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Investing in research: an action plan for Europe

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1. EXECUTIVE SUMMARY

The present action plan sets out initiatives required to give Europe a stronger public research base and to make it much more attractive to private investment in research and innovation. Carrying out these actions will allow the European Union to bridge the growing gap in the levels of research investment between Europe and its main trading partners, which is putting at risk our long term innovation, growth and employment potential. The objective is to reach the objective set by the March 2002 Barcelona European Council, to increase the average research investment level from 1.9% of GDP today to 3% of GDP by 2010, of which 2/3 should be funded by the private sector.

To reach the Barcelona objective, research investment in Europe should grow at an average rate of 8% every year, shared between a 6% growth rate for public expenditure and a 9% yearly growth rate for private investment. This is ambitious yet realistic given the strong support given to the objective.

The March 2003 European Council called for the Commission to present this action plan, which has been prepared on the basis of a wide consultation of European institutions, Member States, acceding and candidate countries, as well as stakeholders from industry; public research and finance. The consultation showed a very broad support for the 3% objective. It revealed that most countries are already taking measures to boost investment in research, and that many have set national targets in line with the European 3% objective.

The action plan aims at building on this momentum, ensuring that the necessary initiatives at European and national levels are sustained, mutually consistent and commensurate with the challenge of bringing radical improvements to the European system of research and technological innovation. Europe is facing a situation where the weakest link in the system risks discouraging investment – to give but a few examples: the shortcomings and rigidities of research careers, leading excellent human resources to move out of research or out of Europe; the dispersion and lack of visibility of Europe's often excellent research; the difficulties encountered by technology-intensive SMEs to find financing for their research and innovation projects; or the lack of awareness of researchers and research managers regarding the protection and management of intellectual property.

The action plan complements a series of mutually reinforcing European initiatives aimed at boosting the Union's competitiveness, notably in the fields of enterprise and innovation policy, and of structural reforms in the product, services, capital and labour markets. Together they form the Commission's policy response to the March 2000 Lisbon European Council objective to "make Europe the most competitive and dynamic knowledge-base economy by 2010".

The action plan comprises four main sets of actions.

A first set of actions aims at supporting the steps taken by European countries and stakeholders, ensuring that they are mutually consistent and that they form an effective mix of policy measures. This includes a process of co-ordination with and between Member States and acceding countries. It also entails creating a number of "European technology platforms", which will bring together the main stakeholders – research organisations, industry, regulators, user groups, etc. – around key technologies, in order to devise and implement a common strategy for the development, the deployment and the use of these technologies in Europe.

The second set of actions aims at improving considerably public support to research and technological innovation. In order to invest in research in Europe, enterprises need to find here abundant and excellent teams of researchers, a strong public research well articulated with industry, and effective public financial support, including through fiscal measures. The action plan focuses on actions to improve the career of researchers, to bring public research and industry closer together, and to develop and exploit fully the potential of European and national public financial instruments. For example, the action plan asks public authorities to eliminate by 2005 the current rules and practices, attached to many public funding schemes, which prevent trans-European cooperation and technology transfer and thus reduce considerably the research and innovation opportunities available to the beneficiaries.

A third set of actions addresses the necessary increase in the levels of public funding for research. Given the current economic downturn, it is all the more important to ensure that budgetary policies favour investments that will lead to higher sustainable growth in the future, among which research is a strong priority. Actions focus on encouraging and monitoring the redirection of public budgets, and on making full use of the possibilities for public support to industry offered by State aid rules and public procurement rules. For example, the action plan proposes to clarify and improve awareness of the types of public support that public authorities can use with no distortion to competition.

Lastly, a fourth set of actions aims at improving the environment of research and technological innovation in Europe: intellectual property protection, regulation of product markets and related standards, competition rules, financial markets, the fiscal environment, and the treatment of research in companies' management and reporting practices. For example, the action plan sets the objective that every student in science, engineering and business should receive at least a basic training on intellectual property and technology transfer.

The action plan marks the start of a process. Progress will be monitored and the Commission and Council will give further orientations in the future, if appropriate, to keep the Union on track. However, there is little time to succeed and the gap is still growing rapidly between Europe and its major trading partners. Implementation must start immediately at all levels, and it must be driven with a clear vision that what is at stake is the success or failure of Europe's ambition to become the most vibrant place for innovation-driven growth and employment creation.

2. A CALL FOR ACTION

The Barcelona European Council launched in March 2002 a call for action to increase investment in research and technological development¹ and close the gap with Europe's main competitors. Investment in research, the European Council decided, should rise from 1.9% to 3% of GDP in the European Union by 2010, and the share funded by business should rise to two-thirds of the total. Since then all stakeholders have confirmed the relevance of that call and the need to act quickly, on the lines suggested by the Commission communication of September 2002 "More research for Europe: towards 3% of GDP"². The gap in research investment between the European Union and the United States is already in excess of € 120 billion per year and widening fast, with alarming consequences for the long-term potential for

¹ "Research and technological development" is hereafter referred to as "research" or "R&D".
² COM(2002)499, 11 Sept. 2002.

innovation, growth and employment creation in Europe. As explained in the September 2002 communication, the gap is linked to less attractive conditions for private investment in research in Europe, due both to lower and possibly less effective public support, and to various obstacles in the wider framework conditions of European research and innovation.

From September 2002 onwards the Commission undertook a wide consultation of European institutions, Member States, acceding and candidate countries, as well as of stakeholders, notably European industry and the financial sector. Responses were overwhelmingly supportive of the 3% objective and of its emphasis on business investment in research. Many replies contained useful insights and proposals that have been used in preparing the present action plan. All Member States, acceding and candidate countries agreed on the importance of increasing investment in research, and most indicated that they had already put in place policies and concrete measures to that effect, or were in the process of doing so. Many have also set national targets in line with the European 3% objective. For example, both France and Germany have adopted the 3% objective for themselves, and so has a future Member State, Slovenia. Momentum is thus building up.

Both the European Economic and Social Committee and the Committee of the Regions supported the 3% objective, as did the Members of the European Parliament who took part in a public debate on that theme.

The numerous detailed replies received from industry and business associations were also unanimously supportive. Many, like the European association of industry (UNICE) and the European Round Table of Industrialists (ERT), stressed that reaching the 3% objective is crucial for Europe's competitiveness but will require major policy changes to restore Europe's attractiveness for research investment. ERT made the 3% objective the main focus of its recommendations to the European Council of March 2003 and UNICE one of its major topics. Associations representing small and medium-size enterprises (SMEs) concurred on the importance of increased investment in research for their constituencies.

