is not an innovative body able to carry out scientifically based planning of innovation in the education system. The principle of unanimity still applies to its decisions, although that principle has been loosened somewhat for key decisions. With its annually changing presidency, and the ongoing shifting of partisan interests that that entails, the KMK was in need of reform even prior to the prohibition on co-operation. That need has become all the more apparent following the Federalism reform. The Expert Commission thus recommends that a body be established that has a longer-term focus and that has governance structures that are less subject to blockage, are scientifically founded and are able to move forward in improving the education system.

Germany's federalism has been a success. The prohibition on co-operation, however, has halted progress in improving Germany's overall educational standards and levels – and, thus, is braking the development of Germany's innovation sector. Efficiency and performance improvements are possible within a system of co-operative federalism, as the area of research funding has proven. For this reason, the Expert Commission urgently recommends that the prohibition on co-operation be suspended. As a central policy area, education policy must be seen as a multi-level task. Federal impetus could help trigger urgently needed reforms in the education sector.[173] At the same time, suspension of the prohibition on co-operation, and strengthening of co-operative structures, will not alone suffice to solve the problems involved. Such moves have to be followed by suitable education-policy measures. The German education system can be successfully improved only through decisive, concerted efforts, aiming toward specific education-policy goals.

B 2 THE EUROPEAN DIMENSION OF R&I POLICY

Since the year 2000, an attempt has been underway, in the framework of the European Research Area (ERA), to improve Europe's performance as a centre for R&I. To that end, targets and support instruments have been developed, at the level of the Member States and of the EU, aimed at intensifying co-operation and co-ordination and at enhancing information exchange between actors in the R&I sector.[174]

As a result of this development, R&I policy in Europe is no longer being managed on the exclusively national basis that guided such policy until about two decades ago. The purpose of such measures is to establish Europe as one of the world's leading research regions. As part of such efforts, its quality standards in research and innovation, already high in some regards, are to be improved, and European economic growth is to be reinforced in a lasting way. R&I activities co-ordinated on an EU-wide basis are to become the heart of European growth policy.

The Expert Commission welcomes the ERA initiative, since it can help reinforce research and innovation in Europe in a lasting way. In this chapter, the Commission comments on the recent development of European R&I policy and provides proposals for its future structure and orientation.

Origin, aims and instruments of the European Research Area (ERA)

Until the year 2000, R&I policy in Europe was nationally fragmented in the extreme. A few trans-boundary initiatives, along with the Framework Programmes (FP) for Research and Technological Development, which were launched in 1984, the EUREKA and COST programmes and a small number of joint research centres[175] were exceptions. Until the year 2000, intensive co-operation developed solely in the areas of nuclear research, aerospace and defence. Basically, R&I policy remained a national concern for each of the Member States, however.[176]

In the past ten years, the field of R&I policy has generated great dynamism at the EU level and grown considerably in importance. The initiative for establishment of the ERA, which was launched in 2000, brought a reorientation focused on a coherent European innovation policy. Figure 02 presents the steps taken to date within that initiative.

European R&I policy, in its reoriented form as of 2000, concentrates on three core areas:[177]

– Creation of a European Research Area with improved co-operation structures, livelier competition and optimised use of resources,
– Improvement of co-ordination between national research activities and strategies,

– Development of a European research policy that integrates all policy areas of relevance to R&I policy, at the European and national levels.

To achieve these aims, a range of new policy instruments were introduced[179] that complement conventional co-operation-support strategies. Among these are jointly defined national aims, strengthening of excellence support provided by the European Research Council (ERC) and the European Institute of Innovation and Technology (EIT), and co-ordination measures such as the European Technology Platforms (ETP), ERA-Net and ERA-Net Plus (cf. Box 02). These instruments were positively received in Germany in particular. In October 2010, acting under the impression of the financial crisis, the European Commission presented the strategy paper "Innovation Union", oriented to the further development of European R&I policy through 2020. That paper calls for increases in R&D expenditures, for more effective funding allocations and for modernisation of European education and research institutions, with an emphasis on promoting excellence and enhancing support provided by business enterprises.[180]

Funding programmes and resource allocations

Figure 03 shows allocations of resources in important European R&I policy programmes.[181] The overview also includes the budgets of major European research institutions, such as the European Organisation for Nuclear Research (CERN) and the European Space Agency (ESA). The various funding programmes are described in Box 01.

The following sections focus in greater detail on the Structural Funds, the 7th Research Framework Programme (FP7) and the European Research Council.

