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Convergence of Nanotechnology, Biotechnology, and other Technologies at the OECD

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The Organization for Economic Cooperation and Development

Mission: to promote policies that will improve the economic and social well-being of people around the world.

History: established in 1961

Headquarters: Paris, France

Membership: 36 countries

Budget: EUR 374 million.

Secretariat staff: 2 500

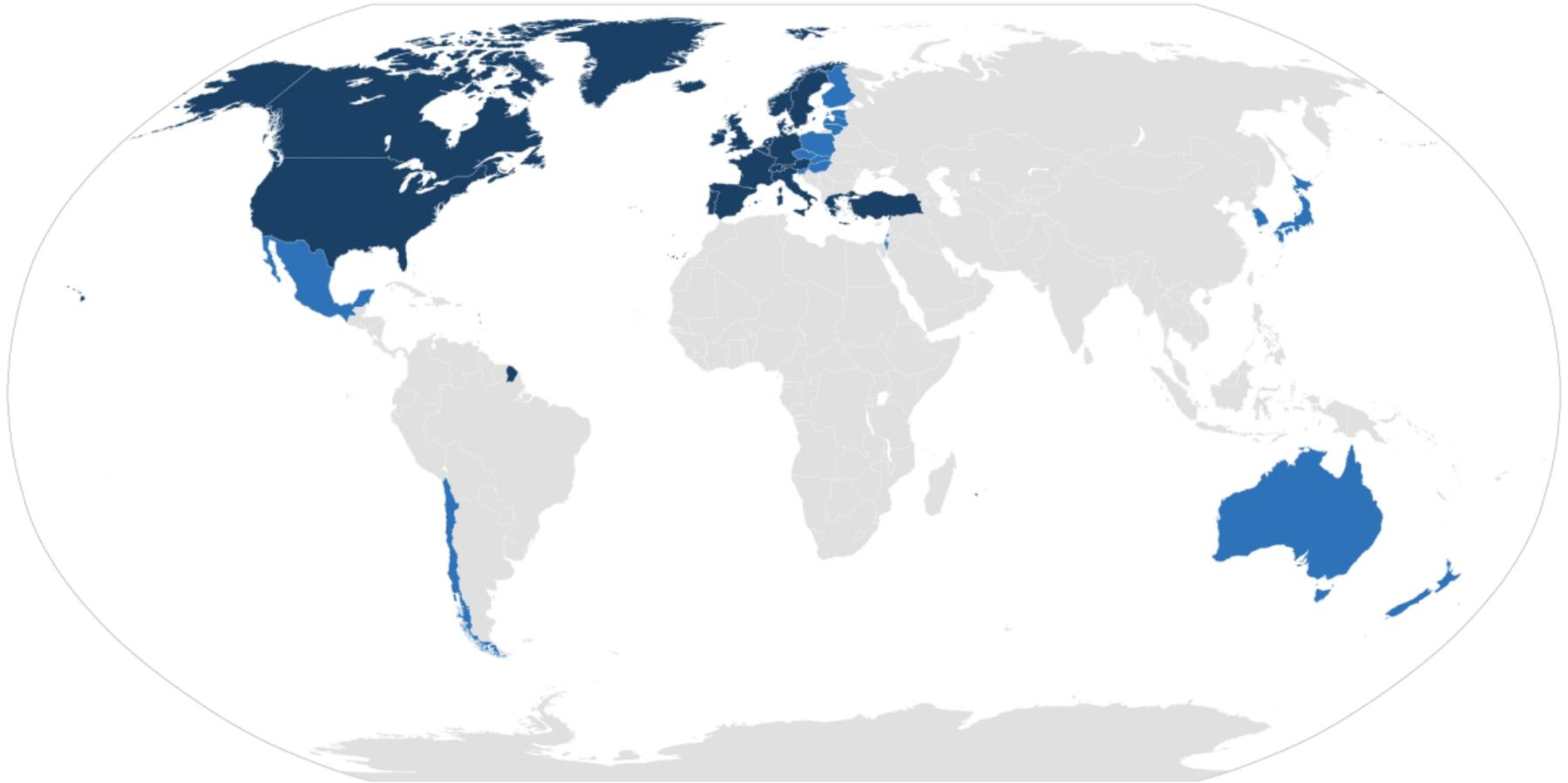
Publications: 250 new titles/year



The OECD is an Intergovernmental Organization

36 OECD Member Countries

plus 3 accession countries and 5 Key Partners

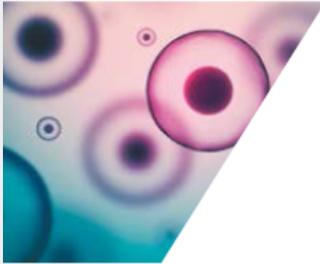


- Founding member countries (1961)
- Other member countries

OECD Directorate for Science Technology and Innovation



“We pride ourselves on tackling topics at the boundaries of our scientific and technological understanding, such as using biotechnology and nanotechnology to alter modes of production, and how digital shifts like “big data”, earth observation and digital platforms are changing our world.”



Policies on bio-, nano- and converging technologies

Emerging technologies have the potential to help address major challenges facing humanity. But they also raise important questions about the very future of societies. The DSTI supports governments and citizens in making informed choices about key technologies within their scientific, economic and social contexts.

Climate change, food production, global health and sustainability: each of these areas will require social and technological innovation. Hopes for key and emerging technologies such as bio, nano, and ICT run high. Developments in biotechnology – whether in genomics, cell-based therapies, pharmaceuticals or bioproduction – are currently improving health and the economy. Nanotechnology