Opinion of the European Economic and Social Committee on ‘Investment in Knowledge and Innovation (Lisbon Strategy)’

(2007/C 256/04)

On 14 September 2006, the European Economic and Social Committee, acting under Rule 31 of its Rules of Procedure, decided to instruct its Section for the Single Market, Production and Consumption to draw up an information report on Investment in Knowledge and Innovation.

At the plenary session on 14-15 March 2007, it was decided to change the information report into an own-initiative opinion (Article 29(2) of the Rules of Procedure).

The Section for the Single Market, Production and Consumption, which was responsible for preparing the Committee’s work on the subject, adopted its opinion on 3 May 2007. The rapporteur was Mr Wolf.

At its 437th plenary session, held on 11-12 July 2007 (meeting of 12 July), the European Economic and Social Committee adopted the following opinion by 120 votes with one abstention.

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1. Introduction

1.1 Under the heading ‘THE RELAUNCHED LISBON STRATEGY FOR JOBS AND GROWTH’, the European Council, in its Presidency Conclusions of 23-24 March 2006 (point 12), welcomed the initiative taken up by the European Economic and Social Committee to increase ownership of the Lisbon Strategy at Community level. It encouraged the European Economic and Social Committee to continue its work and asked it for a summary report in support of the Partnership for growth and employment in early 2008.

1.2 In the meantime, on 15 February 2007, the Committee adopted a resolution on the implementation of the renewed Lisbon Strategy, to be presented to the Spring 2007 European Summit.

1.3 In preparation for the summary report requested by the European Council, four information reports on the following topics will be drawn up:
   — Investment in Knowledge and Innovation;
   — Business potential, especially of SMEs;
   — Employment of priority categories;
   — An Energy Policy for Europe.

These information reports will form the key points of the summary report.

1.4 The following text, which was drawn up in cooperation with representatives of the national economic and social councils of some Member States, deals solely with the subject of investment in knowledge and innovation.

2. Summary and recommendations

2.1 Europe’s strength lies in the capabilities and performance of its citizens.

2.2 The free interaction of inventive craftsmanship and entrepreneurial initiative with scientific methods and systems and the technologies and industrial processes that developed out of them was the European recipe for success that brought about the progress that led to the living standard we enjoy today. This went hand in hand with historical socio-political developments, resulting in the free citizen in the modern state with separation of powers, democracy and fundamental rights.

2.3 The development and intensive use of energy-consuming industrial processes, machines and transport systems made a decisive contribution to this. Energy freed people from the burden of the heaviest physical labour, multiplied their productivity, provided heating and lighting, and made previously unimaginable mobility and communication possible. Energy became the food and fuel of modern economies.

2.3.1 In the light of the finite reserves of fossil fuels, the rapidly rising worldwide demand for energy, and the expected impact of energy consumption on climate change, it is unsurprising that securing sustainable and climate-friendly energy supplies is at the top of the political agenda. A key prerequisite to achieving this very difficult objective is a strong, wide-ranging and effective research and development programme for energy.
However, above and beyond this, there are a great many more problems and tasks that can only be solved by research, development and innovation. These include, for example, combating physical and mental illness, making life and participation in society easier for people with disabilities, the effects of demographic change (including gerontology), protecting the environment and, more generally, protecting and developing our way of life, our European values system and our social model. All things considered, however, research and development also serve the fundamental aim of bringing about greater and new knowledge. Increased knowledge not only helps us to solve problems, but also broadens our world view, objectifies conflict situations, and enriches our culture.

Moreover, the European Union faces the challenge of increasing global competition, the challenge being to maintain European jobs, prosperity and social and environmental standards. This is true not just because of the economic power of the USA and Japan, but above all because of the increasingly strong industrial and research performance of countries such as China, India and Brazil, and in view of the significantly lower wages and social and environmental standards in those countries.

The only way to deal with this is to continue in the future to stay ahead in research, technological development and innovation, rooted in a socio-cultural environment of democracy, the rule of law, political stability, free enterprise, planning security, motivation, the recognition of achievements, and social security.

Top performances in the scientific and technical field, and their entrepreneurial conversion into a competitive, economic force, are essential preconditions to safeguarding our future (not least with regard to energy and climate issues), preserving and improving our current global position, and developing rather than jeopardising the European social model.

The basic prerequisite for achieving this goal is a social climate that is open to progress and innovation, in which society fully understands this and all its implications, so that politicians at all levels create the necessary conditions and take decisions that are conducive to such progress, and so that enough business confidence and optimism is built up for the necessary investments to be made in Europe and new jobs to be created. This also includes raising awareness of the fundamental significance of basic research, as this lays the necessary foundations for future innovations. An entrepreneurial spirit that is willing to innovate and take risks is particularly needed, as are political leadership, dependability and a sense of reality.

