CSTP/TIP Workshop on the OECD STI Outlook and the Innovation Policy Platform

17 June 2015, Paris, OECD Headquarters

Summary notes of the "forward looking" breakout session 3:
The future of science policy design and delivery.

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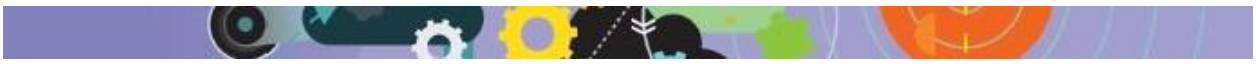
Background

The *OECD Science, Technology and Industry Outlook* (STIO) is a biennial publication that provides policy makers with the latest information on recent and expected trends in the global science, technology and innovation (STI) landscape and identifies potential implications for national policies. The STI Outlook is produced under the aegis of the OECD Committee for Scientific and Technological Policy (CSTP) with input from its Working Parties, notably the Working Party of Innovation and Technology Policy (TIP).

The OECD has undertaken a "Forward Look" exercise on future STI policy trends in preparation for the STI Outlook 2016 with a view to improve the "outlook" dimension of the next edition. The exercise seeks to project current STI and policy trends into a 10-15 year future and identify challenges and implications for STI policy makers. The approach is mainly desk-based, complemented by interviews and a small number of mini-workshops in various parts of the world. The exercise started in mid-2015 and should be completed by the end of the year.

The afternoon sessions of the June CSTP/TIP workshop aimed to scope topics of interest to CSTP/TIP that should be prioritised in the framework of this forward looking analysis. This scoping exercise has been conducted through five interactive breakout sessions during which participants were asked to present, comment and/or report on a specific topic of interest to them.



The future of science policy design and delivery

Breakout session n°3: summary note

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The opinions expressed and viewpoints herein are those of the participants and do not necessarily reflect the official view of OECD member countries and non-OECD economies. All participants were invited to contribute under the Chatham House Rule, i.e. they are free to use the information received and gathered, but neither the identity nor the affiliation of the participants may be revealed.

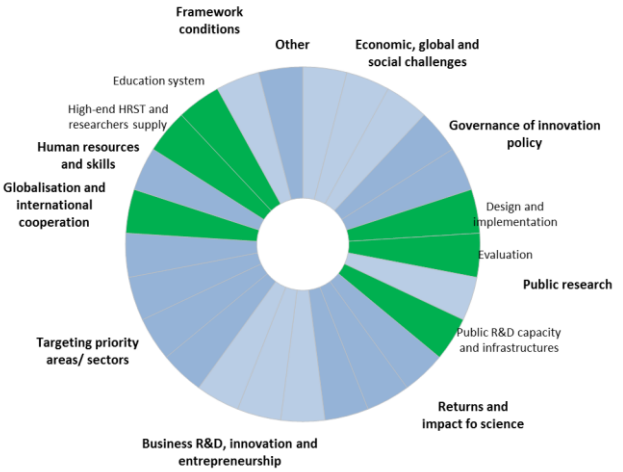
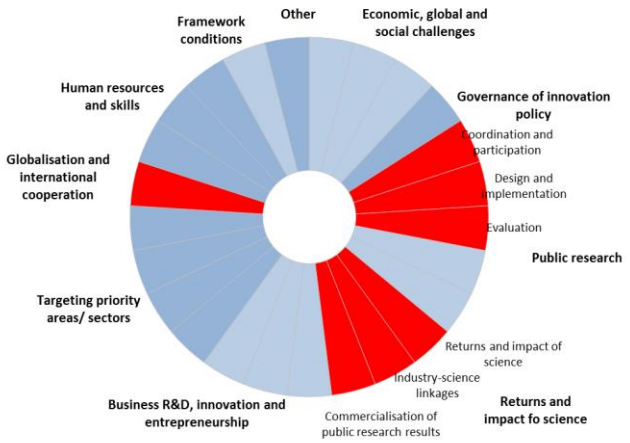
I. Strengths and weaknesses of national science systems

Part I. Identifying national strengths and weaknesses.

As a first exercise, country delegates are asked to present the major strengths and weaknesses of their respective national science systems (maximum 3 strengths and 3 weaknesses for each participant), and try to identify common issues and assets across countries. Country delegates are divided in 2 groups of about 4/5 persons each.

Part II. Clustering national strengths and weaknesses.

Overall, the factors most recurrently identified by country delegates as key strengths / weaknesses on national science systems may be clustered as follows. The diagram below is based on the standard STI policy "hot" issues used in the STIO 2014 policy questionnaire and country profiles.

Strengths	Weaknesses
	
Governance of science policy	**Governance of science policy**
Orientation and priorities - Research is performed along strategic priorities and efforts concentrated into large research centres. ***Funding*** - Good levels of funding are reached, as well as a fair level of diversification among sources of funding. - Current funding mechanisms allow a flexible allocation of funding and balance between different objectives and actors. ***Evaluation*** - Science policy is oriented towards excellence and greater evaluation.	***Orientation and priorities*** - Is raised the question of prioritisation : should efforts and funding be maintained on all fields of fundamental research or should a focus be given to social challenges? - Decision-making is limited because of a lack of strategy and vision for the future. ***Funding*** - Overall investments on science may become an issue, especially since public budgets are under pressure after the crisis. ***Evaluation*** - Science accountability mechanisms may have perverse effects on research (e.g. too strong focus on publications at the detriment of the quality of results and their reproducibility). ***Coordination and adaptability*** - Science policy is fragmented among agencies. Science systems may lack efficient coordination among actors and stakeholders. - Science systems are slow to adapting to changes. There may be a lack of flexibility in governance mechanisms.
Research capacity and output	
- Some countries have scientific leadership. - Science systems performance is steered by excellence of some individuals or some research groups. - Quality of research output in terms of publications and citations.	
Networks and transfers	**Networks and transfers**
- The networking capacity of science systems is perceived as strength.	- Commercialisation of public research results and knowledge transfer is a core issue. - Part of the transfer issue is related to the weakness of industry-science linkages.
Internationalisation of science	**Internationalisation of science**
- National science systems are well connected globally and are involved in international collaboration.	- Brain drain is a major threat. - There also are potential risks of excessive focus on international collaboration, leading to perverse incentives.