A major lesson from the consultation is that large European companies are planning to maintain a significant degree of investment in research despite the current economic slowdown and despite, notably, the sharp downturn in some high-tech sectors. However, as tougher economic conditions make it even more important for these companies to rationalise their global development, they are not planning new research investment in the European Union but rather in other regions that they deem more attractive, such as the United States and some Asian countries. European SMEs, meanwhile, find that their ability to invest in research and innovation is often limited by both reduced auto-financing capacity and more difficult access to external financing. The current economic conditions have further restricted their access to finance for research and technological innovation³ activities. The economic downturn makes it thus even more important and urgent to focus public action on supporting research and innovation.

According to an econometric study undertaken for the Commission services⁴, attaining the 3% of GDP objective for research investment would have a significant impact on long-term growth and employment in Europe, in the order of 0.5% of supplementary output and 400,000

³ "Technological innovation" is hereafter referred to as "innovation".

⁴ Study undertaken by the ERASME research team (Paris) with an adapted version of the NEMESIS model (to be published).

additional jobs every year after 2010⁵. The full impact on growth and employment may be even higher thanks to the boost that additional world-class research will give to the international competitiveness of European industry and services and to Europe's global economic attractiveness. Last but not least, more research in areas of social and environmental interest will help Europe lead the way towards a more sustainable future. As emphasised by the Commission in its report to the March 2003 European Council⁶, investing in research is thus at the heart of the strategy set by the Lisbon European Council in March 2000 for Europe's economic, social and environmental renewal.

The European Council of 21 March 2003 called on the Commission to prepare the present action plan and asked the Commission, the Council and Member States to take action on its basis.

The action plan is based on a broad and systemic approach to research and innovation. Both the consultation and supporting studies showed that such an approach is the only credible path to deliver the major increases needed in public and private research investment. Assuming an average EU GDP growth rate of 2% per year until 2010, the targets set in Barcelona (3% and 2/3 from the private sector) require a growth rate of 8% per year for the overall European research effort, shared between a 9% yearly increase for business funding and a 6% yearly increase for public funding.

In order to achieve this, the action plan first addresses the need to **develop a common understanding** shared at all policy levels and by all stakeholders, and to **ensure sustained and coherent progress throughout Europe**. This can notably be achieved by using, where appropriate, an open co-ordination process, European technology platforms and a mutual learning process for European regions, and by designing and implementing policy mixes that combine in a coherent way a broader range of policy instruments. Making the whole of Europe working together is an important issue (see chapter 3).

The action plan then covers successively aspects linked to the effectiveness of public support for research, to the level of public resources made available, and to the improvement of framework conditions:

- **improving the effectiveness of public support for research and innovation**, both financial and in the form of human resources and the public research base (see chapter 4);
- **redirecting public resources towards research and innovation**, through increased attention to public spending quality, adapted state aid rules, better use of public procurement (see chapter 5);
- **improving framework conditions for research and innovation** such as intellectual property rights, product market regulations, competition rules, financial markets, tax conditions and the corporate management and reporting of research (see chapter 6).

⁵ This would result notably from major structural changes in the European economy, in particular a shift towards more research intensive and high-growth industries and a considerable increase of the innovation capacity in the European economy.

⁶ Commission report to the Spring European Council "Choosing to grow: knowledge, innovation and jobs in a cohesive society", COM(2003)5, 14 Jan. 2003.

The action plan should be seen in the broader context of the various policy initiatives and the co-ordination process that form part of the Lisbon strategy, notably in the fields of economic and employment policies, enterprise policy, education and training policy, and the internal market strategy. In particular, measures to encourage investment in research must go hand in hand with measures to foster enterprises' motivation to innovate and their capabilities to draw concrete benefits from research – measures that are implemented through industrial, entrepreneurship and innovation policies. The recent communication on innovation policy⁷ highlights the importance of non-technological forms of innovation⁸, identifies the various policy areas having a bearing on enterprises' propensity to innovate, and maps out a route to strengthen innovation policies through co-operation and mutual learning. The pursuit of structural reforms in product, services, capital and labour markets is also important for the creation of a more dynamic and competitive business environment which is conducive to more investment in research and innovation. The action plan addresses specific aspects with a direct bearing on investment in research.

The action plan is supported by a dedicated Website⁹ which contains supporting documents and links to other sites devoted to related policies and activities. The site will be enriched and updated continuously, notably to monitor the implementation of the action plan. The annexed working document of the Commission services provides specific elements of information and analyses in support of the action plan.

3. PROGRESSING JOINTLY

Member States are well aware of the need to boost investment in research and they have started putting in place policies and measures to that end. A **European process of co-ordination** is important to ensure that Member States learn from each others' experience and take actions that are mutually consistent. Such a process will also ensure that the European Council can regularly follow the progress achieved towards the objectives it has set.

Sector-specific issues should be taken into account, including through setting specific objectives and milestones in some areas such as information and communication technologies. Increased coherence and co-ordination is needed at the level of the various stakeholders involved in the development and deployment of key technologies in Europe. This can be promoted by **European technology platforms**, bringing together the main stakeholders concerned, in order to set a common strategic agenda addressing research as well as, where appropriate, regulatory and standardisation issues.

Progressing jointly also means that **all regions should be enabled to benefit** from increased research and innovation. Differences and disparities between regions in the enlarged EU are considerable. While some are in a position to maintain or develop technological leadership, others should rather focus on developing the absorption capacities – including applied research and development activity – that will enable them to benefit from world-class research

⁷ "Innovation policy: updating the Union's approach in the context of the Lisbon strategy", COM(2003)112, 11 March 2003. See also the Commission communication "Industrial policy in an enlarged Europe" (COM(2002)714, 11 Dec. 2002) and the Green paper "Entrepreneurship in Europe" (COM(2003)27, 21 Jan. 2003).

⁸ Technological innovation must often be combined with other forms of innovation, such as in design, marketing and business organisation, in order to draw the full commercial benefit.

⁹ <http://europa.eu.int/comm/research/era/3pct/>

undertaken elsewhere in Europe. However, all regions would gain from more systematic mutual learning in defining their research strategies.

Lastly, administrations at all levels should **develop a systemic view of the various policy dimensions** that need to be mobilised in defining and implementing appropriate policy mixes to foster private investment in research and innovation. These policy mixes involve often different sectors of the public administration, between which co-ordination needs to be strengthened.

3.1. Fostering the coherent development of national and European policies

An open co-ordination process, as called for by the Spring 2003 European Council, will facilitate mutual learning between Member States in their efforts to increase and improve research investment. It will also help increase the effectiveness of Member States' actions by ensuring, on a voluntary basis, greater consistency with each other and with related Community actions. Lastly, it will organise the data gathering and reporting necessary to enable the European Council to take stock of the progress achieved towards the objective it has set, and assess its efficiency¹⁰.