greatly contributes to the development of novel materials that could affect virtually every area of economic activity. And both areas are fast converging with information technology (IT) to generate powerful new systems of manufacturing and health care. It is becoming clear, for instance, that biotechnological production of industrial materials and fuels at scale is a large challenge that now requires greater convergence with computation and IT.

DSTI policy work on biotechnology, nanotechnology, ICTs and their interactions contributes original policy analysis and messages to the global community, sometimes making ground-breaking proposals to policy makers. Topics focus on research and technological development, innovation and commercialisation, standards and regulations, best-practice policy formulation and implementation, ethical, legal and social issues, public engagement, education, skills and training, organisation of research, and measurement and evaluation methods and tools. ■

Q Find out more

• OECD Working Party on Bio-, Nano- and Converging Technologies (BNCT) – <http://oe.cd/bnct>



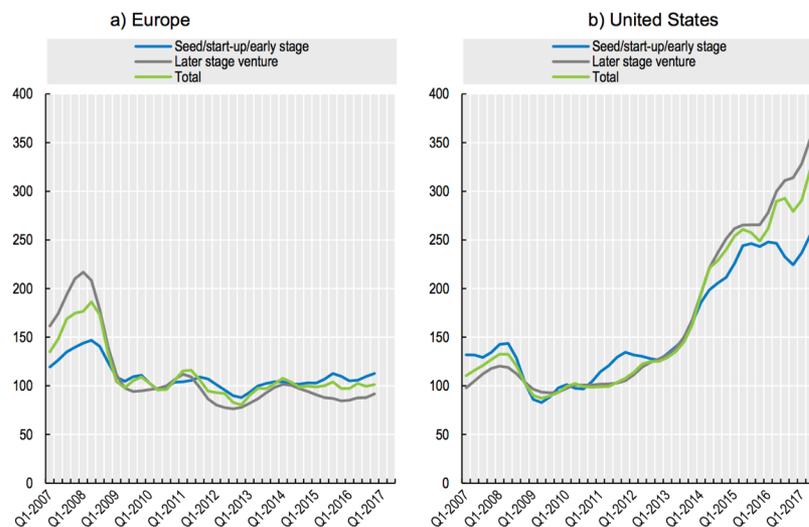
💡 Did you know...?

Many governments around the world are investing heavily in brain research and neurotechnologies, which they hope will improve medicine and lead to many kinds of innovation. Emerging neurotechnologies have the potential to spur a paradigm shift in the understanding of the structure and mechanistic functioning of the brain, including the biologic underpinnings of cognition, empathy, consciousness, and mind. The confluence of brain science, engineering and computing has led to the construction of an artificial neuron based on high speed and low energy nanoscale devices. ●

OECD STI Outlook 2018



Figure 13.1. Venture capital investments over time in Europe and in the United States



Note: Trend-cycle, 2010 = 100.

