Opinion of the European Economic and Social Committee on Cooperation and transfer of knowledge between research organisations, industry and SMEs — an important prerequisite for innovation (own-initiative opinion)

(2009/C 218/02)

On 10 July 2008 the European Economic and Social Committee, acting under Rule 29(2) of its Rules of Procedure, decided to draw up an own-initiative opinion on:

'Cooperation and transfer of knowledge between research organisations, industry and SMEs — an important prerequisite for innovation.'

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 February 2009. The rapporteur was Mr WOLF.

At its 451st plenary session, held on 25 and 26 février 2009 (meeting of 26 February), the European Economic and Social Committee adopted the following opinion by 158 votes with 1 abstention.

1. Summary and recommendations

1.1 This opinion is about cooperation and knowledge transfer between research performing organisations, industry and SMEs, as such cooperation plays a key role in turning the results of scientific research into innovative products and processes.

1.2 The Committee recommends that those working in industry and SMEs be systematically informed about which knowledge and technology resources are available in universities and research organisations in the EU and how relevant contacts can be established. Accordingly, the Committee recommends that the Commission should work to set up a Europe-wide (internet) search engine, bringing together and complementing existing information systems, thus fulfilling the specific demand for information better than hitherto.

1.3 The Committee supports efforts towards free internet access to scientific publications. However, this will usually be associated with higher costs for the public purse. Efforts should therefore be made to secure reciprocal arrangements between EU Member States and with non-European countries. This should not restrict research performing organisations' and their scientists' freedom of choice in publishing their results in whichever journal or whichever forum best serves the purpose of getting their results disseminated and recognised worldwide.

1.4 The Committee recommends that further thought be given to free access to research data, but that limits be set on how far such an enterprise should go. This should not mean premature open access to any data that arises from the research process, including what is known as raw data. The Committee recommends that the Commission proceed cautiously and step by step, involving the relevant researchers.

1.5 In view of the different working cultures of research performing organisations and industry, the Committee recommends that a fair balance of interests be ensured. This includes the tension between prompt publication of results and the need for confidentiality, as well as intellectual property rights including patents.

1.6 The Committee therefore welcomes the fact that the Commission has now made clear, with its recommendation concerning the handling of intellectual property, that it certainly does not wish to interfere with cooperation partners' freedom to make contractual arrangements even when contract research is involved. The Commission's recommendations should be a help, but not become a straitjacket.

1.7 The Committee repeats its recommendation that a European Community Patent be introduced, with an appropriate grace period that does not infringe novelty status.

1.8 When it comes to developing research infrastructure, such as accelerators, radiation sources, satellites, earth-based astronomical equipment, or fusion facilities, research performing organisations are not primarily suppliers of new knowledge, but rather principals and customers. The Committee recommends that the experience arising so far from the EU's and Member

States' existing rules on aid, budgets, procurement and competition be thoroughly reviewed to see that they are conducive to the purpose of keeping the skills and specialist knowledge gained by industry under such contracts and using them to make Europe more competitive, and indeed for subsequent follow-on contracts, or whether new kinds of industrial policy instruments are needed in this area.

2. Introduction

2.1 The Committee has published numerous opinions [1] on issues of research policy. In particular, it has pointed out the fundamental importance of sufficient research and development for the Lisbon and Barcelona goals.

2.2 One particularly important aspect of these recommendations concerned to cooperation between research performing organisations/public research organisations (including universities), industry and SMEs and the necessary knowledge transfer, with the aim of developing innovative processes and marketable products. This opinion looks at this aspect in more depth and focuses on the themes listed in chapters 3 to 5: (a) publications and information; (b) cooperation in developing innovative processes and marketable products; and (c) cooperation in developing research infrastructure [2].

2.3 These issues relate to the balance – but also the tension – between cooperation and competition. On the one hand, cooperation is necessary in order to maintain and strengthen the competitiveness of European industry vis-à-vis that of countries outside the EU. On the other, competition among European businesses must not be distorted; this is covered by the rules on state aid (European law on state aid), which are designed to ensure a level playing field in the single market.

2.4 The tension that thus arises forms the background for the issues and recommendations set out below, in particular as regards intellectual property rights and the associated problems of free information transfer.

2.5 The subject of cooperation has also been taken up by the Commission and the Council. Among other things, this has led to the Commission Recommendation [3] on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations. The aim of this is to encourage the Member States and research bodies to act in a more uniform manner. However, these recommendations, despite their largely sensible aims and proposals, raised new questions of their own and gave rise to serious reservations among the relevant organisations concerning intellectual property rights in collaborative and contract research. These questions, and their subsequent resolution by the Commission, are part of this opinion.

