Working Party on Innovation and Technology Policy

STRATEGIC ORIENTATIONS FOR TIP’S PROGRAMME OF WORK 2017-2018

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Delegates will find attached a discussion paper that outlines some of the issues that the TIP could consider as it defines its contributions to the CSTP programme of work for the 2017-2018 biennium.

The paper has been developed based on initial suggestions by the TIP bureau and in co-operation with the Secretariat. Delegates are invited to comment and discuss the proposals with a view to selecting and prioritising the number of themes that could be developed into activities.

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STRATEGIC ORIENTATIONS FOR THE PROGRAMME OF WORK 2017-18

Introduction

1. As the TIP reaches the midway point in the 2015-16 Programme of Work it is following up on the CSTP Ministerial discussion in Korea. This paper focuses on possible TIP-related orientations for the 2017-18 Programme of Work and Budget in light of: the strategic orientations and future priorities for the CSTP following the Daejeon Declaration of the CSTP Ministerial (see Annex 1 for an excerpt of the priorities for OECD outlined by Ministers at Daejeon); b) the follow-up to the 2015 OECD Innovation Strategy, the Next Production Revolution project and continued work on Green Growth as well as c) the positioning of the TIP in light of its core competences and comparative advantage in terms of policy making at the interface between public research and business innovation.

CSTP Orientations and Recent Discussions

2. During the recent CSTP meeting, discussion on its 2017-18 Programme of Work¹, centred on the Committee’s strategic orientations as set out at in the CSTP Chair’s Strategic Document [DSTI/STP(2015)13]:

- Defining the rationale and scope for policy action to address key issues faced by countries, such as globalisation, sustainability, and digitalisation of science, technology and innovation and health;
- Linking up to new actors, both countries and stakeholders, to ensure that OECD work both reaches them and is informed by their perspectives;
- Priority setting, impact assessment and evaluation;
- International scientific co-operation: access to data; technology and research infrastructure; funding international collaborations; global challenges; and finally;
- Helping countries develop truly broad-based innovation policies.

3. As the CSTP defines its priorities for the 2017-18 PWB, it is highly probable that the following areas for work described in the Chair’s strategic document will be a priority for the Committee:

a) Digitalisation of STI. A variety of issues have been suggested for CSTP wide work in this area, ranging from guidelines on access to research data to investigating the impact of the digitalisation of STI on human resources and skills needs, on the funding of research (infrastructures, data dissemination etc.), on conditions for multidisciplinarity; on "citizen science"; and how

¹ At the CSTP Meeting in Korea, Delegates noted the preliminary thoughts on the CSTP programme of work and budget for 2017-218 and were invited to send the Secretariat suggestions and priorities by 20 November 2015. The Secretariat is currently analysing the suggestions received and will report to back to the CSTP in the coming months as well as corroborate the views of the various CSTP working parties, including the TIP.
digitalisation might affect the links between teaching, research and innovation, and in turn be changed by them.

b) **International co-operation in research addressing grand challenges:** Following on the work of the Steering Group on International Co-operation in Science, Technology and Innovation for Global Challenges (STIG), the CSTP has proposed that work in this area focus more on downstream and implementation issues related to international co-operation (e.g. the sharing of cost, the identification and sharing of benefits, Intellectual Property Rights). The work would also capitalise on recent national initiatives in the field. The GSF and BNCT would have particular interest in this area of work, as would NESTI with respect to the measurement issues raised.

c) **Assessing Science and Innovation Policy Instruments:** Following on the completion of the 2015 OECD Innovation Strategy, the CSTP is likely to wish to continue its work on the assessment of innovation policies in 2017-18. New activities across the working parties could be developed to assess the evolving policy mix for innovation. CSTP might also select one or several new instruments, e.g. patent boxes or prizes, and investigate their use, effectiveness and design. Major avenues of work might include: distributed cross-country microdata analysis of confidential national databases for NESTI; new policy instruments, policy mix, the impact of public research and policy indicators for TIP; the impact of policies for bio, nano and converging technologies for BNCT; science funding instruments and the impact of science and infrastructures for GSF; and impact analysis for the Space Forum. Co-operation will be ensured with CIIE which is also working in this area.

