



RESEARCH AND INNOVATION IN THE NEW EUROPEAN POLITICAL CYCLE

POSITION PAPER





KEY MESSAGES

- 1 Research and innovation is a societal imperative.** We constantly need to invent new solutions to tackle major challenges facing us such as climate change, the ageing population, poverty, cancer or other illnesses. It is also highly important for companies which constantly need to innovate to stay competitive in the global marketplace.
- 2** European companies are at the technological forefront in several strategic industrial sectors. **BusinessEurope’s survey shows that nine out of ten companies plan to increase their research, development and innovation (RDI) investments in Europe over the next five years.** EU companies are also expecting an increase of their investments outside Europe.
- 3** In light of this acceleration of the global innovation race and a fast-changing world, EU business calls for deeper and faster progress at EU-level in **four priority fields: i) more and smart public investments, ii) “fit-for-innovation” regulations, iii) skilled people and iv) enhanced collaboration.**
- 4** In this new EU political cycle, it is crucial that the EU moves forward in these four priority fields. In certain cases, this can be achieved with a smarter implementation of existing policies. In others, it requires more ambitious decisions or brand-new initiatives. **BusinessEurope puts forward 30 concrete policy measures** to make this ambition a reality. All are designed with the objective of strengthening the impact.

KEY FIGURES

Businesses across Europe accounted for **66%** of total European **R&D expenditures** in 2017.



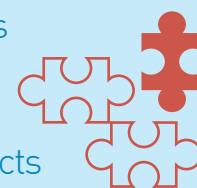
Source: Eurostat 2019



88% of companies plan to **increase** their **RDI investments** in EU-EEA countries over the next 5 years.

Source: BusinessEurope 2019 survey

68% of companies consider the lack of skills is an obstacle to develop RDI projects in Europe.



Source: BusinessEurope 2019 survey

TABLE OF CONTENT

1. INTRODUCTION	4
2. THE PIVOTAL ROLE OF RDI FOR THE EUROPEAN SOCIETY AND ECONOMY	5
3. WHAT EU BUSINESS NEEDS	6
More and smarter public investments.....	7
“Fit-for-innovation” regulation.....	8
Skilled people.....	9
Enhanced collaboration.....	10
4. WHERE ARE WE TODAY AND WHAT HAVE WE LEARNED?...	12
Public investments.....	12
EU regulatory framework.....	14
Skills.....	15
Collaboration.....	15
5. POLICY RECOMMENDATIONS	16
More and smarter public investments	16
Funding level and focus.....	16
Funding administration	17
Missions	17
“Fit-for-innovation” regulatory framework	18
Innovation-focused regulatory practices.....	18
Sandboxes for RDI.....	18
Stakeholder engagement.....	18
Access to data	19
Skilled people	19
Primary and secondary education.....	19
Tertiary education.....	20
Vocational training.....	20
Immigration of skilled workforce.....	20
Enhanced collaboration	21
European partnerships.....	21
Technology infrastructures.....	21



1. INTRODUCTION



Hundreds of publications and studies have extensively documented what are the key drivers and factors that influence the capacity of business to innovate and notably their ability:

- to increase investments in research, development and innovation (RDI), and
- to translate technological inventions into innovations and market-ready solutions, products, offerings and/or business models.

Some are RDI-policy dependent (e.g. public funding, etc.) while others depend on wider circumstances (e.g. entrepreneurial culture, proximity of markets, regulations, etc.). What is clear is that there is no easy way to increase Europe's innovation power.

What is also clear is that the world of RDI in which European companies navigate today is very different from what it was even a few years ago. This is due to several reasons, including the digitalisation of RDI. For instance, the speed at which new products reach markets has strongly increased: Meucci's invention took more than six decades to reach half of USA households, smartphones took seven years to hit the same adoption rate, and some popular apps achieve this today in a matter of months.

There is also a clear acceleration of the global innovation race. In China, industrial investments in R&D are growing fast: +20% between 2017-2018 (compared with only +8% in the EU and +9% in the USA)¹. Since 2000, 24 countries have established national innovation agencies.

The main challenge is therefore to define what RDI-focused measures should be prioritised in the new EU political cycle in order to further enhance the EU innovation ecosystem, better cope with this fast-moving world and further strengthen the EU's innovation power and competitiveness.

This paper first defines what are the key EU business needs to be prioritised in the new EU political cycle (chapter 3). It also puts forward concrete RDI-focused proposals to address these needs (chapter 5), following a review of what has been achieved so far at EU level (chapter 4). It results from an extensive consultation of BusinessEurope's membership and a corporate survey conducted between February and March 2019, which involved 133 all-sized companies located in Europe.

¹ EU R&D Scoreboard – the 2018 EU Industrial R&D Investment Scoreboard

2. THE PIVOTAL ROLE OF RDI FOR THE EUROPEAN SOCIETY AND ECONOMY

The EU is the second largest economy in the world. It accounts for 20% of global R&D investment, produces one third of all high-quality scientific publications², and holds a world leading position in industrial sectors such as pharmaceuticals, chemicals, aerospace, mechanical and electrical engineering, fashion or research output in Artificial Intelligence³.

Despite these promising statistics, the EU is lagging in several areas: R&D investment across the EU falls short of the 3% GDP target. The EU is home to only 33 “Unicorns” (i.e. start-ups valued at over \$1 billion) compared with 151 in the USA and 83 in China, and has fewer young leading innovators (“yollies”). Private RDI investments are lagging (1.3% of EU GDP compared with 1.6% in China, 2% in the United States, 2.6% in Japan or 3.3% in South Korea). Whilst in the future 9 out of 10 jobs will require at least basic digital skills, almost half of Europeans still do not have any digital skills today⁴.