Skills for innovation	Skills for innovation
- Education systems (in general) provide the right skills and links between research and education are good.	- The attractiveness of research careers remain a major issue.

Part II. Drivers of change

Delegates are invited to discuss possible drivers of change of the current situation that might reshape / transform national science systems towards 2030.

The Secretariat proposed the following drivers of change:

- Technology convergence.
- Shifting economic gravity.
- Globalisation (research internationalisation) and GVCs.
- The changing nature of innovation (new business models, non-tech innovation).
- Grand challenges (Ageing, pressure on strategic resources, climate change etc.).
- 21th century society (interconnected, mobile, urban).

The following additional major drivers of change have been identified:

- **Big data** will be a major driver of change in science, opening new opportunities for a no-boundary interdisciplinary research and easier access to knowledge (e.g. Massive Open Online Courses).

Part III. In 2030

Delegates are invited to discuss how current drivers of change may lead to new opportunities / threats for national science systems on the long term (to 2030).

Opportunities	Grey area	Threats
Open 'citizen' science - Greater engagement of society and different communities in science (e.g. increasing participation of patients in medical research) including in public science policy and the setting of research agenda. **Enhanced global collaboration** - The need to tackle with global challenges should prompt countries to deepen international coordination and elaborate more multilateral agreements. **Enhanced science governance** - There may be a demand for greater stewardship from policy makers as well.	**Technological convergence** - Opens new fields of research and new areas of knowledge with potentially high socio-economic impact. - But challenges current infrastructure (including data infrastructure). - Ensuring sufficient funding in the future is a challenge while existing mechanisms are better for funding science in a particular field. How will research funding policies react to changing technological patterns? **Accountability of science** - Is needed to increase trust in and efficiency of science. The challenge is to demonstrate the outcomes and returns of science to stakeholders. - Public perception and understanding of science is a major determinant of an open and accountable science. - Fiscal constraints in countries may further increase the need for transparency and evidence of good science. - However current funding incentives have perverse effects on the quality of research (e.g. rush to publish at the detriment of the robustness of results).	**Conservatism** - Current science systems are very conservative. This may be a threat to the quality of science in converging fields and slow the adoption of big data in science. **Unattractive research careers** - Ensuring stability in job and the attractiveness of research careers while there is evidence of growing disinterest of youth in science and more popular project-based funding has contributed to weaken research careers. - Working life has also changed and research careers need to be more flexible. **Uninclusive science** - There are unequal capacities among countries to tackle the future drivers of changes. Inequalities reflect in differences in research performance and outcomes. Same gaps appear within countries. - Gender (un)balance and more broadly the under-representation of minorities in science is a shared challenge in many countries **Misalignment of education and research** - May hamper the commercialisation of public research as research production

		is disconnected from consumption. One challenge is to better connect schooling, education, R&D, and relevance to public and private users. - There is a potential risk to undermine public engagement and support for science as misunderstanding arises. - The skills needs of industry may differ from the skills made available on the labour market.

Part IV. Emerging thoughts regarding the future of science policy

The renewed mission of public research

The mission of science is discovery and not sorting out every problem on the planet. The public should not assume that everything will be addressed through science. Although it may be easier in some fields than others, getting society involved in science and science policy is important. It is only recently that researchers are geared towards immediate needs of society. The dynamics of societal interaction have changed as well, which provides new opportunities to involve society in science policy in new ways and in a greater range of topics than before.

Orientation of public research: Balance between basic and more applied research

It is important to strike a balance between fundamental and applied science in the light of all the future drivers of change. Yet, there is a threat that citizen-driven scientific agenda may be challenge-driven and more oriented towards applied research activities at the detriment of basic research. There are also risks that research converges in very small and specialised areas or fields of knowledge and big opportunities for the future may be missed. Long-term challenges need disconnecting from the current challenges. To go towards the very long term challenges, preserving basic research is imperative.

Fiscal consolidation and budgetary cuts are putting additional pressure on research systems and may threat traditional autonomy in research agenda and practices. New incentive schemes (e.g. bibliometrics) and funding mechanisms (e.g. competitive project-based) encourage faster knowledge transfer and more applied or thematic research and may be detrimental to blue sky research. Likewise budgetary constraints may have negative impact on research career prospects and encourage a brain drain.

Reproducibility of scientific results

The lack of reproducibility of journal articles can undermine trust in science. Making research data available through pen science initiatives for instance can help. Increased training for research techniques as well.

International competition and scientific divide

National science systems are facing serious global challenges related to the internationalisation of science and rising competition, greater openness in science, and persisting global challenges. Countries are increasingly engaging in international cooperation but at the same time, there are risks to see the global science system further polarises and the scientific divide between countries enlarges, leading to greater inequalities.