d) **Emerging technologies for the next production revolution and sustainable growth:** The OECD Green Growth Strategy set up a framework to help countries develop policies and tools to shift growth towards a more sustainable low-carbon economy. Technology and innovation policy – both at national and international levels - clearly must play a role in delivering more eco-efficient growth. The CSTP should remain involved in the area. Possible future work includes: developments of the bioeconomy (synthetic biology, biomaterials, biomass) as well as greener materials, led by BNCT, that could connect more directly to higher level agendas like the post-COP21 global efforts; the impact of digitalisation on production methods; responsible research and innovation for the NPR (linked notably to social acceptance of new technologies); sustainable development of the ocean economy. Work on policy instruments and approaches by TIP might also contribute, as could NESTI indicators of green technologies. Future work might involve co-operation with the Environment Committee and with the Agriculture Committee.

e) **Emerging technologies for health:** The demand for health innovation is increasing, not least because of the ageing populations in OECD countries. Emerging technologies, like genomics or neurotechnologies, offer new opportunities but also raise new challenges in terms of basic science, research funding and market regulation. Their development might also entail high costs at a time when health spending is becoming a main concern for governments. Certain of these technologies raise also specific ethical issues. CSTP (notably through BNCT) might consider identifying a few key aspects of the health innovation issue and could co-operate with the Health Committee to develop a project. The TIP may have a role in such work.

4. Themes A, C, D, and E seem quite in line with the TIP’s long- and short-term orientations. Contributing to these areas will nevertheless require the TIP to clearly define its activities and develop tools to work in partnership with other bodies in the CSTP family (e.g. BNCT, GSF, and NESTI) and outside (i.e. CIIE, EPOC).

**Selection Criteria**

5. Despite the above top-down priorities from the CSTP as well as horizontal OECD projects, the TIP retains significant latitude to propose bottom-up priorities. Indeed, the mandate of the TIP is
sufficiently broad to explore many areas that are touched upon in the CSTP priorities. It needs to be borne in mind, however, that the quality and impact of projects require that a sufficient amount of resources be focused on each of them, which implies that there is a limit to the number of projects that TIP will be able to conduct in 2017-18; the list below might therefore be shortened.

6. Concerning the criteria of selection for future activities of TIP, there are several issues that could be considered:

- Are the topics aligned with the longer-term goals and interests of the CSTP and TIP?
- Are issues appropriate for TIP? Does TIP have competence and if not, can it build such competence within the time and frame of limited resources?
- Are topics sufficiently high-priority for all members and Participants as well as in light of OECD’s growing involvement with the G7 and the G20?

Possible elements of the PWB in 2017-18: Implications of the CSTP Ministerial

7. Although the TIP is still developing its vision for the longer term – including through the upcoming CSTP/TIP STI Outlook Workshop on the Forward Look, the following are some policy areas that, while being based on the TIP’s experience and own appreciation of the future opportunities, clearly could contribute to meeting the top-down priorities set by the CSTP and to responding to the request by Ministers outlined in the CSTP Daejeon Ministerial Declaration (Annex 1).

8. This includes the follow up to the TIP work on Open Science, including assessing the need to revise the OECD Recommendation on Access to Research Data from Public Funding; developing the methods and indicators for assessing the impact of research and innovation policies; and exploring the policy frameworks needed for sustainable development and the next production revolution such as by developing better evidence on the effectiveness of specific policy instruments that could advance technologies for sustainable development, as well as better evidence on the co-ordinated use of these instruments (“systems innovation”) and identifying effective ways for sharing good practice in the governance, design and implementation of innovation policies.