In particular, the Barcelona target set for the purpose of implementing the Lisbon strategy must be taken very seriously by all the relevant stakeholders if Europe is not to fall further behind its global competitors in terms of R&D investment. This target states that total R&D expenditure in the EU should be increased such that it reaches around 3 % of GDP by 2010. Two thirds of the required investment is to come from the private sector.

In December 2006, the Council adopted the Seventh R&D framework programme (FP7) for 2007-2013. The budget for this programme, at around EUR 50 billion, was significantly higher than for the previous one. This is another significant European policy success, which the Committee has substantially supported. However, the Community will still only be providing about 2 % (in other words, only one fiftieth) of the total investment in research and development aimed for by the Barcelona target. As the Committee has repeatedly stressed, this is insufficient to maximise the intended multiplier and integrating effects that EU funding has on Member States’ research funding and the willingness of industry to invest.

Therefore, the Committee reiterates its recommendation that this part of EU funding should, as a first step, be increased by half, i.e. to around 3 % of the total investment aimed for by the Barcelona target, as part of the revision of the EU budget planned for 2008. This is especially relevant in the light of the future European Technology Institute (ETI) and the urgent need for more R&D into climate-friendly sustainable energy supply.

Equally, however, the willingness of industry, and in particular small and medium-sized enterprises, to invest in research and development needs to be promoted and made more attractive and profitable through appropriate legal (including laws on liability), administrative, fiscal and financial framework conditions. EU law on state aid also has an important role to play here; it should enable the Member States to provide more effective and less bureaucratic support than in the past for the research and development plans of universities, research organisations and industry, and help them to establish networks. Careful consideration should therefore be given to the question of whether the Community framework for state aid to research, development and innovation really is conducive to these goals.

Knowledge is based on two equally important and interdependent pillars: education and research. New knowledge must be attained through research and development. The starting point is existing knowledge. This must be consolidated and passed on through education, training and lifelong learning. Both the methods and the content should be assessed as to whether they are conducive to the specified aims. Both these pillars also need significantly increased financial investment and suitable framework conditions.
2.14 Europe's strength lies in the capabilities and performance of its citizens. Doing more to promote and develop these capabilities must therefore be a priority. Accordingly, the Committee calls on the Member States to strengthen and improve their educational establishments and to put in the considerable investment necessary to achieve this. Sound education and training for the masses is just as important as the education of the academic elite. With this in mind, a wide range and sufficient number of sound and appropriate educational establishments, from primary schools to universities, are necessary. Only then will European society as a whole be receptive to education and science.

2.15 In addition, the Committee repeats its recommendation that a common European knowledge area be developed to complement the European Research Area, through closer supranational cooperation in the areas of learning, innovation and research. Any incentives and measures in support of lifelong learning have an important role to play here. Lifelong learning is the key to the knowledge society. Obstacles to the single market that are obstructing the transition to the European knowledge society must be removed as quickly as possible.

2.16 This includes still greater support from Member States for personal mobility, and strengthening relevant, effective EU programmes (Erasmus, Marie Curie). Mobility is conducive to attaining and transferring skills. Free movement of workers, researchers and students across Europe must be guaranteed, and rewarded by means of incentives; it must go hand in hand with decent income, working conditions and support for families. Public bodies across Europe also need to improve access to information in this area.

2.17 As regards the significance and promotion of innovation, the Committee refers not only to its detailed recommendations set out below, but especially to the excellent Aho Report, which it endorses. This particularly concerns the legal and social environment for innovative entrepreneurship and an innovation-friendly market. The Committee also refers to its more detailed opinion on Unlocking and strengthening Europe's potential for research, development and innovation.

2.18 Progress and innovation take place when new knowledge is turned into new and better processes and products (including ongoing improvement of existing ones), new societal models, and the requisite management methods; thus, the key is an innovative entrepreneurial spirit and entrepreneurial initiatives. That said, progress and innovation also depend on new kinds of services, on developing healthcare services, and in general on better solutions to social problems within the economic constraints that exist.

2.19 Thus, innovation means devising and implementing new technologies, processes, organisational methods, business models, educational models etc. that previously had not been, or could not be, considered. It is therefore important that relevant legislation offers sufficient room for manoeuvre to give new ideas that were not previously thought of the chance to be put into practice and not to wither away before they even take root simply because they do not fit into the framework of excessively detailed regulation. Over-restrictive regulation is a brake on innovation. The Committee therefore supports all efforts to simplify regulations and to check them for superfluous, excessively detailed and unnecessarily restrictive requirements.

2.20 Innovation means accepting a certain level of risk of failure and indeed of losses; generally speaking, the effectiveness, or indeed the disadvantages or side-effects, of a new approach or idea is only recognised when it has proven itself in practice and in competition with other processes. Even failure provides lessons. Opportunity and risk are two sides of the same coin. As a rule, the expected benefit of an innovation should outweigh the possible risks associated with it. Potential risks to society require a special assessment. Consideration could also be given to whether — at least for small and medium-sized enterprises — a risk fund (for example at the EIB) should be set up to help cover possible losses.