3. Publicising research activities and achievements

3.1 **Scientific publications**. Traditionally, scientific results are published in printed specialist journals after undergoing stringent peer review. Sometimes they are published beforehand by the research institutes as pre-prints or technical reports etc. In addition, they are reported at, and published in the proceedings of, specialist conferences.

3.1.1 **A new dimension: the internet**. The internet has opened up a new dimension of communication and knowledge transfer. Thus, the publishers now also publish most scientific journals in electronic form on the internet.

3.1.2 **Libraries and cost issues**. Access to printed and electronic publications has largely become a reality thanks to the libraries of universities and research performing organisations. However, universities and research performing organisations must be financially capable – and there is a serious problem [4] here – of bearing the associated costs (of publications and subscriptions).

3.1.3 **Free open access to scientific publications**. Whilst internet access to scientific publications has up until now usually been associated with costs that have to be borne either by the libraries and/or their sponsoring institution, or directly by the users, efforts to make such access free of charge for all users ('free open access' [5]) have been ongoing for some time. To make this work, a number of business models and payment arrangements are being examined, some of which have already led to firm agreements. The Committee supports such efforts. However, not all agreements will be cost-neutral for the public purse. The Committee therefore recommends that efforts be made towards reciprocal arrangements among EU Member States and with non-European countries.

3.1.3.1 **Unrestricted freedom of choice**. However, this should certainly not restrict research performing organisations' and their scientists' freedom of choice in publishing their results in whichever journal or forum in their view best serves the purpose of getting their results disseminated and recognised worldwide.

[1] See point 6.
[2] INT/450, CESE 40/2009 (not yet published in the Official Journal).
[3] C(2008) 1329, 10 April 2008.
[4] URL: http://ec.europa.eu/research/science-society/pdf/scientific-publication-study_en.pdf.
[5] Open Access. Opportunities and Challenges — a Handbook. European Commission/German Commission for UNESCO, 2008.

3.1.4 **Open Access to research data**. Beyond this, models ([1]) have been developed to enable generalised open access – i.e. beyond the voluntary exchange of data that is already commonplace between cooperation partners – via the internet not only to scientific publications, but to the data underlying them. However, this raises questions of an organisational, technical and legal nature (e.g. protection of intellectual property and data protection), and of quality assurance and motivation, which in many cases can only be answered in a way specific to each discipline. The Committee therefore considers that it is right to continue such deliberations, but also to set limits on how far such an enterprise should go. The Committee recommends that the Commission proceed very cautiously in this area, in particular by involving the researchers directly affected.

3.1.5 **Right to confidentiality**. The Committee emphasises that this must not mean premature open access to any data arising from the research process, including what is known as raw data. Researchers must first correct erroneous measurements, mistakes, issues of interpretation etc., assess their importance, and deal with them in the internal opinion-forming process before they give the go-ahead (if appropriate) for publication. Otherwise, the individual rights of researchers and the fundamental basis of scientific work and data protection, not to mention quality standards and priorities in scientific publications, could be damaged.

3.2 **Information for businesses and SMEs**. Many businesses and SMEs who are interested in new developments are not sufficiently well informed about which knowledge and technology resources are actually available in universities and research organisations in the EU and how relevant contacts can be established with a view to initiating possible cooperation. There is therefore, above and beyond the set of instruments mentioned above, a need for information outside the narrow circle of experts.

3.2.1 **Publications aimed at a wider public**. There is also literature aimed at non-specialists (so-called popular science literature) on scientific and technical subjects. The Commission has in recent years also played an increasing and successful role in disseminating the scientific and technical results from the research programmes it sponsors, for example with the excellent **research*eu** ([2]) magazine or the ***CORDIS*** ([3]) internet portal. Similarly, more and more universities and research organisations have started to present their activities and results on the internet ([4]), not least with a view to knowledge transfer and possible cooperation.

3.2.2 **Transfer offices**. In addition, numerous research organisations have for some time had their own, very useful, knowledge transfer offices ([5]) with appropriately-trained specialists ('technology transfer officers' ([6])). However, these mostly work at regional or organisation level, such that using them for the purpose of carrying out a pan-European search remains very tedious.

3.2.3 **Support organisations and consultants**. Alongside the Commission, several organisations and networks are working, in some cases on a commercial basis, to meet the need at European level described above: there exist, for example, EARTO, the Association of European Science and Technology Transfer Professionals and ProTon ([7]). The Commission, too, offers support via its SME Portal and the European Enterprise Network ([8]).

