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ERAC

WORKING PAPER

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From: ERAC Secretariat
To: ERAC (European Research Area and Innovation Committee)
Subject: Report "Science, Research and Innovation Performance of the EU 2018" - Update on progress made (agenda item 5.3)

Delegations will find attached the powerpoint presentation made on agenda item 5.3 during the ERAC meeting in Tartu on 21-22 September 2017.
Report
"Science, Research and Innovation Performance of the EU 2018"

Update on progress made

35th ERAC meeting
Tartu, 22 September 2017
The Report in numbers

1 Report
2 Sections
4 Qualitative op-ed style analyses
5 In-house chapters
6 External contributions
43 analysed countries
@ 250 Charts and tables
@ 8000 data points
Part I: In-house (macro) chapters

- R&I Impacts
- Investment in R&I and other Intangible Assets
- Scientific, Technological and Innovation Outputs
- Framework Conditions for Innovation
- Entrepreneurship and Structural Change
Part II: External (micro) deep dives

- **Mariana Mazzucato (UCL):** "Mission-oriented innovation policy: challenges and opportunities"
- **Reinhilde Veugelers (KU Leuven and Bruegel):** "Does the European corporate R&D landscape become increasingly more concentrated in a happy few "superstars"?"
- **Chiara Criscuolo (OECD):** "Slow and divided: Which policies to lift economies and re-start engines of growth for all?"
- **Pierre Mohnen (UNU MERIT):** "R&D, ICT and Productivity"
- **Sara Amoroso and Alexander Tuebke (EC-DG JRC):** "Productivity and the role of intangibles: Focus on the world largest R&D investors"
- **Debora Revoltella and Christoph Weiss (EIB):** "Financing Innovation*"

* Exact title to be confirmed
Key messages

➢ Innovation and its impacts are changing due to digitalisation and other longer-term forces

➢ This provides large opportunities and also risks and uncertainty

➢ The fast pace of changes in innovation needs to get reflected in the analysis of R&I performance

➢ Uncertainty from the changes in innovation should be embraced and calls for policy experimentation and further research
Growth is back but slow productivity dynamics hinder its robustness and the catch-up with US

Total factor productivity - compound annual growth, 2007-2016

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies

Data: European Commission - DG Economic and Financial Affairs
R&I creates new and better jobs but can affect existing ones

There is no overall job destruction in Europe, but labour markets are becoming polarised, putting pressure on wages and on inequality

Source: European Commission- EPSC
Changes in the innovation landscape are driven by long-term socio-economic forces ...

- Demographics
- Climate change
- Globalisation
- Digitalisation
... that are changing the pace, nature and impacts of innovation ...

- Increased complexity of the innovation process
  - Increasingly converging technologies and sectors
  - Role for off-the-shelf technologies

- Concentration of benefits in superstar firms
  - "Winner takes most" strategies
  - Increased concentration in industries

- Very rapid innovation pace change
  - In a decade, only 3 companies remain in top-10 by market capitalisation
  - Top-4 most capitalised companies: 1-Apple (33) 2-Alphabet (22); 3- Microsoft (6); 4- Amazon (NA)
... increasing innovation divergence across firms and hindering innovation diffusion.

Notes: The global frontier is measured by the average of log labour productivity for the top 5% of companies with the highest productivity levels within each 2-digit industry. Laggards capture the average log productivity of all the other firms. Unweighted averages across 2-digit industries are shown for manufacturing and services, normalised to 0 in the starting year. The vertical axes represent log differences from the starting year: for instance, the frontier in manufacturing has a value of about 0.3 in the final year, which corresponds to approximately 30% higher in productivity in 2013 compared to 2001.

Source: Andrews et al. (2016).
In view of the changes in innovation dynamics, a number of factors need to be considered when analysing innovation performance

- Importance of intangible assets
- Role of skills
- Relevance of excellence in science
- Enhanced significance of knowledge flows
- Transformational entrepreneurship
- Framework conditions to support innovation, entrepreneurship and structural change
Europe remains a global public research and scientific powerhouse ...

World R&D expenditure - % distribution(1), 2015

World share of highly cited scientific publications, 2014

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies
Data: Eurostat, OECD, UNESCO
Notes: (1) The % shares were calculated from estimated values for total GERD in current PPP€. (2) Japan+South Korea+Singapore + Chinese Taipei. (3) Brazil+Russian Federation+India+South Africa.

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies
Data: CWTS based on Web of Science database
Note: (1) Fractional counting method. (2) Citation window: publication year plus two years.
... but business R&D investment and investment in other intangible assets such as ICT or economic competences lags well behind other economies.

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies

Data: Eurostat, OECD

Notes: (1) KR: There is a break in series between 2007 and the previous years. (2) US: Business enterprise expenditure on R&D (BERD) does not contain most or all capital expenditure. (3) CN: There is a break in series between 2009 and the previous years.
... and this hinders Europe's ability to build stronger knowledge flows...

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies
Data: EIS 2016, CWTS based on Web of Science database (March 2017 data), Eurostat, OECD

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies
Data: World Intellectual Property Organization
... and does not permit Europe to take advantage of its scientific excellence. This holds back Europe's innovation capacity in many upcoming technologies.

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies
Despite some vanishing progress, weaker market framework conditions ...
... and low access to risk capital are, among other factors ...
... putting a brake on Europe's ability for transformational entrepreneurship ...
... and locking in significant resources on unproductive companies.

Capital share sunk in zombie firms in 2013

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies
Note: Firms aged ≥10 years and with an interest coverage ratio<1 over three consecutive years. The sample excludes firms that are larger than 100 times the 99th percentile of the size distribution in terms of capital stock or number of employees.
As a result, Europe's upwards convergence towards more productive activities is driven by (and it affects low) investment levels.
There are significant differences across MS. An innovation divide persists, but is more nuanced.

Source: DG Research and Innovation - Unit for the Analysis and Monitoring of National Research and Innovation Policies

Data: Eurostat, OECD, UNESCO

Notes: See Report for details
This analysis in the Report has implications for policy formulation

1. Boosting investment in intangible assets
2. Re-thinking public funding and support for R&I
3. Opening up R&I to boost innovation diffusion
4. Regulating to support (not to hinder) innovation
5. Re-thinking competition policy
6. Completing the internal market
7. Boosting risk capital
8. Accelerating/ deepening structural reforms
9. Boosting R&I capacities across the EU
10. Opening European R&I to the World
Next steps

01 ERAC WORKSHOP
   4 October 2017

02 SOUNDING BOARD
   10 October 2017

03 LAUNCH OF THE REPORT
   Q1 2018

04 DISSEMINATION & STAKEHOLDER DIALOGUE
   Q2 2018

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