Taking into account the orientations defined by the Lisbon European Council, application of the open method of co-ordination to the 3% initiative will consist in a collective continuous process of monitoring, a reporting mechanism on national initiatives and progress and an evolving mutual learning, which is:

- geared towards European targets (in this case the 3% and two-thirds objective) translated by Member States into national targets and actions consistent with the overall EU objective and appropriate to their national situations and priorities;
- organised along agreed guidelines (proposed to Member States in the present action plan);
- supported by a set of selected indicators, and by benchmarking exercises on focused topics where there is a particular need for detailed data-gathering and information-sharing and for the identification and dissemination of good practices.

Such an approach should also be applied to the initiatives arising from the human resources implications of the 3% objective, by extending the existing process focusing on the international mobility of researchers to issues involved in the provision of increased and adequate human resources in science and technology.

Complementarity and consistency will be ensured with the mutual learning process on innovation policies outlined in the communication on innovation policy¹¹.

New actions

- ✓ **Set up an open process of co-ordination on actions for increasing investment in research**, involving Member States and acceding countries as well as the candidate countries wishing to participate, based on the light methodology and the set of existing indicators proposed in the annex to the present action plan (*Implementation: Member States and acceding countries with support from the Commission; 2003*)

¹⁰ See annexed Commission staff working paper.

¹¹ Op. cit.

- ✓ **Set up an open process of co-ordination on actions for developing human resources in science and technology**, with particular emphasis on the implications of the 3% objective, as an extension of the existing process focusing on mobility (*Implementation: Member States and acceding countries with support from the Commission; 2003*).

3.2. Shaping a common vision for the development and deployment of key technologies

In some domains research has a vital role to play in addressing major technological, economic, or societal challenges. Here, European technology platforms will provide a means to foster effective public-private partnerships involving as appropriate public research, industry, financial institutions, users, regulatory authorities and policy-makers, and this will deliver the impetus to mobilise the research and innovation effort and facilitate the emergence of “lead markets”¹² in Europe.

In essence, technology platforms will be mechanisms to bring together all interested stakeholders to develop a long-term vision, create a coherent, dynamic strategy to achieve that vision, and steer its implementation. A strategic research agenda will form a crucial part of the strategy to optimise the contribution of research to the process. Technology platforms should also address both the technical and non-technical barriers to and requirements for the optimal development, deployment and use of technologies, such as regulations, standards, financial aspects, social acceptance, skills and training needs, etc., while taking into account the relevant Community policies.

Existing initiatives in areas such as aeronautics and rail transport offer elements of good practice and constitute in effect a first group of European technology platforms. The Commission is planning to set up with relevant stakeholders additional European technology platforms in key areas such as plant genomics, road and maritime transport, hydrogen, photovoltaics, areas of nanotechnologies and information and communication technologies, and steel technology.

New actions

- ✓ **Set up European technology platforms** on a number of key technologies, following the criteria and methodology indicated in the Commission staff working paper attached to the present communication (*Implementation: stakeholders, with support from the Commission; 2003*).

3.3. Enabling all regions to benefit from increased investment in research

A number of past and current initiatives have encouraged regions to develop their own innovation strategies, including research aspects. These initiatives are already proving extremely valuable in raising the awareness of regions about the importance of research and innovation¹³ and to help them put supportive policies in place. However, the 3% objective is spurring many new policy developments at European and national levels that need to be reflected in updated and strengthened regional strategies. Moreover, acceding and candidate countries have specific needs, for example regarding infrastructure (already largely in place in

¹² See Commission communication "Innovation policy : updating the Union's approach in the context of the Lisbon strategy", op. cit., for a discussion of "lead markets".

¹³ See annexed working document of the Commission services.

current Member States), which need to be taken into account in the development of their own regional strategies.

New actions

- ✓ **Establish a mutual learning platform** to help regions in the further development of their research strategies, taking into account their specific situation and needs. Building on existing activities, the platform will be supported notably by the development of a typology of regions, a methodology for the comparative assessment of regional performance, and specific actions to promote the use of science and technology foresight at regional level (*Implementation: Commission-supported process with regions; 2004*).

3.4. Designing a coherent mix of policy instruments

Firms will invest more in research only to the extent that they can draw concrete commercial benefit from the results. They must have access to an adequate supply of quality human resources and to a stronger and more responsive public research base. Increased and more effective public support is necessary and it must be accompanied by much more favourable framework conditions, such as adequate intellectual property right systems, a competitive environment with research and innovation-friendly regulations and competition rules, supportive financial markets and a favourable fiscal environment.

The Commission's recent communications on industrial policy, entrepreneurship and innovation policy¹⁴ complement the present action plan in pointing the way towards a more competitive business sector willing to invest in and benefit from research.

As remarked in a recent report to the Commission¹⁵, “the scale of the structural changes needed to transform the EU into a research-intensive, high-tech, knowledge-based economy make it highly unlikely that any single route – in isolation – will be enough.” Clearly, a broader range of policies and instruments will need to be mobilised and co-ordinated more closely than has been the case until now to stimulate increased private investment in research and innovation. The broader policy mixes that are required should optimise the use of various financial support instruments and combine them with measures to improve framework conditions. The design and implementation of appropriate policy mixes at EU, national and regional levels is thus a key challenge for public authorities. The optimal design of these policy mixes depends on the specific strengths and weaknesses of national or regional research and innovation systems, as well as on taking into account, where appropriate, sector-specific issues. It requires effective co-ordination between the various departments or ministries concerned.

The following action is thus essential to the effective development of national policies in support of research and innovation. The Commission is applying this approach in developing its own policies and will support Member States applying it through the open method of co-ordination.

¹⁴ Op. cit.

¹⁵ Report to the Commission of the independent expert group on “Raising EU R&D intensity: Improving the effectiveness of the mix of public support mechanisms for private sector research and development”, April 2003.

New actions

- ✓ Improve the effectiveness of public actions to promote research and innovation by **designing policy mixes using in a coherent way various policy instruments, and by developing the interactions with policies put in place by other countries and at European level**, notably on the basis of information shared and lessons learned through the open process of co-ordination (*Implementation: all levels, with Commission support for the open process of co-ordination*).

4. IMPROVING PUBLIC SUPPORT TO RESEARCH AND INNOVATION

Industry reactions to "More research for Europe"¹⁶ showed unambiguously that the main factors considered by firms when deciding whether and where to invest in research, are the availability of abundant and excellent researchers and research personnel, a vibrant, world-class public research base, improved public financial incentives, and a much more favourable regulatory environment. This chapter focuses on the need to expand and improve human resources, to strengthen the public research base and to enhance the effectiveness of the various public financing instruments.