3.2.4 **Systematic search**. Insofar as the above-mentioned instruments cannot yet adequately meet the demands of industry/SMEs, the Committee recommends that the Commission – where possible in cooperation with one of the large search engine companies – work towards **meeting this need systematically through a pan-European (internet) search system** in which the specific information referred to above is summarised in a uniform and accessible format. As a first step towards this, there would need to be an opinion-forming process to define more precisely the aims and scope of the first stage of such a search system, so as to gain experience in a pilot phase.

3.2.5 **Staff exchanges**. As the most effective knowledge transfer takes place between people who move between research and industry, the Committee reiterates in this context its repeated recommendation that such exchanges of staff should be more strongly encouraged and supported, for example through a system of grants and sabbaticals such as the Marie Curie Industry-Academia grant.

([1]) COM(2007) 56, 14.2.2007; C (2008) 1329, 10 April 2008 – Annex II.
([2]) http://ec.europa.eu/research/research-eu.
([3]) http://cordis.europa.eu.
([4]) http://www.ott.csic.es/english/index.html in Spain or http://www.technologieallianz.de in Germany.
([5]) COM(2007) 182, 4.4.2007.
([6]) C(2008) 1329, 10 April 2008, point 7.
([7]) http://www.earto.org/; http://www.astp.net/; or http://www.protoneurope.org.
([8]) EEN: http://www.enterprise-europe-network.ec.europa.eu/services_en.htm and SME Portal http://ec.europa.eu/enterprise/sme/index_en.htm.

4. Cooperation in the development of marketable products and processes - fair balance of interest

4.1 **Different work cultures**. In view of the many documents and recommendations that are already available on this subject, which are referred to in the introduction, this chapter must focus on a few selected issues that arise from the working cultures and interests of research and industry, which are, of necessity, different. The Committee has already dealt with some of these differences in detail in its first opinion on the European Research Area ([1]) and subsequently mentioned them on several occasions. Essentially these are about:

4.2 **Publication and secrecy**

— Research needs early publication of its results so that other scientists and groups of researchers can check them. This is also helps to generate synergies through immediate interaction within the scientific community, in particular where several laboratories are cooperating in a joint research and development programme.

— Government must generally also insist on early publication of findings from research it has funded in order to ensure a level playing field.

— At present, however, even publicly funded research performing organisations must, where their results lead to significant innovations, submit a patent application before they publish their results, as this would otherwise infringe novelty status and prevent them from patenting their invention. This necessity, which also applies to open access, is also highlighted in the Commission's recommendation on the management of intellectual property ([2]).

— In order to defuse the resulting conflict between objectives, the Committee has repeatedly recommended that a grace period in which novelty status is not infringed ([3]) be introduced into the Member States' patent legislation and into the future Community patent legislation.

— On the other hand, it is generally in a company's interests - in view of the competition situation - that the findings from its product development remain confidential at least until a new product is ready for the market or the relevant patents have been secured.

4.3 **Research to seek knowledge – development to seek results**. A researcher's product consists of discoveries that are made through a complex process of seeking and finding out, the outcome of which is unknown. By contrast, development covers a targeted, planned process that only begins when a specific aim can be set and the route is sufficiently clear. Nonetheless, there are shifting overlaps, interactions and synergies between research and development – indeed, these processes do not have to follow a linear sequence.

4.4 **Different evaluation criteria. Researchers** and 'their' research organisations are judged according to the quality, number and impact of their publications ([4]) and discoveries, and increasingly by the number of their patents. By contrast, **managers** are evaluated primarily according to the commercial profits of 'their' business, which in turn depends on the number, quality and price of the products sold.

4.5 **Synthesis**. These contradictions must therefore be reconciled and a fair balance of interest established that brings benefits to both – unequal – cooperation partners. If the most effective researchers and their organisations are to come on board, they must be given a sufficient incentive to do so. Such '*cooperation may be impeded if rights to research results are all passed on to the contracting companies*' ([5]). The reason for this is that new knowledge (foreground) grows and evolves out of existing knowledge (background) and thus, by its nature, includes significant aspects of the background, meaning that the latter is an inherent part of new knowledge. Therefore, flexibility and room for manoeuvre are needed in the agreements about intellectual property rights and the associated appraisal processes, so that individual circumstances and the very nature of creative processes can be taken into consideration. A lack of such flexibility and room for manoeuvre can, at worst, discourage science and business from cooperating.

