thresholds applying to highly skilled workers coming into the country are lower. In the medium term, we need smart rules with clear entry criteria which are largely based on the qualifications of the immigrants, as is already customary in many other countries.

► **Patents and standards** are strategic instruments for technology transfer which enable new research findings to be transformed rapidly and effectively into marketable products, thereby generating competitive advantages for German firms. Patents safeguard intellectual property. Standards play an important role in creating a market for new products and processes.

In Europe, the Economics Ministry is working towards a **low-cost, user-friendly EU patent and for a single European patent jurisdiction**. Talks have been going on for several years now, and they need to be rapidly concluded so that Europe can have EU-wide patent protection.

The Economics Ministry will give greater support to small and medium-sized enterprises, individual inventors and higher education facilities in terms of **legal protection** and commercial exploitation of their innovative ideas. The instruments will be made more market-oriented; in future, there will be competition between the patent exploitation agencies.

The Economics Ministry provides additional incentives for the early transformation of research findings into marketable products via **standardisation**. The earlier the companies take account of standardisation issues in forward-looking areas, such as electric mobility, the better the market opportunities for their new products will be. After all, the person setting the standard gets the market.

► New technologies place **new demands on measuring equipment and procedures**. Nanotechnology, for example, needs entirely new measurement and assessment procedures, e.g. in order to ensure the safety of nano-products in terms of health and the environment.

The Economics Ministry will launch a **fundamental reform of the metrology system**. The main aim is to keep pace with the rapid development of technology. At the same time, the rules should be made more flexible in order to cut costs for business and to make the procedures more economic.

► It is estimated that the **public sector purchases goods and services** worth around **250 billion euro** a year. This offers considerable potential for innovation. The purchase of state-of-the-art products and the latest technical solutions not only saves the state costs and energy, but also encourages businesses to bring innovations to market. At the same time, the state fosters the spread of innovation.

The Economics Ministry will speed up the implementation of the **guidelines for innovation-oriented public procurement**, which have been adopted by several federal ministries, and look into new initiatives, such as the pre-competitive procurement of research services.

By promoting the new **"REPROC" pilot project**, we aim to standardise procurement processes and have most of them handled electronically.

These measures are backed by the **"Innovation creates a lead"** prize, which the Economics Ministry awards together with the Materials Management, Purchasing and Logistics Association. The aim is to

disseminate the use of particularly innovative purchases by contracting authorities.

► Germany has a **highly efficient research infrastructure** which produces outstanding research and is closely networked with the business sector. The Economics Ministry itself is responsible for several leading research establishments, like the German Aerospace Center, the PTB (national metrology institute), the Federal Institute for Materials Research and Testing, and the Federal Institute for Geosciences and Natural Resources.

In co-operation with the Research Ministry, the Economics Ministry will further progress the **Academic Freedom Initiative**, in particular in order to achieve greater flexibility and responsibility on the use of budget funding and the recruitment of top brains. After all, our research establishments are competing globally to attract the best researchers.

The Economics Ministry will increasingly motivate the **research institutes to work together with commerce**. To this end, the co-operation programmes have been opened up and new incentives have been specifically targeted at the Federal Institutes.

Also, the research establishments are **regularly evaluated** with a view to maintaining their high performance level and to meeting future challenges.

► Germany faces global competition as a **base for technology**. For this reason, we need to promote R&D in Germany. Technology products from Germany need to enjoy IPR protection, and the export of such products needs support from the instruments we use to promote international trade. Europe's internal research and innovation market needs to be developed further. This is especially important for a country which is so

deeply integrated into the European and global economy.

