THE COMMERCIALISATION OF PUBLIC RESEARCH

Dominique Guellec
Head, Country Studies and Outlook Division
Directorate for Science, Technology and Industry

Associacio Catalana d’Universitats Publiques
Barcelona
November 4, 2013
Outline

• OECD: Who we are
• Public Research
• Commercialisation
• The Innovation Policy Platform
WHO WE ARE
The OECD...

• ...is the global organisation that drives **better policies for better lives**

• ...analyses, measures and compares experiences and policies to give advice that helps **raise living standards** globally

• ...aims for a **stronger, cleaner, fairer world** through efforts such as:
  - Restoring confidence and **financial stability**
  - Tackling **climate change**
  - Fighting international **tax evasion** and **corruption**
Fast facts

- Established: 1961
- Headquarters: Paris
- OECD Centres: Berlin, Mexico City, Tokyo, Washington
- Members: 34
- Secretary-General: Angel Gurría (Mexico)
- Secretariat staff: 2,500

- Nearly 300 expert committees and working groups with participation of +100 countries
OECD’s global reach

34 member countries

New members: Chile, Estonia, Israel, Slovenia

Key Partners: Brazil, China, India, Indonesia, South Africa

Ongoing membership talks with Russia

Public Affairs and Communications Directorate
SETTING THE STAGE
Public research funding
Government funds a large share of publicly performed R&D (USD 400 bn in 2012)

(2010: 71% of HERD and 93% of GOVERD in the OECD)

Source: OECD Research and Development Database, 2011
Switch in performers of R&D towards higher education sector

R&D performed in the government and higher education sectors as % GDP

Total OECD (1988)

Total OECD (2008)

HERD

GOVERD
Institutional core funding
REI funding
Project funding

- Basic funding: guaranteed mid- to long-term, not dependent on applications, various means of assigning budgets, including performance-based elements, organized in programs, focus on exceptional research quality, system-level perspective (i.e., national science landscape), frequent reference to socio-demographic issues, time-bound, application-based, competitively organized, outcome-oriented.

Research funding mechanisms
Government funded R&D in higher education by type of funding, 2010

Source: OECD Scoreboard, 2013.
Performance-based funding for public research in tertiary education institutions

• Scope:
  – Experts commissioned to investigate models, indicators and impacts
  – Questionnaire survey completed by 13 countries

• Key findings:
  – Most schemes introduced since 2000
  – Main rationale: raise quality of research; but also others
  – Assessments commonly used for several rounds of annual funding
  – Open disclosure of processes and results in most countries
  – Similarities in indicators used: 3rd party income, publications, degree completions; differences in combinations and weighting, reliance on quantitative indicators and peer review, and use of additional indicators
  – Differences in budget impacts of schemes: while difficult to compare across countries, annual block funding affected ranges from 6% to 75%
  – Differences in the involvement of HEIs in designing schemes
  – Few formal evaluations of schemes – evidence suggests positive effects on research outputs and research management
  – Negative and unintended consequences also highlighted: e.g. narrowing of research focus on publications targeted at certain journals
Performance-based funding for public research in tertiary education institutions (2010)

<table>
<thead>
<tr>
<th>Country</th>
<th>System</th>
<th>Year implemented/ major revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>RAE moving to REF – research excellence framework</td>
<td>1986/current</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>RAE</td>
<td>1992/2002</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>RAE</td>
<td>1993</td>
</tr>
<tr>
<td>Australia</td>
<td>Composite Index, Research Quality Framework (RQF), Excellence in Research for Australia (ERA)</td>
<td>1995/current</td>
</tr>
<tr>
<td>Italy</td>
<td>Valutazione triennale della ricerca (VTR)</td>
<td>Evaluation 2001-03/ funded 2009</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Performance-based research funding (PBRF)</td>
<td>2003/current</td>
</tr>
<tr>
<td>Belgium (Flemish Community)</td>
<td>BOF key</td>
<td>2003/2008</td>
</tr>
<tr>
<td>Norway</td>
<td>Norwegian model (new model for result-based university research funding)</td>
<td>2006</td>
</tr>
<tr>
<td>Sweden</td>
<td>New model for allocation of resources</td>
<td>2009</td>
</tr>
<tr>
<td>Denmark</td>
<td>Implementation of the Norwegian model</td>
<td>Current</td>
</tr>
<tr>
<td>Finland</td>
<td>Funding formula for allocation of university resources</td>
<td>1998/2010</td>
</tr>
</tbody>
</table>
Public research institutions: mapping sector trends