RDI is one of the most important levers to boost Europe’s economy and competitiveness. It can help to increase a company’s market share, as well as foster job creation. Through RDI, entirely new markets can be created, leading to new business opportunities on a potentially massive scale.

The societal benefits of RDI are equally important: RDI can make substantial contributions to dealing with today’s and tomorrow’s societal challenges, such as poverty, ageing, social exclusion, health, climate change, mobility and energy security. Being largely accessible to all segments of the population, rapid innovation can foster overall well-being and improve the European way of life.

The EU business community is convinced that if Europe wants to remain a leading economy in the world, stand up to societal challenges and be relevant to citizens, it needs to strongly prioritise RDI in its political agenda.

²Report “Science, Research and Innovation Performance of the EU 2018”

³Elsevier, 2019, Artificial Intelligence: How knowledge is created transferred, and used

⁴Commission, 2017, The Digital Skills Gap in Europe



3. WHAT EU BUSINESS NEEDS

It is important to distinguish between invention and innovation. While an invention results from an investment in R&D (i.e. spending money to create new technologies), innovation is the realisation of its economic and societal potential (i.e. making money from new technologies).

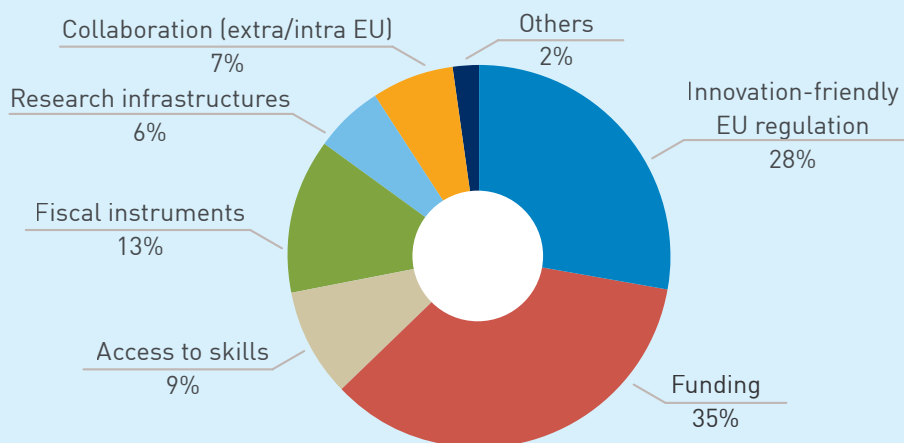
Innovation does not happen just because of competitive pressure or some non-specific demand in the market, nor does innovation automatically follow from some brilliant invention. Innovation happens if actors are put in a position to conceive, design, develop and deliver innovative products, solutions and services. Innovation is 1% idea and 99% hard work.

Companies, including start- and scale- ups, SMEs, mid-caps and large companies, are the main drivers of innovation, simply because a company's survival depends on driving new offerings to the market. In addition, companies account for the lion's share of inventions⁵. Businesses across Europe accounted for 66% of total European R&D expenditures in 2017⁶.

Given this central role of business in both invention and innovation, a closer look at what companies need to scale up investments in RDI is necessary. This section outlines the top four EU business needs.

BUSINESSEUROPE'S SURVEY

What are the top policy areas where further progress at EU level over the next five years would help to scale up your RDI investments in the EU-EEA?



⁵Only 9% of patents come from universities and public research institutes (European Patent Office, Annual Report 2018)

⁶Eurostat News Release, 2019, First estimates of Research & Development expenditure

► MORE AND SMARTER PUBLIC INVESTMENTS

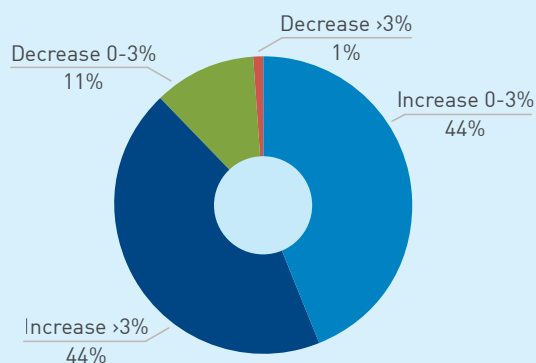
In the Lamy Report, increasing public RDI funding – both at EU and national levels – was the very first policy recommendation to improve the scope and impact of EU RDI Programmes⁷. The Report suggested that EU and national budgets prioritise research and innovation and that the post-2020 EU research and innovation programme has a budget of €160 billion.

Although RDI projects are mainly developed within the private sector, public investment is considered key to leveraging private investments. The impact of public funding for private RDI is by no means limited to the co-funding expected from recipients of the funding. Much more important is the beneficial impact of public funding on the overall innovation ecosystem, which is vital for the stimulation of private RDI investments.

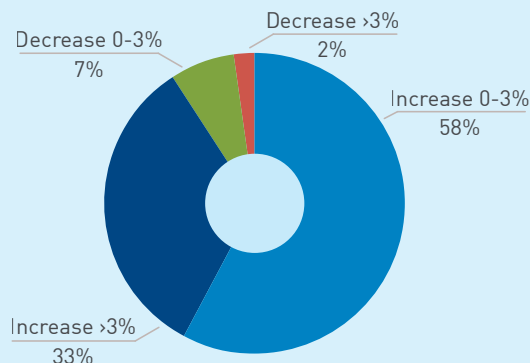
BUSINESSEUROPE'S SURVEY

BusinessEurope's survey shows that nine out of ten companies plan to increase their RDI spending over the next 5 years in the EU-EEA. 44% of them even intend to increase their RDI investments in EU-EEA countries by at least 3% (p.a.). However, the risk of companies moving RDI investments outside of the EU-EEA is also real: the share of companies planning a similar increase outside of Europe is lower (i.e. 33%) whilst not negligible.

