

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

CSTP CHAIR'S STRATEGIC DOCUMENT -- IN PREPARATION FOR THE 2017-2018 PWB

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1. This document aims to initiate the process for developing a policy relevant and well-integrated Program of Work and Budget (PWB) for the CSTP over 2017-18.
2. It lists policy areas where CSTP might consider developing its work over the next biennium. Those areas were identified on the basis of several criteria. 1) They reflect the comparative advantage and recent experience of CSTP and its Working Parties. 2) They correspond to priorities across the OECD and DSTI. 3) They are explicitly mentioned in the Ministerial Declaration as areas where CSTP should engage in the future. It is expected that CSTP will examine the relevance and relative priority of these areas and identify potential directions of work within each area.
3. The next steps in the PWB preparation process are presented in detail in document [DSTI/IND/STP/ICCP/CP\(2015\)2](#). In the case of CSTP, the selected areas of work will be discussed by Working Parties and will be developed into specific project proposals by the Working Parties and by country delegates by the end of December 2015. These project proposals will be collected and harmonised by the Secretariat until mid-January, and the Committee will prioritise them in February, before discussing the overall PWB in detail in its March meeting. Based on the outcome of the discussion and prioritisation exercise, a revised version of the Committees' draft PWB template will be issued for approval by written procedure with a deadline by mid-May.
4. This document complements document [DSTI/IND/STP/ICCP/CP\(2015\)1](#), which presents a number of common directions for work across the four committees served by DSTI, and which includes a joint proposal from the STI Chairs for a joint project on Seizing the Benefits from Digitalisation for Growth and Wellbeing. The document draws directly on the Declaration of the CSTP Meeting at Ministerial level ([DSTI/STP/MIN\(2015\)1](#)) which provides CSTP with several specific requests concerning its future work orientations.
5. The context for STI policies is marked by three major trends, as analysed in the Ministerial Discussion Themes document ([DSTI/STP/MIN\(2015\)2](#)): the major role of STI in boosting economic growth and addressing grand challenges; the current transformation experienced by STI, due to digitalisation and globalisation; and the need to enhance and better assess the impact of STI policy instruments. These trends are directly reflected in the areas of work proposed below.

Cross-cutting theme: The digitalisation of STI

6. Digital equipment, models and data are involved in more and more human activities, be they physical or non-physical, and the monitoring and control of real-world operations is increasingly done through virtual models. Digitalisation is a cross-cutting trend which concerns most if not all economic and social domains. Research and innovation are obviously affected by this trend in many ways as STI activities rely increasingly on information and communication technology (ICT). In research activities this is illustrated for instance by the increased use of big data, more widespread remote collaboration between researchers, the progress of electronic publishing, the growth in data infrastructures, etc. This is also affecting industry, where the increased reliance on ICT is changing innovation and production activities, hence market structures, the formation of prices and labour and capital compensation etc.

7. Digitalisation of society and the economy might be addressed by a cross-cutting project, at DSTI or OECD-wide level. In this framework, CSTP might investigate "the digitalisation of STI", both through dedicated projects and by including a digitalisation dimension in some of its thematic projects. In the previous PWB, CSTP (through TIP) has looked at open science, which is a particular aspect of digitalisation, emphasising access to research data. In the current PWB, CSTP is investigating the Next Production Revolution (NPR), which overlaps to a significant extent with digitalisation: the specific impact of a number of new technologies (e.g. robotics), the impact of NPR on productivity and income distribution (also addressed in the project on "Innovation for inclusive growth"), and enabling policies for developing NPR technologies. In view of the transformative impact of ICT on STI, the Ministerial Declaration is requesting CSTP to continue its work in this area.

8. A variety of issues might be investigated in this context and priorities will have to be established: updating the Council Recommendation on access to public research outcomes or possibly issuing a new Council Recommendation on Open Science; assessing the impact of open science on STI; investigating the impact of the digitalisation of STI on human resources and skills needs, on the funding of research (infrastructures, data dissemination etc.), on the conditions for multidisciplinary; on "citizen science"; and how digitalisation might affect the links between teaching, research and innovation and in turn be changed by them. CSTP might also investigate the impact of digitalisation on social and economic outcomes, including productivity and income distribution (continuing the work on "innovation for inclusive growth" and the next production revolution (NPR) from the current PWB).

9. Digitalisation raises also new issues for measurement. Measuring the use and impact of digitalisation in science and innovation, or for any other activity, opens up new requirements in terms of data infrastructure and challenges conventional metrics. As the Internet evolves and data become basic infrastructure, as the simple "adoption" of ICTs saturates, more sophisticated metrics on the nature of science, innovation and production, as well as on the links between these processes will need to be developed. Digital infrastructures also create new opportunities for measurement and challenge existing standards of collection of STI indicators. These issues will be considered at the 2016 Blue Sky conference and the discussion will be able to inform work on new metrics of "digitisation" of science and innovation over 2017-18 and beyond.