Innovation support in the framework of the Structural Funds

The most important contribution, quantitatively speaking, to promotion of innovation in the European economic sector comes from the Structural Funds.[182] Support in the framework of the Structural Funds is provided via a large number of national and regional programmes, initiatives and measures to which the Structural Funds make financing contributions. On the one hand, the Structural Funds are oriented to strengthening of cohesion – with an emphasis on supporting catch-up development of selected regions in the Member States. On the other hand, innovation support has been growing in importance. The Expert Commission doubts whether the aims and processes of cohesion policy can be usefully combined with the aims and processes of innovation policy.[183] The European Commission itself takes a critical view of the current situation – although it does so from a different perspective. In the framework of the Europe 2020 initiative, it proposes that Structural Funds allocations be tailored more precisely, duplicate financing be avoided, and greater attention be given, in funding, to regional circumstances.

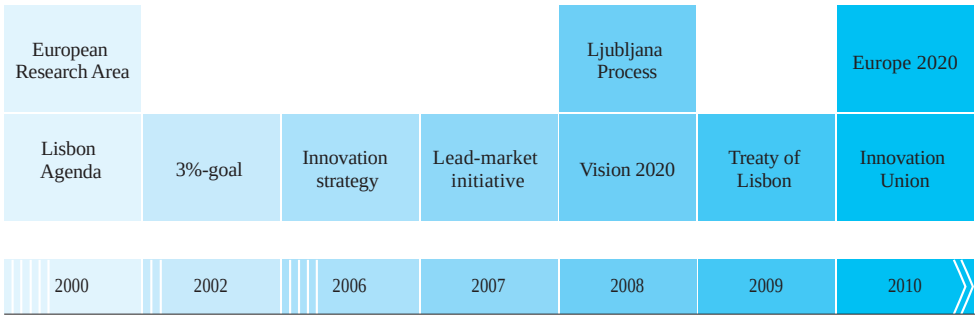
Recently, by initiating a working group within the Scientific and Technical Research Committee (CREST), Germany took an active role in optimising co-ordination of the Structural Funds and measures under the 7th Research Framework Programme (FP7).[184] The guidelines formulated by the working group call on national and regional decision-makers to co-ordinate the two funding lines – the Framework Programme and the Structural Funds – as efficiently as possible, in order to achieve greater overall effectiveness.[185] It is urgently necessary for all Structural Funds resources to be used more efficiently. The Federal Ministry of Economics and Technology (BMWi) has already acted on these considerations, by implementing a National Strategic Reference Framework (NSRF). In addition, the German side has called for RTDI-relevant Structural Funds resources to be focussed on application-oriented research areas in the period after 2013.[186]

7th Research Framework Programme

Bibliometric studies have shown that parts of the funding provided in the Framework Programme context have been supporting excellent research.[187] The 7th Framework Programme has considerably increased the relevant available funding. For the period 2007 to 2013, it now amounts to EUR 6.15 billion[188] per programme year, or an increase of nearly EUR 3 billion per year over the three preceding framework programmes.[189]

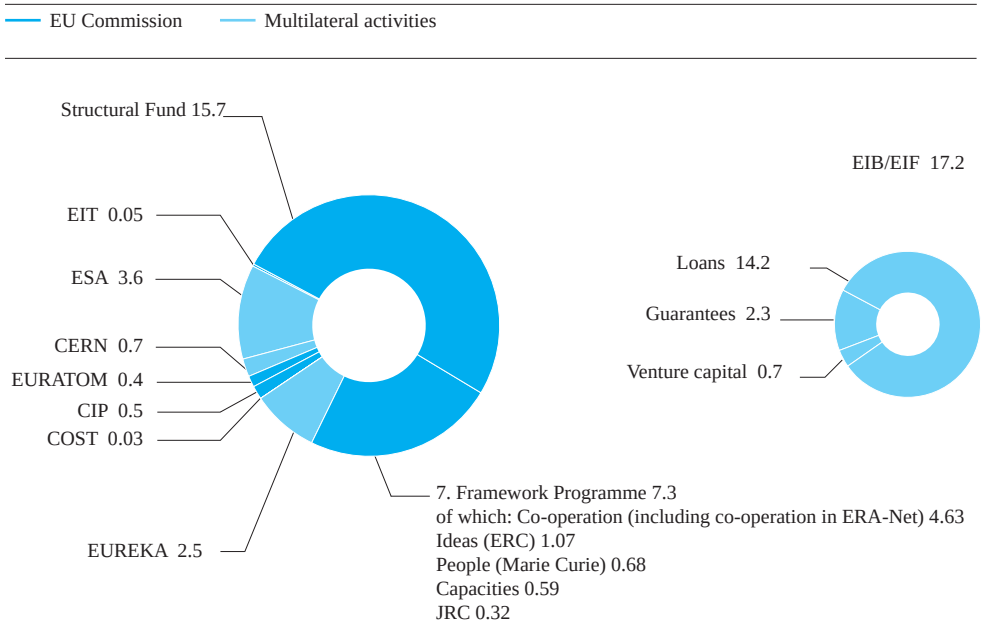
Comparisons with previous Framework Programmes show that EU support has been growing in importance

Development of European research and innovation programmes since 2000 FIG 02



Source: Daimer et al. (2011: 4).