In the EU-EEA, what is the expected average annual growth rate of your company's RDI investment over the next five years?



Outside the EU-EEA, how is your company's annual rate of RDI investment expected to change in the next five years?



Also, it should be noted that a quarter of respondents confirm that raising the public funding allocated to RDI would directly help them to further scale up their RDI investments in the EU. Further to the amount of public RDI money, respondents also call for more flexible funding programmes, i.e. not restricted to rigid silos, with less bureaucracy and faster time to grant, combining different financing instruments, boosting risk capitals.

They also emphasised the need to direct public money towards collaborative projects (e.g. project-specific research consortia, joint undertakings and private-public partnerships) involving all kinds of actors (start-ups, SMEs, mid-caps and large companies) and to support all kinds of projects (from low technology readiness levels -TRLs - research projects to initial market uptake with high TRLs, from lower to higher risky investments requiring a bigger venture capital market).

⁷Lamy Group report, 2017, LAB-FAB-APP – Investing in the European future we want

▷ “FIT-FOR-INNOVATION” REGULATION

The relationship between regulation and innovation is neither straightforward nor unidirectional. Well-drafted rules can be a driver of innovation, poorly-designed rules can stifle it.

Regulation can be too rigid and inflexible and stand in the way of innovative offerings. Furthermore, regulation can be at the wrong level (e.g. multiple national rules instead of EU-wide regulation) and thus create complexity to the detriment of innovation. And finally, regulation can hamper innovation simply by being obsolete and not taking new technology and other developments into account.

On the other hand, regulation can be a major driver of innovation and contribute to the development of innovation landscapes and ecosystems. It is worthwhile remembering that it was a well-designed regulation which pushed Europe to technology and market leadership in the early years of mobile telephony. Also, new or adjusted regulation and/or policy guidelines can help with the phasing-out old technologies by incentivising more modern and sustainable solutions.

In general, regulation is an important aspect of investment and planning for companies because it fosters stability and certainty (e.g. for investment). Furthermore, the more relevant stakeholders are involved in its design, the better the regulation tends to work. For instance, the framework for technical regulation, the so-called ‘new legislative framework’, has allowed companies to achieve high levels of performance in machine safety or electromagnetic compatibility with only minimal guidance from regulators. Also, intellectual property rights (IPRs) set an important pre-condition for innovation.

BUSINESSEUROPE'S SURVEY

BusinessEurope's survey shows that having a “fit-for-innovation” regulation (innovation friendly EU regulation, agile administration of RDI funding, R&D implementation and deployment) is what companies expect and need the most from the EU: 28% the respondents stated that a supporting EU regulation is the most important lever to upscale their RDI investments in the EU.

This preference reflects companies' need for innovation friendly EU regulation (e.g. science-based legislation, always up-to-date regulation but otherwise stable, with higher harmonisation and coherence between the EU and the national levels). Also, responding companies called on the EU to support industry's efforts to bring new technologies to market, as part of a more fundamental request to rethink industrial policy in the light of global competition on playing fields that are not always fully even.

▷ SKILLED PEOPLE

European business is facing a significant shortage of talented technical staff for RDI. Since 2008, mismatches between skills and jobs have grown by 29% in Europe, creating substantial problems for recruiting and consequently major bottlenecks in companies' capacity to develop new offerings and businesses⁸. This strongly and adversely impacts Europe's RDI performance.

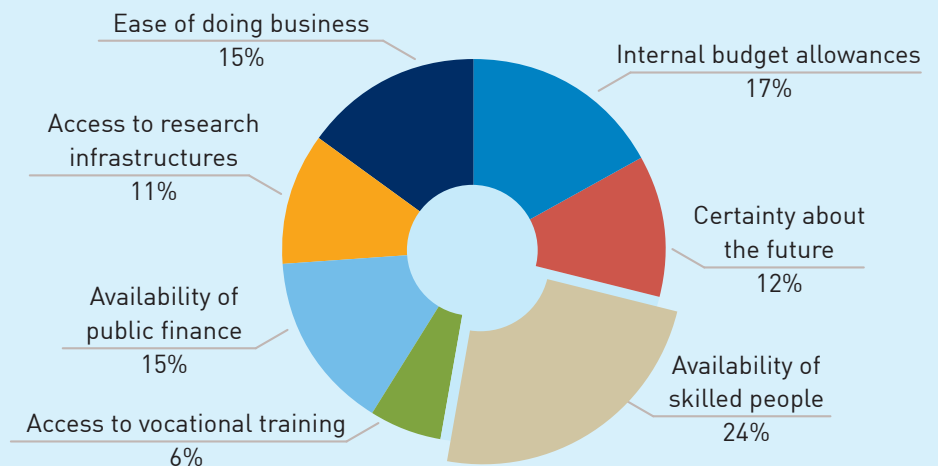
Whilst skill shortages and mismatches generally challenge firms everywhere⁹ and give rise to the so-called "war for talent", the situation is particularly difficult for EU companies willing to invest in RDI projects: the best universities in the world are outside the EU¹⁰ – and so are the best students¹¹. Also, the proposed academic programmes are not always designed to provide the skills and competences required by companies – which can make education to work transitions more challenging, while forcing companies to develop internal training programmes – and VET courses are still underutilised in Europe. All in all, the EU is facing growing competitive challenges because of a global massification in tertiary education, a more favourable demography outside of Europe and strong investment in excellence in other world regions (especially United States, China)¹².

Around 40% of European employers have difficulties in finding people with the skills they need to grow and innovate¹³.

BUSINESSEUROPE'S SURVEY

BusinessEurope's survey shows that the availability (in terms of both quantity and quality) of skilled people is the most important factor pushing EU companies to invest outside Europe.

Regarding your company's RDI investments outside the EU-EEA in the last three years, how has each of the following been a major factor?