• Scope:
  – 20 countries participated: country notes / questionnaires
  – 12 institutional case studies

• Key findings:
  – Amid diversity, trend towards more competitive funding
  – Variety of public funding sources
  – A trend too far? Concerns around short-termism, convergence, careers, infrastructures, etc. Korea and New Zealand have notably reinstated core funding on account of these concerns
  – Funding instruments should balance short and long-term goals and consider division of funding between PRIs and other research providers
  – PRIs’ organisational arrangements have undergone active change
  – Increase in the importance of international relationships
  – Challenges in recruitment, particularly foreign staff
Promoting Research Excellence: New Approaches to Funding

Research funding mechanisms

Institutional core funding
- Basic funding guaranteed mid- to long-term
- Not dependent on applications
- Various means of assigning budgets, including performance-based elements

REI funding
- Organised in programmes
- Focus on exceptional research quality
- System-level perspective (i.e., national science landscape)
- Frequent reference to socio-demographic issues

Project funding
- Time-bound
- Application-based
- Competitively organised
- Outcome-oriented
### Overview of REIs in responding countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Name of REI</th>
<th>Start date</th>
<th>Maximum funding period for individual research unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>ARC Centres of Excellence</td>
<td>2003</td>
<td>7 years</td>
</tr>
<tr>
<td>Austria</td>
<td>Competence Centres for Excellent Technologies</td>
<td>2008</td>
<td>K1: 7 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>K2: 10 years</td>
</tr>
<tr>
<td>Denmark</td>
<td>Investment Capital for University Research</td>
<td>2008</td>
<td>5 years</td>
</tr>
<tr>
<td>Estonia</td>
<td>Development of Centres of Excellence in Research</td>
<td>2001</td>
<td>7 years</td>
</tr>
<tr>
<td>Finland</td>
<td>Centres of Excellence (2008-13)</td>
<td>1995</td>
<td>6 years</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Bonus Incentive Scheme</td>
<td>1998</td>
<td>No maximum set (will change in future)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Centres of Research Excellence</td>
<td>2002</td>
<td>6 years</td>
</tr>
<tr>
<td>Norway</td>
<td>Norwegian Centres of Excellence</td>
<td>2002</td>
<td>10 years</td>
</tr>
<tr>
<td></td>
<td>Centres for Research-based Innovation</td>
<td>2007</td>
<td>8 years</td>
</tr>
<tr>
<td></td>
<td>Centres for environment-friendly energy research</td>
<td>2009</td>
<td>8 years</td>
</tr>
<tr>
<td>Poland</td>
<td>Leading National Scientific Centres</td>
<td>2012</td>
<td>5 years</td>
</tr>
<tr>
<td>Portugal</td>
<td>Multi-Year Funding Programme</td>
<td>1996</td>
<td>5 years</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>National Research University initiative</td>
<td>2008</td>
<td>10 years</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Centres of Excellence</td>
<td>2009</td>
<td>4 years</td>
</tr>
<tr>
<td>Sweden</td>
<td>Strategic Research Areas</td>
<td>2010</td>
<td>5 years</td>
</tr>
<tr>
<td></td>
<td>Linnaeus Grants</td>
<td>2006</td>
<td>10 years</td>
</tr>
<tr>
<td></td>
<td>Berzelii Centres</td>
<td>2006</td>
<td>10 years</td>
</tr>
</tbody>
</table>
Promoting Research Excellence: New Approaches to Funding