2.21 The Committee has repeatedly pointed out that human capital is the most delicate and most valuable resource for knowledge and innovation. Requisite training bodies that are sufficient in number, resources and quality are therefore key prerequisites for meeting the demand for good scientists, engineers and teachers.

2.22 By virtue of the investment carried out by society on the one hand, and by individual researchers on the other, with a view to acquiring broadly-based and not readily accessible fundamental knowledge and high-level specialised knowledge, society — as represented by politicians — assumes responsibility for making optimal use of this investment. This responsibility must be reflected in a concern to ensure that trained research workers and engineers are able to start families and are provided with appropriate job opportunities and suitable career paths, with attractive options for branching out into other fields, without running the risk of being professionally sidelined or sent down dead ends. If qualified scientists and engineers are unemployed, underpaid or underemployed (inter alia through excessive administration and committee work), this represents a waste of economic investment and serves as a deterrent for the next generation of top-level scientists and engineers, with the result that they opt for non-scientific and non-technological careers or emigrate from Europe.

2.23 This does not rule out the need to involve experienced experts and scientific and technical achievers more than hitherto in relevant decision-making processes and administrative dossiers relating to research policy, entrepreneurial and innovation policy matters. The establishment of the European Research Council (ERC) is a very encouraging first step in this direction. However, sufficient relevant expertise also needs to be attracted to and retained in EU (including the Commission) and Member State bodies that provide funding for research and innovation. Administration alone is not enough.
2.24 Turning research and innovation into industrial products and processes raises a particular set of issues. The Lisbon target of two-thirds of R&D investment coming from industry is not without reason. It is therefore particularly important to enhance the professional image of entrepreneurs and to raise public awareness of their key role in innovation, economic progress and prosperity in general. For this reason, the Committee, as the bridge to organised civil society, has put entrepreneurship with a human face at the centre of its forthcoming work programme. Only through responsible, energetic and imaginative entrepreneurship that is able to develop freely will the Lisbon goals be achieved.

2.25 Many further aspects and details are dealt with in the more comprehensive comments below, and also in the Committee opinions on The road to the European knowledge-based society — the contribution of organised civil society to the Lisbon Strategy (1) and Unlocking and strengthening Europe’s potential for research, development and innovation (2).

3. General observations

3.1 Development of science and technology. Europe is the cradle of ever-evolving modern science and research. If the Greek/Egyptian cultural area is taken into consideration, along with the cross-fertilisation with the Indian-Arabic (3) cultural area that has taken place from time to time, then it can be said to be the cradle of science generally. Despite various ups and downs over time and some interruptions caused by war, science and research were linked right across Europe, irrespective of national borders. Their methods and way of thinking were decisive in paving the way to our contemporary European society, its values, its way of life and its standard of living: they were a defining characteristic of the European cultural area (4). The recipe for success of the resulting achievements was the free interaction of inventive craftsmanship and entrepreneurial initiative with scientific methods and systems and the technologies and industrial processes that developed out of that.

3.2 Development of society. The key social developments that led to free citizens in the modern state with separation of powers, democracy, fundamental rights and social welfare legislation went almost hand in hand with scientific and technological progress.

3.3 Development of living conditions. As a consequence of these parallel processes, the living conditions of people in the countries and regions involved have changed and improved as never before in human history. In the last 135 years, the average life expectancy of the population (5) has more than doubled (6). In the last 50 years, agricultural yield in terms of surface area has almost trebled. In the successful industrialised countries, the talk is now of obesity rather than malnutrition, of information overload rather than a lack of information, and of an ageing population rather than child mortality. The capabilities and achievements of modern, mobile industrial society that have come about through research, science and innovation touch every area of human development and quality of life.

3.4 Use of energy. The development and intensive use of energy-consuming industrial processes, machines and transport systems made a significant contribution to the progress that has been made. Energy freed people from the burden of the heaviest physical labour, multiplied their productivity, provided heat and light, and made previously unimaginable mobility, communication and cultural development possible. Energy became the food and fuel of modern economies.

3.5 The climate issue and energy supply. However, this significant development brings with it new problems and challenges. Global warming, its possible consequences, and strategies for reducing it are the subject of far-reaching political decisions (7) and a large number of studies (8), some of which have controversial conclusions. The Stern Review (9), entitled The Economics of Climate Change and published at the end of October 2006, has established that reducing global warming caused by greenhouse gases will cost around 1% of GDP, which in particular includes further R&D activities that are necessary for this purpose. However, even leaving aside the problem of climate change, the issue of safe, sustainable energy supply for Europe (and indeed the world) is one of the central political challenges which significantly increased research and development will play a very important role in resolving (10).