9. In light of the above, some important themes that could be the basis of TIP activities for the CSTP programme of work and budget in 2017-18 might be the following:

- Theme 1: Adapting business support schemes to match the evolving innovation landscape. Industrial innovation is rapidly changing. New technological developments, not least simulation and digital design, the use of “big data,” and nanotechnology, make it possible to create new manufacturing processes (and not just products). Meanwhile new business models and Internet-based platforms are transforming business at national and global level. New demands for economic sustainability and inclusiveness are also changing business innovation, creating greater differentiation and market segmentation. Company IPR strategies are becoming more sophisticated, if not more open, and “softer” forms of IP (copyright and trademarks) are becoming more important in innovation. What can survey data on innovation and/or case studies tell us about how firms are using data/information resources to innovate in terms of products, processes or business models? What are the implications for framework conditions, including IPRs and regulations? How can traditional business innovation instruments such as technology diffusion and demonstration programmes, R&D grants, prizes, soft-loans, or tax credits help firms to seize the benefits of digitalisation? What new instruments might be appropriate? A project under this theme could draw on the TIP’s extensive experience in assessing business innovation support schemes and focus on a limited set of support schemes in order to identify
best policy practices. Co-operation would be sought with BNCT (i.e. policies for the next production revolution); CDEP on big data; NESTI regarding data/evidence of the digitalisation in science and innovation as well as CIIE which conducted a meta-study on the evaluation of business support schemes several years ago.

- **Theme 2: Digitalisation of research and innovation: implications for human resources in STI.** The digitalisation of STI is a relevant cross-cutting theme in the CSTP and it can be reflected in current and future projects driven by TIP which recently completed its analysis of open science policies including those related to access to research data. Digitalisation has increased the speed and globalisation of research and innovation processes. For firms, digitalisation forces enterprises to continuously develop new products and processes. For public research, digitalisation offers new opportunities to accelerate scientific discovery, but it also comes with many challenges, some which have already been addressed in the earlier TIP project. The capacity of human resources to handle large data sets; to work and collaborate in virtual environments and to manage interdisciplinary teams is extremely important to public research organisations and firms alike. It is likely that in the years to come, educational institutions will need to implement new curricula as well as multidisciplinary programmes to prepare graduates, both those going into research careers, but also those going to work in industry to manage and work with big data. This will imply a substantial investment in human capital and in worker training, but also a strong potential for significant pay off. From the TIP side, a project on the digitalisation of research and innovation would explore the underlying skills requirements for data-driven science and innovation (the demand-side) and the implications for higher education, researcher training and worker skills (the supply-side). This project would also provide input to the CSTP follow up on Open Science by examining the data-related skill needs at public research institutions. Co-operation with GSF (on research infrastructures) and NESTI regarding work on advanced human resources and skills, including skill surveys of scientists, would be ensured. TIP would also co-ordinate the work with CDEP (big data); EDU (skills strategy); and BNCT. TIP may also benefit from the expertise of the former RIHR working party, which now constitutes an integral part of the group and previous work by CDEP on the silver economy.

- **Theme 3. Ensuring that public research contributes to the needs of the traditional industries and activities.** A large part of the research and innovation system in many countries is dominated by the public sector, even if most R&D is performed by the business sector. Much of the “targeted” or mission-oriented public research by public research organisations (PROs) and research intensive universities also tends to support research of relevance to pharmaceutical, biotechnology, ICT, agro-food and energy firms. This is evident in many of the priority-setting exercises in countries where public research is directed towards the same technological fields and scientific disciplines. While many of these choices reflect areas of comparative strength at national and global level, they may not sufficiently contribute to innovation in traditional industries and activities where many SMEs predominate. Many countries have attempted to encourage firms to engage universities and to increase research and innovation capacity by stimulating the demand side (e.g. innovation vouchers) or trying to transfer public research to companies (supply-side) or human resource policies (PhD in industry training programmes). What other channels exist to increase the contribution of public research to traditional industries and entrepreneurs? Can public research be directed to the needs of these firms/actors? But how to identify these firms and how to engage them? Should universities or should PROs be the main actors to engage them? Which instruments exist and what lessons can be drawn from initiatives in OECD countries? A TIP project in this area could explore: 1) the priority-setting processes for research funding to the benefit of traditional industries and activities; and 2) the policy mix to support technology transfer and innovation in traditional industries and activities, including the role of boundary-spanning institutions and human capital.
• **Theme 4. Promoting innovative solutions for the circular and low carbon economy.** Following on the CSTP Ministerial and the COP21 discussions, it is clear that meeting the sustainability challenge will require higher levels of investment in green technologies as well as new business models and improvements in the public sector. One such business model is the “circular economy” model which aims to reduce carbon in production and consumption through a better management of resources both *ex ante* (e.g. eco-design) and *ex post* (waste management) so as to maximise resource utility of and preserve the capacity for renewable resources. The concept may have been initiated at the European Commission but it has economic roots going back decades if not centuries. The circular economy is about large-scale system change and thus involves more than renewable and biological resources but also technology, human skills, and financial capital as well as public sector institutions and skills policies. The TIP may wish to build on its system innovation work to explore the concepts behind the circular economy and second, to analyse the critical policies and governance arrangements that can enable the transition to a circular economy. Such policies include public R&D funding, public procurement of green innovation, smart regulation and standards, financing the commercialisation of public research to de-risk investments, including demonstration projects and finally, skills policies. The TIP could develop this activity jointly with the BNCT, linking up to its work on the bio economy, for example. Co-operation would also be sought with CDEP on big data; the Environment Directorate and the CIIE. Outside the OECD, collaboration with the European Commission would be ensured.

