

**DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
COMMITTEE FOR SCIENTIFIC AND TECHNOLOGICAL POLICY**

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**FOSTERING INTERNATIONAL SCIENCE AND TECHNOLOGY CO-OPERATION TO ADDRESS
GLOBAL CHALLENGES**

BACKGROUND AND ISSUES FOR THE CSTP WORKSHOP OF 20 OCTOBER (AFTERNOON)

Gebze, TUBITAK TUSSIDE (Turkish Institute for Industrial Management), 20 October 2008, starting at 13.45

Delegates will find attached a short paper providing background and issues for discussion at the half-day CSTP workshop on international science and technology co-operation of 20 October.

A draft agenda for the workshop and the visit to the TUBITAK Marmara Research Centre was distributed separately with the code DSTI/STP/AH/A(2008)1.

CSTP delegates are invited to discuss the approach set out in this paper and agree on:

- The aims and scope of the project.*
- The involvement of their delegation in the proposed Project Steering Group, or other ways in which they may wish to contribute to the project.*
- The approach to be followed to ensure that the work adds value and has a strong impact.*

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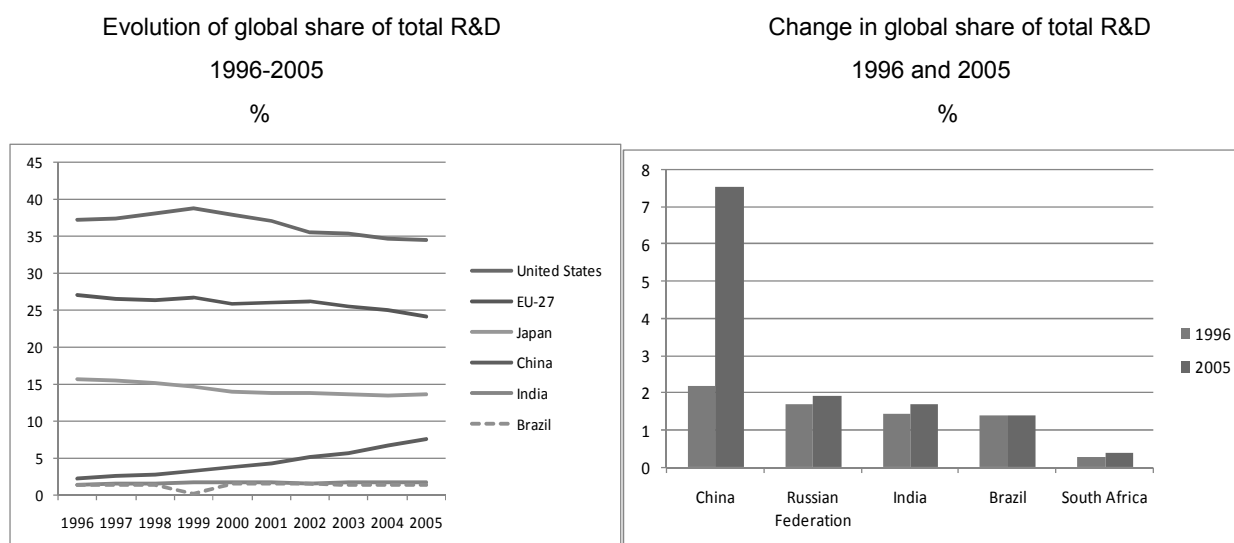
FOSTERING INTERNATIONAL SCIENCE AND TECHNOLOGY COOPERATION TO ADDRESS GLOBAL CHALLENGES – BACKGROUND AND ISSUES FOR DISCUSSION

CSTP Workshop, 20 October, TUBITAK-TUSSIDE (Turkish Institute for Industrial Management),
see: <http://www.tusside.gov.tr/eng/index.html>

The internationalisation of science and technology

1. Science and technology have always been global activities, but recent developments have accelerated their internationalisation. For example, the potential for international scientific cooperation has increased drastically due to massive growth in the power of information and communication technologies. This has revolutionised science in many ways, including in enabling more intensive scientific cooperation. Another factor is the emergence and opening up of new scientific powers as members of the global scientific community (Figure 1); this has added enormous resources to global science and has opened a new potential for scientific discovery. China, for example, accounted for the second largest number of scientific publications in engineering in 2005 and ranked 5th in the total number of scientific publications.¹ Recent policy developments, such as the establishment of the European Research Area (ERA) and other regional initiatives, have added to this internationalisation process.

Figure 1. Global R&D trends in major OECD regions and selected non-member economies



Source: OECD estimates, based on OECD, Main Science and Technology Indicators, and UNESCO.