Funding allocations in important programmes of European research and innovation policy[178] FIG 03



In billions of euros per year. Figures relative to funding volumes: for EU Commission programmes and COST, planning period 2007–2013; for EIT, 2008–2013; for EIB, 2008–2009; for EUREKA, 2005–2009; for ESA/CERN, 2009.
Source: Rammer et al. (2011: 19).

BOX 01

Important European research and innovation policy programmes[190]

Structural Funds are financing instruments of European regional policy, designed to strengthen economic and social cohesion in the EU. Originally oriented to the aim of financially supporting poorer regions in catch-up development, they have been expanded to include (inter alia) support for research, technological development and innovation (RTDI)[191]. The last of these areas of support is open to all EU Member States. The available Structural Funds resources for the period 2007 to 2013 amount to EUR 347 billion. Of that amount, Germany receives a share of EUR 26.3 billion. Throughout Europe, an average of EUR 15.7 billion are earmarked annually for RTDI measures in the period 2007 to 2013.

The **7th Research Framework Programme (FP7)** comprises the elements Co-operation, Ideas (financing of the European Research Council – ERC), People (the Marie-Curie Programme for support of scientists' mobility), Capacities (research infrastructure) and the Joint Research Center (JRC; for support of the European legislative process in the area of R&I). Pursuant to Art. 163 ff. EC Treaty, the Framework Programmes have the aims of strengthening the Community's competitiveness and supporting its research measures.[192] For the 7th Framework Programme, the relevant available funding has been increased, in comparison to funding under preceding framework programmes; for the period 2007 to 2013, it now amounts to EUR 7.3 billion annually.[193]

Since 1985, via **EUREKA**, the European Commission has supported application-oriented development of innovative products, processes and services, within the context of trans-boundary projects that are initiated by funding recipients themselves. Projects are not financed from a central budget; instead, relevant funding is managed individually by each Member State.[194] Some EUR 2.5 billion are available annually in the period 2007 to 2013.

Funding in the **COST** framework (European Cooperation in Science and Technology), which has been in place since 1971, supports basic research in the pre-competitive phase. Like EUREKA, COST is not restricted to specific technologies. As a rule, funded projects have small numbers of participants and run for relatively short terms.[195] The COST programme is providing annual funding of some EUR 29 million in the period 2007 to 2013.

The **Competitiveness and Innovation Framework Programme (CIP)** is designed to provide support

relative to national budgets. In FP7, the ratio between Framework Programme funding and the EU Member States' own state R&D financing (i.e. R&D financing by national and regional governments) is about 1:10. From FP4 to FP6, the corresponding ratio was only about 1:15, and in the first two framework programmes it ranged from 1:20 to 1:25.[202] Part of the reason for this development is that many Member States have not increased their R&I budgets to the same degree that the European Commission has increased its own budget in this area.[203]

The importance of current Framework Programme support can extend beyond the monetary realm: for a number of actors, Framework Programmes can influence the thematic orientation of R&I activities. At present, FP7 does not seem to be giving research a significant thematic bias, however. The relevant overall impacts vary: for smaller, and new, Member States, the support can be of considerable significance, whereas for actors in the large Member States the available funding tends to be of secondary importance.

The support provided by the Framework Programmes tends to have relatively weak financial effects. With respect to business enterprises, the overall budget is too small. In Germany, EU funding accounts for only a small percentage of R&I financing.[204] Under FP6, EU allocations for German higher education institutions amounted to only about three percent of the R&D funding provided, during the same period, by national institutions.[205] The corresponding financing share for non-university research institutions under FP6 was somewhat higher, amounting to 4.4 percent. Under FP7, universities and non-university research institutions have indeed profited from improved opportunities for co-operation and the resulting effects of co-operation. Nonetheless, the Framework Programmes have been highly significant for only a few German players.

for small and medium-sized enterprises (SMEs). Its funding emphases are on information and communications technologies (ICT) and on renewable energies. For the period 2007 to 2013, it has a total budget of EUR 3.62 billion (about EUR 518 million annually).[196]

The **European Atomic Energy Community (EURATOM)** was established in 1957.[197] Financing of EURATOM's tasks in the area of fusion and nuclear research, and radiation protection, is now carried out within the Research Framework Programme. For the period 2007 to 2011, it amounts to EUR 2.8 billion.