4.1. Human resources

More and adequately skilled researchers will be needed in Europe in order to attain the targeted increase of investment in research by 2010. Increased investment in research will raise the demand for researchers: about 1.2 million additional research personnel, including 700 000 additional researchers, are deemed necessary to attain the objective¹⁷, on top of the expected replacement of the ageing workforce in research. It has also to be considered that such an increase will have to face general demographic pressures¹⁸, the stagnation of student enrolment in a number of scientific disciplines and international competition to attract highly qualified workers. Thus, the adjustment of human resources to the prospective needs for research and innovation will imply combined and greater efforts from all the stakeholders in order to: attract a sufficient number of world-class researchers in Europe; make research more attractive to various categories of the population, especially women¹⁹; and reduce losses at the various stages of education and during the research career, including at the most experienced stage. This implies addressing research-related issues in a number of policies, especially labour market, employment, education and training, and immigration-related policies. Although general measures should be preferred whenever possible, the scale and urgency of the challenge regarding the need for researchers make it necessary to envisage temporary specific measures.

Strengthening the human resources in research thus involves a combination of initiatives at national, regional and Community levels aiming at:

- Attracting more students to research, in particular through the increase in financial incentives, the Science and Society initiatives, and the facilitation of student mobility;

¹⁶ Op. cit.

¹⁷ In head count. These are orders of magnitude, the precise results depending on hypotheses retained. There were about 1.6 million researchers in Member States and acceding countries in 2000.

¹⁸ The active population is expected to have fallen by 9 million by 2010.

¹⁹ The potential for increasing the number of women researchers is considerable since the proportions of women in researchers in the public and private sectors are respectively 31% and 15%.

- Attracting international researchers to Europe and fostering mobility between the academic world and industry;
- Maintaining researchers in the profession and in the European research area by giving favourable career development prospects and a positive image of the researcher's profession.

Main ongoing initiatives relevant to the 3% objective

- ✓ Implementation of the Mobility strategy for the European research area, especially initiatives aiming at improving access to the European research labour markets, such as the launching of information tools for researchers, the full application of the co-ordination of social security schemes, including the improvement of the take up of complementary pensions, and the implementation of the European health insurance card;
- ✓ Implementation of the Science and Society action plan, notably actions to promote the mainstreaming of gender equality and the launch of an initiative to enhance science teaching and bridge the gap between science education and working with science.

New actions

- ✓ **Develop proposals on the career of researchers** aimed at facilitating the opening of national systems for the recruitment, evaluation and further career development of researchers at European and international levels, including the need for a specific regulatory framework (*Implementation: Commission communication 2003, Member States*);
- ✓ Examine the case for **further European or concerted measures to substantially enhance the conditions for researchers in the EU**, in the framework of the open process of co-ordination (*Implementation: Commission and Member States, starting 2003*);
- ✓ **Adopt and implement the foreseen proposals for an action plan and a directive on the conditions of entry and stay of third-country nationals for the purpose of research in the EU** (*Implementation: Commission proposals 2003*);

4.2. Public research base and its links to industry

The links between industry and public research (either from university or public research organisations) are evolving from a dominance of 'sponsorship', in which companies funded public researchers to solve specific problems, towards more structured forms of partnership aiming at sustained, long term interaction. There is a growing awareness that public research institutions can be valued partners providing complementary expertise, knowledge and resources that are often unavailable within the industrial community. Such partnership offers a potentially powerful tool to make investment in research more attractive to business while also benefiting public research.

However, in Europe we are still at the beginning of the process. Many companies still see public research merely as a source of basic knowledge and highly-trained students. When it exists, the partnership process is not always managed properly. All in all, there is a widespread perception in Europe of a continuing gap between the respective performances of academic research and technology-based innovation.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Initiatives to be derived from the consultation on the Commission communication “The role of universities in the Europe of knowledge”, particularly on how to establish closer co-operation between universities and enterprises.

New actions

- ✓ Pursue or initiate necessary **regulatory and administrative reforms, and support measures, to enable public research institutions to develop more effective links with industry**, in particular SMEs, while safeguarding their public mission in education and fundamental research. Issues to address include notably the establishment of incubators, science parks, seed funds and new types of public-private partnerships and the performance appraisal of researchers (*Implementation: Member States*);
- ✓ **Increase the participation of industry and other stakeholders in the determination of priorities for public research** (*Implementation: all levels*);
- ✓ Develop **guidelines to help Member States review – and, where appropriate, adapt – their national regimes governing the ownership, licensing and exploitation of IPR resulting from publicly-funded research**, with the aim of promoting technology transfer to industry and spin-off creation (*Implementation: Commission with Member States; 2004*);
- ✓ Develop **European guidelines for the management and exploitation of intellectual property rights in public research institutions and public-private partnerships**. These guidelines will help public research institutions to develop and enforce, on a voluntary basis, charters setting out the main principles to be applied regarding e.g. the ownership and licensing of research results, the sharing of revenues, etc. (*Implementation: Commission in co-operation with stakeholders; 2004*).

4.3. Improving the mix of public financing instruments and their effectiveness

Increasing public support to research and innovation goes hand in hand with improving its effectiveness, in particular its leverage effect on private investment. There is scope for making a more effective use of the various public financing instruments, individually and in combination: direct measures, fiscal incentives, guarantee schemes, support of risk capital. A mix of instrument is needed as no single instrument can address optimally the needs of all segments of industry. Direct measures and fiscal incentives can be used for large firms as well as SMEs, while guarantee and risk capital schemes concerns mainly SMEs.

Public financing instruments must be developed and used with due respect to competition rules, notably art. 87 of the Treaty (CE), as well as, in the case of fiscal measures, with due respect for Member States' commitments in the EU tax arena, notably the Code of conduct for business taxation.

4.3.1. Mix of financing instruments

The main challenge at European level is to reinforce the respective roles of the major financial instruments and their complementarity in support of research and innovation: the Sixth

research framework programme (FP6), the structural funds, Eureka, and the financial instruments of the EIB Group²⁰. The possibility should also be explored of gearing part of the interventions of the European Bank for Reconstruction and Development (EBRD) in acceding and candidate countries to support industrial investment in research and innovation. Member States should also seek to optimise their mix of instruments taking into account the characteristics of their research and innovation systems as well as experiences in other countries and developments at European level.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Further development of complementarity and synergies between European financing instruments : the Sixth research framework programme, structural funds, EIB/EIF and Eureka (joint working groups);
- ✓ Effective implementation of the Sixth research framework programme, in particular to foster excellence and integration of resources, as well as cooperation between national programmes (ERA-Net scheme);
- ✓ Mid-term review of the structural funds instruments, highlighting the potential benefits for regions of actions under the research and innovation priority;
- ✓ Launch of the ‘innovation 2010’ initiative of the EIB Group, as the follow-up to its innovation 2000 initiative, with increased means (investment target of € 20 billion for 2003-2006) and improved instruments to invest in research and innovation activities.