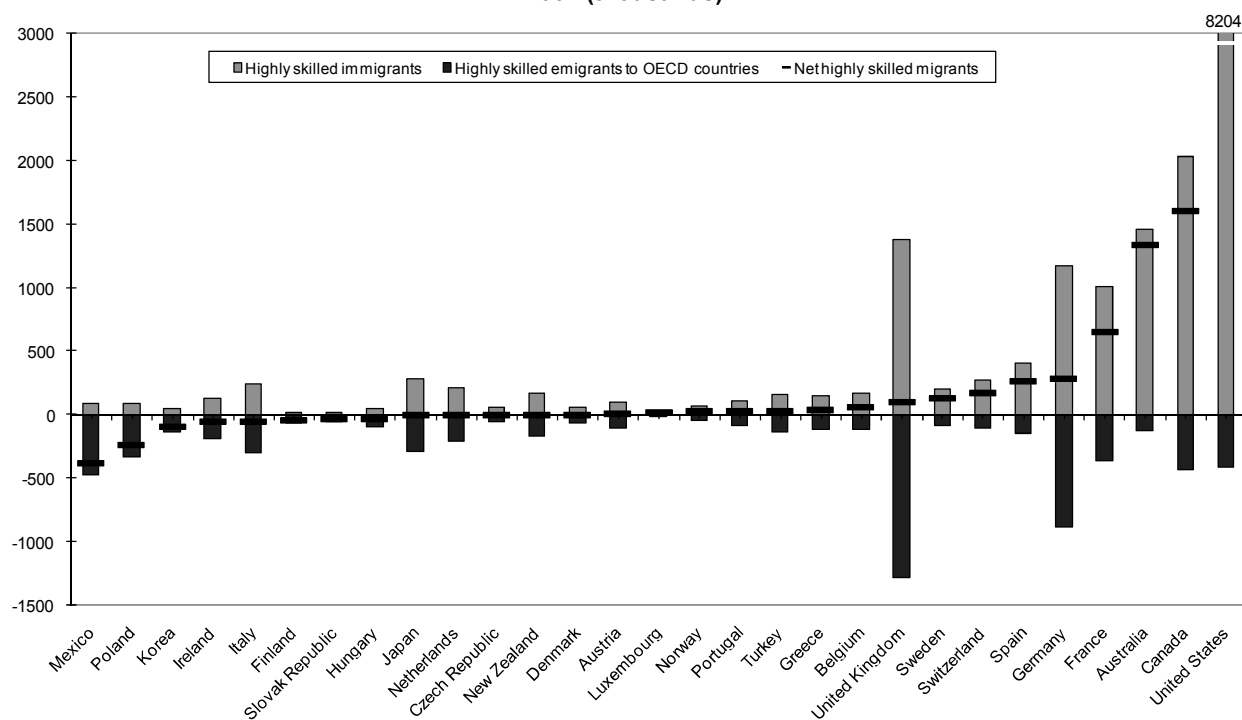
2. The rapid internationalisation of scientific research is visible across a wide range of indicators:
- A growing proportion of scientific research involves foreign co-authors; the latest NSF estimates show that 20% of all S&E articles in 2005 involved international co-authorship, up from less than

¹ National Science Foundation (NSF), Science and Engineering Indicators 2008.

10% in 1988 (NSF, 2008). Around 27% of US article output in 2005 involved international collaboration, against 23% in Japan, 25% in China and around 50% for most EU countries. There is some evidence that the mobility of academics is associated with higher quality output; a study of highly cited researchers (Evidence, 2005) found that a very large share had research experience out of their home country.²

- Scientific education has become more global; the number of students enrolled outside their country of citizenship rose from about 600 thousand in 1975 to about 2.7 million in 2005, with particularly rapid growth from 1995 to 2005 (OECD, 2007).³

Figure 2. Immigrant and emigrant population 15 years and over with a tertiary education in OECD countries, 2001 (thousands)¹



1. 2001, or nearest available year.

Source: OECD Database on Immigrants and Expatriates.

- The labour market for scientists and engineers is becoming more and more global. Most OECD countries are net beneficiaries of international mobility of highly skilled workers, with inflows exceeding outflows. The United States, Canada, Australia and France, in particular, have experienced strongly positive net inflows of tertiary-educated migrants (OECD, 2008a; Figure 2).⁴ In Ireland and New Zealand, more than 35% of doctorate holders are foreign-born. In contrast, some non-OECD countries have very high expatriation rates of highly skilled workers,

² Evidence (2005), "Tracking UK and international researchers by an analysis of publication data", Report prepared for the Higher Education Policy Institute.

³ OECD (2007), *Education at a Glance 2007*, OECD, Paris.

⁴ OECD (2008a), *The Global Competition for Talent: International Mobility of the Highly Skilled*.

in some cases of more than 80% (OECD, 2008a). Developing international mobility policies that can benefit both developed and developing countries is a major challenge.

3. Recent years have also seen a dramatic shift in the internationalisation of business research, technology and innovation. Multinational firms nowadays seek not only to exploit knowledge generated at home in other countries, but also to source technology internationally and tap into worldwide centres of knowledge. Due to intensified global competition, companies have been forced to innovate more quickly and develop commercially viable products and services more rapidly. Relevant knowledge has become increasingly multidisciplinary and global in scope, making innovation both more expensive and riskier. Moreover, the growing complexity of science, technology and innovation now often implies that knowledge from a wide range of (often global) sources is required. Innovation strategies increasingly require international cooperation and global sourcing in order to tap into new market and technology trends worldwide and meet a diverse range of consumer demand (Figure 3).