3.6 Further problems and challenges (11). However, climate change and energy supply are not the only problem. Further examples of important areas of research on which the Committee has made detailed recommendations in earlier

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(1) OJ C 65, 17.3.2006.
(3) Possibly also with the Chinese cultural area.
(4) A very comprehensive and detailed description of these processes can be found in the Committee’s own-initiative opinion on Science, society and the citizen in Europe (OJ C 221, 7.8.2001).
(5) In Germany.
(6) Not least thanks to a reduction in child mortality.
(8) For example:
1) WMO/UNEP Intergovernmental Panel on Climate Change — Climate Change 2007: The Physical Science Basis — Summary for Policy Makers, or
2) Open letter by 61 Scientists to the Canadian Prime Minister (http://www.lavoisier.com.au/papers/articles/canadianPMletter06.html).
(9) http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm.
(11) See also OJ C 185, 8.8.2006.
opinions such as that on the Seventh R&D framework programme (17) and that on its Specific Programmes (18) include combating physical and mental illness, making life easier for disabled or otherwise disadvantaged people with the aim of improving their professional development and participation in the knowledge society; the effects of demographic change (plus gerontology); a better understanding of complex economic, social and cultural issues, how they are related, and their impact on each other; protecting the environment; and, more generally, protecting and developing our way of life, our European values system and our social model.

3.7 Global competition. Moreover, the European Union faces the very serious challenge of increasing global competition. A particular challenge for the EU is to maintain European jobs, prosperity and social and environmental standards. This is true not just because of the economic power of the USA and Japan, but more particularly because of the significant and increasingly strong industrial and research performance of countries such as China (which wants to overtake the United States as the most technologically advanced country in the world by 2030 (19)), India and Brazil, and of the significantly lower wages and social and environmental standards in those countries. It is precisely against this background of global competition and of the global race for increased investment in research and development, including global competition for the best scientists and engineers, that the European Union needs to optimise its policies in this area. Thus, we are talking primarily about global competition, not that within Europe.

3.8 Staying ahead in research, development and innovation. Europe’s competitive position can thus only be maintained if it continues in the future to maintain its lead in research, technological development and constant innovation, rooted in a socio-cultural environment of democracy, the rule of law, political stability and dependability, free enterprise, planning security, motivation and the recognition of achievements. The European Research Area must be strengthened and expanded. Whilst this is now generally recognised in political statements of intent, the reality in terms of action and specific priority-setting (e.g. research budgets) and the relevant regulatory frameworks (e.g. collective agreements (19) and tax laws (20)) shows up significant and regrettable deficiencies, both at Community level and in most of the Member States. Just how dramatic this state of affairs is should not be underestimated, even if some Member States show an encouraging trend towards catching up (20).

3.9 Top performances in the scientific and technical field. Top performances in the scientific and technical field, and their entrepreneurial conversion into innovations and a competitive, economic force, are essential preconditions to safeguarding our future, for example with regard to energy and climate issues, preserving and improving our current global position, and developing rather than jeopardising the European social model. All things considered, however, research and development also serve the fundamental aim of bringing about greater and new knowledge. However, increased knowledge not only helps us to solve problems, but also broadens our world view, objectifies conflict situations, and enriches our culture.

3.10 Reviving tradition. Europe must now, therefore, become aware that it was once the leading area for research and innovation and aim to revive that tradition. Europe’s strength lies in the capabilities and performance of its citizens. More must therefore be done to promote and develop these capabilities than has hitherto been the case. However, this also means investing significantly more in research and development, increasing their efficiency, strengthening the willingness and ability of industry, commerce and government to innovate, promoting and recognising effort, and reducing any obstacles that stand in the way.

3.11 Increasing investment. In particular, this means that the EU and the Member States must invest significantly more in research and development, in general education that reflects this, and in educating the required scientists and engineers (of both sexes). Above all, however, it means that the willingness of industry, and in particular small and medium-sized enterprises, to invest in research and development needs to be promoted and made more attractive and profitable through appropriate legal, administrative, fiscal (20) and financial framework conditions.

3.12 A social climate that favours progress. The most important prerequisite for achieving this goal is a social climate that is open to progress, innovation and entrepreneurship, in which society fully understands this and all its implications, so that politicians at all levels create the necessary conditions and take decisions that are conducive to such progress, but also so that jobs are created and enough confidence and optimism is built up in industry for the necessary investments to be made. This includes ensuring that the public is made more familiar with the achievements and significance of science and technology and the pioneering work of entrepreneurs than is currently the case. This also means recognising that basic research (19), in particular, lays the necessary foundations for future knowledge and innovations.

(20) In particular the income and contractual status of young scientists and engineers.
(19) On this subject, see also the Communication from the Commission COM(2006) 728 final: Towards a more effective use of tax incentives in favour of R&D. The Committee will draw up a separate opinion on this.
(20) See in particular OJ C 110, 30.4.2004. From a historical perspective, it was proposals for basic research that benefited from the first scientific cooperation initiatives (Western Europe). They were thus in particular an incentive to build centres for large-scale equipment and to create a critical mass that would have been too expensive for any individual Member State.
3.13 Recognising achievements. The decisive impact of these achievements on our current way of life, the conditions in which they came about, and the scientific, technological, entrepreneurial and cultural achievements associated with them, must be recognised by society, taught in schools and accorded the significance they deserve.