The **European Organisation for Nuclear Research (CERN)** is the largest major European research institution. It was founded in 1954 and is now financed by a total of 20 countries. Its budget of EUR 724 million (2009) is used for basic physical research.[198]

The **European Space Agency (ESA)** is tasked with designing and carrying out the European space programme. ESA's budget in 2009 amounted to EUR 3.6 billion.[199]

The **European Institute of Innovation and Technology (EIT)** was founded in 2008, with the aim of overcoming shortcomings in knowledge transfer and co-operation between higher education institutions, non-university research institutions and researching business enterprises. To those ends, Knowledge and Innovation Communities **(KICs)** are formed, within the EIT framework, to drive the EIT's activities. For its work in the period 2008 to 2013, the EIT has an initial budget totalling EUR 309 million.[200]

The **European Investment Bank (EIB)** and the **European Investment Fund (EIF)** belong to the EIB Group. The EIB is owned by the EU Member States. The shareholders of the EIF include the EIB (66 percent), the European Commission (25 percent) and other European financing institutions (9 percent). The EIB borrows funds on capital markets and makes them available, at favourable terms – and usually in the form of loans and venture capital – for projects. The EIF (working in co-operation with the EIB) primarily supports small and medium-sized enterprises (SMEs). The EIB is financially independent; it finances itself by issuing bonds and other debt products.

The subscribed capital of the EIF amounted to EUR 2.9 billion in 2009; that of the EIB comprised EUR 232 billion.[201] Each year, in its area "Support for the Knowledge Economy", the EIB grants loans totalling some eleven to twelve billion euros.

Promotion of excellence by the European Research Council (ERC)

Since 2007, the ERC has supported [206] outstanding scientists (along with their research groups) conducting especially ambitious and demanding basic research. Much of the research involved is interdisciplinary.[207] The ERC is integrated within the "Ideas" focus of FP7, and it already has an excellent reputation within the European research community.[208] Selections are made by independent, discipline-specific panels whose members are chosen by the ERC itself, and not by the Commission.

ERC grants have surely also been well-received in Europe because they offer attractive project funding, at attractive terms.[209] German scientists have been highly successful in competition for ERC grants, while Germany's success in serving as a location for supported projects has been less than satisfactory to date.[210] Many German ERC grantees do not work in Germany, and only a few foreign grantees conduct their research in Germany.

Figure 04 shows the numbers of projects supported to date, broken down by the scientists' nationalities. A total of 273 German citizens have received support thus far. Of that number, only 166 work in Germany, however. A total of 107 of the German scientists funded by the ERC conduct their research outside of Germany, either in an EU Member State or Associated State (in most cases, Switzerland). Too few foreign researchers have been coming to Germany, while German researchers have proven to be highly mobile or have even avoided the German system altogether. No in-depth studies have been carried out to determine the reasons why scientists leave their countries in order to work in a different national science system. On the other hand, experience gained to date in this area supports a number of conclusions – less than flattering ones – regarding the German system. With their rigid salary

BOX 02

New EU co-ordination instruments

Co-ordination instruments, such as the Joint Programming Initiative established by the European Commission in 2008, are becoming more and more important. Along with the European Technology Platforms (ETPs), which cover selected technological areas, the Joint Programming Initiative is designed to offer overarching solutions for current societal challenges.[211]

ERA-Nets and ERA-Nets Plus measures are established in the framework of thematically defined research areas. Designed to enhance co-ordination of Member States' research activities, they are aimed both at government ministries and at research organisations (in the case of Germany, at project management agencies and at the German Research Foundation (DFG)). Currently, some 70 networks are being supported in the ERA-Net framework (Associated States are also eligible to participate). Financing is provided for activities for co-ordinating, networking (i.e. linking) and opening up regional funding programmes.[212] A first evaluation of the two ERA-Net initiatives has shown that such network-initiation instruments can be successfully implemented. In conjunction with Art. 185 Treaty on the Functioning of the European Union (TFEU) (formerly, Art. 169)[213], such instruments, via a bottom-up approach, can facilitate co-operation on a new level of joint action and can enhance coherence.

regulations, civil-servant status for professors, burdensome teaching loads and bureaucratic processes, German universities are often unable to compete with higher education institutions of other countries, especially those of Switzerland and the UK. What is more, Germany is at a disadvantage with regard to the UK and certain other, smaller EU countries in that the international research community tends to be English-speaking.