4. As in the case of science, new technologies, notably ICT, are among the main drivers of the internationalisation of innovation as these have enabled new ways of collaboration and have led to greater specialisation in the global innovation system. Lower transport costs and falling trade barriers have also strengthened market integration across borders. The emergence of new global players, such as China and India, is another major factor in this shift. A wide range of indicators demonstrates the internationalisation of (business) research:

- Recent empirical evidence shows that the top-700 R&D spending MNEs have increasingly invested in R&D outside their home country in line with the growth in the global supply of S&T resources (OECD, 2008b).⁵
- A considerable share of R&D is funded from abroad. For example, in the EU-27, finance from abroad represented around 10% of total business enterprise R&D.
- International co-operation in invention, as measured by patents, is increasing. The world share of patents involving international co-invention increased from 4% in 1991-93 to 7% in 2001-03, with small and less developed economies particularly actively engaged in international collaboration.⁶
- Non-OECD economies account for a sharply growing share of the world's R&D – 18.4% in 2005, up from 11.7% in 1996, with China accounting for the bulk of this growth.⁷

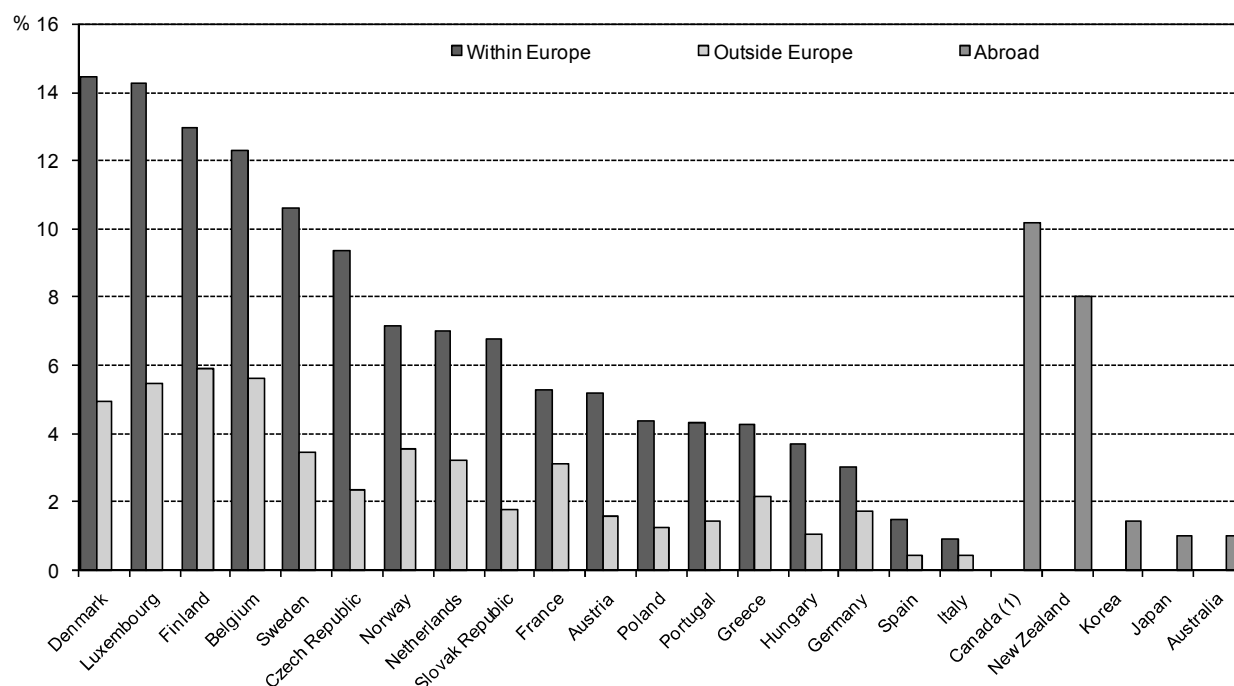
⁵ OECD (2008b), *The Internationalisation of Business Research: evidence, impacts and implications*. More than 95% of the 700 firms with the largest R&D expenditure are MNEs and they account for close to half of the world's total R&D expenditure and more than two-thirds of the world's business R&D (UNCTAD, 2005, *World Investment Report. Transnational Corporations and the Internationalisation of R&D*). The top R&D performing MNEs often spend more on R&D than many countries and their presence is not only felt through activities in their home countries but also increasingly abroad.

⁶ OECD (2008c), *Open Innovation in Global Networks*, forthcoming.

⁷ OECD (2008d), *Science, Technology and Industry Outlook 2008*, forthcoming.

Figure 3. Firms with foreign co-operation for innovation, 2002-04 (or latest available years)

As a % of all firms



Note: Firms may have more than one co-operation partner.

1. Manufacturing sector only.

Source: Eurostat, CIS-4 (New Cronos, May 2007), National data sources.

Global challenges

5. The internationalisation of science and technology is accompanied by another important global trend, namely the growing urgency of a range of social and environmental challenges. Climate change and the related challenge of global energy supply are the clearest examples, but so are access to clean drinking water, global health and international food security. These challenges all figure prominently on the agendas of the OECD, the EU and the G8.⁸

6. Science, technology and innovation are increasingly looked at to help provide solutions to these challenges. The development of new technological solutions and the wider application and diffusion of existing technologies are expected to make important contributions to lowering carbon emissions and improving energy security, for example (Figure 4). New technologies, innovative business models and