3.14 Further prerequisites. However, progress and continuous innovation do not depend exclusively on science and technology; but also on the motivation, the skills and the willingness to work of all those involved, as well as on innovative business models, the right management methods, and on a legal framework that is conducive to all of the above.

3.15 Acceptance of risk. If promoting new approaches to research, innovative technologies, business practices and business models is to be a success, one must accept that success involves a certain amount of risk, including the risk of losses. Generally speaking, the advantages and effectiveness, or indeed the disadvantages, risks and side-effects of a new approach are only recognised with it has proven itself in practice and in competition with other processes. Even failure provides lessons. Opportunity and risk are two sides of the same coin. As a rule, the expected benefit of an innovation should outweigh the possible risks associated with it. Potential risks to society require a special assessment. Consideration could also be given to whether — at least for small and medium-sized enterprises — a risk fund (for example at the EIB) should be set up to help cover possible losses.

4. Education, training and lifelong learning

4.1 Knowledge base. Knowledge is based on two equally important pillars: education and research. New knowledge can only be attained through research and development. For this to happen, existing knowledge is required as a starting point: this must be consolidated and passed on through education, training and lifelong learning. The aims of this are as follows:

4.1.1 Basic knowledge. The first aim is to ensure that every citizen has a sound basic knowledge of science, technology and the economy, how they work and their significant basic principles, as part of his or her education. This is essential if, for example, citizens are to be able to make judgements about the often complicated interrelations that need to be understood in order to arrive at an informed political opinion. Accordingly, the curricula and available teaching time at all levels of education should be oriented towards gradually introducing children and young people to a scientific, technical and economic way of thinking and to the store of knowledge (20) that exists, by using concrete examples and clear and stimulating explanations and teaching materials. They should also raise awareness of the significance of science, technological development, innovative socio-economic arrangements and the knowledge society in general to their future and life opportunities. If this is to happen, significantly more emphasis needs to be placed on this part of the curriculum. The Committee welcomes and supports the recommendations of the Rocard report, which addresses this concern (21).

4.1.2 Incentives for choosing a profession. At the same time, those who show talent for science and technology should be encouraged to pursue a — notoriously tough — course of study in this area and, with this in mind, be given a solid basis of knowledge with which to start a career in this field. This, too, means that school curricula, especially in grammar schools, should provide extensive, high-quality teaching.

4.1.3 Regaining lost ground in terms of breadth and depth. Thus, there is significant ground to be made up in terms of teaching in science and technology. Of course, this does not change the fact that all talents across the spectrum need to be nurtured, including the social sciences, economics, the humanities and the arts. Sound education and training for the masses — which also means that pupils need to be willing to work and self-disciplined — is just as important as the education of the academic elite. High-quality educational establishments, from primary schools to universities, are the fundamental prerequisite for society as a whole to be receptive to education and science.

4.1.4 The European Knowledge Area. The Committee repeats its recommendation that a common European knowledge area be developed to complement the European Research Area, through closer supranational cooperation in the areas of learning, innovation and research. Obstacles to the single market that are obstructing the transition to the European knowledge society must therefore be removed as quickly as possible. On this subject, the Committee refers to its opinion on The road to the European knowledge-based society — the contribution of organised civil society to the Lisbon Strategy (22).

4.1.5 Lifelong learning and mobility. Incentives and measures in support of lifelong learning have an important role to play here. Lifelong learning is the key to the knowledge society. This includes still greater support from Member States for personal mobility, and strengthening the relevant, effective EU programmes (Erasmus, Marie Curie). Mobility networks

(20) OJ C 65, 17.3.2006.
Europe and is conducive to attaining and transferring knowledge. Free movement of workers, researchers and students must be guaranteed and go hand in hand with decent income, working conditions and support for families. Public bodies across Europe also need to improve access to information in this area.

4.2 Standard of skills training. This also means that scientific and technological training in universities and technical colleges must, at the very least, match the highest international standards. The most important capital for research and innovation are highly qualified and motivated scientists and engineers of both sexes who maintain and develop their skills through lifelong learning throughout their careers and a sufficient number of whom are capable of taking on leading roles and carrying out pioneering work in the most difficult areas.

4.3 Opportunities for all. In the future, progress and success will, more than ever, be the result of structured team work involving division of labour where all those involved have the best possible opportunities to develop and take initiatives in accordance with their talents, skills and creativity. This also means that there needs to be sufficient interchangeability of school systems so that people of all abilities, including, for example, late developers, are given the opportunity of the best possible education. It is also essential to have high-quality training institutions for the whole spectrum of specialists that is and will be needed for the wide range of tasks in technology, science and business.