New actions

- ✓ **Develop the research and innovation priority as a major axis of the structural funds after 2006** (*Implementation: Commission 3rd Cohesion report; 2003*);
- ✓ **Streamline funding of collaborative projects in the frame of EUREKA** by examining possible options, in particular ways to synchronise national support²¹ or to create a common financing scheme (*Implementation: Eureka Member States*);
- ✓ **Optimise the mix of financing instruments**, taking into account the needs for different industry segments and developments in other countries and at European level (*Implementation: Member States*);
- ✓ **Develop co-operation between the Sixth research framework programme and the European Bank for Reconstruction and Development**, on the model of the successful co-operation set up with the EIB Group (*Implementation: Commission and EBRD; starting in 2003*).

4.3.2. Direct measures for research and innovation

Direct funding, usually in the form of grants²², remains the preferred type of public support to business research in most countries. Grants allow public authorities to finely target specific

²⁰ Includes the European Investment Bank (EIB), which implements loan instruments, and the European Investment Fund (EIF), which manages equity and guarantee instruments.

²¹ Grants, loans or guarantee schemes.

²² Conditional grants or loans, although used less often than grants, are also direct measures; reimbursement is linked to success or failure of commercial exploitation.

technologies or scientific areas, overcoming cyclical or sectoral slowdowns. They can also influence recipients' behaviours through the conditions attached to them, for example to encourage the development of partnerships and technology transfer.

Important issues are how to promote the constitution of a critical mass for research in key areas, as national capacities are more and more often proving insufficient to create world-class poles of excellence; how to ensure the participation of SMEs, which is crucial to boost the innovative capacity of large segments of the economy; and how to ensure that the results of publicly-funded research are fully exploited²³.

A possible European initiative for the acquisition of defence research, as suggested by the European Council of March 2003 following the Commission communication on the defence equipment industry, would also increase the effectiveness of European defence R&D efforts and could lead to increased funding of frontier technologies of dual-use interest.

New actions

- ✓ **Eliminate rules and practices in national programmes that impede European co-operation and technology transfer²⁴, and allow funding of organisations from other Member States** where appropriate (*Implementation: Member States; proposed target: 2005*);
- ✓ Gear more research programmes towards the **constitution of poles and networks of excellence** by encouraging clustering or integration of resources at regional, national and European levels (*Implementation: all levels*);
- ✓ **Enhance the innovation impact of R&D programmes by encouraging and supporting the integration of innovation-oriented activities in research projects** (e.g. knowledge management and diffusion, training activities, take-up measures for SMEs) (*Implementation: all levels*).
- ✓ Consider setting **targets for the participation of SMEs** in national programmes, on the model of the 15% target set in the Community research framework programme (*Implementation: Member States*).
- ✓ Develop a **European agenda for advanced research relating to global security**, and launch a **preparatory action in view of the possible setting up of a European structure to procure security-related research of common interest**, following the Commission communication on the defence equipment industry and the European Council conclusions on the subject (*Implementation: Commission with Member States*).

²³ See report to the Commission of the independent expert group on "Raising EU R&D intensity: improving the effectiveness of public support mechanisms for private sector research and development: direct measures", April 2003.

²⁴ For example restrictions on the use of the results in other countries and on sub-contracting to non-national organisations. Moreover, even when national programmes have no formal rules excluding projects involving collaboration with organisations from other countries, the absence of an explicit statement guaranteeing the eligibility of such projects is often perceived negatively due to past practices in the attribution of funds.

4.3.3. Fiscal measures for research

Fiscal incentives are increasingly used to encourage business research as they can support a wide population of firms, including SMEs, while leaving enterprises a maximum of independence. To be effective, fiscal measures for research should be designed with care and co-ordinated with other research support instruments. Although optimal design depends on the country-specific context, notably the general national fiscal system, there is scope for mutual learning. For example, a recent review of tax incentives for business research²⁵ suggests that volume-based schemes, although more costly, may be more effective than incremental schemes in stimulating increased research expenditure, in particular in periods of economic downturn; that an important feature may be to make the fiscal scheme independent of profitability, through carry forward / carry back facilities or cash refunds if companies make losses; and that a clear definition of eligible activities is essential, and should preferably include outsourced research as well as in-house activities.

New actions

- ✓ **Encourage a concerted use of fiscal incentives to address research policy issues of common interest**, notably to:
 - **Encourage the creation and early growth of research-intensive firms;**
 - **Facilitate fund raising by new or existing foundations supporting R&D activities in Europe;**Consider also such a concerted use of fiscal incentives to **raise the attractiveness of research careers.**
(Implementation: Commission with Member States in the context of the open method of co-ordination; progress report in 2004);
- ✓ **Improve fiscal measures for research** on the basis of:
 - formal evaluations, whose results should be disclosed;
 - mutual learning;
 - the application of principles of good design such as simplicity, low administrative cost and stability;*(Implementation: Member States);*
- ✓ **Disclose data on the budgetary cost of fiscal measures** *(Implementation: Member States).*

4.3.4. Support to guarantee mechanisms for research and innovation in SMEs

The purpose of guarantee schemes is to share risks between different stakeholders. They may cover either equity investment of venture capital funds or loans and are particularly appropriate for supporting the financing of SMEs, with a high leverage effect on private finance. Equity guarantees could be used to support the creation and early growth of technology-based firms, while loan guarantees would be more appropriate for the financing of research or innovation projects in established SMEs with a limited risk profile.

Public support for such schemes is well developed, notably at the European level by the European Investment Fund (EIF), whose SME guarantee facility has benefited some 120 000 SMEs since 1998. This support is typically offered through sharing the cost of guarantees (co-

²⁵ See report to the Commission of the independent expert group on “Raising EU R&D intensity: improving the effectiveness of public support mechanisms for private sector research and development: fiscal measures”, April 2003.

guarantee) or counter-guaranteeing them. However, despite well-identified market failures in the financing of research and innovation, the potential of guarantee schemes for supporting specifically research and innovation activities appears still largely unexploited in most Member States. Therefore, a better use of such schemes should also be considered and promoted where appropriate, including innovative tools such as the inclusion of guarantees in a larger integrated package of services and the securitisation of loan pools²⁶.