Source: OECD (2017), *Entrepreneurship at a Glance 2017*, OECD Publishing, Paris http://dx.doi.org/10.1787/entrepreneur_aag-2017-en based on Invest Europe Yearbook 2016 and National Venture Capital Association/PitchBook Report, 2017Q2

The Next Production Revolution

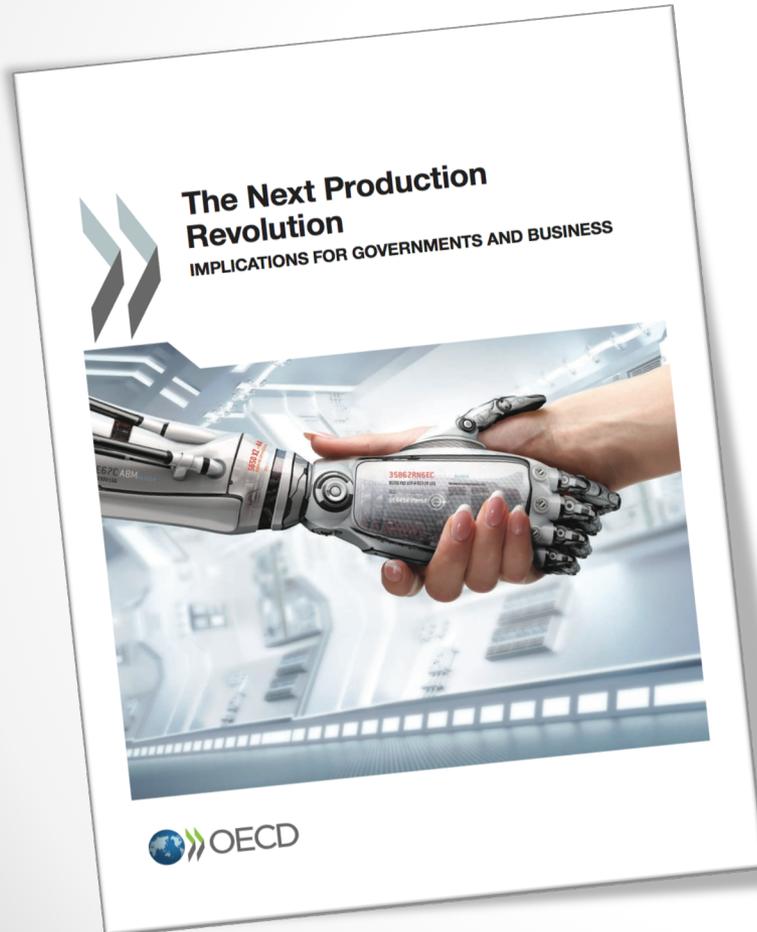
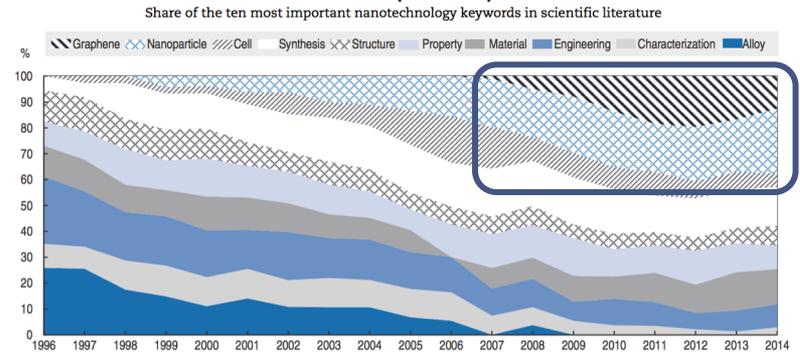