European Institute of Innovation and Technology (EIT)

Another institution for promoting excellent research is the European Institute of Innovation and Technology (EIT). The EIT is the first European-wide institution to be charged with overcoming deficits in knowledge transfer and in co-operation between higher education institutions, non-university research institutions and researching business enterprises. Via its Knowledge *and* Innovation Communities (KICs), which are set up in the form of public-private partnerships (PPP), the EIT promotes formation of networks linking partners in science and industry. One of the priorities of the German Council Presidency in 2007 was to build KICs and the institute itself, which Germany saw as a way of enhancing mobility of scientists.[214] Germany is participating vigorously in the EIT and in the various KICs: two of the 18 members of the Institute's Governing Board are Germans, and all three of the KICs established to date have German participation. It is still too early to analyse the KICs' general impacts and success. In position papers, the measure is termed – somewhat prematurely, in the view of the Expert Commission – as a "model of innovation governance" [215] that should be applied to other areas as well. The Federal Government has expressed especially clear support for the idea of integrating the EIT and the KIC model, in an institutionalised form, within the Framework Programme.[216] The Expert Commission views the KIC initiative as a suitable model for improvement of knowledge transfer between science and industry. It advises, however, that detailed impacts analysis be carried before the model is applied to other areas. For example, the question arises whether, in light of the EIT's aims, competition between consortia is the best form of competition.

Improve co-ordination, clarify areas of responsibility

R&I policy at the EU level is highly fragmented and exhibits much overlapping of responsibilities. A range of different Directorates-General are responsible for the EU's many different and highly complex instruments for supporting R&I. Such distribution of responsibilities hampers the formation of a coherent EU innovation policy as well as the emergence of synergies between the various relevant measures. Still, at the beginning of the year the European Commission expanded the focus of the Directorate-General for Research, renaming that DG the Directorate-General for Research and Innovation, and initiated a range of relevant structural changes. The Expert Commission considers that initiative to be a step in the right direction. The Expert Commission

Allocations for Germany within FP6 and FP7, and national R&D expenditures

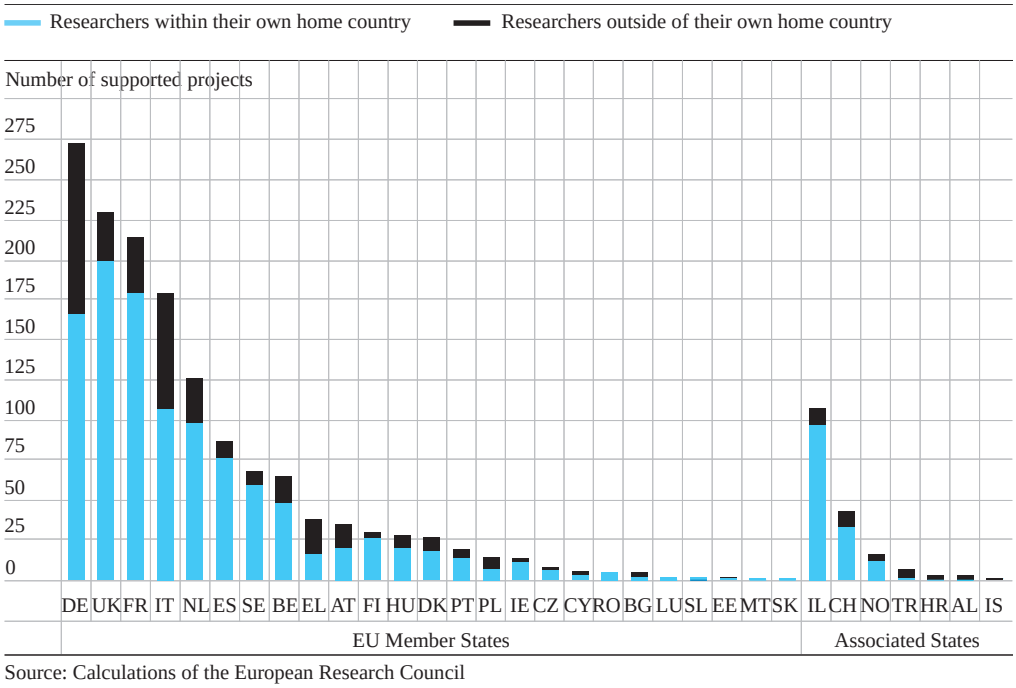
TAB 03

	Universities	Non-university research institutions / other	Business enterprises	**Total**
6th Framework Programme				
Allocations for Germany*, in millions of euros	235	339	182	**756**
R&D financing by the Federal Government and the *Länder**, in millions of euros	7,688	6,739	2,038	**16,465**
Total R&D financing* in millions of euros	9,247	7,711	39,048	**56,006**
6th Framework Programme vs. R&D financing by the Federal Government / *Länder*, in percent	3.05	5.04	8.92	**4.59**
6th Framework Programme vs. total R&D financing, in percent	2.54	4.40	0.47	**1.35**
7th Framework				
Allocations for Germany*, in millions of euros	254	253	194	**701**
R&D financing by the Federal Government and the *Länder**, in millions of euros	8,115	6,986	1,936	**17,036**
Total R&D financing* in millions of euros	10,304	8,820	44,428	**63,552**
7th Framework Programme vs. R&D financing by the Federal Government / *Länder*, in percent	3.14	3.62	10.00	**4.11**
7th Framework Programme vs. total R&D financing, in percent	2.47	2.86	0.44	**1.10**