⁸Manpower Group, 2018, Solving the Talent Shortage

⁹US education and training resources fail to meet the evolving needs of the innovation economy, creating a sizable "skill gap" that leaves business with an insufficient supply of qualified workers (Business Roundtable, 2019, Innovation Nation – An American Innovation Agenda for 2020)

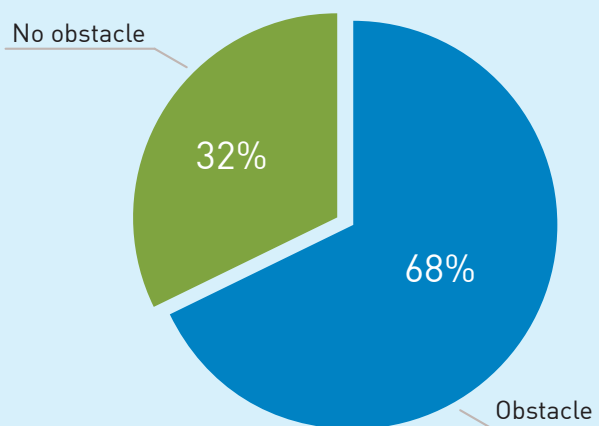
¹⁰Shanghai Academic Ranking of World Universities 2018

¹¹The US remain the top destination for international students (470,000) – hosting one third of foreign student flows. They are followed by the UK (270,000), Australia (157,000), Japan (108,000), Canada (107,000) and France (71,000) – OECD, International Migration Outlook 2018

¹²European Commission, 2018, Science, Research and Innovation Performance of the EU

¹³European Commission, 2016, Communication A new skills agenda for Europe

Regarding your company's RDI investments in the EU-EEA in the last three years, has the availability of skilled people been an obstacle?



It is also an important obstacle (together with internal budget constraints, availability of public finance and cost of doing business) to developing RDI projects in Europe.

In terms of most "sought-after" skills, the survey shows as well that STEM graduates are the most needed professionals to increase companies' RDI performance while highlighting a specific shortage of people with these skills. More precisely, the most "sought-after" profiles are engineers (44%), while the demand for data scientists (including AI) and cybersecurity experts continues to grow.

► ENHANCED COLLABORATION

The conversion of knowledge into novel products-technologies-applications-services is not always easy. Companies can find it difficult to fully capture the innovation potential because of the rising complexity and the interdisciplinary nature of technology (e.g. AI). They may have internal constraints (e.g. lack of human or financial resources) which make it difficult for them to upscale their innovations. Also, the need to respond to societal challenges pushes companies to collaborate further and more often with new partners and sectors.

Collaboration is key for RDI: already established and world famous RDI networks between universities, research and technology organisations (RTOs) and industry provide strong incentives, attract additional innovative talents, and regularly succeed in turning inventions into innovations (e.g. Silicon Valley). The EU has a good number of knowledge clusters (e.g. the Cyber-valley in Germany, the Brainport Eindhoven in the Netherlands or the Manufacturing Academy of Denmark), but there is still room for improvement.

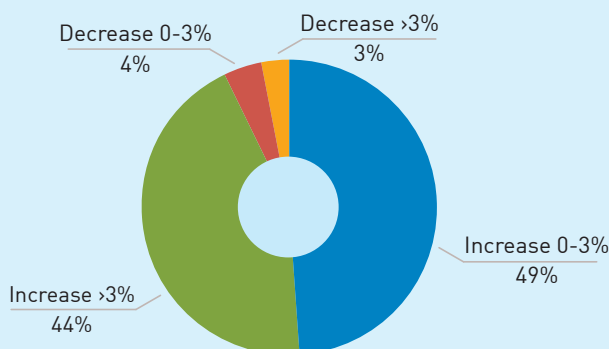
Technology infrastructures can help companies create innovative solutions by offering facilities, equipment, capabilities and support services as playgrounds for testing and demonstrating new offerings and testing market relevance with prototypes and products that are not yet viable. Such infrastructures reduce the cost and risk of RDI for individual companies. They offer opportunities which companies, especially start-ups SMEs and mid-caps, could not afford on their own.

Well-run technology infrastructures are much more than just the ‘hardware’. They come along with a network of partners of different kinds, i.e. companies, start-ups, universities, RTOs, etc. However, most importantly, they foster collaboration and partnerships, and thus open new innovation spaces beyond the means of individual companies. Thus, technology infrastructures are not only solution-providers, but also collaboration-enablers. The key role of a technology infrastructure is to act as a nucleus of an ecosystem, and to enable and foster collaboration between the ecosystem’s members.

BUSINESSEUROPE’S SURVEY

BusinessEurope’s survey shows that 93% of the companies have increased their share of RDI investments dedicated to collaborative projects, compared with 5 years ago. Their most relevant partners are universities (90%) and RTOs (87%). Underlining these positive figures, responding companies mention enhanced collaboration among the top 3 policy areas where further progress at EU level is needed to help them scale up their RDI investments in Europe.

How has your company’s share of RDI investments dedicated to collaborative projects changed compared to five years ago?



Furthermore, companies stress that Europe leads in the field of R&I Public Private Partnerships (PPPs). A quarter of companies participating in our survey asked for these instruments to remain easily accessible and for their resources to be raised. Thanks to the collaborative efforts between public authorities, regulatory bodies, universities, RTOs, and industry, outstanding research results have been collected. Partnerships have been key to fostering strong and innovative ecosystems, implementing long-term strategies with impactful results and demonstrating high socio-economic impact and global competitiveness¹⁴.

BusinessEurope’s survey shows that companies generally support the establishment of such facilities and see a need for a policy agenda clearly promoting and supporting collaborative RDI projects around such infrastructures.

