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MEETING DOCUMENT

From:	ERAC Secretariat
To:	ERAC (European Research Area and Innovation Committee)
Subject:	ERAC Workshop and Plenary (item 3.1 - Strategic capacity of ERAC) - "Investing in and for the Sustainable Development goals" - note by the Commission

ERAC delegations will find in annex a note from the Commission on "Investing in and for the Sustainable Development goals" with questions for discussion, in view of the ERAC Workshop on the "Future of EU R&I policy" and the ERAC Plenary (agenda item 3.1), that will take place on 5 and 6 June respectively.

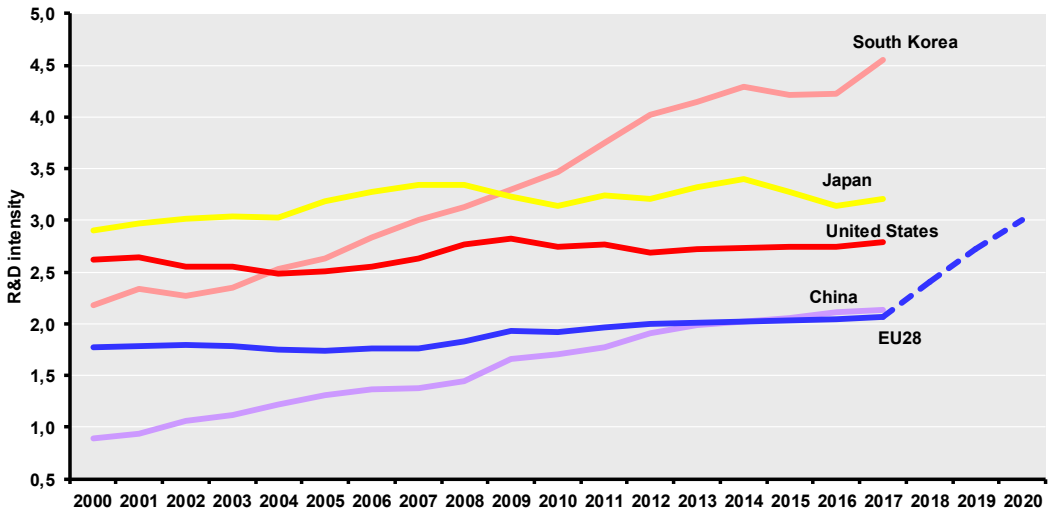
INVESTING IN AND FOR THE SUSTAINABLE DEVELOPMENT GOALS

1. Investing in R&D – state of play

History and context: Research and Innovation (R&I) are undisputed drivers of industrial competitiveness, job creation and labour productivity growth[1]. Hence, one of the key goals of the EU during the last couple of decades has been to increase the levels of R&D investment, to provide a stimulus to EU's growth and competitiveness. In order to close the R&D intensity gap with its main competitors, at the 2003 Barcelona Summit[2], the European Council agreed that the EU should set the objective of devoting 3% of its GDP to R&D activities by 2010, where two-thirds of the investment should come from the private sector. In 2010 this target became one of the five headline targets of Europe 2020 Strategy, with an achievement date of 2020 (European Commission, 2010).

How far are we from reaching 3% target? The **EU R&D intensity has increased by 0.9% annually**, from 1.77% in 2000 to 2.07% in 2017. Still, to meet 3% target by 2020, the EU R&D intensity would have to increase by more than 10% per year (dashed line in Figure 1). Despite the fact that the EU is still far from reaching its target, it is important to notice that with only 7% of the world population, the **EU is responsible for 20% of the global R&D expenditure**. With respect to our main competitors, R&D intensity in the EU was lower than in South Korea (4.55% in 2017), Japan (3.2% in 2017), the United States (2.79% in 2017), and in China (2.13% in 2017) (Figure 1).

Figure 1: Evolution of R&D intensity, 2000-2017



Source: EC DG RTD, Unit 'Reforms and economic analysis: country intelligence'; Data: Eurostat, OECD