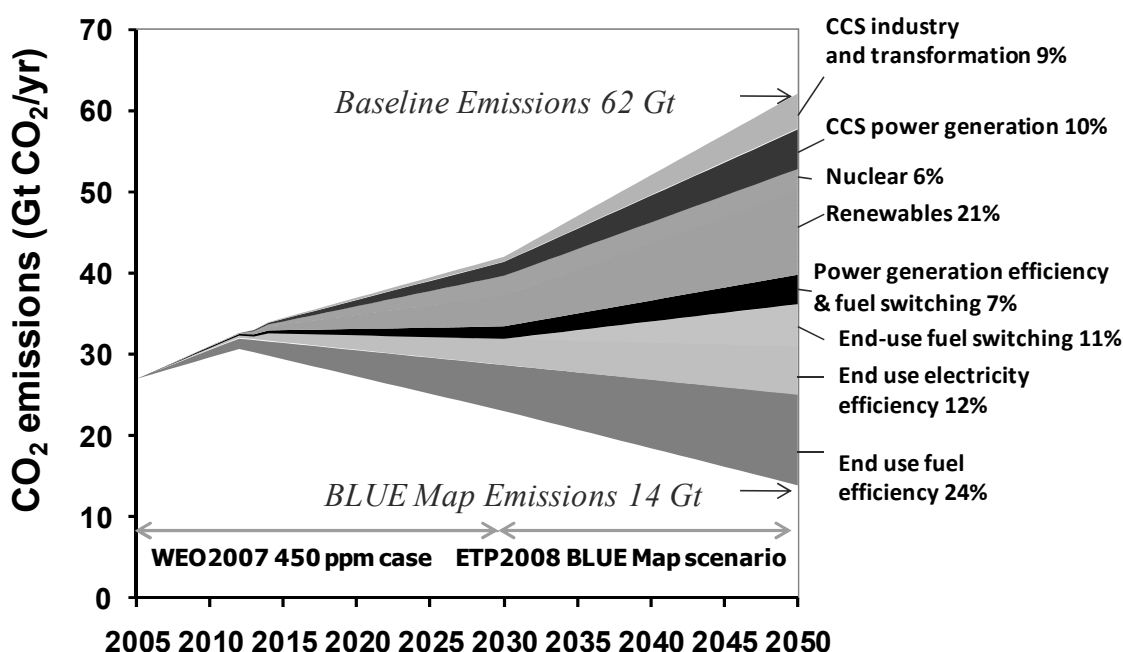
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See www.oecd.org/mcm2008 for the Chair's Summary of the OECD's 2008 Ministerial Council Meeting; http://www.g8summit.go.jp/eng/doc/doc080709_09_en.html for the Chair's Summary of the 2008 G8 meeting; http://www.eu2008.si/en/News_and_Documents/Council_Conclusions/June/0619_EC-CON.pdf for the Conclusions of Slovenia's EU Presidency in the first half of 2008; and <http://www8.cao.go.jp/cstp/english/others/g8summary-e.pdf> for the Chair's Summary of the G8 Science and Technology Ministers Meeting of June 2008.

better technology diffusion are also expected to help address water scarcity, improve global health and improve food security.

7. As these challenges are truly global in nature, they do not only require strong national efforts to foster scientific progress, as well as technological and non-technological innovation, but also international cooperation and coordination of national efforts. Such cooperation can involve basic research, the joint development of new solutions as well as the diffusion of technologies and knowledge at the global level. The growing urgency of these global challenges is adding to the increasing focus on international science and technology cooperation in the international policy discussion.

Figure 4. Contributions of key energy technologies to CO₂ emission reductions, 2005-2050



Note: WEO refers to the IEA's 2007 World Energy Technology Outlook.

Source: International Energy Agency, Energy Technology Perspectives 2008: Scenarios and Strategies to 2050.

Policy issues

8. The rapid internationalisation of science and technology and the emergence of a range of important global challenges raise a number of (overlapping) policy issues. The discussion throughout this paper focuses on three sets of issues that pertain to the expertise of the CSTP, namely:⁹

- a) Scientific cooperation;
- b) Technology cooperation;

⁹ A fourth issue, how to adjust to the globalisation of innovation, has been the subject of considerable CSTP work. Work on this topic will continue in the context of work by the Working Party on Technology and Innovation Policy.

- c) Science and technology cooperation in the context of specific global challenges;

9. **Scientific cooperation** between nations, firms, institutions and individuals allows countries to draw on a broader range of talent, enables cost sharing, helps in keeping abreast of new scientific and technological developments and also allows results and approaches to be shared across a wide community of scientists. As the bulk of scientific research is conducted abroad (even in case of the United States, the world's largest investor in science and innovation), international cooperation is clearly essential for scientific progress. Much of the drive for scientific cooperation comes from scientists and scientific institutions, but policy plays an important role in facilitating cooperation and providing access to national science systems.

10. The changing landscape for global science implies that it is important to consider whether existing policies and frameworks for international scientific cooperation continue to meet today's requirements. Policies and rules affecting international scientific cooperation, *e.g.* as regards intellectual property rights in international research cooperation; access to publicly funded scientific archives, information systems and data collections; standards in scientific research, transnational R&D funding models and procedures, international mobility and migration policies, arrangements to ensure scientific integrity and safeguard research quality, and others are key. Moreover, national incentives to engage in international cooperation are clearly also of great importance. Policies and practices in these areas need to be considered carefully to ensure that they remain relevant and adequate in today's era of global (and digital) science.