10. In view of this broad potential scope of an activity of the digitalisation of STI, more specific areas will have to be identified for future projects, and such projects could involve all CSTP Working Parties. This work would require the close coordination of CSTP with CIIE, CDEP and other OECD Committees. In addition, as reflected below, it would be expected that the impact of digitalisation would be explored in other thematic projects that CSTP would carry out in 2017-18.

Other thematic areas of work for 2017-18

11. *Operationalising international cooperation in research addressing grand challenges:* as the economic cycle is exercising downward pressure on government budgets for research in many countries, and as the needs for innovation for certain global challenges like climate change are becoming more pressing, one way to keep research effective at the global level is to improve international coordination. That might help to increase the scope of research and reduce the cost for each country. It might also be a way to better integrate developing countries in global research networks. There are various ways this can be done, which imply various degrees of mutual involvement. One way is just for countries to share information on their current and planned research projects and dedicated funds, as is done already in certain areas like Alzheimer's disease. Another way is setting up fully integrated international research programmes or infrastructures. Between these two extreme forms there is a continuum of possible arrangements. CSTP already worked on such issues in 2011-12, in the context of the Steering Group on International Co-operation in Science, Technology and Innovation for Global Challenges (STIG). As

compared with this earlier project, the proposed new activity would focus more on downstream issues, raised in the implementation stage, and might deliver concrete proposals in that regard. CSTP might investigate the policy issues raised by international cooperation (e.g. the sharing of cost, the identification and sharing of benefits, Intellectual Property Rights), examine which instruments would be most appropriate in each specific context (as defined by the challenge in question, the research issues involved, etc.). 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.

12. *Assessing Science and Innovation Policy Instruments:* Assessing the impact of policies has become a major concern for governments, and CSTP has developed a range of activities in this field in recent years: it held two workshops on impact assessment in 2013 and 2014, the RIHR and TIP produced a report, and all four Working Parties are currently doing impact assessment projects. Impact assessment is in fact becoming a cross-cutting theme, which applies to most policy projects of CSTP as all policies require their impact to be assessed. It is also to be noticed that the tool box and policy mix of innovation policies has evolved over the past decade, with increasing use of indirect, tax-based instruments (R&D tax credit, patent box) and with the orientation towards addressing grand challenges and promoting breakthrough innovations (such as through systems transition policies and prizes). As impact assessment activities will be conducted by all Working Parties, there will be an opportunity for synergies and possibly common events. Projects might share some common infrastructure (e.g. common quantitative and qualitative information) and elaborate on certain commonalities in their respective approaches. New approaches could be designed, like the compilation of "policy indicators" (qualitative indicators synthesising the policies undertaken by a country in a particular area, that would facilitate cross country comparisons) pioneered in 2015-16 or the identification of indicators for social and environmental impacts. CSTP has analysed some of the new policy developments already, notably innovation procurement and R&D tax credits (NESTI), systems transition (TIP) and science funding instruments (GSF). In view of its impact on policy making such work should continue. CSTP might also select one or several new instruments, e.g. patent boxes or prizes, and investigate their use, effectiveness and design. All four Working Parties have interest in this work area, which might include notably: 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 by the Space Forum. Cooperation will be established with CIIE which is also working in this area.

13. *Emerging technologies for the next production revolution and sustainable growth:* Generating economic growth which is sustainable is top of all governments' priorities, and emerging technologies play an essential and direct role in that regard. CSTP has contributed and is still contributing to this area with the current horizontal project on "the next production revolution" (NPR) and several reports and events relating to green innovation. CSTP (with BNCT, TIP and CIIE) is also playing a prominent role in the OECD Global Forum on Green Growth and Sustainable Development to be held in Paris in December 2015. As sustainability and environmental issues will stay high on the global political agenda in the foreseeable future, CSTP should remain involved in the area, drawing on its comparative advantages and cooperating with partners as needed. Possible future work include: 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); as well as work on the 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 Environmental Policy Committee and with the Committee on Agriculture.

14. *Emerging technology for health*: the demand for health innovation keeps growing, be it in developed countries, notably in connection with ageing, or at a global level with respect to a number of poverty-related diseases. While health innovation has achieved considerable progress, as testified by the continued improvement in the health status of populations around the world, more attention needs to be paid to understanding the unique policy dimensions of new and emerging technologies, like genomics or neurotechnologies. These technologies 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 cooperate with the OECD's Health Committee in order to develop a joint project.

Data and knowledge infrastructures to support STI policies

15. CSTP work needs to be based on robust knowledge and information foundations, both quantitative and qualitative. Maintaining and developing these foundations are key to maintaining and improving the quality of CSTP policy analysis and ensuring the position of CSTP on the global STI policy stage, as these infrastructures are also used by many other actors in the field, including governments from Member and non-Member countries, academics and other analysts and stakeholders.