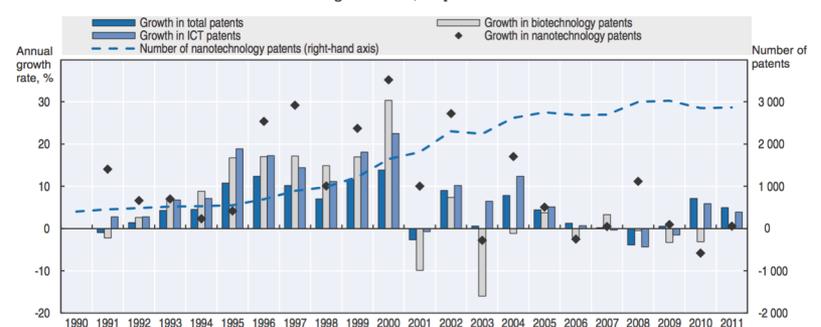
Figure 4.3. Changing citation of the most important keywords in nanoscience literature (1996-2014)



Source: Elsevier (2016), Scopus Custom Data, database, Version 12.2015 (accessed October 2016). Text mining performed with VOSviewer, version 6.1.3.

StatLink <http://dx.doi.org/10.1787/888933473842>

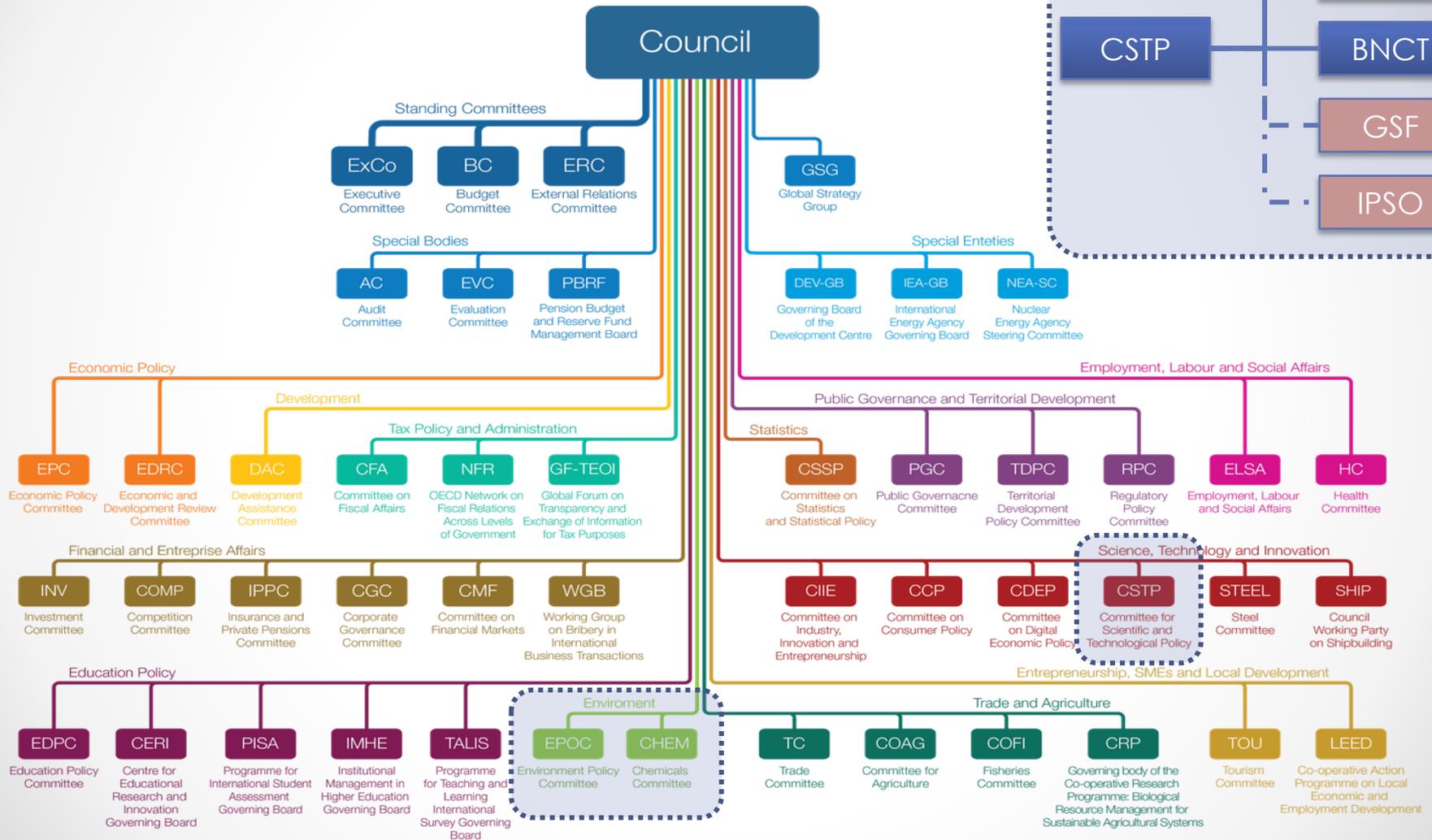
Figure 4.1. Evolution of patents in nanotechnology, biotechnology and ICT, 1990-2011