11. **Cooperation in developing new technologies** involves an additional step in the cooperation among countries. The 1995 Council Recommendation on International Technology Cooperation involving Enterprises set out some of the reasons why governments may wish to facilitate such cooperation. For example, the development of some potentially high payoff technologies is a high risk, and costly venture, which can exceed the capacity and capabilities of individual firms or even countries. To some extent, the market will provide incentives for the delivery of such global public goods, but in other cases there may be market failure, simply because there is unlikely ever to be sufficient potential return on capital invested (perhaps where such goods are truly non-exclusive and public) or because of incentives (perverse or otherwise) in the structure of the market that act against efficient delivery. Some of the policy issues that emerge in this area include: a) IPR arrangements in international technology cooperation and the use of IPR in collaborative networks; b) funding arrangements and fiscal issues; c) legal and regulatory issues; d) international mobility of highly skilled and immigration issues; e) issues involving public research organisations.

12. International cooperation in applying science, technology and innovation policies to **addressing global challenges**, notably climate, energy, water, health and food can simply be regarded as a concrete example of science and technology cooperation. One important question for governments today is, for example, how to plan, advance and fund major science and technology initiatives that cross geo-political and disciplinary borders, *e.g.* to help address climate change? Ensuring that this is done in an efficient and effective way that avoids unnecessary duplication is essential. Such approaches are complex, however. What exactly should governments invest in, and how much? How should the research be organised and financed? Who should carry it out? Should international cooperation be developed from the bottom-up or involve top-down coordination? What are the limitations and barriers that need to be overcome? What countries should be involved? What approaches and activities will be needed to address a specific global issue (*e.g.* research, development, commercialisation, health and safety, marketing, awareness, public engagement, etc)? How best to involve the private sector in the overall efforts in finding solutions to global challenges is another key question. How can the research efforts be integrated into broader approaches to innovation to ensure it meet market demands for new products and services? How can available technology be transferred to people and countries in need; which barriers need to be overcome?

13. New approaches are starting to be used to leverage the activities of governments, firms and stakeholders at the international level. For example, the International Aids Vaccine Initiative (IAVI) is a non-profit, public-private partnership that aims at developing a vaccine for HIV. Its activities include research and development as well as policy analysis. The OECD's Noordwijk Medicines Agenda of June 2007 is another initiative aimed at fostering innovation to meet a global challenge, in this case improving the availability and access to medicines, vaccines and diagnostics for neglected and emerging infectious diseases. Similar approaches are starting to be applied to other areas requiring a global solution.

The OECD work thus far

14. OECD has addressed several of these issues in recent work. As regards **scientific cooperation**, the Global Science Forum has undertaken a wide range of work over the past years, notably in focusing on areas requiring long-term international cooperation between public research policy organisations. Specifically, the Forum serves its Members in the formulation and implementation of their science policies by: 1) exploring opportunities for new or enhanced international co-operation in selected scientific areas; 2) defining international frameworks for vital national or regional science policy decisions; 3) addressing the scientific dimensions of issues of global concern. Ongoing work focuses on cooperation in the establishment of large-scale research facilities as well as a range of other issues. The Annex lists some recent activities and achievements of the Global Science Forum.¹⁰

15. Considerable work has also been undertaken in the field of **international technology cooperation** and the broader set of policy issues related to the **internationalisation of innovation** (see Annex). This includes recent work on the internationalisation of business R&D, open innovation in global networks, international mobility of the highly skilled, ongoing work on IPR in international collaboration, and work on trade and innovation. This work has been supported by the development of new indicators of internationalisation and knowledge flows, e.g. as regards R&D, patenting and scientific publishing. Work in this area has also led to a number of OECD Council guidelines on international cooperation, such as a 1988 Recommendation on Principles for International Co-operation in Science and Technology and a 1995 Recommendation on Principles for Facilitating International Technology Cooperation Involving Enterprises.

16. A third area of OECD work involves activities that have been undertaken to foster **international cooperation to address specific global challenges** (see Annex). This is, for example, the case for the longstanding work of the International Energy Agency on energy R&D, but also includes the recent work on medicines for neglected infected diseases that involved CSTP's Working Party on Biotechnology as well as the Development Cooperation Directorate. Other OECD and CSTP work has addressed other global challenges. In 2007, for example, a CSTP study on Integrating Science and Technology into Development Policies was released. The Working Party on Biotechnology has undertaken work on access to clean water, which is currently being extended by the Working Party on Nanotechnology, as part of broader OECD efforts to address access to water. Moreover, work on sustainable development and the role of biotechnology has been undertaken for some years by the WPB. Much of this work has considered the role of science and technology, including international cooperation.

Guidance from the high-level meeting of the CSTP in March 2008

17. The importance of international cooperation and globalisation in the area of scientific and technological policy was clearly acknowledged at the high-level meeting of the CSTP of 3-4 March 2008. Several dimensions of the internationalisation of science and innovation were discussed by participants and a number of conclusions were reached (see DSTI/STP(2008)6).

¹⁰ See also: http://www.oecd.org/department/0,3355,en_2649_34319_1_1_1_1_1,00.html

18. The major challenge identified at the meeting for **international scientific co-operation** was governance – who are the right stakeholders, who is steering, what are the objectives and what are the rules? Related to this, providing major research infrastructure for international projects, and leveraging the results of research were highlighted as issues, particularly in terms of sharing the costs (funding) and benefits (commercialisation). The mobility of scientists was viewed as a continuing challenge, where a sustainable model has still not been found. In terms of goals for international co-operation, some countries indicated developing country issues should be the focus, while others spoke of global challenges such as energy technology and climate change. Delegates pointed out that international co-operation takes time, since consensus must be reached at both a scientific and societal level, within the bounds of national legal and regulatory systems.