*Average value in the period 2003–2006, per year. **Average value in the period 2007–2008, per year. Source: Rammer et al. (2011: 37). Grimpe et al. (2009). EU Bureau of the BMBF. OECD (MSTI 01/2010). Eurostat. Calculations of the ZEW.

ERC support, by researchers' nationality

FIG 04



Source: Calculations of the European Research Council

emphatically calls for better co-ordination between the European Directorates-General, as well as for better co-ordination with national state actors.

Explore possibilities for "variable geometry"

Some observers see a "two-speed Europe" as a prospect to be avoided at all costs. The Expert Commission sees a different prospect to avoid: that the speed of European policy could be determined by the slowest actor. The "variable geometry" principle could make it possible for different groups of Member States to co-operate in the R&I sector. Use of that principle, therefore, should be intensified. Acting flexibly, participating Member States could form theme-focussed groupings, while still remaining open for co-operating partners from less well-"equipped" Member States. The Expert Commission thus recommends that exploration of the possibilities for overlapping co-operation groupings, involving different Member States in different cases, be intensified. Such a model for differentiated integration would enhance Europe's competitiveness in the global market in a lasting way.

Use the Open Method of Co-ordination more realistically

European R&I policymakers took an unprecedented step when they agreed on consistent, joint national aims without establishing relevant instruments that would be available throughout Europe. That approach is one element of the Open Method of Co-ordination (OMC),[217] which the EU has implemented in numerous policy areas since the Treaty of Lisbon was signed. The OMC makes possible joint co-ordination of European-wide reform processes in areas that did not originally lie within the EU's scope of responsibility. In application of the OMC, the principle of subsidiarity is upheld.[218] Implementation of the aims is left up to the national actors themselves. This approach is based on the hope that integration of national political structures and actors will make it possible to achieve the agreed aims more quickly, and more efficiently, than would be possible via a homogeneous package of measures enacted at the European level.

In principle, the Expert Commission views action in the OMC framework as useful. At the same time, it must be doubted whether such an approach was suitable in the case of the desired increase in R&D intensity, i.e. the 3 percent goal. The 3 percent goal is well-chosen in the case of Germany – it is not unrealistic, although it necessitates considerable effort. For other Member States, some with R&D quotas of less than 2 percent, the goal has been set much too high, however. On the other hand, some Scandinavian countries had already reached the goal when it was announced. In principle, European-wide goals should be attainable for all Member States, lest they become purely symbolic and undermine the potential of European policy. With regard to increasing R&D intensity, it would have been more useful to agree on aiming to increase national R&D intensities by 0.3 percentage points, in each case, by the year 2010. The Expert Commission calls for a more realistic approach in this area. Grand pronouncements are no substitute for sound policy.

Simplify application-related bureaucracy, and make co-ordination instruments less complex

Throughout all relevant measures, it is clear that stringent administrative requirements create enormous obstacles – for example, for SMEs (small and medium-sized enterprises), and even for SMEs operating within the framework of project consortia. Application-related bureaucracy also hampers first-time applicants, especially applicants from new Member States. Around such obstacles and barriers, an entire consulting economy has thrived. Applicants could avoid some of the costs for required advice if the long-promised reduction of bureaucracy would finally come about. For this reason, reduction of bureaucracy, and creation of transparency within application and approval procedures, should be key concerns of Germany's current European policy. The issue of simplification also extends to structures and processes of the newly created co-ordination instruments within FP7 (ERA-Net, ERA-Net Plus, Joint Programming Initiative).[219] While the Expert Commission expressly welcomes the establishment of such instruments, the instruments' current structures and processes still seem too complex, as the first interim evaluation has indicated.[220]

Improve co-operation in industry projects

In its last report, the Expert Commission noted that Germany needs to protect and reinforce its leadership in high-value technologies, such as automotive technology, chemical technology, mechanical engineering and electrical engineering. In addition, Germany's efforts in high technology urgently need to be systematically expanded, especially in segments in which Germany can achieve comparative global advantages.[221] In both cases, too little use has been made of technology-focussed co-operation between EU Member States, although such co-operation is highly significant for German companies. By way of example, we mention the urgent need to intensify European co-operation in the area of electromobility. In the framework of co-operation in a selected trans-boundary model region, efficient, focussed product and infrastructure development could be undertaken, and tested on a realistic scale (cf. Chapter A 7). Synergies could also be achieved in the area of high-speed trains. National sensitivities play a large role in such efforts. Such sensitivities have repeatedly proven to be a barrier to development of new markets. For this reason, the Expert Commission urges that co-operation throughout Europe be improved in industry projects in the framework of R&I policy. Promotion of trans-boundary markets is a suitable means of encouraging co-operation between European industrial partners. Furthermore, national considerations should not be permitted to stand in the way of possible market consolidation.