4.4 Networking. Especially for the purposes of vocational training, even closer networking of the training, research and industrial application pillars is needed. There is a clear link here to the subject of lifelong learning and mobility (see point 4.1.5). There is also a need for better cross-border networking of universities and higher education colleges. With this in mind, the Committee welcomes the plans for the European Technology Institute (ETI) (23), which is aimed at further developing the innovation capacity of the EU and its Member States by connecting training, research and innovation activities at the highest level. However, above and beyond education and training, this also applies to all the pre-competitive research and development (24) of industrial firms, such as the joint development of improved engine technology in the car industry.

5. Financial matters and procedures

5.1 Investment is a matter for all stakeholders. The EU, the Member States and the private sector must do their best — i.e. considerably more than they do now — to provide the necessary investment for education, research and development.

5.2 Barcelona target. The Barcelona target set for the purpose of implementing the Lisbon strategy must be taken very seriously and strenuously pursued by all the relevant stakeholders if Europe is not to fall further behind its global competitors in terms of R&D investment. This target states that total R&D expenditure in the EU should be increased such that it reaches around 3 % of GDP by 2010. Two thirds of the required investment is to come from the private sector.

5.3 Multiplier effect of the Seventh R&D framework programme. In December 2006, the Council adopted the Seventh R&D framework programme (FP7) for 2007-2013. The budget for this programme, at around EUR 50 billion, was significantly higher than for the previous one. This is another very significant European policy success, which the Committee has substantially supported. However, the total budget for this is about EUR 50 billion, which means that the Community will still only be providing about 2 % (in other words, only one fiftieth) of the total investment in research and development aimed for by the Barcelona target. However, as the Committee has repeatedly stressed, this is insufficient to maximise the multiplier and integrating effects that EU funding has on Member States’ research funding and much-needed industry investment, and thus bring about the considerable increase that is needed to reach the Barcelona target.

5.4 Reiterated recommendation. Therefore, not least in view of the planned establishment of the European Technology Institute (ETI) and the urgent need for more R&D work into climate-friendly, sustainable energy supply, the Committee reiterates its recommendation (24) that this part of EU funding should, as a first step, be increased by half, i.e. to around 3 % of the total investment aimed for by the Barcelona target, as part of the revision of the EU budget planned for 2008. This would be a particularly effective step by the EU towards reaching the increasingly important Lisbon and Barcelona goals more quickly than can be expected at present, and towards solving the above-mentioned problems more effectively and more quickly.

5.4.1 Competition with China. The equivalent research efforts being made by China, for example, are increasing rapidly, and Europe must make every effort so as not to lose markets in globally important and essential technologies to international competitors. However, it is not politically credible to demand that the private sector provide the necessary investment when the EU and the Member States have not provided their share of funding for the Barcelona target which they themselves set.

5.4.2 Core funding by Member States. At the very least, the Member States should ensure that their universities and research institutes have sufficient core funding to be able to receive the expected level of co-financing from the Seventh R&D framework programme.

(24) OJ C 93, 27.4.2007.
(25) See also chapter 7 of OJ C 204, 18.7.2000.
5.5 EU framework for state aid. EU law on state aid should therefore be framed in such a way as to encourage the Member States and enable them to provide greater, more effective and less bureaucratic support than in the past, for the research and development plans of universities, research organisations and industry, and help them establish networks between them. Careful consideration should therefore be given to whether the Community framework for state aid to research and development and innovation (\(^2\)) really is conducive to these goals.

5.6 Member States’ budget rules. Individual Member States’ budget rules should allow for a more flexible drawing/flow of funds for R&D measures. These should be adapted to the cycle of each project. For instance, it should be possible to transfer allocated funds to the following calendar or budgetary year.

5.7 Development of scientific infrastructure. The EESC has also recommended on several occasions (\(^2\)) that a much greater part of the resources of the EU’s Structural Funds be used for the development of scientific infrastructure. The use of funding from the European Investment Bank for this purpose could also be highly beneficial.

5.8 Potential of SMEs. It is also important to further strengthen the potential of SMEs, and especially of start-up companies, for innovation and, more generally, to provide stronger incentives for industry to invest in this area. The Committee also refers to its recommendations (\(^3\)) on the EU multiannual programme for enterprise and entrepreneurship, and in particular for small and medium-sized enterprises (SMEs) and to the support for the knowledge-based economy that is especially important in this context. The fact that 98 % of all firms in the EU are SMEs makes it particularly clear how important it is to strengthen the capacity for innovation of this category of enterprise. The Committee therefore welcomes the fact that EUR 1.3 billion are set aside for R&D by and on behalf of SMEs within FP7. Existing regulations that make life difficult for SMEs should be reviewed and, where possible, red tape should be cut; the authorities could also, through business angels, provide help with access to funding opportunities. Europe can also draw inspiration from the funding policies of other countries in this area.