• **Scope:**
  – Research Excellence Initiatives (REIs)
  – Review of 27 REIs from 18 countries

• **Key findings:**
  – Combine features of both institutional and project-based funding – provide funding, but also prestige
  – Objective: competitiveness of research
  – Part of strategies to fund fewer institutions, selected on the basis of excellent performance and future potential
  – Selection panels tend to be internationally staffed
  – Variation in focus: young researchers, infrastructure, attracting international talent, cooperation with industry
  – Evaluation evidence remains weak – long-term effects remain unverified and evaluation efforts have yet to focus on effects on research landscape as a whole
Public research funding

Knowledge transfer and the commercialisation of public research
New strategies and policies for the transfer, exploitation and commercialisation of public research results

• **Scope:**
  – Mapping of recent institutional strategies and government policies to enhance the transfer and commercialisation of public research results
  – Benchmarking performance in OECD countries
  – 10 institutional case studies
Commercialising public research...

... is important for generating more economic growth and jobs from innovation...

... and is not easy, as academia and business are two different worlds, with different motives, rules and cultures.

Commercialisation has been at the centre stage of research policies in OECD countries for 20 to 30 years now

⇒ What is it about?
⇒ Where are we with it?
⇒ What can we do to foster it?
Commercialisation is more than IP

- Research Results
  - Invention Disclosure
  - No invention Disclosure

- IP Protection
  - Patents
  - Copyrights
  - Trademarks
  - Trade Secrets

- Evaluation of Invention

- Market technology

- Benefits
  - Social
  - Economic
  - Cultural

- Joint Publications
  - Mobility
  - Contract research
  - Facility sharing
  - Consultancy
  - Start-ups by students and graduates
  - Etc.
Academic patenting has increased in most countries in the 2000s

Patents filed by universities, 2001-2005 and 2006-2010
Patent applications under Patent Cooperation Treaty (PCT) per billion GDP (Constant 2005 USD (PPP))

Source: OECD Patent Database
In Europe, revenue from licensing is low compared to the US and is not increasing.
Spin-off creation is higher in Europe, but little evidence of growth and job effects.
Co-authored publications can indicate the degree to which business absorbs or integrates public sector knowledge.

Industry-science co-publications, 2006-10

% of industry-science co-publications in total research publication output

Source: Centre for Science and Technology Studies (CWTS), Leiden University, using Web of Science (WoS) database.
Business-funded R&D in the higher education and government sectors, 2001 and 2011

As a % of R&D performed in these sectors

Source: STI Scoreboard 2013.
... commercialisation seems to be levelling off in a number of countries.

- What is holding back the commercialisation of public research?

- What solutions?
Why the levelling off?

- **Limits in policies**: narrow focus on patenting, with little understanding of the broader determinants ("what should I do with my patents?")
- **Governance and incentives**: Technology Transfer Offices often lack capabilities (size, skills, incentives)
- **The knowledge produced** by public research is not always relevant to commercialisation.
Beware of assertiveness in IP management!

From: HR Team Communications [hrteamcommunications@micron.com]
Sent: Monday, January 14, 2013 3:35 PM
To: Multiple-Recipients
Subject: Micron’s student recruitment at the University of Illinois

Dear Professor:

I write to inform you of a change in Micron’s student recruitment at the University of Illinois (“UIUC”). Because Micron remains a defendant in a patent infringement lawsuit that UIUC filed against Micron in Federal court in Illinois on December 5, 2011, effective immediately, Micron will no longer recruit UIUC students for open positions at any of Micron’s world-wide facilities.

When the case was first filed, Micron expressed to UIUC counsel the company’s strong dismay that despite the long-term synergies resulting from collaboration and partnership between Micron and UIUC, UIUC had chosen to file suit against Micron. UIUC counsel continues to refuse to dismiss the case even though the case has now been stayed indefinitely, pending resolution of a Micron petition filed with the Patent & Trademark Office regarding the validity of the three UIUC patents asserted.