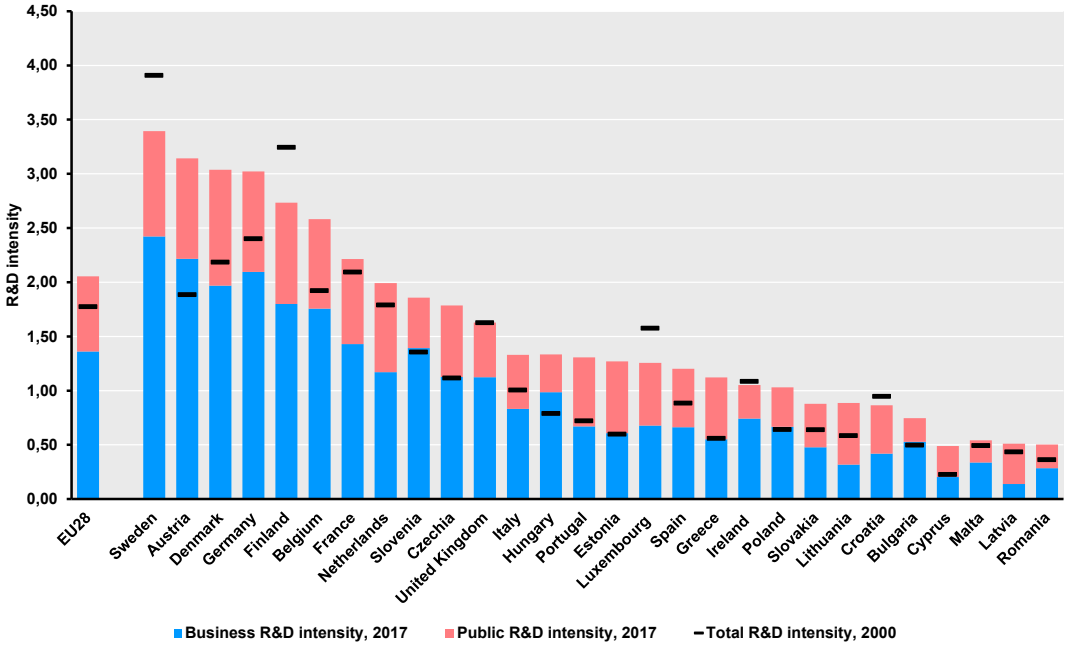
At national level, **R&D intensity increased over the 2000-2017 period in 22 Member States** (Figure 2), with national R&D intensity ranging from 0.5% in Romania to 3.4% in

[1] R&I accounted for 62% of EU economic growth between 1995 and 2007, and 15% of all productivity gains in Europe between 2000 and 2013 (European Commission, 2017).
[2] Barcelona European Council 15-16 March 2002. Presidency conclusions. http://europa.eu/rapid/press-release_PRES-02-930_en.htm

Sweden. Three countries have already reached their 2020 target: Germany (3.02%, with a target of 3%), Denmark (3.05%, with a target of 3%) and Cyprus (0.56, with a target 0.5%)[3].

There are big differences between investment trends in the **private and the public sectors**. With a value of 0.69% of GDP in 2017, the **EU has one of the highest public R&D intensities[4] worldwide**. Public R&D intensity is now higher in the EU than in the US, Japan and China[5]. In contrast to the public R&D intensity, the **EU business R&D intensity[6] (1.36%) is significantly lower** in comparison to other main economies[7]. Figure 2 displays big differences between the shares of business and public R&D intensities among the Member States.

Figure 2: R&D intensity, 2000 and 2017

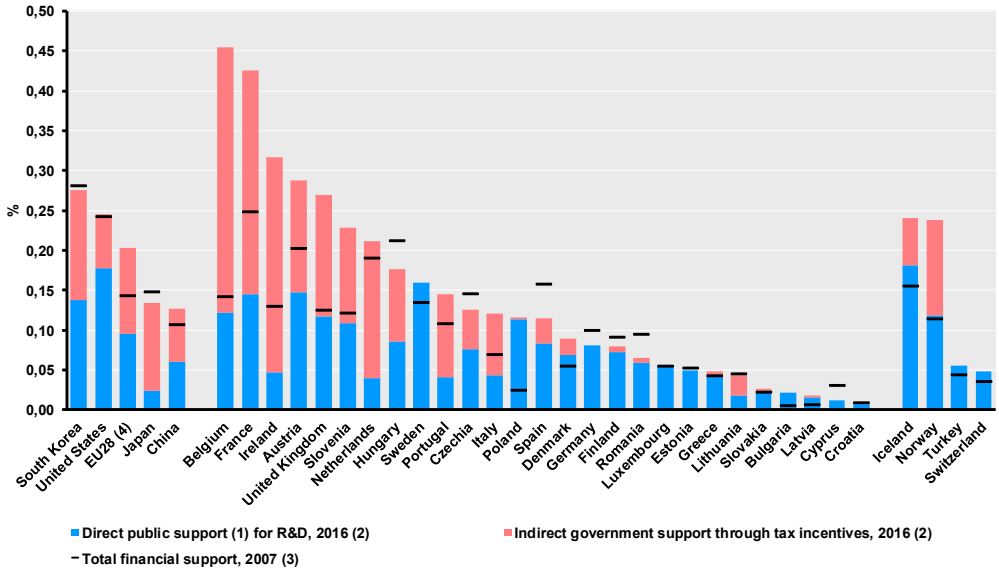


Source: EC DG RTD, Unit 'Reforms and economic analysis: country intelligence'; Data: Eurostat