¹⁴Hydrogen-Europe, ASD, Bio-based Industries Consortium, EFPIA, UNIFE, 2017, “Industry and research associations call for maintaining EU institutional Public Private Partnerships in Research and Innovation under Framework Programme 9”

4. WHERE ARE WE TODAY AND WHAT HAVE WE LEARNED?

The EU has long been committed to research and has been developing a dedicated EU policy since the early days of the European project. However, the stronger attention to innovation has been developing only over the last decade. It is therefore essential to move EU innovation policy forward.

This section reviews and provides an assessment of implemented EU measures and achievements so far, with focus on the four priority fields identified in the previous section.

► PUBLIC INVESTMENTS

Since 1984, the EU has run multi-annual Framework Programmes (FPs) for R&D to strengthen its position in science and industrial technological development and address major societal challenges. These programmes have progressively been accompanied by numerous instruments which have generally supported the innovation ecosystem in Europe. More recently, companies have developed more interest in EU programmes, with Horizon 2020 addressing innovation and not only R&D.

Companies find several advantages in applying for European RDI funding: EU programmes – from the drafting phase to the publication of the calls and submission / evaluation of the proposal – are broadly transparent. They bring together teams across countries and scientific disciplines and strongly support collaboration. The principle of excellence guarantees that only the best projects are supported, based on competitive calls. Also, EU funding has been helping European academia to remain internationally competitive and support talent development in Europe, especially through the internationally recognised work of the European Research Council. Finally, the impact of the European RDI programme appears to be sound: Horizon Europe is expected to generate an estimated gain of up to 100.000 jobs in RDI activities between 2021-2027, and each euro invested could generate a return of up to €11 of GDP over 25 years¹⁵. InvestEU and its Research, Innovation and Digitisation policy window is expected to mobilise €200 billion.

Despite these promising results, there is room for improvement in the following areas.

- **Volume of funding:** Horizon 2020 accounts for 6.71% of the total EU budget, whilst the budget share proposed to be allocated to Horizon Europe is 7.63%. These shares suggest that RDI does not take a high priority on the EU's agenda. In addition, the aforementioned Horizon Europe figure has yet to be confirmed by policy-makers and assumes that it will not be reduced in the upcoming MFF negotiations.

¹⁵Commission proposal for a Regulation establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination

- **Engagement of companies:** The share of EU FP funds assigned to industry is modest: FP7 funding allocated to the private sector (including SMEs) was 25%¹⁶, whilst the share of Horizon2020 is 27%¹⁷. In short, the engagement of companies in European RDI programmes remains low. This reflects a certain degree of disappointment in the business community about the benefit of participation compared with the cost of engagement. Since companies are the main driving force to translate research results into novel products and their related societal benefit, this trend exacerbates the old European dilemma of being strong in inventions but weak in innovations. Several factors, that are presented in box 1, explain the declining attractiveness of EU programmes for companies.
- **Clusters of excellence:** Around the world, innovation power is typically focused on a few clusters of excellence, as opposed to being evenly distributed. This is hardly surprising, since RDI depends much more on the exchange of ideas and people than other disciplines. While initiatives such as Smart Specialisation account for this simple fact, there remains a need to gear European funding more strongly towards the creation of world-class RDI clusters.
- **Venture capital (VC):** The EU VC industry (€6.5 billion) is around the sixth the size of its counterpart in the US (€39.4 billion). Whilst this may in part reflect the lower number of suitable investment opportunities in the EU, there is also widespread evidence that access to VC, particularly for funding the up-scaling of late-stage start-ups, is a significant barrier to growth¹⁸. Such VC funding is particularly important, not only for purely financial reasons but also for the expertise and management experience such funds can provide to firms seeking to expand rapidly. Whilst welcomed, the amount allocated to Venture EU (€410 million) is not likely to be of a magnitude able to contribute significantly to closing the gap with the USA. The proposed European Innovation Council (EIC) is a step in the right direction as it targets risky market-creating innovation. However, the EU should be vigilant to ensure that this tool is used to support the long-term expansion and commercialisation of RDI in the EU.

BOX 1 – DIFFICULTIES ENCOUNTERED BY COMPANIES WHEN PARTICIPATING IN FPS

Companies are the main driving force to translate research results into novel products and their related societal benefit. However, Europe still fails short in being strong in inventions but weak in innovations. The following factors explain the declining attractiveness of EU programmes for companies.

- The administrative burden of submitting and executing a proposal remains fairly high, making even larger companies reluctant to participate in a call.
- In a volatile, uncertain, complex and ambiguous world of ever faster innovation cycles, the current average time-to-grant of 192 days is not aligned with companies' needs to drive innovations to the markets fast enough. This is especially true for digital innovations: the research challenge specified in a proposal may already be out of date by the time the proposal is granted.
- Oversubscription of the programme reduces the chance of winning a proposal to 14%. In other words, a company must on average submit 7 proposals in order to win one – a significant effort that especially smaller companies can hardly afford.

¹⁶Commission, 2015, Ex-post evaluation of the 7th EU Framework Programme (2007 – 2013)

¹⁷Commission, 2017, Staff Working Document in-depth interim evaluation of Horizon 2020

¹⁸Commission, 2015, Assessing the potential for EU investment in venture capital and other risk capital fund of funds



- Current efforts to promote “open science”, which is increasingly understood not only as a novel way to publish results, but also as an obligation to make all research results public regardless of their potential business value lead to a shift from market-driven to academic research. Also, companies fear that proposals submitted with an “open access opt-out” have a reduced chance of being accepted.
- The complexity and diversity of EU funding programmes and formats are a growing barrier, especially for new-comers. For instance, while we very much welcome the proposal to set up a European Innovation Council, there is a need to ensure a good governance with the European Institute of Innovation and Technology.
- Due to their pre-competitive focus, EU programmes do not address the most significant challenge in RDI – overcoming the infamous “valley of death” and bringing novel offering successfully to a competitive market.