• **Theme 5: Meeting the needs of the silver economy through innovation.** Ageing societies will affect not only the capacity for economies to innovate and compete globally (the supply side) but also the demand for innovation. Many OECD countries and regions have already included elements related with the “silver economy” concept in their current innovation strategies and policies. The TIP could bring its system innovation perspective to this issue given that ageing populations affect many parts of the economy. New models for healthy living, employment and entrepreneurship, and new channels and forms of education could be considered. The focus of the activity could be split in several objectives, for instance: 1) Analyses of the aging challenge from the perspective of innovation and the economy (i.e. effects on the labour market and innovation skills); 2) Analysis of innovation policies to provide solutions such as public-private partnerships and ICT-based initiatives that target the needs of the ageing society. Within each of these two strands of analysis a few specific areas could be selected for in-depth case study work such as a) the labour market for skilled older workers; b) innovative housing solutions for the elderly; c) leisure and tourism; and e) health care, including e-health. Work would be co-ordinated with the BNCT (e.g. work on personalised/precision medicine) and the Health Committee, the Employment, Labour and Social Affairs Committee and build on the previous work of the CDEP.

**Next steps**

10. The TIP is invited to discuss its priorities for its next programme of work in light of the above and the outcomes of the Joint TIP session on the Green Growth and Sustainable Development Forum when it meets in plenary on 14-16 December 2016. Ideally, there will be a selection during the TIP meeting to narrow down the number of themes to 3 or 4. Thereafter, the Secretariat, working with the Bureau, will propose specific output results to be included in the draft PWB for consideration by CSTP. The following time-table sets the process and schedule for the development of the CSTP’s programme of work and budget 2017-18 [DSTI/IND/STP/ICCP/CP (2015)2.

• **December 2016-January 2016:** Working Parties should finalise their contributions and submit them to the CSTP as proposals for inclusion in the PWB 2017-18.
- **February-March 2016**: Working Parties proposals are rated by the CSTP. Some projects may be dropped or scaled back if they receive low ratings.

- **March 14-15 2016**: CSTP discusses and approves draft PWB

- **Mid-June 2016**: initial review by Budget Committee;

- **July-October 2016**: SG presents final draft PWB with proposed resource reallocations.

- **November-December 2016**: Council approves PWB.
ANNEX 1. EXERPT FROM “THE DAJEON DECLARATION ON SCIENCE, TECHNOLOGY AND INNOVATION POLICIES FOR THE GLOBAL AND DIGITAL AGE” [C (2015) 159]

WE, THE MINISTERS AND REPRESENTATIVES OF Australia, Austria, Belgium, Brazil, Brunei Darussalam, Cambodia, Canada, Chile, People’s Republic of China, Colombia, Costa Rica, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Kazakhstan, Korea, Lao People’s Democratic Republic, Latvia, Lithuania, Luxembourg, Malaysia, Mexico, Morocco, Myanmar, the Netherlands, New Zealand, Norway, Philippines, Poland, Portugal, the Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, the United Kingdom, the United States of America, Viet Nam and the European Union, assembled in Daejeon, Korea, on 20 and 21 October 2015, under the chairmanship of Korea and the vice-chairmanship of Norway and Spain to discuss how science, technology and innovation can help shape our common future;