In addition to this, it should be noted that, apart from direct support, governments have increasingly used **R&D tax incentives** to support business R&D. Figure 3 shows that the level of public support for business R&D has increased in most of the Member States between 2007 and 2016, particularly through the increased use of R&D tax incentives. Especially strong increases of total public support for business R&D are evident in Belgium, Ireland, France, United Kingdom and Slovenia. The amount of foregone tax revenues is much higher than direct support in Belgium, France and Ireland.

[3] Source: Eurostat, OECD
[4] Public R&D intensity is measured as GOVERD+HERD as a % of GDP.
[5] In 2017, the public R&D intensity in the US was 0.63%, in Japan 0.64%, China 0.48%, and South Korea 0.87%.
[6] Business R&D intensity is measured as BERD as a % of GDP.
[7] In 2017, the business R&D intensity was 2.04% in the US, 2.52% in Japan, 1.65% in China and 3.62% in South Korea.

Figure 3: Direct and indirect public support for business R&D as % of GDP, 2007 and 2016



Source: EC, DG RTD, Unit 'Reforms and economic analysis: country intelligence'; Data: Eurostat, OECD

Furthermore, R&D intensity varies substantially between sectors of economic activities. Based on the EU Industrial R&D Investment Scoreboard (Hernández et al., 2018), **the highest intensity is found within the high tech ICT and health sectors**. **It is followed by medium tech sectors, such as the automotive industry and engineering**. The differences in sectoral specialisation for different regions lead to big differences in regional R&D intensity. The sectoral intensity gaps have been increasing over the last few years with the EU companies widening their automotive intensity lead over those of the US and China. The US companies are widening their intensity lead over the EU and China in both ICT and health sectors.

R&D intensity targets have shown to have a clear mobilising effect, stimulating in depth reflection on what is a suitable economic growth model and the best policy mix to achieve it. They have led to the portfolio of R&I support instruments becoming more complex, experimentation with new policies and increased attention for impact assessment and evaluation. In this respect, it **continues to be a powerful target for R&I policy**, but a discussion is needed on whether it needs to be complemented by other indicators or subtargets in order to address the challenges of our time, with a major question being whether, besides focusing mostly on the rate, we also need to concentrate on the direction of investment.

2. Investing for the SDGs

While R&I investments are key drivers for growth and jobs, their role as **key enablers to accelerate the transition towards an environmentally, socially and economically sustainable Europe** is also widely recognised. The Commission's reflection paper "Towards a Sustainable Europe by 2030" (European Commission, 2019a) highlights that Europe needs to deploy research and innovation to support the shift from a linear to a circular economy, correct imbalances in food systems, and deliver future-proof energy, buildings and mobility.

The Communication that the Commission put forward to the Sibiu Summit (European Commission, 2019b) also made it clear that Europe should focus research and innovation to support ecological, social and economic transitions that are fair for all.

Because of the scope, scale and urgency of the societal challenges facing Europe, policy is called to pay **increased attention not just to the rate (the quantity and quality) of R&I investments, but also to the overall direction of these investments**. This can support the coordinated transformation of a broad range of interconnected systems that are crucial to our economy and society. Systems, such as *energy, agro-food, health, mobility, production and consumption*, all include a number of actors that have to act together. To illustrate some successful systemic transitions, Figure 4 provides specific examples of radical innovations in mobility, agro-food and energy domains. It illustrates that R&I, besides being a driver of technological innovations, can benefit from an increased focus on social, business model and infrastructural innovations (Geels, 2020).