Continue to move single-market harmonisation forward

Harmonisation of the European single market needs to be further intensified. Harmonisation of public procurement, of the legal forms that companies can take and of general legal norms (for example, in liability law) would benefit innovators in particular, a group for whom entry into other national markets in Europe continues to entail high costs. And such benefits would accrue especially to growth-oriented start-ups. What is more, patent systems would profit significantly from a simplified judicial system and from the introduction of an EU patent (EFI 2010:88, Chapter A 6 of this report). As a result of fragmentation in its single market, Europe is still far from realizing its potential as an economic power.

Give Structural Funds a more precise orientation, and improve co-ordination with the Framework Programme

The Structural Funds have acquired great significance for R&I in Europe. At the same time, the extent to which the various aims of the Structural Funds measures are truly being achieved is unclear. The Expert Commission proposes that the impacts of Structural Funds resources for Research, Technological Development and Innovation (RTDI) be analysed, with a view to reliably quantifying the resources' potential to promote innovation and to creating an empirical basis for discussion regarding the existing parallel structures in the Framework Programme and the Structural Funds. One can gain the impression that Structural Funds resources are serving as tools for systematic, European-wide redistribution of funds – and thus are not achieving their actual convergence objectives. In the main, Structural Funds should be oriented to active support for weaker regions. They should not be generally open – via an expansion of their task spectrum – to all Member States as funding sources.

The Framework Programmes have a strong focus on excellence. To be successful in key European competitive procedures, regional innovation systems and their actors need first to achieve a sufficient degree of maturity.[222] For this reason, lasting support for weaker Member States, with regard to innovation structures, and in the framework of the Structural Funds, is generally to be welcomed, as long as such support is oriented to the aim of convergence.

Focus the Framework Programme more strongly on excellence

The Federal Government has warned against weakening support for excellence, based in the Framework Programme, in favour of cohesion-related aims.[223] The Expert Commission shares these concerns, and it notes that, in administration of Structural Funds resources, administration of R&I-relevant resources needs to be more effectively separated from administration of other resources. Useful measures in this area include detailed co-ordination of innovation-relevant actors and Directorates-General at the EU level, with respect to the Structural Funds, and interaction between the agencies responsible for the

Structural Funds and for the Framework Programmes. As the German High-Tech Strategy has shown, interdepartmental co-ordination of all participating actors can enhance the effectiveness and efficiency of R&I policy – and such enhancement would certainly also be welcome at the European level.

Strengthen and expand the ERC

The Expert Commission expressly welcomes the establishment of the ERC and the ERC's orientation to research excellence and European-wide competition. The German Rectors' Conference (HRK) and the German Council of Science and Humanities (*Wissenschaftsrat*) have urged that the ERC's organisational stability be protected, and that its independence be assured. The Expert Commission supports that call.[224] One of the special advantages of ERC support is that it promotes individual researchers. In principle, it offers supported scientists the freedom to choose their work location, and thus it enhances mobility. In practice, however, shifting of projects to other institutions often entails major expenses. ERC support highlights key weaknesses of the German university system. It is thus also an important indicator of the success of the German research system. Universities, universities' administrations and the *Länder* will be judged in terms of that success.

Act now to optimize ITER management

In Europe, important scientific projects are managed by supranational organisations such as EURATOM and ESA. The budgets for such projects are regularly approved by the European Commission, the Member States and the European Parliament. Execution of some projects leaves much to be desired in terms of transparency and control, however. In some cases, drastic cost overruns result, requiring national governments, the European Commission and the European Parliament to take "emergency action". Fund shortages in such projects have to be addressed by shifting funds from budgets of EU research programmes and other EU efforts. Such moves, in turn, impose considerable financial limitations on the European Union's Framework Programmes.

An example of serious management failure that produces such effects is seen in the ITER project[225] (International Thermonuclear Experimental Reactor). ITER is a global project for the construction, and later operation, of an experimental fusion reactor in Cadarache, France. The project partners include the European Atomic Energy Community (EURATOM), China, India, Japan, Korea, Russia and the U.S. Operation of the fusion reactor is to begin in 2018.