6. Structural aspects and basic conditions

6.1 Reference to other and previous reports. On this subject, the Committee refers first of all to the two recently-published Commission Communications (\(^4\)) on innovation and to the excellent Aho report (\(^5\)). It also refers to its own opinion (\(^6\)) on Unlocking and strengthening Europe’s potential for research, development and innovation, which in many places overlaps with this document, but also goes into much more detail on several of the issues dealt with herein.

6.2 Innovation is more. Reaffirming and complementary to the above-mentioned reports, the Committee also reiterates that progress and innovation do not depend exclusively on science and technology, but also on applying such knowledge through new and better products and processes, innovative business models, and the right management methods; thus, an innovative entrepreneurial spirit and entrepreneurial initiatives are also key. Progress and innovation also depend on new kinds of services, on developing healthcare services, and in general on better solutions to social problems — an example of this is the concept of ‘flexicurity’, which the Committee has discussed (\(^7\)).

6.3 Innovation — a step into uncharted territory. Thus, innovation means devising and implementing new technologies, processes, organisational methods, business models, educational models etc. that had not previously been considered. Therefore, their effectiveness can usually only be proven once it has stood the test of real competition.

6.4 Flexible regulatory frameworks. At the same time, regulations are drawn up on the basis of existing knowledge. It is therefore very important that such regulations offer sufficient room for manoeuvre — i.e. enough plurality and variability — to give new ideas that were not previously thought of the chance to be put into practice and not to be suffocated at birth or allowed to wither away slowly simply because they do not fit into the framework of existing regulation. When drafting legislation, it is therefore important to ensure that fundamental issues are dealt with and regulated, but that excessively detailed regulations are avoided. Overregulation and excessively restrictive rules, however well-intentioned they may be, stifle and hinder innovation. The Committee therefore supports all efforts to simplify regulations and to check them for superfluous and/or unnecessarily restrictive requirements. This also serves the purpose of releasing experts (see below) from unnecessary red tape. Moreover, the mistakes of individuals should not lead to the overregulation of everyone.

6.5 Freedom of research. Once again: Innovation requires sufficient entrepreneurial freedom. Scientific freedom — inter alia freedom from restrictive (\(^8\)) or indeed ideological requirements — is a fundamental prerequisite for creative research and

\(^{(3)}\) For example in OJ C 65, 17.3.2006.
\(^{(9)}\) See also OJ C 65, 17.3.2006, point 4.13.2 on the Charter and footnote.
new discoveries and inventions, without prejudice to a) the limits placed by legislative answers to ethical problems and b) the proper use of allocated funds.

6.6 Reiteration of CESE 1566/2006. Reference is made to further important observations in the opinion (34) referred to under point 5.1. The statements contained therein are strongly supported. Points 4.7 to 4.11 of that opinion make recommendation on the following topics, which are relevant to this opinion: Moving from enhancing our knowledge of nature to the creation of innovatory products, processes and services. Mobility between academia and industry. Publicly accessible information systems. Clusters. Start-ups. Basic research. The innovative product. Public procurement. Intellectual property and necessary Community patent. Period of grace prior to publication which does not infringe novelty status. The language problem. Particular situation of the new Member States.

6.6.1 Protection of intellectual property — European Community patent. The particular emphasis is thereby again placed on securing adequate protection for intellectual property (35): it must be worthwhile for businesses to invest in research, development and innovation, and the financial, legal and administrative outlay required to secure and retain property rights must not adversely impact Europe’s economic strength vis-à-vis global competitors. This also shows the urgent need for a Community patent (with a grace period enshrined in it).

7. The human factor

7.1 Most valuable resource. First of all, the Committee refers to its specific opinion (36) on this subject and once again reaffirms and underscores the statements contained therein. As it had already done on earlier occasions, the EESC pointed out in the abovementioned opinion that human capital is the most delicate and most valuable resource for knowledge and innovation. The most important task is therefore to motivate talented young people to embark upon a scientific or technical education and to provide them with the best possible such education.

7.2 Quality of training bodies (See chapter 4). The number, resources and quality of the requisite training bodies are therefore key prerequisites for meeting the demand for good scientists, engineers and entrepreneurs. It is therefore essential to establish and maintain — working in liaison with research and teaching bodies (37) — an adequate number of properly equipped, top-quality attractive universities and, above all, institutes of technology, possessing excellent teaching staff. These universities and institutes of technology must be able to stand up to competition with the best universities in the USA or other non-European states. They must consequently also be sufficiently attractive to draw the best students from non-European countries.

7.3 Society’s responsibility. By virtue of the investment carried out by society on the one hand, and by individual researchers on the other, with a view to acquiring the desired broadly-based and not readily accessible fundamental knowledge and high-level specialised knowledge, society — as represented by politicians — assumes responsibility for making optimal use of this investment. This responsibility must be reflected in a concern to ensure that trained research workers are provided with appropriate job and professional development opportunities and suitable career paths, with attractive options for branching out into other fields, without running the risk of being professionally sidelined or sent down dead ends. If qualified scientists and engineers are unemployed, underemployed or underpaid, this represents a waste of economic investment and deters the next generation of top-level scientists and engineers, with the result that they decide against scientific or technological careers or emigrate from Europe. Excessive bureaucracy (see point 7.7) is also a form of underemployment.