Source: OECD (2016b), STI Micro-data Lab: Intellectual property database, <http://oe.cd/ipstats> (accessed October 2016).

StatLink <http://dx.doi.org/10.1787/888933473820>

OECD Organizational Structure



What is the CSTP's Mandate?

The Committee for Scientific and Technological Policy (CSTP) shall be responsible for encouraging co-operation among Members and, as appropriate, with Partners, in the field of science, technology and innovation (STI) policy, with a view to contributing to the achievement of economic, social and scientific aims, including growth and the creation of jobs, sustainable development, improved well-being of their citizens and advancing the frontiers of knowledge.

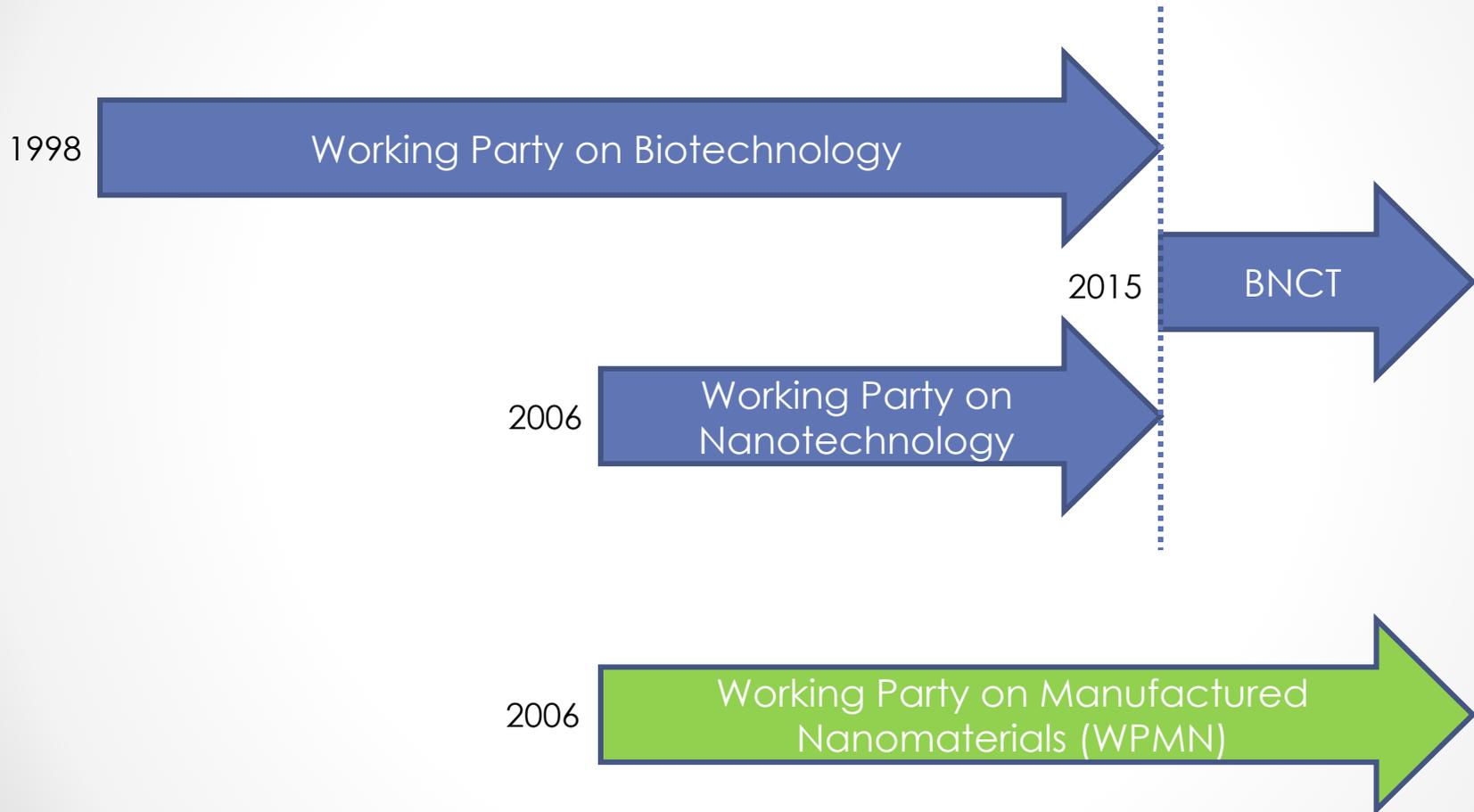
It shall pay particular attention to the integration of STI policy with other aspects of government policy, which is of increasing importance in the context of increasingly globalized knowledge economies.