New actions

- ✓ On the basis of experience in some countries, **make better use of guarantee mechanisms to improve access to debt and equity financing for research and innovation activities in SMEs** (*Implementation: all levels*);
- ✓ Consider strengthening and extending future guarantee schemes managed by EIF from its own resources or the community mandate, in order to support the **development of national and regional guarantee programmes to improve access to debt and in particular equity financing for research and innovation in SMEs** (*Implementation: EIB Group and Commission*).

4.3.5. Support to risk capital for research-intensive SMEs

Research-intensive SMEs tend to rely more than others on risk capital for their start-up and early growth, as their auto-financing capability is very limited compared to the size of their research investment needs and their access to credit is restricted by the perceived risk associated with research. The dramatic decline of risk capital activity since 2000 makes it particularly difficult for young research-intensive SMEs to grow or even survive in current conditions. Considering the market failure to raise adequate funding for seed and early stage capital and the cyclical factors that have led to the current funding gap in subsequent stages, there is a strong case for public support for seed and early stage capital, as well as for a wider, time-limited public support to venture capital markets.²⁷ Public measures should also address awareness issues.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Networking activities for risk capital fund managers and business angels, encouraging the emergence of trans-European co-ordinated risk capital activities.

New actions

- ✓ **Strengthen and broaden EIF risk capital activities to better address market failures and current equity gaps** (seed and early stages, including incubators and funds established jointly by networks of universities, and for a limited period the equity gaps in subsequent rounds), **and to extend to public research organisations its advisory services on the setting up of new funds** (*Implementation: EIF and Commission*);

²⁶ See report to the Commission of the independent expert group on “Raising EU R&D intensity: improving the effectiveness of public support mechanisms for private sector research and development: guarantee mechanisms”, April 2003.

²⁷ See report to the Commission of the independent expert group on “Raising EU R&D intensity: improving the effectiveness of public support mechanisms for private sector research and development: risk capital measures”, April 2003.

- ✓ **Increase awareness of research-intensive SMEs about appropriate use of risk capital** notably through actions at regional level, in accordance with the Commission guide on risk capital financing (*Implementation: all levels*).

5. REDIRECTING PUBLIC SPENDING TOWARDS RESEARCH AND INNOVATION

Increasing the quality of public support for research will contribute to raising the level of private investment significantly. It is, however, not sufficient. There is also a need for more public investment in support of research. The following sections examine this in the light of the stability and growth pact and the broad economic policy guidelines, of State aid rules, public procurement, and the financial perspectives for the European Union.

5.1. The stability and growth pact and the broad economic policy guidelines

The recent Commission proposals for strengthening the co-ordination of budgetary policies²⁸ confirmed that the quality of public finances, under the angle of their contribution to growth, is an integral part of budgetary surveillance within the context of stability and convergence programmes. In this regard, the Commission has repeatedly made the case for refocusing public spending towards more productive investments, notably in support of research and innovation, since they are conducive to higher growth in the future. In order to ensure macroeconomic stability and long term sustainability of public finances, this must be done within the framework of the stability and growth pact. Increased public support for research and innovation is one of the categories of spending in support of the Lisbon objectives, for which the Commission considers that small and temporary public deficits should be authorised in countries having otherwise attained a positive or close to balance budget position. The current economic downturn makes it all the more important to ensure that budgetary policies favour investments that will lead to higher sustainable growth in the future.

Consistent with this approach, the Commission's proposal for the broad economic policy guidelines 2003-2006 recommends to refocus public spending towards more productive investment, particularly research and innovation, and translates this priority into a number of specific recommendations to Member States²⁹.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Implementation of the Stability and growth pact, particularly the more detailed assessment of the quality of public spending proposed by the Commission communication of November 2002 on the co-ordination of budgetary policies;
- ✓ Adoption by the Council and follow-up of the Commission recommendations for the Broad economic policy guidelines 2003-2006, particularly regarding the quality of public spending and its refocusing towards knowledge, notably research and innovation.

New actions

- ✓ **Encourage and monitor the refocusing of public spending towards knowledge, notably research and innovation** (*Implementation: all levels*).

²⁸ COM(2002) 668, 27 November 2002.

²⁹ See notably recommendations 13 and 14 of the Commission's proposal for the broad economic policy guidelines, COM(2003)176, 8 April 2003.

5.2. Balance between national and EU public funding until 2010

The financial means available from the European Union budget to support research and innovation should be examined in relation to the efforts undertaken at national level. Clearly, given the long-term common target of 3% of GDP for research expenditure, the respective roles of public expenditures at EU and national should be assessed as soon as possible in co-operation with Member States and acceding countries.

New actions

- ✓ **Analyse and discuss with Member States and acceding countries the public budget requirements** for attaining the 3% objective and the repartition of roles and efforts between national and Community levels until 2010 (*Implementation: Commission with Member States and acceding countries, in the context of the open method of co-ordination*).

5.3. State aid rules

Many forms of public support to research cause no distortion to competition and therefore do not constitute State aid. This type of support should be encouraged in priority. However, a large proportion of public support to business research still falls within the State aid category. The Community framework for State aid for R&D aims at striking a balance between the need to ensure on the one hand that distortions of competition are kept to the minimum and on the other that European industry becomes more competitive. Public support is justified by the recognised failure of the market to induce business investment in research at an optimal level. The framework was renewed in 2002 until 2005 as the maximum levels of aid authorised were not considered an obstacle to the achievement of the 3% target. However, as by the end of 2005 the current framework will have been in force for nearly ten years, it will be necessary to review the basic definitions and concepts used to take account of subsequent developments in R&D.

Block exemption regulations alleviate the burden of notifying certain types of State aid and hasten the granting of support to industry. The Commission intends to amend the existing block exemption for State aid to SMEs, widening its scope to both individual R&D aid and R&D aid programmes, which will considerably reduce the number of notifications. The possibility of a further block exemption will be considered within the review of the Community framework on State aid for R&D.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Rapid adoption of a revised block exemption for SMEs, encompassing State aid for R&D;
- ✓ Collection of data and reporting on the redirection of State aid towards horizontal objectives, including research.

New actions

- ✓ **Clarify and improve awareness of the forms of public support to research that cause no distortion to competition and therefore do not constitute State aid** (*Implementation: Commission*);

- ✓ **Prepare the revision of the Community framework on State aid for R&D**, notably through in-depth review of the following issues:
 - the definition of the cut-off point between research activities eligible for public support and pure commercial innovation activities and differentiation between eligible R&D projects according to their proximity to the market;
 - changes in the role of public research establishments towards stronger co-operation with industry;
 - the various models of public support for R&D activities used by the Community's major trading partners and their implications in terms of a level playing field for European enterprises acting on global marketsWithin the review of the framework, the possibility of block exempting aid will be considered (*Implementation: Commission*);
- ✓ **Redirect State aid towards R&D** as part of the more general redirection of State aid towards horizontal objectives (*Implementation: all levels*).