19. The discussion also highlighted that global outreach is crucial, and delegates questioned whether current incentives are sufficient. Ensuring the mobility of scientists, and open and free access to data and information, were viewed as essential. More broadly, delegates noted the importance of establishing a strategy, and being clear about who is collaborating (is it between developed countries, or developed and developing countries?). Representation from firms in this process was seen as crucial.

20. Delegates indicated an important role for the OECD is to provide a platform for exchange and, potentially, frameworks for international initiatives and collaboration. Crucially, these must complement other areas (such as climate change and environment) and must not become isolated. The OECD should also continue to disseminate best practices and provide statistics and benchmarking.

21. The discussion on **global innovation** also highlighted a number of challenges. While technology diffusion across borders increases the stock of knowledge, delegates noted that if individual countries perceive the costs of openness to exceed the benefits, “knowledge protectionism” could result. Absorptive capacity is an important issue here, especially for developing countries, and delegates suggested that the private sector and general public must be convinced that education and innovation are essential. A further challenge identified was the risk of overlapping activities, as countries duplicate infrastructures and policy efforts in order to attract R&D activity. Small countries, with more limited resources and a predominantly SME firm profile, had particular concerns. Delegates raised questions about how increased globalisation of R&D could be matched with better co-ordination of policies and better framework conditions for innovation within individual countries, and with better mechanisms for international collaboration.

22. Openness in knowledge activities was strongly supported and delegates highlighted the importance of global forums in science and technology policy to facilitate co-ordination and to share good practices in national and transnational policies. The private sector needs to be included to ensure an understanding of their viewpoints and challenges. With increasing globalisation, there needs to be more co-operation related to IPRs and standards. Delegates agreed that country-specific responses would be more appropriate in some instances.

23. Delegates suggested a number of areas where the OECD could add value. These included:

- Providing new indicators and drawing on OECD experiences to assist countries with implementation and evaluation of policies. The role of the OECD has been and should continue to be strong in this area. Delegates suggested measurement and analysis of international knowledge flows and spillovers will be essential;
- Developing a common understanding and language on globalisation issues;
- Undertaking more work on non-technological innovation, organisational innovation, public sector innovation, the service sector, and traditional “low-tech” industries; and

- Providing a focal point for global forums in S&T policy for a global innovation system and supporting continued engagement with the broader international community.

24. Finally, in the discussion on **international cooperation to address global challenges**, the key challenge that was identified was how to support international collaboration while ensuring benefits flow at the national level. Being able to demonstrate positive spillovers at the national level will be critical for all countries. Regarding this, delegates noted that there is no simple developed/developing or low/high technology dichotomy that can be used to classify countries. There are important gaps within countries as well as between countries – such as differences in levels of education across society and levels of technological capability across sectors. Other challenges included better understanding the tools and instruments available to facilitate international collaboration and research capacity, and mainstreaming S&T into broader policy settings.

25. In responding to these challenges, delegates highlighted the need for focus and prioritisation of issues – perhaps via a forum that examines knowledge-based issues with a forward looking approach. As part of this, it will be necessary to draw on experience from the business community. Delegates pointed to the need for innovation in the public sector (especially health, education and transport) – this large sector, which often operates under different incentive structures, could obtain strong benefits from increased innovation. Increased international co-operation needs to be supported by diverse competences at a national level, with a strong basic science foundation. Some delegates suggested foreign aid could be invested in R&D, education and infrastructure, with a view to promoting S&T.

26. A variety of issues were identified as having potential for OECD involvement. In particular, measuring spillovers and demonstrating their importance at international and national levels was highlighted as a crucial task in which the OECD could provide leadership. Other areas included providing benchmarking, indicators, best practices and lessons, and providing advice on how to select the best projects and make good decisions in the S&T policy field. Delegates suggested that the OECD should also facilitate learning from the various institutional arrangements and decision-making structures that countries use. Looking forward towards more “non-traditional” areas of work, delegates questioned whether the OECD could provide a platform to support new collaboration.

Going forward; potential work to be undertaken in 2009-2010

27. The discussions at the Oslo meeting and the subsequent discussion of the CSTP on its work programme for 2009-2010 demonstrate the interest in many member countries and observers for a deepening of the work on international cooperation and globalisation of science and innovation. The key question is in which areas the CSTP work can add most value to the wide range of existing international activities. Potentially, a number of areas can be distinguished:¹¹

- a) **Measurement and mapping of internationalisation:** CSTP, notably its National Experts on Science and Technology Indicators (NESTI), already plays an important role in developing information on global R&D investments. Recent work on the internationalisation of R&D and work on international mobility of the highly skilled (including the development of new indicators

¹¹ A number of activities under these headings can be distinguished in the draft work programme for the CSTP (see DSTI/STP(2008)9/REV1). This includes work on indicators and knowledge flows (to be carried out by NESTI), work on adjusting technology and innovation policies to globalisation (to be carried out by TIP) and work on international science and technology cooperation (where the CSTP has decided to play the lead role itself). The OECD Global Science Forum has not yet decided on all its activities for 2009-2010, but international scientific cooperation will remain at the core of the GSF work. Further activities are included in the work programme of other OECD Committees, including work under the OECD Innovation Strategy (see SG/INNOV(2008)2, forthcoming).

