Working Party on Innovation and Technology Policy

ADJUSTING POLICIES TO THE GLOBALISATION OF INNOVATION - PROPOSAL FOR WORK IN 2009-2010

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This note sets out some thoughts on a possible TIP project on globalisation and innovation, that would be undertaken in the context of the Innovation Strategy. This work may also involve co-operation with other OECD Committees and Working Parties, notably the CIIE.

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ADJUSTING POLICIES TO THE GLOBALISATION OF INNOVATION – DRAFT PROPOSAL FOR WORK IN 2009-2010

Background and context

1. Recent OECD work has focused in considerable detail on the globalisation process, including the internationalisation of science and innovation. This work points to a dramatic shift in the internationalisation of business research, technology and innovation, and in the nature of this process. 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.

2. New technological opportunities, notably ICT, are among the main drivers of the internationalisation process as these have enabled new ways of collaboration and have led to greater specialisation in the global innovation system. Advances in ICT have also facilitated the management of dispersed innovative activities. For instance, developments in the codification and standardization of R&D processes have increased the possibilities to segment R&D activities and disperse R&D stages over different locations. ICT has also provided a platform for the diffusion of non-R&D based innovation, especially in the services sector.

3. The emergence of new global players, such as China and India, is another major factor in this shift. A growing number of countries have developed important S&T capabilities in recent years. While S&T resources are still highly concentrated in OECD countries, non-OECD economies account for a growing share of the world’s innovation capabilities. China, for example, has become the 3rd largest investor in R&D and now counts about 1000 foreign labs, accounting for about 25% of business R&D.

4. 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).²

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2. 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).
• 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.

• 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. Non-OECD economies accounted for over 40% in the growth of global R&D between 2001 and 2006, up from 23% between 1996 and 2001.

5. This work also showed that decisions where to locate innovative activities are primarily related to the market potential and the quality of skills. Company surveys indicate that the main reasons to locate research and/or development facilities abroad are the proximity of large and growing markets. Other important factors were the availability of engineers and researchers, and the proximity to other activities (production, sales) of the company. Some factors like proximity to suppliers, low labour costs of researchers or low degree of regulation of product markets, systematically score as relatively unimportant.

6. Some emerging economies offer a combination of low wages and a good education system resulting in a large mass of well-trained workers. In China, for example, only a small proportion, but a very large absolute number of the population has a tertiary degree. Just as the internationalisation of manufacturing had important cost advantages, the internationalisation of innovative activities is also motivated to some extent by cost-cutting, resulting in outsourcing of activities and location of these activities in countries with low costs. However, the key reasons are not lower wages but the available pool of skilled workers, including scientists and engineers and the access to a large market.

7. Overall, empirical analysis and case studies show that the internationalisation of innovative activities can bring substantial benefits, e.g. greater cost efficiency in the innovation process, greater ability to learn about innovation conducted by other companies/institutions, a reduced time length before commercialisation and a positive impact on the innovation capacity of the own firm. At the same time, concerns are raised in many countries, notably the possible erosion of home based innovative activities by off-shoring and outsourcing abroad that could result in a reduced capacity to absorb knowledge and technologies developed abroad. This concern is particularly strong for smaller countries that may not have the critical mass for research and too small a market. Some OECD countries, as well as many developing countries fear being marginalised in this process.

8. The internationalization process is spreading beyond R&D. Companies increasingly rely on outside innovation for new products and processes, and at the same time have become more active in licensing and selling results of their own innovation to third parties. Innovation is increasingly based on knowledge assets beyond the boundaries of the company and cooperation has become an important way of knowledge sourcing in order to generate new ideas and bring them quickly to the market (outside-in). At the same time companies may also spin-out technologies and intellectual property that were internally developed but that are determined to be outside the core business of the firms and thus better developed and commercialized by others (inside-out).

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.
9. Most companies implement these practices as an integral part of the company’s strategic development through innovation networks. Companies co-operate with the best in their business and take advantage of the expertise that these partners have built through many years. Companies look at innovation networks as a close collaboration with other external partners i.e. customers, consumers, researchers or other people that may have an input on the future of their company.

10. The globalisation process is also accompanied by a growing mobility of highly skilled talent across borders. The importance of mobility stems from its contribution to the creation and diffusion of knowledge, which is vital for innovation processes. Not only does mobility aid the production and dissemination of codified knowledge, such as formal R&D, scientific publications and patenting, it is also an important transmission method for tacit knowledge.