([1]) OJ C 204, 18.7.2000, p. 70.
([2]) C(2008) 1329, 10.4.2008, Recommendation No. 4 to the Member States and in Annex I, No. 7 to public bodies.
([3]) As used to be the case, for example, in German patent law.
([4]) And according to the prestige of the particular journal in which the results are published!
([5]) OJ C 204, 18.7.2000, p. 70.

4.6 **Intellectual property and the Commission's recommendation on that subject**. The Committee therefore welcomes the fact that the Council (Competition) has emphasised the contractual freedom of the parties, stating in its decision of 30 May 2008: '*CALLS UPON all universities and other public research organisation to pay due regard to the content of the Commission's Code of Practice and to implement it according to their specific circumstances, including appropriate flexibility for contract research*'. In particular, the Committee welcomes the fact that the Commission, too, has now made clear ([1]) that it does not, in its recommendation ([2]) which specifically addresses this issue, wish to interfere with the freedom to make contractual arrangements, even for contract research. Instead, sufficient flexibility should be provided for, as long as there are no other restrictions such as the framework for research, development and innovation or other European or national laws.

4.6.1 **Further clarification**. It should also be made clear that inventions that give rise to patents cannot simply be commissioned, but represent an additional creative achievement ([3]). The evaluation of these and the returns arising from them must therefore be a matter for negotiation; equally, the commissioning partner firm must not block an evaluation to the detriment of the economy. The Committee therefore welcomes the fact that the Commission is drafting a clarification on this point. The Commission's recommendations should be a help, but not become a straitjacket.

4.7 **The Community patent**. In this context, the Committee once again stresses (see also point 4.2) its repeated recommendations in favour of a European Community patent that provides the inventor with an appropriate grace period that does not infringe novelty status.

4.8 **Rules for participation and law on state aid**. The Committee has already recommended, in its opinion ([4]) on the rules for participation, that in the future parties to contracts be given greater freedom in the contractual arrangements, but also in the choice of instruments. In particular, this relates to the access rights to contract partners' new knowledge and protection rights and/or to existing knowledge and protection rights. Free access rights should be offered as an option, but not – as proposed for certain cases – required without exception. Moreover, the free provision to business of intellectual property by state-run higher education institutions or research organisations also carries the danger of violating European law on state aid.

4.9 **Public-private partnerships**. The Committee's arguments and recommendations mentioned in points 4.6 and 4.8 should therefore also be applied in particular to the otherwise very welcome public-private partnerships in the area of research and development and to the joint technology initiatives they entail.

4.10 **Inventor's fees for employees**. Particular attention should be paid to the laws on employee inventions that exist in some Member States. This relates to the right of an inventor to a patent and an appropriate fee for the use thereof, even if he made the invention as part of his regular employment. Under no circumstances must this right be undermined.

5. Cooperation in developing research infrastructure – maintaining know-how

5.1 **New technological territory – one-offs**. Aside from the category of cooperation between research and industry mentioned above, there is another equally important category, in which the research bodies are not primarily suppliers of new knowledge for the purpose of developing innovative serial products (or processes), but rather principals and customers. This mainly concerns the development of new kinds of infrastructure, such as accelerators, radiation sources, satellites, earth-based astronomical equipment or fusion facilities. In this context, industry develops and produces important new individual components, mostly on the basis of ongoing development contracts.

5.2 **Specialisation and risk**. Businesses in this innovative area require highly-skilled, specialist staff and - because of the possibility of failure - a willingness to take risks. The financial return is often low, as the manufactured product is nearly always a one-off and businesses regularly underestimate the costs involved: generally speaking, the boundaries of existing know-how need to be pushed back significantly.

([1]) Commission Recommendation on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations. (2008) ISBN 978-92-79-09850-5. The last paragraph of chapter 4.3 reads: "Nevertheless, the parties are free to negotiate different agreements, concerning ownership (and/or possible user rights) to the Foreground, as the principles in the Code of Practice only provide a starting point for negotiations. …".

([2]) C(2008) 1329, 10 April 2008, Annex I, Point 17.

([3]) This idea is also behind the granting of inventor's fees for employees – see point 4.10.

([4]) OJ C 309, 16.12.2006, p. 35.

5.3 **Drivers of technological progress**. To be sure, such orders give the firms involved a significant boost to their high-tech skills, which in the long term increases their competitiveness in related areas and is generally conducive to technological progress. However, businesses often find it difficult to use their potential, including employees and engineers in the relevant speciality, where there is no immediate prospect of follow-up orders, when putting those resources to work in the development and production processes for mass-produced goods is much more lucrative.