7.4 Developing talent. People, including all employees in firms, universities and research institutes, must be provided with the best possible opportunities — in the light of their talents, capabilities and levels of creativity — to develop their gifts and display initiative. We also need to bring about a social climate that makes it possible to start a family and is conducive to and promotes their creativity. At the same time, this also means that the young people who benefit from this training and support, for their part, are driven by a sense of duty and by commitment to make every effort to make the best possible use of the talents and the skills they have learned. These are important issues of social policy, family policy, the academic discipline of business management, and management culture in general. This latter has now recognised the impact of a sensible work-life balance on creativity and productivity (38).

7.5 Identifying and assessing high achievers (39). Outstanding skills and achievements cannot properly be assessed by quantitative indicators, which are in any case subject to abuse. For example, a problem is posed by those scientific authors who like to quote each other in their publications, thus forming quotation cartels and gaining advantage in assessments based on quantitative indicators. As evaluation criteria, neither the number of publications nor that of quotations, patents or other key figures are sufficient or stand up to scrutiny; quality, novelty value and significance are more important. Moreover, it has sometimes been the case that the most groundbreaking discoveries or inventions were recognised, acknowledged, used or quoted only after a certain delay. Therefore, in order to assess personalities and achievements, with all their characteristics and facets, we need the wealth of experience and personal judgement (though even then misjudgements cannot be totally avoided) of the key representatives of the relevant area of expertise in which the achievements have been made or are expected.

(35) On this subject, see also Commissioner Günter Verheugen, SPEECH/07/236 on Intellectual property — a driving force for innovation in Europe, 19 April 2007.
(37) With this aim in view, the achievement of even better networking between universities and non-university research bodies could be helpful, particularly in order to include in such networking the equipment and infrastructure of such research and teaching bodies, but also to allow the latest knowledge to be taught.
(39) See also OJ C 110, 30.4.2004.
7.6 Involvement in decision-making processes. It is also necessary to involve experienced experts and scientific and technical achievers more than hitherto in relevant decision-making processes and administrative dossiers relating to research policy, entrepreneurial and innovation policy matters. The establishment of the European Research Council (ERC) is a very encouraging first step in this direction, which the Committee has strongly supported (41). However, sufficient relevant expertise also needs to be attracted to, and retained for, the administration of EU (i.e. the Commission in particular) and Member State bodies that provide funding for research and innovation. In particular, this should involve successful young engineers and researchers. Support for research and innovation needs to go beyond mere administration.

7.7 Freedom from the burden of too many non-core tasks. Research, development and inventing are activities that require a lot of time in terms of mental effort and laboratory work, as are consolidating and passing on knowledge. These activities need time for undisturbed concentration and reflection. Since 2000, various bodies, partner institutions, networks, and monitoring procedures for the various grant-awarding bodies, partner institutions, networks, and monitoring and approval bodies. This would also bring benefits in terms of significantly greater transparency.

7.8 Brain drain and mobility. There are good reasons (see also point 4.1.5) for engineers and scientists needing professional mobility and flexibility. However, this should not be at the expense of personal and family life or of social security (43). Moreover, it must not lead to net emigration of the best people from Europe. Therefore, working conditions within Europe must be sufficiently attractive to prevent this and, at the very least, to lead to an overall balance in the mobility of highly-qualified achievers. At the same time, some Member States are concerned that a one-way brain drain could take place within the European Union. Therefore, as the Committee has repeatedly recommended (see also point 5.7), a significantly larger proportion of the EU's Structural Funds should be used for developing scientific infrastructure so as to create attractive research locations in all Member States that will then attract people back to their home countries and, at the same time, be able to partner within networks.

7.9 Professional image of entrepreneurs. Turning research and development into industrial products and processes raises a particular set of issues. The Lisbon target of two-thirds of research funding coming from industry is not without reason. It is therefore particularly important to enhance the professional image of entrepreneurs and to raise public awareness of their key role in innovation, economic progress and prosperity in general. For this reason, the Committee, as the bridge to organised civil society, has put entrepreneurship with a human face at the centre of its forthcoming work programme. Only through responsible and energetic entrepreneurship that is able to develop freely will the Lisbon goals be achieved.


The President
of the European Economic and Social Committee

Dimitris DIMITRIADIS

(41) See also OJ C 110, 30.4.2004.
(42) See, for example, Frankfurter Allgemeine Zeitung, No 60, 12 March 2007, ‘Ein Forscher geht’, and also No 67, 20 March 2007, Interview with Harald Uhlig.
(43) See also OJ C 110, 30.4.2004.