The project was originally initiated by four partners (Russia, U.S., EURATOM and Japan). In 2003, China and South Korea also became partners in the effort; in 2005, India joined as well. Cost planning for the project, which was based on an estimate dating from 2001, was not questioned when the project was approved by the expanded group of partners. Within only two years after the project commenced, it became obvious that the planned budget framework was too small, by a factor of 2.5 to 3. EURATOM's contribution, for example, which was originally set at EUR 2.3 billion (in 2001 prices), grew to EUR 5.9 billion by the end of 2009. For the years 2012 and 2013 alone, cost overruns for the project are expected to reach 200 percent (EUR 2.1 billion instead of EUR 0.7 billion).

As a result of the large number of parties involved in the project, and of the work-sharing procedure that has been implemented, budget overruns cannot be adequately monitored and controlled. No overall project planning is in place, and each national ITER agency is responsible only for its own work package. Cost overruns for individual work packages, cost overruns that can be useful for national research institutes and for suppliers, can be passed on to other partners within the overall consortium. Since EURATOM has a 45 percent share of the overall ITER project, the EU has to bear a considerable share of the cost overruns.

To date, the European Commission and the participating Member States have been unable to establish efficient, effective management structures for supranational projects. The Expert Commission calls on the Federal Government to work for the establishment of suitable, efficient management structures that conform to standards for major supranational projects. Neither the EU nor Germany can afford the inefficient use of research funding that is currently taking place.

Launch the European Initiative for Excellence

The Expert Commission sees a need for institutionalised, long-term co-operation between excellent European higher education institutions.[226] In some Member States, such as France, the UK, Denmark, Austria and Germany, national initiatives for excellence are already underway, with the aim of providing selective support to researching institutions and alliances between such institutions. The key criterion for such support is scientific excellence.[227] The Expert Commission proposes that a European Initiative for Excellence be initiated, a mechanism whereby small groups of leading European higher education institutions would form networks and receive institutional support via the EU.[228] Support should provide considerable funding, for sufficient duration to permit the establishments of lastingly stable co-operation relationships. As within the French initiative for excellence, funded institutions should receive an endowment that will yield interest that can be used to finance research and co-operation projects. Supported higher education institutions should have full authority over relevant funding allocations, and they should be permitted to co-ordinate their own research and teaching themselves, outside of any central administration for the effort. By properly co-ordinating curricula, such networks would be able to achieve high mobility potential, from the bachelor's degree level up.

An initiative for excellence at the European level would offer a number of advantages at once. It could help strengthen excellent, co-operative organised basic research in a lasting way, by providing the stable structures and long-term investments that are essentially important for open-ended, pioneering research. Furthermore, it would expand institutionalised EU-wide research co-operation. The networking involved could also help fulfil the aims of the Bologna Process and help reinforce what has been achieved thus far in that process. Before such a far-reaching measure can be planned and introduced, it must be discussed intensively throughout Europe, however. The results of the national initiatives for excellence should enter into such discussion. The European Commission should initiate the necessary discussion process by providing an overarching presentation of the experience gained to date with the national initiatives for excellence.

Strengthen Germany's role in European R&I policy

The era in which R&I policy in Europe was solely national in scope has been over for some time now. The aim of European R&I policy must be to establish Europe, via intensified co-ordination and co-operation, as one of the world's leading knowledge economies. In light of prevailing national interests, and because R&D measures at the European level tend to be inefficiently designed and bureaucratically structured[229], that will be no easy task.

Over the past ten years, the Federal Republic of Germany has recognised this challenge and, on various occasions, has taken an active role in European co-ordination processes. The Expert Commission expressly welcomes such participation. Such efforts need to be further intensified. In today's increasing international competition, Germany will have no chance of success with a nationally oriented R&I policy. It lacks the resources that such a national orientation would call for. Strengthening and developing the European dimension of R&I policy is a matter of Germany's own vital interests, and it is in the interest of other European countries for Germany to take a strong, active role in shaping such policy at the European level. With the experience it has gained with the High-Tech Strategy, the Initiative for Excellence and other political processes, the German policy sector can bring much constructive impetus to the European policy process. At the same time, it must not be afraid to continue learning. Germany can profit from other countries' experience with certain political instruments and strategies.[230] Significantly, in all likelihood, a leading role in shaping of European R&I policy will go hand-in-hand with the loss of some national decision-making authority.

NETWORK NEUTRALITY AND INNOVATION B 3

For years, intensive discussion has been underway in the U.S. regarding the pros and cons of network neutrality, i.e. the issue of whether users or network providers are to decide how the Internet is to be used. This discussion also extends to the issue of whether, or under what circumstances, network providers should be able to block, delay or prioritise certain