on careers of doctorate holders) all aimed at enhancing the quality of information on global scientific and technological activities. However, the discussion at the high-level meeting of the CSTP highlights that more could be done in this area, notably in measuring and mapping international knowledge flows. This work could also involve a better mapping of global science and technology capabilities, notably in non-OECD economies.¹²

- b) **Measuring the impacts and spill-overs of internationalisation:** The Oslo meeting pointed to concerns in several countries as regards continued political support for public investment in innovation in a context of globalisation. It also pointed to the risk of knowledge protectionism if the national benefits of investment in innovation were not made sufficiently clear. Sound evidence on the impacts of the internationalisation of science and innovation on economic and social outcomes, including the measurement of knowledge spill-overs across countries, could help address these concerns. Such work would involve empirical analysis of data on internationalisation and would thus draw on work under the first area considered above.
- c) **Fostering international scientific cooperation and developing improved frameworks:** OECD could also examine barriers to international scientific cooperation and foster such cooperation. The OECD Global Science Forum plays a key role in this area, in addressing barriers to cooperation that have been identified by its members. Issues that could be considered in this area of work include frameworks and arrangements affecting the scope for international cooperation, such as: a) funding arrangements and funding models for international scientific cooperation; b) scientific standards; c) IPR rules for international scientific cooperation; d) access arrangements to research facilities, data or outcomes of scientific research, etc; e) international mobility of highly skilled; aiming at the development of approaches that provide benefits to both developed and developing countries. Work on these issues could aim at fostering improved international frameworks and approaches to international cooperation. It could also consider national policies and arrangements that provide incentives for researchers to become engaged in international scientific cooperation, e.g. as regards funding and mobility, with the aim of developing and fostering good practices that can be implemented by national governments in their own national context.
- d) **Fostering international technology cooperation:** A fourth potential area of work goes beyond scientific cooperation and public research and involves technology cooperation between firms and within public-private partnerships. The 1995 Council Recommendation on International Technology Cooperation involving Enterprises marked a step in this direction and recent OECD work on the globalisation of innovation identified some of the new challenges that must be faced in this area. As noted above, some of the issues that could be addressed under this heading include: a) IPR arrangements in international technology cooperation; b) funding arrangements and fiscal issues; c) legal and regulatory issues; d) international mobility of highly skilled and immigration issues; e) issues involving public research organisations. Work in this area is closely related and touches on work underway or planned in other OECD Committees, such as the Committee on Industry, Innovation and Entrepreneurship, the Trade Committee and the Investment Committee. All these Committees have recently also shown interest in this area, although their work is primarily focused on trade and investment barriers. Any CSTP work in this area could draw on existing work, e.g. in developing good practices for international cooperation to address global challenges, such as the IAVI and Noordwijk Medicines agenda mentioned above.

¹²

Such work could provide a partial response to the recent communiqué of G8 science and technology ministers, who called, inter alia, for a stock-taking of the science and technology situation in Africa (paragraph 15 of the Chair's Summary).

e) **Supporting work to address specific global challenges through international cooperation:**

The CSTP could also undertake further work to help address specific global challenges through international cooperation, e.g. climate change, energy, access to water, global health or food security. Recent work by GSF on energy research and the 2007 high-level Noordwijk meeting can be considered examples of such activities, as can ongoing work in the Working Party on Nanotechnology on water. Food security is also an area of growing global concern where the role of science and technology is considered of considerable importance. Activities focused at specific global challenges will require close cooperation with more specialised international organisations and other OECD Directorates and Committees addressing such challenges and will also require a close examination of the contribution that the CSTP can make to this work from the perspective of scientific and technological policy. Questions that could be addressed under this heading are closely related to those under (d) above, e.g. what are current trajectories for R&D and technology to help address specific global challenges? Are market and non-market conditions likely to deliver the necessary technologies and public goods? If not, why not, and if not, what could be done at the policy level to improve matters? This requires an understanding of what science and technology opportunities exist in relevant fields, which of these are being developed and why (as well as the corollary, which are not being developed and why).

28. In undertaking work in any of these areas¹³, that are closely related and not clearly separated, CSTP will need to consider the potential impact of its work and examine how it can be best add value to other activities that are ongoing or planned. In this context, CSTP may wish to focus on areas that are clearly in its own policy remit, i.e. scientific and technological policy, but that add value to activities in other domains. Moreover, CSTP may wish to engage in work that is forward looking, reflecting current trends in internationalisation. In all these activities, it may also wish to consider the comparative advantages of the OECD, such as its strong analytical and diplomatic capabilities, its neutrality, its broad international reach and its ability to deal with cross-cutting policy questions. These advantages can help attract the right stakeholders from the scientific and governmental communities, as well as industry, NGOs and civil society for this area of work.

Possible approach to the project

29. Considering the interest expressed at the CSTP, the ongoing and planned activities on internationalisation of science and innovation in the work programme of the CSTP and other Committees, including those in the context of the OECD Innovation Strategy, the CSTP may wish to consider how it can best undertake its work in 2009-2010. The proposal below offers a way forward that takes a step-wise approach to the issues at hand. The proposal offers but one possible approach to the topic and is simply intended as a way of focusing the CSTP discussion at the half-day workshop of 20 October and at the CSTP meeting of 21-22 October.