STATE our commitment to support science, technology and innovation to foster sustainable economic growth, job creation and enhanced wellbeing, NOTING that achieving these goals will require adequate investment, and policy and regulatory environments that support strong and well-connected global science and innovation systems, and which also enable creativity and innovation throughout the economy and society, and RECOGNISE that changes in science and innovation systems, influenced by digitisation and globalisation, require that our national and international policy agendas and instruments be updated.

“.............................”

INVITE the OECD to:

a) Support the improvement of policies for “open science”, notably by:

i) continuing to explore key policy actions to promote open access to the results of publicly funded research, and to investigate ways to develop internationally coordinated approaches to data and information infrastructures;

ii) assessing the need for revising the Recommendation of the Council concerning Access to Research Data from Public Funding, and identifying common principles for the development of open science and big data (in conjunction with parallel efforts addressing the broader issue of data access on the Internet);

iii) working with key actors to bring the lessons learned from information- and data-sharing initiatives led by the scientific community to the attention of policy makers and bring policy lessons to the attention of the scientific community.

b) Continue to develop methods and indicators for assessing the impact of research and innovation policies, notably by:

i) preparing analyses of policies and their impact across countries;

ii) facilitating the exchange of good practices on impact assessment;
iii) conducting co-ordinated impact assessments of comparable policies across countries when appropriate.

c) Continue improving statistics and measurement systems to better capture the key features of science, technology and innovation, including by ensuring a successful 2016 OECD Blue Sky conference on the Future of STI Indicators, which can make a major contribution to this goal.

d) Explore the innovation policy frameworks needed for sustainable development and the “next production revolution”, specifically by:

   i) analysing the expected economic, social and environmental impact of emerging technologies including the impact on productivity and inclusive growth;

   ii) examining the innovation policy issues raised by environmental challenges;

   iii) developing better evidence on the effectiveness of specific policy instruments (e.g. prizes) that could advance technologies for sustainable development, as well as better evidence on the coordinated use of these instruments (“systems innovation”);

   iv) assessing the policies needed to accelerate development of a bio-based economy, including the design of guidelines for measuring the sustainability of biomass production and utilisation, while exploring the associated ethical, social and political implications;

   v) analysing the role of research and innovation in the sustainable development of the ocean economy.

e) Investigate how best to support basic research in the health area and its translation into applications, notably with regards to omics technologies and precision medicine; identify innovative approaches to foster co-operation between the various stakeholders involved in research and development; and examine effective ways to integrate ethics and societal values into the evolution and governance of health technologies.

f) Explore new measures to implement effective cross-border co-operation in science and technology, particularly by:

   i) identifying best-practice mechanisms to improve the coherence and coordination of national research agendas across countries. Such mechanisms might include the development of standards, methodologies and other approaches for sharing information on publicly-funded research across countries.

   ii) improving the availability of information about national research agendas, which could help avoid unnecessary duplication, identify possible gaps in global research efforts, and enable greater international co-operation to address shared research challenges.

   iii) exploring the need for updating the Recommendation of the Council concerning a General Framework of Principles for International Co-operation in Science and Technology.

   g) Identify effective ways for the international sharing of good practices in the governance, design and implementation of innovation policy between countries having different levels of development, including by:
i) exploring how to build research and innovation capacities in developing countries as well as in less favoured areas of the developed world;

ii) examining ways of improving statistical data on official development aid allocated to science- and technology-related projects;

iii) studying and proposing ways how innovation could make growth more inclusive.

h) Explore ways to improve science advisory processes, including mechanisms for international co-ordination and exchange of good practices, and the associated engagement of civil society, and examine the possible development of a Recommendation of the Council on Scientific Advice.

COMMIT to working collectively with all stakeholders to implement and review, as appropriate, the understanding that we have achieved in this Declaration so as to maintain its relevance to future challenges and opportunities confronting our economies and societies.