What is the BNCT's Mandate?

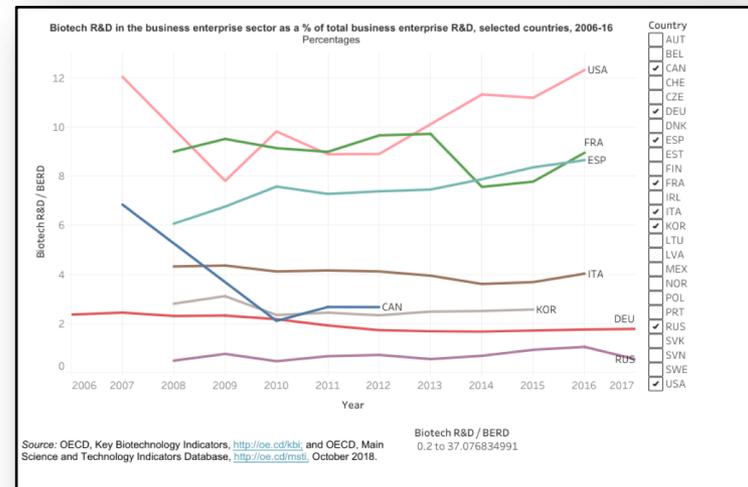
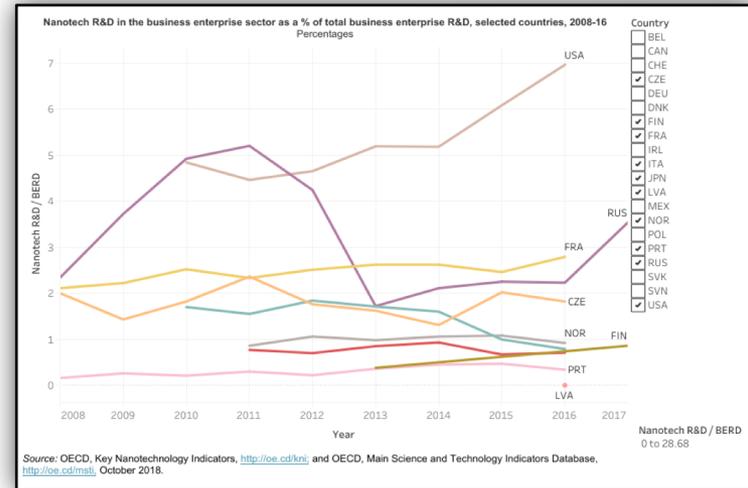
Taking into account the priorities established by the CSTP, the objective of the Working Party on Biotechnology, Nanotechnology and Converging Technologies (BNCT) is to address policy issues related to biotechnology, nanotechnology and their convergence with other technologies (e.g. information and communications technologies (ICT)).

The BNCT will be concerned with the confluence of disciplines such as the life sciences, the physical sciences, engineering and information sciences, and with technologies such as biotechnology, nanotechnology and, insofar as they are related to issues of convergence and the emergence of new technologies, electronics and information and communications technologies (ICTs).