- **Activity I: Mapping of internationalisation and empirical analysis of its impacts.** This work would cover areas 1 and 2 above. It would consist of mapping international science and technology cooperation, including differences in national patterns of specialisation and international cooperation; and analysing the impacts and measuring the international spill-overs

¹³

In addition to these areas, a related but separate and already scheduled activity of the CSTP, to be carried out primarily by the Working Party on Innovation and Technology Policy, involves further work on how national science and technology policies will need to adjust to the globalisation of innovation. This work follows on CSTP work completed in 2008 and could deal with questions such as how to ensure reciprocity in access to support for private R&D, opening national policies to foreign participants, ensuring the continued efficiency of national policies, and, more broadly, adjusting national policies to internationalisation.

of internationalisation and international cooperation. This phase could draw on considerable existing work, e.g. by the academic community, but could also require work by NESTI (and related statistical groups such as the Working Party on Industry Analysis) as well as some desk research at OECD.

- **Activity II: Mapping existing and new approaches to science and technology cooperation.** This work would address the activities outlined under work areas 3 and 4 above and would aim at mapping existing approaches to international science and technology cooperation, in particular new models, approaches, frameworks and ways of governance, as well as the existing experience with cooperation and the principal barriers to cooperation. This work would enable the CSTP to examine and discuss which issues could be addressed by the Committee, in cooperation with other Committees and organisations, as required. The work could possibly distinguish:
 - a) Obstacles to international scientific cooperation, e.g. public vs. private interests, fair return and procurement rules, political considerations, bureaucratic procedures (authorization, evaluation, authority for making decisions), immigration/visa problems, incompatible schedules, etc. This could be based on the practical experience with important international projects, such as ITER, Galileo, etc.
 - b) Obstacles to international technology cooperation, where private interests play a more important role, e.g. IPR rules, funding arrangements, legal issues, immigration and labour market rules, etc.
 - c) Promising new approaches and frameworks for international science and technology cooperation, e.g. from specific fields such as environment, health or climate change.

30. These first two activities would enable the CSTP to take stock of the evidence and existing situation and permit it to evaluate how best to take the work forward. Possible avenues following these first two activities include:

- **Activity III: Exploring existing approaches and developing good practices.** This work would further explore the challenges of international science and technology cooperation and develop good practices and policy approaches, thus continuing the work under Activity II outlined above. This work would require close interaction with delegates and a range of stakeholders, drawing on their hands-on experience, and could eventually lead to a report with international principles and guidelines, e.g. in the form of an OECD Council Recommendation, if this would be an appropriate mechanism to ensure a strong impact of the work. It could also simply provide a range of good practices and policy recommendations, as it custom in many OECD reports.
- **Activity IV: Supporting work to address specific global challenges.** An alternative, though closely related and possibly parallel, strand of work would involve the CSTP directly in the policy discussion on key global challenges. For example, the CSTP could decide to become more actively involved in the OECD work on climate change and energy; health; water; or food security; and the role of science and technology cooperation in each of these domains. In most of these areas, CSTP has already had some involvement, e.g. through TIP work on energy innovation and GSF work on energy research; through work by the Working Party on Biotechnology (WPB) on innovation in health; and through work by WPB and the Working Party on Nanotechnology on access to water. However, this work could be strengthened by becoming a more active partner in ongoing OECD work in these areas, notably from the perspective of scientific and technological policy. As noted above, questions that could be addressed under this heading include: what are current trajectories for R&D and technology to help address specific

global challenges; are market and non-market conditions likely to deliver the necessary technologies and public goods? If not, why not, and if not, what could be done at the policy level to improve matters?

31. These activities simply provide a broad set of possible activities that the CSTP may wish to consider for its work programme for 2009-2010. Each of these activities will have to be worked out in more detail, including their possible time frame, following initial discussion by the CSTP. The relationship with, and contribution to, planned work in the context of the OECD Innovation Strategy will also need to be considered in this context (see SG/INNOV(2008)2).

32. Moreover, given the wide range of existing and ongoing work on international science and technology cooperation within the OECD and in other international bodies, CSTP work will have to be carefully developed to ensure that the work adds value to existing activities. A number of organisational arrangements may help in this respect, notably:

- Establishing a Steering Group for the project, involving delegates from CSTP, relevant working parties (notably GSF, but potentially others depending on the precise scope of the work), as well as other interested partners. This steering group will need to be particularly broad if the work would be aimed at addressing specific global challenges that are the subject of work in other parts of the OECD.
- Close cooperation with the European Commission and other international bodies active in the field. Participation of the EC in the Steering Group could be particularly helpful.
- Close coordination with work in other OECD Directorates and other OECD initiatives, notably in the context of the OECD Innovation Strategy.

33. Delegates are invited to discuss the approach set out in this paper and agree on:

- *The aims and scope of the work on international science and technology cooperation.*
- *The involvement of their delegation in the proposed Steering Group, or other ways in which they may wish to contribute to the project, such as the involvement of national experts on science and technology cooperation.*
- *The approach to be followed to ensure that the work has a strong impact.*

ANNEX 1: SELECTED REFERENCES TO OECD WORK

International scientific cooperation

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International technology cooperation and internationalisation of innovation

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