11. As well as economic incentives, such as opportunities for increased pay and career advancement, and access to better research funding, mobile talent also put a strong emphasis on higher quality research infrastructure, the opportunity to work with “star” talent, and increased freedom to debate. Policy settings, for example on research, ethics and intellectual property, will also have an impact on where talented workers choose to work. Less amenable to potential government policy, but still important, are family or personal ties that draw people to certain locations.

12. For receiving countries, the inflow of talent spurs a variety of positive effects related to knowledge flows, R&D and creativity. These include the possibility for increased R&D and economic activity due to the availability of additional skilled workers, improved knowledge flows and collaboration with sending countries, increased enrolment in graduate programmes, and potential firm and job creation by immigrant entrepreneurs. The mobility of the highly skilled also supports the increasing internationalisation of research and the move towards open innovation. Movement of talent is one of the keys to linking domestic firms to foreign knowledge and to stimulate spillovers from foreign R&D sources to local R&D units and the economy at large.

13. For sending countries, work on the effects of emigration has often focused on migrant remittances and brain drain, with a particular emphasis on the impacts on developing countries. Recent literature also points to the benefits of “brain circulation” in transferring knowledge to sending countries. Brain circulation can refer to the return of skilled migrants to their home country after a period abroad, or to a pattern of temporary and circular migration between home and abroad. Not only do professionals diffuse the knowledge they acquire to their home country, they also maintain ongoing networks with former colleagues and acquaintances abroad, thus facilitating ongoing knowledge exchange and economic linkages.

Policy issues

14. The emergence of global value chains and global innovation networks raises new policy issues for OECD countries. The changing approaches to innovation within companies directly affect the competitiveness of countries, thereby challenging existing policies of (national) governments. The key issue for governments is how to help move national economies up the value chain and develop higher value added activities in order to safeguard industrial competitiveness in the global economy.

15. A first common policy concern (also identified at the CSTP high-level meeting in March 2008) simply relates to understanding the process and having sound evidence to underpin policies. Policy makers look for a better understanding of the process of innovation at different levels (local, regional, national, global) in order to assess the benefits of innovation for national economies. While technology diffusion across borders increases the stock of knowledge, individual countries may perceive the costs of openness to exceed the benefits. If this is (or is perceived to be) the case, “knowledge protectionism” could result.
For example, the importance of knowledge flows for innovation remains difficult to demonstrate in particular as an increasing share of the spill-overs of investments in innovation may accrue to foreign partners in the innovation process.

16. A second issue concerns the implications of the globalisation of innovation for existing framework and innovation policies. To a large extent, the globalisation of innovation strengthens the need for good framework conditions to enhance the attractiveness of a country or region as a location for high value added activities. It reinforces some general principles, such as the need for sound macroeconomic and structural policies; policies to foster exchange and openness, e.g. openness to FDI and trade, openness to highly skilled workers from abroad; sufficient protection of IPR, as well as good conditions for entrepreneurship, as a way of bringing new ideas into the marketplace.

17. But the attractiveness of national economies for innovation may depend on more than framework conditions. One important determinant of location includes the knowledge capabilities that various countries have to offer, for example in offering an abundant and high-skilled labour force that offers talent that firms can use. Effective knowledge institutions that engage in basic research and provide relevant knowledge for innovation also play an important role. Policy questions in this context relate to the importance of various demand and supply factors for the attractiveness of countries for R&D activities and how countries (but also regions and cities) can develop into hubs within global value chains?

18. Questions can also be raised regarding the effectiveness and relevance of existing policies, including innovation policies, in the increasingly global environment for innovation. For example, how effective are direct or indirect support measures for firm’s investment in R&D? What is their role in attracting foreign R&D and what is their impact on R&D performed in national economies and on broader economic performance? Should national policies be opened up to foreign multinationals based in a country, or to firms based abroad? How important is reciprocity in treatment of MNEs?

**Looking forward: Potential TIP work in 2009-2010**

19. These three aspects, i.e. 1) measurement of impacts and spill-overs; 2) factors determining attractiveness; and 3) implications for innovation policy, could all be examined in more detail. This could involve further analytical work or an examination of current policy responses and policy options.

20. CSTP and TIP are not alone in their interest in these questions, as some additional work on these questions planned in the CIIE work programme, as follows:

- CIIE has indicated it will undertake analysis of micro-data (i.e. on the firm and plant-level) to build indicators and analyse the geographical (local, regional, national, global) dimension of innovation. Specific topics include the location of innovation, knowledge flows (of which within MNEs), their determinants (notably policy) and impact on the innovation performance of countries. This work is being undertaken by the Working Party on Industry Analysis.

- CIIE also intends to analyse the importance of MNEs in terms of investment in innovative activities and their linkages with domestic companies in the national innovation system.