► EU REGULATORY FRAMEWORK

The EU is equipped with one of the largest and most advanced regulatory architectures in the world, with the Single Market being one of the EU’s biggest success stories. At the same time, the diversity and complexity of this regulatory landscape runs the risk of stifling the ability of companies to innovate in certain cases. The following illustrates some of the challenges and opportunities.

- The EU’s better regulation agenda aims to deliver on the set policy goals in the most efficient way, including the development of EU legislation which supports innovation. More specifically, the Innovation Principle was developed to complement the Precautionary Principle, thus encouraging law makers to take both challenges and opportunities into account when drafting new legislation. In this context, the Commission also developed an innovation tool in its better regulation toolbox¹⁹ which provides guidance for the assessment of innovation impacts of proposed EU legislation.
- Innovation-friendly regulation is a matter of sending the right key messages to a larger audience and creating the right spirit. A case example is Artificial Intelligence (AI), which is widely assumed to be a technology with tremendous potential for Europe across all sectors and markets, while at the same time raising fears about AI-based applications violating ethical norms. Ideally, we would see an upbeat mood in Europe, and a lot of encouragement for European pioneers to go and realise the enormous potential of new technologies. Sending this message implies finding the right balance between enabling innovation, encouraging its uptake, and addressing potential challenges in a smart and future-proof way.
- The inherent conflict between different regulatory objectives tends to be downplayed to avoid an honest debate about regulatory priorities in Europe. For instance, while data privacy standards play an important role in building trust in the digital economy, a holistic approach is needed, including an open debate about the merits of data privacy vs. the data-driven realisation of economic and societal benefits. Ideally, the missions to be established under Horizon Europe would be mandated to drive EU legislation towards balanced objectives within their respective fields. In practice, the proposed limitation of the missions’ scope to the Horizon Europe programme will severely limit their ability to push for regulatory convergence, as will the proposed cap on the missions’ budget.

¹⁹https://ec.europa.eu/info/sites/info/files/file_import/better-regulation-toolbox-21_en_0.pdf

- The EU has a strong and highly welcomed tradition of engaging and collaborating with stakeholders in order to achieve state-of-the-art regulation. For instance, the New Legislative Framework (NLF) is the global best practice for regulating market access in a joint effort between regulators and stakeholders. A deliberate separation of roles – regulators specifying essential requirements, and companies developing harmonised standards – has allowed the EU to gain leadership in electrical and machine safety and other domains. At the same time, a staged conformity assessment (from self-declaration to third-party certification for critical applications) minimises the bureaucratic efforts of bringing products to the market. However, the tendency to drive regulation in a top-down approach rather than collaboratively within the framework and spirit of the NLF is raising concerns.

▷ SKILLS

While the competence for the content of teaching and the organisation of education and training systems lies with Member States, the EU helps them with joint goals, common tools for transparency, shared best practices and – where appropriate – recognition of skills and qualifications. EU level cooperation on education and training dates back to 1963 which led in 2000 to the development the European Research Area (ERA), the unified research area open to the world and based on the internal market. The ERA has enabled free movement of researchers, scientific knowledge and technology and has therefore effectively improved the mobility of highly skilled and qualified people. However, gaps still exist in and between Member States.

It is encouraging to see that the work on the provision of STEM and digital skills and the reduction of skill mismatches is ongoing at European level. However, finding the right response to growing skills shortages remains a key challenge for Europe to better respond to growing skills shortages. Moreover, many Member States are still not acting sufficiently to improve vocational education and training (VET) and better adjust education and training systems to the needs of the labour market. Also, the EU and Member States are still failing to fully promote work-based learning components within higher education. In addition, VET could be better promoted as an alternative to higher education.

▷ COLLABORATION

The FPs have provided unique collaboration opportunities between existing and new European and international partners, promoting interdisciplinary projects between companies, RTOs, universities and the public sector.

Approximately 75% of Horizon 2020 funds has been dedicated to instruments supporting collaborative RDI projects involving many organisations across different countries²⁰. The EU promotes intensive collaboration between different types of organisations and scientific disciplines: 2,355 projects between higher education sector and private firms, 2,289 projects between higher education sector and research organisations, and 2,169 projects between the private-for-profit sector and research organisations.

These figures are generally promising. However, the full potential of collaboration has not yet been realised, chiefly because collaboration is sponsored on a per-project basis only and overly stringent rules to participate in partnerships are imposed. More intense and long-term collaboration is realised in innovation clusters, which are not currently supported by synchronised funds or by a fully-fledged EU strategy. The same goes for technology infrastructures, which have only recently received the attention of the Commission, and they should therefore be further supported²¹.

²⁰Commission, 2018, Interim evaluation of Horizon 2020

²¹Commission, 2019, Staff Working Document Technology Infrastructures



5. POLICY RECOMMENDATIONS



Developing RDI activities is increasingly crucial for shaping Europe's future in a globalised world. Europe's ability to enhance its innovation ecosystem and bring innovative solutions from lab to the market will be crucial to make the European economy competitive.

European companies are at the forefront of this global innovation race. Therefore, research and innovation must be at the heart of a modern EU industrial policy that empowers businesses to be leaders in key technologies and finding solutions to societal challenges.

In the new EU political cycle (2019-2024), it is essential that the EU moves forward its RDI policy framework in the four priority fields identified in this paper. The primary objective must be to strengthen the impact of policies. In some cases, this may be achieved via a smarter implementation of existing policies; in others, it requires more ambitious decisions or brand-new initiatives. We believe RDI policy must become an integral part of the EU's industrial policy strategy. As innovation and technological advancement represent the main sources of competitiveness for EU industry, actions proposed in the field of RDI must be considered a key priority for the EU industrial policy.