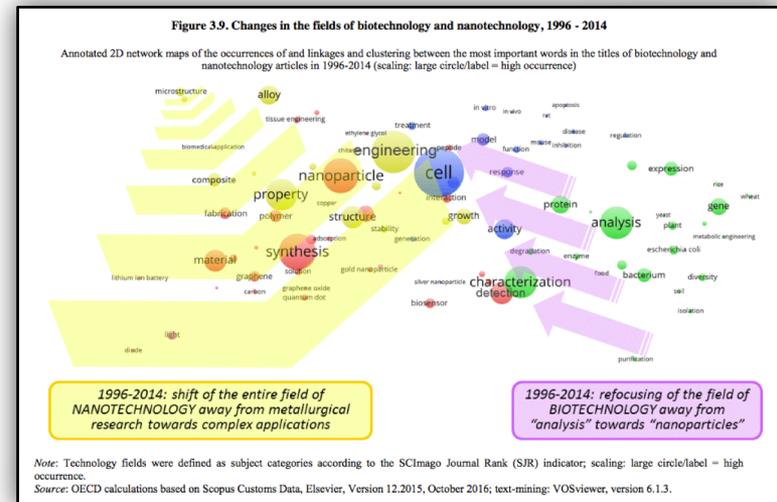
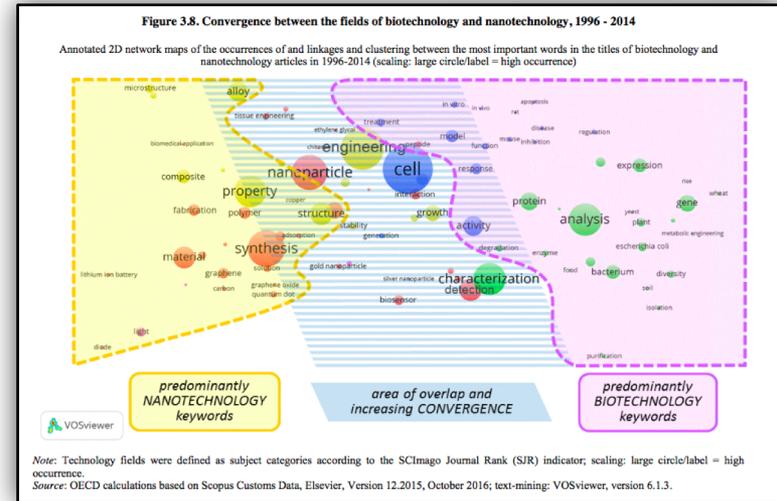
Origin of the BNCT



Statistics and Indicators of Biotechnology and Nanotechnology



Statistics and Indicators of Biotechnology and Nanotechnology



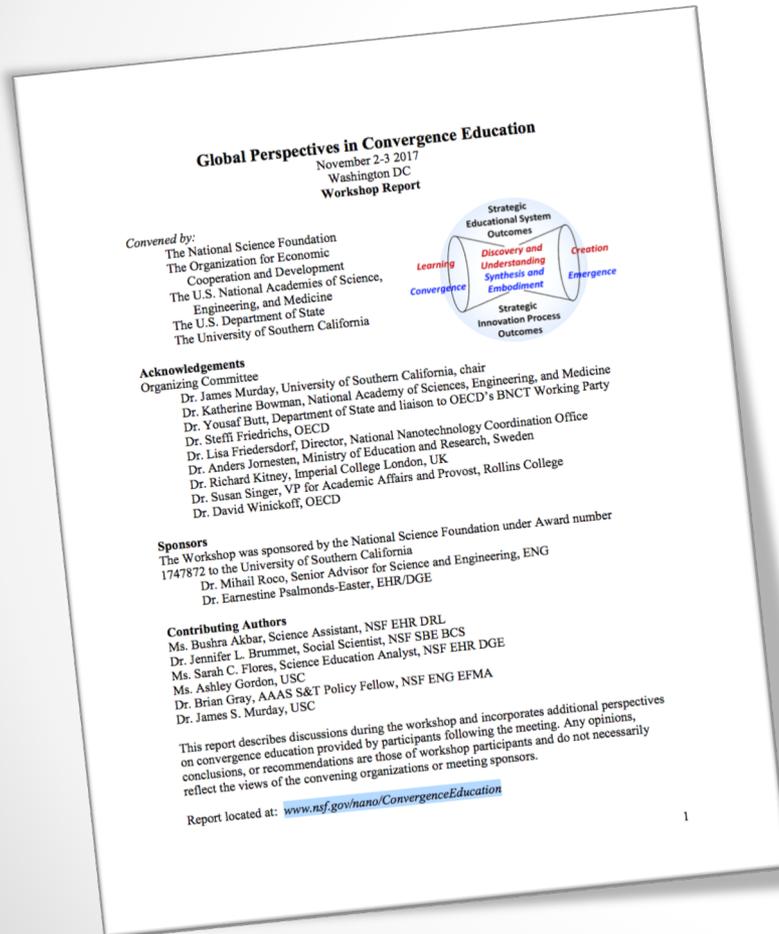
Workshop on Global Perspectives in Convergence Education