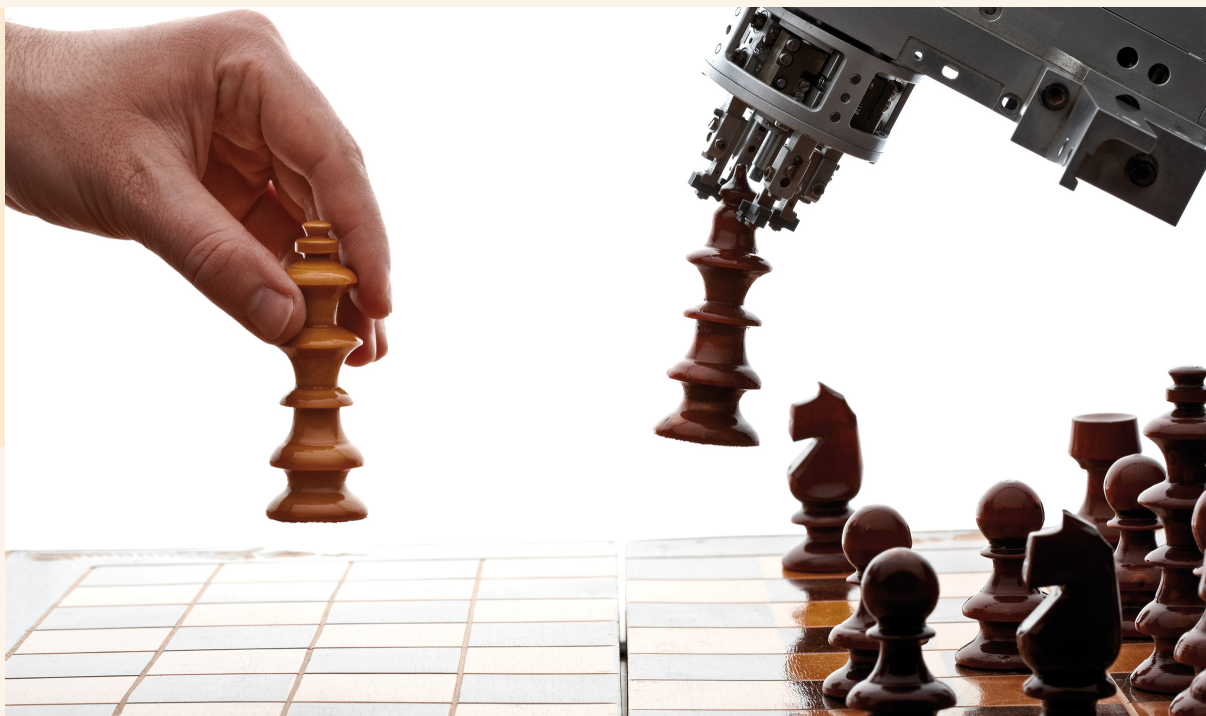
The Economics Ministry will further optimise its **instruments to promote international trade and investment** (such as the export credit and investment guarantees, the information services of Germany Trade and Invest, the bilateral chambers of commerce, and business missions) in order to provide even better backing for the export of German high-tech products and for German foreign direct investment. Together with Germany Trade and Invest, the Economics Ministry will increase its efforts to attract inward investment by foreign firms wishing to do R&D in Germany.

The Economics Ministry is calling for a rapid entry into force of the plurilateral Anti-Counterfeiting Trade Agreement in order to improve the international protection afforded to **intellectual property rights**.

In the context of the **European Commission's new "Innovation Union"**, the Economics Ministry supports the reorientation of European research and development policy, which increasingly aims to transfer technology to commerce and society so that people can work together to tackle the challenges facing society.

The Economics Ministry is working in the policy-making bodies to encourage the European Commission to substantially **simplify its assistance programme procedures** and to **streamline the system of European assistance**. Programmes with too little European added value need to be discontinued. Innovative companies need an easy-to-understand range of instruments providing assistance, as well as rapid and lean authorisation procedures.

## 2. Boosting research and innovation by SMEs



Thanks to their flexibility, small and medium-sized enterprises (SMEs) are important driving forces for innovation. However, many of them lack the financial resources needed to invest enough in R&D. For this reason, the Economics Ministry will give a lasting boost to the capacity of the SME sector to undertake R&D. In line with the EU guidelines, the aim is to offset size-related disadvantages and to foster the internationalisation of SMEs – an aspect which is becoming increasingly important. The programmes are un-bureaucratic and technology-neutral – i.e. the substance of the assisted projects is demand-driven.