This chapter offers 30 policy recommendations for the new EU political cycle that are closely related to research, development and innovation. Recommendations on related policies, such as intellectual property, digitalisation and technologies²², state aid rules and IPCEI (Important Projects of Common European Interest), social policies or skills²³ are covered by separate BusinessEurope position papers.

1 MORE AND SMARTER PUBLIC INVESTMENTS

FUNDING LEVEL AND FOCUS

- ▶ **Allocate at least €120 billion (in constant prices) to the Horizon Europe programme** to take European RDI to the next level and secure real impact. This financial ambition will be key to unlocking private funds, addressing societal challenges and helping reduce the gap in R&D spending to other regions.
- ▶ **Invest > 60% of the Horizon Europe budget to Pillar II, "Global challenges and European Industrial competitiveness"**, which enables ambitious collaborative RDI projects in important industrial key areas and brings technologies to industrial maturity. In addition, the EIC should aim at tackling the infamous "valley of death" with a strong innovation ecosystem approach.
- ▶ **Maintain key-enabling technologies (KETs) as a strong and explicit dimension** of European R&D funding, based on the updated list of KETs proposed by the High-Level Group on Industrial Technologies. Europe shall strengthen public investments in R&D-intensive sectors by **spending at least 10% of Horizon Europe into projects related to KETs** and complement the mission approach of Horizon Europe with a strong focus on KETs.

²²<https://www.besnesseurope.eu/publications/our-digital-ambition-priorities-2019-2024>

²³<https://www.besnesseurope.eu/publications/future-social-dimension-europe>

FUNDING ADMINISTRATION

- ▶ **Radically re-think the way European funding is awarded and administered.** For many years, complaints from participants about the cost and complexity of winning and using European R&D funds have been 'addressed' with incremental adjustments. However, today's time-to-grant (192 days on average) and chances of success (14% on average) strongly clash with ever faster innovation cycles and the need to be agile. The time is ripe to try out new ways of allocating funds, starting with an **ambitious goal e.g. "time-to-grant < 50 days"**, and reverse-engineering the decision process to meet this goal. New methods could be tried (e.g. crowd-voting within the scientific community), and more digital technologies should be used to accelerate decision taking. Many examples exist where industrial processes have been taken to the next level of performance by enforcing "out-of-the-box thinking", and the Horizon Europe funding approval process is a good candidate as well.
- ▶ In EU funding programmes (including e.g. ETS Innovation Fund, Cohesion Fund, InvestEU) **give preference to funding proposals which directly or indirectly support RDI.** For instance, a new infrastructure containing new, innovative elements (e.g. train line piloting interlocking in the cloud or the use of H2-driven locomotives) should be preferred to a standard infrastructure relying on established technologies; RDI infrastructures (e.g. a new laboratory or test bed for Industry 4.0) should have a prominent role within EU funding programmes. Also, **a cross-departmental taskforce shall be created inside the European Commission** to map and ensure stronger synergies among the different EU RDI-related funding schemes.
- ▶ **Maintain the excellence** (both scientific and impact) **criteria** in all EU research programmes to further push EU technology, research and development. Any efforts to undermine or water down this principle should be resisted, as European Framework Programmes aim to secure the European global competitiveness, which is for the benefit of the entire EU innovation ecosystem. Instead of challenging the well-established excellence criteria in Horizon Europe, **synergies with cohesion funds shall be fostered to reduce geographical, economic and social disparities.**

MISSIONS

- ▶ **Establish missions as a new way to drive breakthrough innovations, to be implemented and financed beyond Horizon Europe so as to further break up silos.** At this date, too few proposals offering a potentially significant technological breakthrough are funded by EU programmes. For this reason, some Member States are taking actions towards high-risk / high reward funding programmes modelled by the US DARPA Agency. Although missions have been conceived to improve public support for European RDI by focusing on tangible goals and strong relevance for the public, they are also well suited to adopt most of the proven principles of breakthrough innovation funding and establish DARPA-like elements also in European Research funding. Amongst others, this includes a strong role for individual programme managers (e.g. the power to shift funding from less promising to more promising research activities), a strong involvement of industry, as well as a healthy appetite for risk if justified by potential rewards.



2 “FIT-FOR-INNOVATION” REGULATORY FRAMEWORK

INNOVATION-FOCUSED REGULATORY PRACTICES

- ▶ **Shape the regulatory environment with a positive narrative for emerging technologies.** Regulation for upcoming technologies usually reflects the general public’s attitudes, which in turn are strongly influenced by opinion leaders. A new technology that is portrayed to come with significant challenges risks being subjected to overly stringent rules, even if challenges are hypothetical and clearly outweighed by the potential benefits. Given that AI and other technologies are “make or break” for Europe’s future prosperity and competitiveness, the EU should become an opinion leader in its own right, actively promote such technologies and not shy away from investing in the education of the public on their relevance and benefit. An explicit opportunity-focused communication strategy would help to avoid an excessive focus on risks and pave the way for an innovation-friendly regulation.
- ▶ **Fully implement the Innovation Principle** across the whole policy-cycle, from evaluation to implementation. An important step to achieve this would be to make use of the ‘innovation tool’ mandatory during the impact assessment process for all new relevant EU legislation. Also, the EU should give guidance on the relation between the innovation and the precautionary principles, as they are too often interpreted as conflicting rather than complementary.