5.4 **Application of rules on competition and awarding contracts**. The way the existing rules on competition and awarding contracts are applied has the potential to make the situation worse, not least because the firm that has carried out the development contract cannot then simply receive the production contract as a matter of course. This can mean that that production contract is awarded to a less experienced firm, which, precisely because of its more limited experience, underestimates the difficulties and has therefore quoted a cheaper price. This problem has even led some companies to stop bidding for and/or accepting such contracts. Even 'pre-commercial procurement' instrument [1] does not really deal with the problem described above, as no mass-produced goods are subsequently produced.

5.5 **Problems and the quest for solutions**. The Committee has no ready-made solution for these issues. However, it wishes to draw attention to a serious problem, which not only adds to the cost and timescale of such projects, but also fails to make optimum use of the skills and experience arising from them, as valuable skills are often lost. It therefore recommends that the Commission set up a high-level group of experts [2] to look at experiences to date. This could shed light on whether the current rules on state aid, competition and awarding contracts, and the way they are applied, are appropriate to this specific situation, or whether new kinds of industrial policy instruments are needed in this area.

5.6 **ITER**. The Committee is under the impression that the Commission is very much aware of the problem, for example with the international ITER project, and that appropriate measures to involve industry in that project should now therefore be set in train. This action should, if possible, also be transferred to the requirements of new research infrastructure that is to be set up (ESFRI list).

6. Relevant Committee opinions from the last three years

This opinion has taken account of the following relevant opinions issued over the past three years:

— **7th R&D Framework Programme** (INT/269, CESE 1484/2005 – OJ C 65/9, 17.3.2006)

— **Nanosciences and nanotechnologies** (INT/277, CESE 582/2006 – OJ C 185/1, 8.8.2006)

— **Five-Year Assessment of Community research activities (1999-2003)** (INT/286, CESE 729/2006 – OJ C 195/1, 18.8.2006)

— **RTD – Specific programmes** (INT/292, CESE 583/2006 – OJ C 185/10, 8.8.2006)

— **Research and innovation** (INT/294, CESE 950/2006 – OJ C 309/10, 16.12.2006)

— **Participation of Undertakings – 7th Framework Programme** (INT/309, CESE 956/2006 – OJ C 309/35, 16.12.2006)

— **Participation of undertakings – 7th framework programme 2007-2011 (Euratom)** (INT/314, CESE 957/2006 – OJ C 309/41, 16.12.2006)

— **Investment in Knowledge and Innovation (Lisbon Strategy)** (INT/325, CESE 983/2007 – OJ C 256/17, 27.10.2007)

— **Europe's potential/research, development and innovation** (INT/326, CESE 1566/2006 – OJ C 325/16, 30.12.2006)

— **European Institute of Technology** (INT/335, CESE 410/2007 – OJ C 161/28, 13.7.2007)

— **Green Paper on the European Research Area – New Perspectives** (INT/358, CESE 1440/2007 – OJ C 44/1, 16.2.2008)

— **Innovative Medicines Initiative / Setting up the joint undertaking** (INT/363, CESE 1441/2007 – OJ C 44/11, 16.2.2008)

— **Technology Initiative on Embedded Computing Systems/Setting up the joint undertaking (ARTEMIS)** (INT/364, CESE 1442/2007 – OJ C 44/15, 16.2.2008)

[1] COM(2007) 799 final. Commission communication - Pre-commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe. See also Committee opinion INT/399 – Pre-commercial procurement, CESE 1658/2008 (not yet published in the Official Journal).

[2] If possible involving the research bodies belonging to EIROforum.

— **Setting up the Clean Sky Joint Undertaking** (INT/369, CESE 1443/2007 – OJ C 44/19, 16.2.2008)

— **Setting up the ENIAC Joint Undertaking** (INT/370, CESE 1444/2007 – OJ C 44/22, 16.2.2008)

— **Research and development programmes for SMEs** (INT/379, CESE 977/2008 – OJ C 224/18, 30.8.2008)

— **Competitive European regions through research and innovation** (INT/383, **CESE** 751/2008 – OJ C 211/1, 19.8.2008)

— **Fuel Cells and Hydrogen – Joint Undertaking** (INT/386, CESE 484/2008 – OJ C 204/19, 9.8.2008)

— **European partnership for researchers** (INT/435, CESE 1908/2008 – Not yet published in the Official Journal)

— **Community legal framework for a European Research Infrastructure** (INT/450, CESE 2009/2008 – Not yet published in the Official Journal)

Brussels, 26 February 2009.

The President
of the European Economic and Social Committee
Mario SEPI