► Co-operation on research and technology between SMEs, large companies and research establishments is particularly important in order to accelerate the transfer of technology from research to commerce and to improve the financial basis for research and innovation in SMEs. For this reason, the **Economics Ministry is reinforcing its SME-oriented technology programmes.**

The Economics Ministry's **Central SME Innovation Programme (ZIM)** is a technology-neutral programme which can serve all fields of technology. The nature of the projects ranges from individual pro-

jects to co-operation with research establishments and innovative networks. International projects with partners from other countries are actually given a bonus. The conditions for applications to the programme have been greatly simplified and the processing times sharply reduced (to an average of only three months). It is planned to substantially increase the budget for the programme in the coming years.

In the context of **Joint Industrial Research**, the Economics Ministry promotes pre-competitive research projects by companies which have joined forces in research associations. This instrument will increasingly also provide support to cross-sectoral and international projects, and will be fully converted to a competitive application procedure.

The **ERP Innovation Programme** is another major support instrument; it chiefly supports close-to-market innovation projects with long-term low-interest loans. In this way, all innovative SMEs are eligible for assistance.

► Smaller firms often lack the up-to-date knowledge they need if they are to successfully manage innovation. **Qualified external advice** can however give

them targeted help, thus enabling them to innovate. Many companies lack the money for this, and most of them do not know which consultants offer a high-quality service.

In 2010, the Economics Ministry introduced new **innovation vouchers** for advisory services on innovation; these help small firms to take advantage of expert advice at low cost. From spring 2011, the innovation vouchers will be extended to cover questions of efficient raw materials usage and materials consumption.



### 3. Orienting support for key technologies to the challenges of the future



The major key technologies are vital driving forces to make Germany fit the future. They include energy, biotechnology, nanotechnology, production and optical technology, microelectronics and nanoelectronics, and information, communication and space flight technology. It is our aim to remain a world leader in terms of research into these technologies, and especially in terms of their realisation in the form of new products and processes. That is the only way for us to maintain our prosperity and safeguard our employment on a long-term basis and to master the challenges of the future. The Economics Ministry will make the co-ordination of those technologies where Germany can profit from its strength on the world market, e.g. in the automotive and mechanical engineering sectors, more targeted, more efficient and better. And the support system must leave scope for forward-looking fields like electric mobility.

In detail, the Economics Ministry will set the following specific measures in motion:

- In its **Energy Concept**, the Federal Government has formulated its challenging goal of halving primary energy consumption in Germany by 2050 and raising the proportion of renewables in energy consump-

tion to 80%. At the same time, a high degree of energy security and an economically viable energy supply need to be ensured, so that Germany can continue to be a competitive industrial nation on a permanent basis.

As the lead ministry for energy policy, the Economics Ministry will present a new **energy research programme** in spring 2011. The key aspects of the programme will be: renewable energy, energy efficiency, energy storage technology and grid technology. This will be supplemented by research work by the German Aerospace Center in the fields of energy efficiency and renewable energy. A central information system will be set up in the Economics Ministry to achieve greater transparency of the government support policies and better evaluation of developments in technology.

- As things stand at present, **electric mobility** is the most promising concept for environmentally compatible mobility in future. This is a new value chain which embraces sectors like the energy industry, IT and mobility service providers. By 2020, there should be one million electric vehicles on Germany's roads.

The Economics Ministry will establish a **separate budget item** this year to support electric mobility, to increase to 90 million euro a year by 2013. Funding will go for example towards new and optimised drive concepts for hybrid and pure electric vehicles, towards battery research, towards standardisation in the field of the electric drive system, and towards the optimisation of production technology in the new value chain. One of the themes is “ICT for Electric Mobility”, and here we are promoting ICT-based charging, control and billing infrastructures as well as business models and services based on this.

The Economics Ministry has played a major role in establishing the Federal Government’s **National Electric Mobility Platform**: this renders transparent all the research and pilot projects of industry, research and the state. The aim is to generate synergies and to make Germany not just a lead market, but the world’s leading supplier of electric mobility.

► **Space flight** is a key to the tackling of global challenges like climate change, globalisation and civil safety and security. Private-sector business models and commercial applications are becoming increasingly important in this field. The private sector is making more and more use of space technology. The Lisbon Treaty has given the EU responsibility in the field of space policy. This raises questions about the future distribution of roles.