5.4. Public procurement

Public procurement is estimated to represent 16% of European GDP. It is a leading or major component of demand in a number of sectors, such as health care, education, transport, environmental protection and defence where the public sector can act as a launching customer³⁰. Procurement rules and practices should aim at ensuring that public buyers get the best value for money. Part of this means ensuring that public buyers are able to get products and services with the technology that best fits their needs, including innovative products and services when this is justified. Various possibilities already exist, and the procurement legislative package currently in the process of adoption will clarify and expand them in some respects: for example, with its emphasis on performance and definitions of technical specifications, and with the “competitive dialogue” procedure, allowing to organise competition for complex contracts in dialogue with suppliers so as to identify one or more technical solutions before the final award. Other possibilities may lie with e-procurement and the related dynamic purchase system.

An important objective is to raise public buyers’ awareness of the possibilities offered to them by the legislative framework, and to support the development and diffusion of information enabling them to make full and correct use of these possibilities. This could have a significant impact on the procurement of more innovative products and services, thereby stimulating further research and innovation.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Rapid adoption of the procurement package by the Parliament and Council;
- ✓ Progress of the e-procurement initiative;

³⁰ Through public procurement, in particular in the defence sector, the US government acts as a “launching customer” for innovative technologies (in particular information and communication technologies) and lowers the risk for subsequent customers. In Europe, the European satellite navigation system Galileo is a good example of a large European initiative where initial public procurement plays a major role in the development of the core technologies, followed by a public private partnership for the deployment and exploitation of the infrastructure.

- ✓ Awareness-raising actions proposed in the recent Commission's communication on innovation policy;
- ✓ Progress towards the possible creation of a European intergovernmental defence capabilities development and acquisition agency.

New actions

- ✓ **Support the development and diffusion of information**, for example on the best available technologies for key categories of products, enabling public buyers to procure technologies that best fit their needs, in particular in sectors such as health, environment, transport and education where they are often first customers (*Implementation: all levels*).

6. IMPROVING FRAMEWORK CONDITIONS FOR PRIVATE INVESTMENT IN RESEARCH

While more and better public support is necessary to boost research and innovation in Europe, this needs to be accompanied by considerable improvements in the wider framework conditions to make the European Union really attractive for private investment in research and innovation. A number of recent breakthroughs need to be confirmed and new actions are needed in areas such as intellectual property, market regulations, competition rules, financial markets, fiscal conditions and corporate reporting on research.

6.1. Intellectual property

The protection of intellectual assets is important to the competitiveness of most organisations, private or public, and to their attractiveness for investors. In particular, there is a need for properly balanced intellectual property systems, offering suitable incentives to innovate and invest in research, while at the same time ensuring that the diffusion and further development of research results are not stifled. Considerable progress has been achieved in recent years, at international and Community levels, such as the adoption of the unitary Community design right becoming effective in 2003 and the recent political agreement on the creation of the Community patent system. However, there is still scope to make European intellectual property systems more responsive to the rapid evolution of both research processes and specific technological areas. In addition, actions are needed to promote the optimal use of intellectual property rights systems in Europe, with a special emphasis on academic institutions and smaller businesses.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Setting up of the Community patent system;
- ✓ Negotiation of a proposal for a directive on the enforcement of intellectual property rights;
- ✓ Negotiation of a proposal for a directive on the patentability of computer-related inventions, taking into account the need to avoid stifling competition and open-source development;
- ✓ Rapid implementation of Directive 98/44/CE relating to the patentability of biotechnological inventions and Directive 2001/29/CE relating to copyright and related rights in the information society;
- ✓ Promotion of a common European approach on the grace period issue, in the context of international harmonisation work;

- ✓ Use of existing instruments in the research framework programme to support temporary exchanges of technology transfer professionals between research organisations.

New actions

- ✓ Support **EU-wide coordinated IPR awareness and training activities** targeting in particular the European research community (*Implementation: Commission and other relevant institutions*);
- ✓ **Assess specific research-related aspects of IP law**, including the experimental exception, prior user rights, legislation applicable to technological know-how, and IPR co-ownership provisions, with a view to identifying necessary actions where appropriate (*Implementation: Commission with stakeholders; progress report in 2004*);
- ✓ Ensure that before graduating, every student – especially from science, engineering and business schools – receives **basic awareness/training regarding intellectual property and technology transfer** (*Implementation: Member States and higher education institutions*).

6.2. Regulation of products and standardisation

The impact on research and innovation of existing and new regulations of markets should be checked and optimised where necessary. This should be done in a way consistent with the “better regulation” initiative and notably the Commission’s new impact assessment framework. From a research and innovation point of view, an important objective is to ensure that regulations remain technology-neutral. A good example is the so-called “new approach”, which limits itself to the requirements that are essential to protect the public interest and leaves the technical expression of these requirements to be drafted in the context of the European Standards Organisations (CEN, CENELEC, ETSI) by means of consensus-based standards. This approach has very positive effects on research and innovation by ensuring such technology-neutrality as well as the necessary balance of flexibility and legal certainty. It also means that attention should focus on a timely, effective, open and transparent standardisation process which, like regulation, should remain technology-neutral by relying on performance indicators. Aspects regarding the European standards policy will be examined in details in a Commission communication later this year. The two following aspects are particularly relevant to research and innovation: first, resources need to be made available to fund the research required for completing the development of many European standards; secondly, adequate awareness of standards is needed to allow European business, notably SMEs, to take them better in account in their research and innovation projects.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Forthcoming Commission communication on standardisation;
- ✓ Implementation of the General guidelines for co-operation between the European Standards Organisations and the European Commission³¹;
- ✓ Use of the Sixth research framework programme to fund research necessary for standardisation purposes, in particular in the context of integrated projects and networks of excellence.

³¹ To be published in OJEC.

New actions

- ✓ **Identify technological areas where existing legislation or the lack of legislation is an impediment to the development and deployment of new technologies;** define, where appropriate, measures to address the problems; this will notably be undertaken in the context of European technology platforms (*Implementation: Commission with stakeholders*);
- ✓ **Strengthen the links between the Sixth research framework programme and European standardisation organisations** (CEN, CENELEC and ETSI) with the view of defining and supporting where appropriate research that is required for the development of European standards (*Implementation: Commission and European standardisation bodies*).