Figure 4: Examples of radical innovations in mobility, agro-food and energy domains

	Mobility	**Energy (electricity, heat)**	**Agro-food**
Radical technical innovation	Battery-electric vehicles, (plug-in) hybrid electric vehicles, biofuel cars; hydrogen cars	Renewable electricity (wind, solar, biomass, hydro), heat pumps, passive house, biomass stoves, smart meters	Permaculture, agro-ecology, artificial meat, plant-based milk, manure digestion
Social or behavioural innovation	Car sharing, bike clubs, modal shift to bicycles and buses, tele-working, tele-conferencing	Decentralised energy production ('prosumers'), community energy, energy café's	Alternative food networks, organic food, dietary change (e.g. less meat and dairy), urban farming
Business model innovation	Mobility services, car sharing, bike sharing	Energy service companies, back-up capacity for electricity provision, vehicle-to-grid electricity provision	Alternative food networks, organic food
Infra-structural innovation	Intermodal transport systems, compact cities, revamped urban transport systems (tram, light-rail, metro)	District heating system, smart grids, bio-methane in reconfigured gas grid	Efficient irrigation system, agro-forestry, rewilding, multi-functional land-use

Source: Geels, 2020

At the EU level, the proposed policy measures to address the new challenges facilitate a combination of all available **investment** tools with smarter and more responsive EU **regulation** and the promotion of national **reforms** that will increase the impact of EU policies and promote the achievement of EU priorities, such as climate neutrality by 2050.

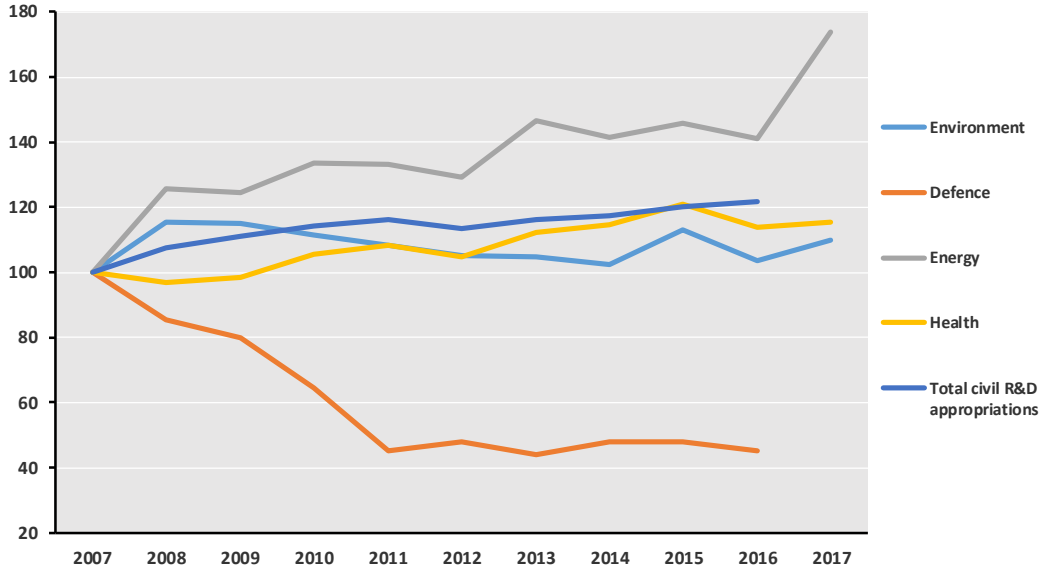
Given that coordinated transformation needs coordinated and strategic investment, the question arises whether the aforementioned increased use of R&D tax incentives among the Member States are the right tools to achieve this goal. Contrary to R&D tax reliefs, direct measures (e.g. grants and loans) appear more effective in provoking certain desired R&D outcomes,[8] such as innovations that support sustainable transitions. Hence, in order to

[88] https://rio.jrc.ec.europa.eu/en/library/rd-tax-incentives-how-make-them-most-effective

establish consistency of national reforms with EU policies, a discussion is needed on the best tools to provide public support to business R&D expenditure.

Focusing on Member States national budgets, we observe that **they are slowly steering their finances towards societal and environmental challenges**. Figure 5 shows an increase in energy related R&D budget appropriations (GBARD)[9] at European level.[10] The growth of the budget allocation for total civil, health and environmental-related R&D is more modest. By contrast, the R&D budget for defence has decreased significantly in recent years.

Figure 5: Allocation of public R&D budgets, EU28



Source: EC, DG RTD, Unit 'Reforms and economic analysis: country intelligence'; Data: Eurostat; (GBARD Index 2007=100)

3. Questions for discussion

- While increasing investment in R&D should remain an aspiration for the EU, should the shifting focus towards sustainability also entail a shift in focus in our investment targets? How can the sustainability dimension be included?

- How should the policy mix for increasing R&D investment be reformed to address a renewed focus in R&I strategy?

[9] GBARD measures only direct budget provisions, hence it does not account for the R&D performed.
[10] The Fourth Report on the State of the Energy Union presents statistics on public investment (national and EU) in the Energy Union's research and innovation priorities: https://ec.europa.eu/commission/sites/beta-political/files/fourth-report-state-of-energy-union-april2019_en_0.pdf

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