On 30 November 2010, the Federal Cabinet adopted the **new space strategy** presented by the Economics Ministry. The strategy focuses on the contribution made by space technology to the tackling of global challenges like climate protection, mobility, communication and safety/security. The new space strategy is oriented to needs and benefits, scientific excellence and sustainability. A crucial role is played by international and especially European co-operation because major, cost-intensive space flight projects can only be realised if financial resources are pooled internationally. Space robotics is an important new focus: it is a key technology for all other space-related applications and is also a springboard for applications on earth.

► **Aviation research** is of great strategic value because its findings are also used in many other sectors. Air traffic is of immense significance for the entire economy, and contains a high degree of potential growth. Innovations like the current transition from metal to composite aircraft entail high technological risks and high costs. Nevertheless, they remain indispensable, so that Germany can remain well-positioned compared to other countries, with even more environmentally friendly, safe and comfortable aircraft.

The Economics Ministry will orient the national **Aviation Research Programme** even more strongly towards the issues of “sustainable air traffic” and “innovative manufacturing processes for new materials (composites)”. The programme will be continued at a high level. A further call will be launched in 2011, with support funding of around 250 million euro available. The Economics Ministry is working in the European context on a long-term strategy for a sustainable air traffic system. Research projects to reduce fuel consumption could in future be partly financed from revenues from the sale of emissions trading certificates.

► The development of **new transport and logistics systems and of innovative maritime technologies** will enhance the competitiveness of leading branches of the economy like automotive manufacturing, trade, and ship and marine technology. The high level of expertise in the maritime industry can for example be seen in the fields of special shipbuilding technology, manufacturing, and safety and environmental protection systems.

The Economics Ministry’s “**Mobility and Transport Technology**” transport research programme aims to improve the efficiency of the overall transport system, to increase the competitiveness of German industry, to reduce transport-related pollution, and to improve the mobility services for the public.

The Economics Ministry has reoriented its “**Next-Generation Maritime Technologies**” research programme. In future, the emphasis will be not only on transport, but increasingly also on national energy and minerals security. Also, Germany’s strengths in ship and marine technology are to be further devel-

oped. The “Intelligent Systems for Marine Technology” beacon project to secure energy and mineral resources is intended to help to open up new market potential here.

The Economics Ministry’s **Shipbuilding Innovation Support** promotes the market launch of new shipbuilding concepts. This will orient shipbuilding in Germany more to the manufacture of state-of-the-art, safe and environmentally friendly vessels.

► The **information and communication technologies (ICT)** are key technologies and a catalyst for innovative products and services throughout the economy. The potential of ICT to generate growth and jobs and to foster an efficient use of resources and energy is far from being exhausted.

With the Economics Ministry taking the lead, the Federal Government redefined its objectives in the **Digital Germany 2015** ICT strategy in November 2010. In particular, the expansion of broadband is to be accelerated, and applied research and development projects enhanced. Also, SMEs are to be given greater help with using the latest ICT.

Once example is the **“E-Energy – ICT-based energy system of the future” beacon project**: under it, six model regions are to show how the use of new ICT can foster more efficient use of the energy systems. The Economics Ministry’s “THESEUS” beacon project supports the development and testing of basic technologies for the “internet of services”. The new “Trusted Cloud” programme promotes innovative applications in the field of cloud computing. The “Start-Up Competition – Innovative ICT” provides enhanced incentives to increase the number of ICT start-ups.

The Economics Ministry has closely integrated the ICT strategy with the **IT Summit**, a high-level platform for co-operation between government, commerce and academia.

The Economics Ministry will keep adapting the **law on digital signatures** and the **Telemedia Act** in line with ongoing developments. A revision of the law on digital signatures is currently being prepared, to create more scope for commerce and administration to use documents with electronic signatures. An electronic stamp signature is to be introduced.