As you know, Micron has long enjoyed a close relationship with UIUC. Among other things, Micron has hired numerous UIUC engineering students for both full-time and internship positions. In addition, the Micron Foundation has endowed chairs at the College of Engineering and has sponsored student scholarships and professor research. However, because UIUC’s suit imposes costs and risks on Micron that are inconsistent with collaborative relationships among Micron, UIUC and its students, Micron must regretfully indefinitely suspend its recruitment of UIUC students and likewise suspend participation in other joint activities.

Sincerely,

Michelle Burks
Academic Program Manager
Micron Technology, Inc.

Source: www.patentlyo.com
New mechanisms for tech transfer

BUT...

Some research institutions (e.g. IMEC) and countries (e.g. Finland) have had **successful experience**, notably in relation with contract research.
Technology Transfer Offices (TTOs) have expanded their missions (marketing non-patent services, innovation culture), liaise or merge to reach a critical mass.

New bridging and intermediation structures
- e.g. Innovation offices programme in Sweden

Replacing or improving TTO structures
- Technology Transfer Alliances (e.g. Innovation Transfer Network (ITN) in the US, SATT in France)
- For-profit models (e.g. Science Ventures in Denmark)
- Internet-based models (e.g. Flintbox at University of British Columbia)
- Free Agency model

Patent funds: selling or licensing IPR.
Successful spin-offs come more often from students and alumni than from professional researchers.

Creating a favourable eco-system for student and academic entrepreneurs
- e.g. Aalto Centre for Entrepreneurship (ACE) in Finland

Work study programmes, internships, mentoring relationships, workshops, seminars, all-campus initiatives, free online entrepreneurship courses, ...

“Crowd funding for research”: more about engaging scientists with society and the economy
- University of Utah’s TTO entered in 2013 an exclusive agreement with crowdfunding platform RocketHub
Promoting Openness in Science

• Requirement to publish in digital format
  – *Institutional*: e.g. US National Institutes of Health (NIH), Canadian Institutes of Health Research (CIHR)
  – *National*: e.g. Spain, New Zealand, US

• Building knowledge repositories
  – e.g. EC: Digital Repository Infrastructure Vision for European Research (DRIVER), Open Access Infrastructure for Research in Europe (OpenAIRE), etc.

• New co-operative models
  – e.g. Lund University, the National Library of Sweden and Nordbib to adopt online guides to open access journals publishing
A few conclusions

- The major channel for knowledge transfer remains the placement of students
- Collaborative research, contractual research are financially more important than IP; and they ensure that the needs of industry are well integrated in the research agenda of the university (demand pull as much as supply push)
- IP matters, but it is not everything
- The creation of spin-offs requires more an eco-system approach than a series of one-off
- Students and alumni are usually better entrepreneurs than professional researchers: need to develop an entrepreneurial spirit among students
Public research funding

Knowledge transfer and the commercialisation of public research

Innovation Policy Platform
Uses...

Knowledge resources and collaboration opportunities

**Accessible Repository** of knowledge
**Intelligent archive** (memory of OECD & WB work)
Virtual platform for **Community of Practice**

**Resource** for policy analysis and research
**Learning space** about policy tools and approaches
Access to **tacit knowledge** and case studies

“**How-to**” of innovation policy formulation and implementation
Systematic **decision frameworks** for policy

Resulting in improved responses to requests from Ministers, policy makers, and practitioners
• Types of content:
  – Existing OECD/World Bank qualitative reports
  – Existing OECD/World Bank quantitative data
  – IPP web pages for summaries and navigation (Q&A format)
  – New IPP ‘knowledge products’: policy briefs and case studies

• Organised by:
  – Country
  – Sectors and General Purpose Technologies, e.g. Nanotechnology
  – Thematic modules
Resources and links

www.oecd.org/sti/innovation

Upcoming events and recent releases
(sign up for newsletter):
www.oecd.org/sti/news.htm
Thank you!

dominique.guellec@oecd.org