16. *STI statistical guidelines*: The OECD plays through CSTP a leading role in the setting of global standards for the statistical measurement of STI phenomena. NESTI has recently completed a very substantive revision of the Frascati Manual, the foundation of a family of statistical manuals that provides a shared language for discussions on STI. In close succession, NESTI has now also initiated the revision of the Oslo Manual on measuring innovation. This revision is envisaged as a potentially modular effort in which core elements of the manual, focused on the perspective of business innovation, are adopted in the early phase of the project. Calls for extending and adapting the framework to other paradigms, such as the public sector, social or citizen innovation require broader consultation and need to be assessed against evidence that such standards can work in practice. In 2017-18, NESTI could also potentially work on guidelines for measuring science and innovation culture or handbooks assisting users in their interpretation of data and indicators derived from multiple sources such as publication indices, webpages and new online-based data infrastructures, in light of recommendations from the Blue Sky conference and CSTP priorities. All these would have direct links with the digitalisation, technologies and grand challenges themes.

17. *STI statistics and databases*: Supported by its global standards and the direct engagement with national experts, CSTP is responsible through NESTI for the collection, quality-assurance and publication of data and indicators on STI. The Main Science and Technology Indicators are published biannually; the Research and Development and the Analytical Business R&D databases provide the basis for R&D data, and are further complemented by Innovation indicators database and the databases on bio- and nanotechnology R&D. Resources are also used to support the activities of the STI micro-data lab which provides a rich source of information to support indicator and analytical CSTP work, such as recent work on scientist mobility or science bursts, or to identify an appropriate sample on which to conduct surveys of scientific authors. The development of this infrastructure and the capabilities for its advanced usage is essential to the production of indicators of specific technology or challenge-related research and collaboration highlighted in the proposed thematic areas of work.

18. *STI Scoreboard 2017*: Published every other year and alternating with the STI Outlook, the STI Scoreboard analyses major trends in knowledge and innovation in today's global economy. It contains over 180 indicators and presents a policy-oriented review of science, technology, innovation and industrial performance in OECD and major non-OECD countries. It is jointly produced by CSTP, CIIE and CDEP. The STI Scoreboard 2017 will provide a first opportunity to introduce recommendations arising from the

Blue Sky Conference on the Future of STI Indicators, to take place in Ghent, Belgium, on 18-20 September 2016, including on the presentation and visualisation of indicators.

19. *STI Outlook 2018*: the STI Outlook is a bi-yearly publication which gathers essential information on STI trends and policies across both countries and policy areas, collected on the basis of a dedicated questionnaire completed by countries. Increasingly the more descriptive parts of the Outlook are embedded in the Innovation Policy Platform, which offers convenient complementary functionalities (e.g. up to date statistics). In addition, the 2016 STI Outlook is taking a new, forward looking approach, attempting to identify and frame emerging or even prospective issues in the field of STI policies. This approach might be continued and refined further in the 2018 STI Outlook. For that exercise certain specific topics might be selected in connection with the thematic projects conducted by CSTP, e.g. a focus could be implemented on digitalisation of STI and the corresponding STI policies.

20. *Innovation Policy Platform (IPP)*: the IPP is a dedicated web site common to OECD and World Bank which gathers STI policy material and documents it in order to facilitate access and interactive use. It has seen increasing traffic since its launch in 2013, and has experienced significant developments in its architecture and content, aimed at providing more and better services to users, notably CSTP country Delegates. The IPP is now a major access point to the STI Policy database (information collected through the STI Outlook questionnaire, jointly with the European Commission from 2016 onwards). In the next biennium incremental development and content enrichment of the IPP will continue, ensuring broad access to CSTP analysis, both to CSTP delegates and to the public at large. A number of more ambitious developments might also be considered: functionalities for supporting diagnosis and decision making; annotated mapping of policy instruments; and modelling of policy mixes. It is also envisaged to develop the country web pages, which are maintained by countries themselves at the periphery of the IPP and which gather their own policy material. All these developments aim at making CSTP material more accessible to users. The IPP has been led by TIP from its inception.

21. *Country reviews*: an increasing number of countries, both OECD and non OECD, have requested a review of national innovation policies over recent years. This activity allows for the mobilisation of OECD thematic knowledge and situates it in a specific country context, which in turn contributes to refining this knowledge. Synergies have also been developed between country reviews and thematic work (e.g. with the knowledge triangle TIP project). Country reviews usually get high visibility in the country concerned (several of them have been presented by the OECD Secretary General to the President or Prime Minister of the respective country), hence raising the visibility of the OECD. In addition, several reviews focused on specific policy issues (on Intellectual Property systems and on public research organisations) have been implemented recently: This might continue in the future with voluntary countries, notably in connection with the thematic policy projects to which such reviews contribute by providing country case studies and from which they directly benefit. This activity is fully funded by Voluntary Contributions.