OECD as co-Convener

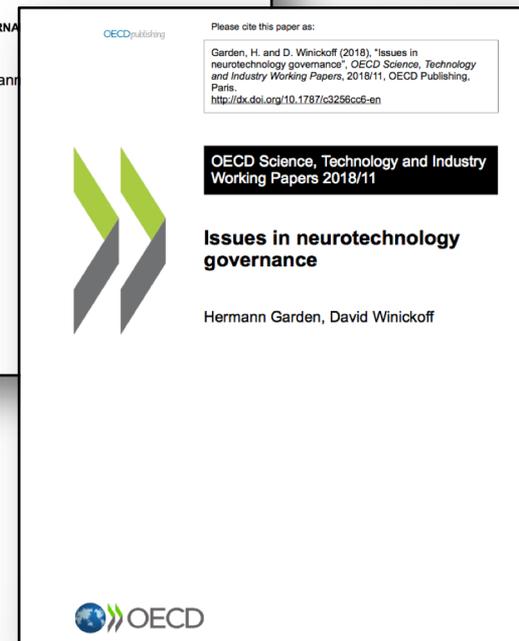
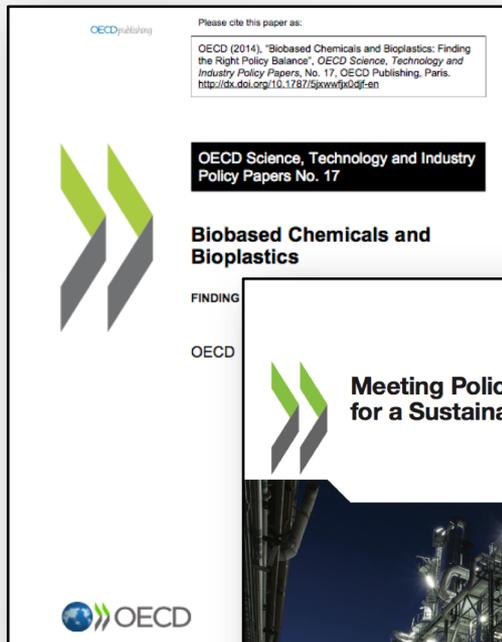
International Collaboration

Observation: The OECD can be an effective contributor toward understanding the implications of convergence education.

Recommendation KF19a: Prepare background information on convergence education to connect with ministers and policy-makers; identify the potential impact on socio-economics.



Bioeconomy and Biotechnology Workshops and Reports



Future Work Plan for the BNCT



overview draft PWB 2019-2020

Project One Collaborative Platforms for Converging Technologies

1) Biobanks, genomics for
personalised medicine

- Review: Biobanks and
Genetic Research
- Review: Licensing of
Genetic Inventions

2) Engineering Biology
infrastructures

3) Converging Technologies
for Advanced Materials

Project Two Responsible Innovation in Neurotechnology

Principles for Responsible
Innovation in
Neurotechnology

Project Three Realising the Circular Bioeconomy

Indicators for national
bioeconomy reviews

Emphasise circular/
sustainability

Thailand pilot (VC)

Recommendation review:

Assessing the
Sustainability of Bio-
Based Products

Thank you!