- A project studying the attractiveness of countries for investment in innovative activities has also been started, in order to analyze the importance of different location factors for these activities. The analysis will not be limited to pure R&D centres but will also include other innovation activities. In order to capture the importance of decision centres within global
innovation networks, location factors for headquarters and other command and control operations will also be considered.

- Finally, a study will analyse the emerging global markets for technology, including their determinants and barriers for further growth. Patent data in combination with technology balance of payments will be used to assess (indirectly) the characteristics of these technology markets. A subsequent analysis will link technology markets to MNEs’ activities given the large technology transfers within multinational network. It is hypothesized that the motivations of FDI in innovation (market seeking, technology sourcing) are directly related to the characteristics of the technology markets in different countries.

21. Most of this planned work in CIIE is primarily intended to extend the existing analysis and build on existing OECD work. CSTP³ and TIP have thus far primarily indicated their interest in further examining the policy implications of previous work on internationalisation, i.e. the implications of internationalisation for public support for innovation, the implications for policies related to openness to knowledge and research institutions, policies related to international mobility of researchers, etc.

22. Moreover, the Oslo meeting indicated an interest in further OECD work in providing new indicators and drawing on OECD experiences to assist countries with implementation and evaluation of policies, e.g. in analysing international knowledge flows and spill-overs. Moreover, the Oslo meeting suggested the OECD should help develop a common understanding and language on globalisation issues.

23. Considering the interest expressed by CSTP and TIP, 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 TIP may wish to consider how it can best undertake its work in 2009-2010. The following potential activities emerge as possible areas of work:

- **Activity I: Measurement of the impacts and spill-overs of globalisation.** This work could analyse the impacts and measure the international spill-overs of internationalisation. This phase could draw on considerable existing work, e.g. by the academic community, but could also require work by NESTI (and related groups such as the Working Party on Industry Analysis) as well as some desk research at OECD. This work could be particularly relevant in a context of possibly more protectionist views on innovation. Such work would need to be coordinated with the planned CIIE work that looks set to cover at least some of the potential channels of analysis. One possible approach to this project could be to arrange for an expert workshop with invited papers on precisely this topic, in cooperation with other OECD bodies. This work could also add value to further TIP work on evaluation and impact assessment.

- **Activity II: Analysis of implications of globalisation for specific policy instruments.** This work would primarily focus on questions related to the effectiveness and relevance of existing policies, including innovation policies, in the increasingly global environment for innovation. It could describe and analyse existing approaches and policies to address the globalisation of innovation, would draw on existing experiences and policy evaluations in member countries, and would ultimately aim at the development of good practices. Depending on the interests of TIP, it could focus on specific policy instruments, e.g. direct and indirect support policies for business R&D. Such funding policy instruments are more likely to be influenced by the internationalisation of

³ For a description of proposed CSTP work in the area of international S&T co-operation, notably on the measurement of international S&T co-operation and the governance mechanisms for international S&T cooperation, see the background and issues paper for the recent CSTP workshop in Istanbul on Fostering International Science and Technology Co-operation to Address Global Challenges [DSTI/STP(2008)18)].
R&D than policies aimed at developing infrastructure, human resources or networks. They may therefore provide a particularly relevant avenue for TIP work. This activity could build on an examination of available evaluations (including micro-economic studies) of direct and indirect support policies in member and non-member countries, and could also draw on the measurement work under Activity I.

- **Activity III: Supporting the development of a comprehensive approach to the globalisation of innovation in the context of the OECD Innovation Strategy.** Activities I and II are important and discrete projects that could be undertaken by TIP and that would address important gaps in the current understanding of policy makers in this area. However, the Innovation Strategy will require a comprehensive perspective on how to adjust policies to the globalisation of innovation. TIP may therefore wish to play a pro-active role in developing such a view, based on its experience and existing work.

24. These activities simply provide a broad set of possible activities that the TIP may wish to consider for its work programme for 2009-2010. Considering the time table for the OECD Innovation Strategy, it is important that considerable progress on these potential activities is made in 2009. This implies that a potential workshop on measurement of spill-overs should be held no later than June 2009 and a draft report on the implications for specific policy instruments should be available no later than December 2009.

25. Moreover, given the wide range of existing and ongoing work on internationalisation of innovation cooperation within the OECD and in other international bodies, TIP 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 TIP, relevant working parties, as well as other interested partners, e.g. CIIE.

- Close cooperation with the European Commission, other international bodies and academics active in the field.

- Close coordination with work in other OECD Directorates and other OECD initiatives, notably in the context of the OECD Innovation Strategy.

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

- **The aims and scope of the work on globalisation of innovation.**

- **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.**

- **The approach to be followed to ensure that the work has a strong impact.**