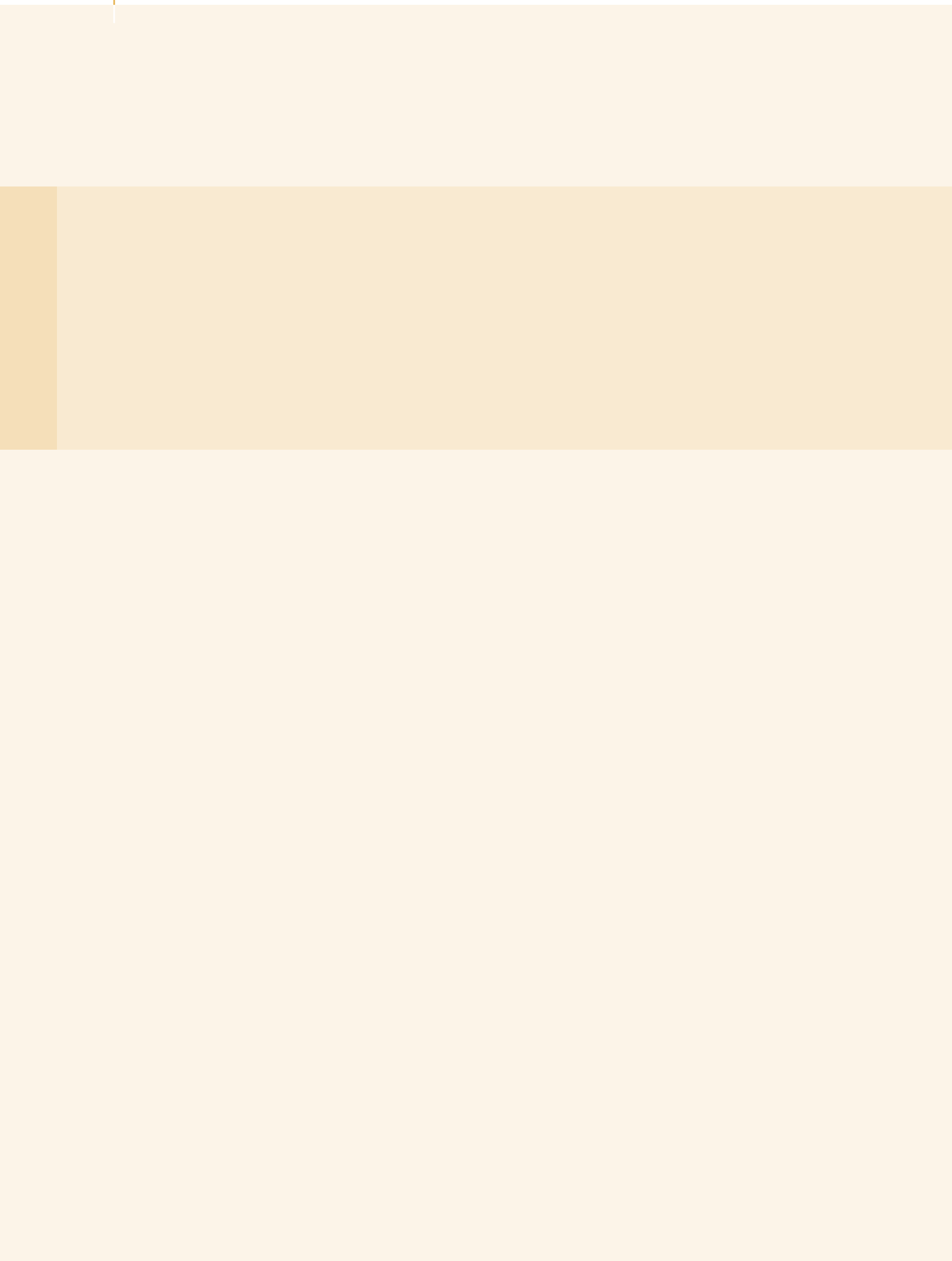
## 4. More transparency and efficiency in technology policy




Technology policy must be **transparent** and understandable for the **public**. It must be constantly developed and evaluated in a dialogue with experts.

In the context of the Technology Campaign, the Economics Ministry will hold **events on the individual technology themes**, in order to bring the stakeholders and the experts together, to provide them with a platform for debate, and to present new policies to the public. We will hold a central event with high-level representatives from commerce and research on 31 March 2011.

The Economics Ministry will subject its technology promotion programmes to ongoing **external evaluation** in order to make them more efficient. For the first time, the technology programmes for innovative SMEs will be studied as a whole, not least in comparison with the support systems of other countries. The results of the study will be available in early 2012.







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