6.3. Competition rules

In addition to the review of the Community framework for State aid to R&D, European competition rules are currently being revised in ways allowing for research and innovation aspects to be better taken into account when assessing market dynamics and competitive conditions. Notably, the recent overhaul of EU anti-trust law gives more emphasis to economic assessment. In this context, the forthcoming revision of the block exemption and guidelines for technology transfer agreements should lead to a less legalistic process focusing more on economic assessment. The effects of research and innovation activities also need to be more explicitly considered in merger decisions, in line with the Merger regulation which foresees that "the development of technical progress" should be taken into account³².

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Forthcoming revision of the block exemption and guidelines for technology transfer agreements (external consultation planned during autumn 2003).

New actions

- ✓ **Develop guidance on how the potential efficiencies through technological progress will be assessed in merger decisions** (*Implementation: Commission*).

6.4. Financial markets

Efficient, supportive and integrated financial markets are a major enabling factor to foster investment in research, notably by technology-based SMEs at the various stages of their development. Key markets involved are risk capital markets at start-up and growth stage, secondary markets for the financing of initial public offerings and subsequent expansion, and debt markets. Particularly important issues for research and innovation are the full implementation of the financial services action plan, in particular aspects such as the integration of capital markets in Europe, and the emergence of rating mechanisms appropriate to technology-based companies, including SMEs.

Equally important is the rapid completion of the risk-capital action plan and its possible follow-up. Notably, the tax and regulatory environment of risk-capital should be considered in this context, as investors, especially institutional investors, are highly sensitive to costs and

³² Article 2(1)(b)

complexity and likely to divert their investments to other asset classes unless the conditions of investment in risk capital are substantially improved. Particular attention should be given to double taxation issues, as well as to the possibly damaging effects of excessive prudential obligations imposed on banks and other financial institutions.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Full implementation of the financial services action plan;
- ✓ Rapid completion of the risk capital action plan, and elaboration of follow-up actions as appropriate.

New actions

- ✓ **Adapt, where appropriate, the fiscal treatment of risk capital to avoid the double taxation of investors and funds**³³ (*Implementation: Member States*); to that effect, consider also the merits and the possibility of developing an **harmonised European fund legal structure** ensuring tax transparency for risk capital operations throughout the Union (*Implementation: Commission with relevant stakeholders*);
- ✓ In the light of the recent dramatic decline of risk capital financing world-wide, and of the particularly important role of banks in risk capital financing in Europe, **ensure that Community legislation on capital adequacy, which will be based on the future Basel II capital agreement, properly takes into account the needs of risk capital providers** (*Implementation: Commission; legislative proposal in 2004*);
- ✓ Examine ways to **promote the use of rating systems that include technology risk assessment** (technology rating)³⁴ to enable potential investors to appraise the specific risks and rewards associated to **investments in technology-based SMEs** (*Implementation: all levels, including Commission, with relevant stakeholders; report in 2005*).

6.5. Fiscal environment

Ongoing actions by the Commission to promote a fair and efficient European fiscal environment is likely to have a significantly favourable effect on the attractiveness of the EU for research investment and innovation. The Commission is following a two-pronged strategy for tackling the tax obstacles to cross-border activities in the internal market: in the short term, enactment of specific legislation targeted at each particular obstacle; in the longer term, development of a systematic, comprehensive solution to all cross-border issues providing companies with a common consolidated tax base for their economic activities within the EU. Actions of particular importance for research investment are listed below.

³³ Double taxation (investors and funds) reduces the profitability of investment in risk capital funds compared to investments made directly in firms, and therefore diminishes the attractiveness of such funds. This restricts investments by both domestic and international investors.

³⁴ Historical financial statements are not a reliable guide to future performance of technology-based firms, because these companies frequently enter new markets with new products. Technology rating looks forward, by helping to assess the value of an innovative technology-based product or service.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Forthcoming Commission initiative on the cross-border offsetting of losses for tax purposes (planned in 2004), which will benefit research activities and contribute to their more efficient allocation within multinational groups, since these activities are almost by definition accounted as loss-making;
- ✓ Work of the EU joint transfer pricing forum, to improve notably the tax treatment of transactions between various units of multinational companies (e.g. transfer of intangibles);
- ✓ Rapid adoption of the draft directive on the taxation of cross-border payments of interest and royalties, which will abolish withholding taxes on royalties for patents in the EU;
- ✓ Progress towards creating a consolidated EU tax base for companies, on the basis of the forthcoming Commission communication planned for the end of 2003.

6.6. Corporate research strategy, management and financial reporting

There is room for progress in increasing awareness of companies, especially SMEs, of the benefits and ways of integrating research and innovation into their business strategy and management. This awareness can be raised by the education system and also by new methods of financial reporting. Within the curricula of business schools more attention should be paid to an integrated approach to R&D management within the overall business strategy. Creating more transparency in financial reporting about the role of investment in research and other forms of intellectual capital will also lead to a better understanding of value creation within companies and provide a better basis for decision-making to managers and investors. Regarding external company financial reporting, more attention should be paid to the implementation of guidelines, consistent with new International Accounting Standards, concerning reporting of R&D and other forms of intellectual capital. These new types of reporting will also provide data, which will enable statistical offices to provide better information on the size of investment in intellectual capital.

Main ongoing EU initiatives relevant to the 3% objective

- ✓ Actions within the research framework programme to stimulate widespread use and harmonisation of guidelines on measuring corporate research and other forms of intellectual capital;
- ✓ Development and regular publication of statistics on firms' investment in intellectual capital.

New actions

- ✓ Set up an **industrial research monitoring activity, including a score-board**, to analyse trends and facilitate benchmarking of research investment and research management practices between firms, building on experience in Member States (*Implementation: Commission support; first report early 2005*);
- ✓ Encourage **corporate measuring and reporting on research and other forms of intellectual capital**, both internally and externally, making use of existing international guidelines. (*Implementation: business sector*);
- ✓ Encourage **the development and inclusion of state-of-the-art R&D management modules into science, engineering and business schools curricula** (*Implementation: Commission with higher education institutions and industry*).

7. CONCLUSION

The present action plan marks the start of a process which has the potential to boost Europe's attractiveness for investment in research and to put the Union on track for reaching the objective of 3% of GDP for research by 2010. However, this requires determined and coherent action by Member States, acceding and candidate countries and all stakeholders. For its part, the Commission will start immediately taking the necessary steps to advance along the lines identified above and to encourage those that are willing to improve the conditions to do more and better research in Europe. It will also report every year ahead of the Spring European Council meeting so that the European Council may follow progress and set further orientations or adjust its strategy as appropriate on the basis of progress made.