SANDBOXES FOR RDI

- ▶ **Support national regulatory sandboxes.** Whilst some Member States have introduced regulatory sandboxes, these are limited to national law and cannot suspend European law (e.g. a sandbox cannot be created to collect vehicle data to foster research in autonomous driving because of the GDPR). This major shortcoming needs to be addressed: **Member States – in collaboration with European and national authorities – shall be able to temporarily suspend limits existing in national laws**, so as to draw conclusions about how to further develop the regulatory framework. As a result, the best practice exchange among Member States and the EU would also be enhanced.
- ▶ **Introduce EU-level sandboxes.** A European sandbox framework should cover domains that are mostly governed by European law, and span across all European agencies and regulatory authorities, so as to have a harmonised sandbox approach. As both companies and institutions will need to become familiar with this new concept, **the EU sandbox regime should be supported by an extensive communication campaign.** There should be call for proposals regarding pilot use cases. European partnerships and trade associations should be involved in the identification of appropriate experiments. Ideally, the Commission should establish a target (e.g. 10 sandbox experiments by 2021) to firmly establish the sandbox framework in the market place.

STAKEHOLDER ENGAGEMENT

- ▶ **Engage more proactively with stakeholders.** The laudable better regulation agenda and Innovation Deals have had limited impact on innovation to date, because they have only focused on specific topics and fail to address the existing and mostly well-known regulatory barriers to innovation. These improvement ideas are not picked up and followed up properly simply because nobody is asking for it. More efforts to encourage a stronger engagement are needed to flush these ideas out, and this could be solved by directly addressing trade associations, organising conferences focusing on different fields of regulation, or involving a high-level group of practitioners. The EU needs to have a broad overview of instances where regulation stands in the way of innovation, among which the worst offenders can be picked and subsequently addressed.

²⁴Sandboxes are experimentation frameworks that allow innovations to be tested in a real-world environment subject to regulatory safeguards and support

ACCESS TO DATA

- ▶ **Handle open access rules with care**; they should not jeopardise the legitimate interests (i.e. commercial exploitation, data protection rules, privacy, confidentiality trade secrets, Union competitive interests, security rules or IPR) and confidentiality constraints of stakeholders. The principle of “as open as possible as closed as necessary” should be the core principle when implementing the open science policy. In particular, **applicants for Horizon Europe funds who prefer to opt out of “open access” should not be at a disadvantage**, not least since they are more likely to create market impact.
- ▶ **Further promote and strengthen IP protection.** The conditions and modalities included in the Horizon Europe programme on access rights to results should not be extended during the implementation of the Framework Programme: access to results shall not mean access to background.

3 SKILLED PEOPLE

PRIMARY AND SECONDARY EDUCATION

- ▶ **Develop a set of guidelines in line with the EU key competences framework to provide students with a basic understanding of business and entrepreneurship.** Whilst entrepreneurial skills go beyond the reasonable scope of primary and secondary schools, students often lack a basic understanding of the business world. Via the dissemination of best national practices, the EU could provide guidance on how to reform school curricula and help today’s students to understand the role and relevance of business, as a first step toward becoming tomorrow’s entrepreneurs.
- ▶ **Develop guidelines for a digital primary and secondary education** to provide students with the digital skills they will later need in their professional life. Digitalisation is a cultural technique, like language or mathematics, which cannot be learnt only through elementary computing courses. If we want to reduce the digital skills gap and make our students prepared for the digital world along multiple dimensions (e.g. risks and opportunities in cyber space, role and safeguarding of personal data), digitalisation needs to be reflected in the entire school curriculum. For this to happen **tertiary education also needs to reform the training of future teachers and current teachers need to be re-trained.** As the “digitalisation of teaching” is a daunting task common to all Member States, the EU should invest in the research on how to teach digitalisation, compile and disseminate best practices, provide guidance on how to effectively reform education systems.
- ▶ **Arouse students’ interest for STEM.** Whilst it is well established that the way STEM subjects are taught has a strong influence on students’ attitudes towards these subjects, traditional education systems do little to arouse students’ interest in STEM. Less teaching from traditional textbooks, more reference to societal challenges (e.g. climate change and underlying science), hands-on experiments, encounters with real-life scientists from academia and industry, and better use of online resources are only some of the options available to teachers to attract students to STEM. Curricula should be designed with equal emphasis on teaching students the different STEM subjects, and winning their hearts for them. Whilst this is primarily a job for Member States, the EU should support their work, e.g. encouraging recipients of MSC grants to meet students, supporting pilot projects to open university labs to local schools and give students a first-hand insight into the world of science and research, promoting gender balance and developing best practices and state-of-the-art online resources.



TERTIARY EDUCATION

- ▶ **Strongly promote industrial PhDs.** As most PhD students join the private sector at the end of their PhD studies, industrial PhDs – i.e. PhDs that are carried out under joint academic and industrial supervision – should be more strongly promoted (at least for STEM disciplines). This move would strengthen the focus on research topics that are at the interface between academic and industrial research. It would strengthen the collaboration and relationship between universities and companies, as well as increase companies' capacity to innovate and translate pre-competitive research results into competitive offerings. The EU should promote industrial PhDs, e.g. **investing 60% of the MSCA budget in “innovative training networks”** – aimed to train new creative, entrepreneurial and innovative early-stage researchers – **and linking higher academic education with businesses through RDI programmes.**
- ▶ **Complete the ERA, continue support for the Erasmus programme, and promote the transnational and intersectoral mobility of researchers Europe-wide.** Erasmus students shall be awarded a scholarship covering a greater proportion of the costs that Erasmus students incur. Universities shall aim at having at least 10% of their students be recipients of an Erasmus scholarship.

VOCATIONAL TRAINING

- ▶ **Support future-proof vocational training.** Digitalisation will have a strong impact on traditional job profiles and make entirely new profiles emerge. As defined job profiles can no longer be assumed to remain relevant during the entire professional life, vocational training needs to undergo significant change to prepare the next generation workforce and re-train seasoned workers to acquire digital as well as soft skills (e.g. team working, multicultural openness, problem solving). Given the wide diversity of approaches toward vocational training within Europe, the EU should encourage vocational training schools to network with their peers in other Member States and establish and disseminate best practices.
- ▶ **Develop and strengthen dual learning apprenticeship systems,** and integrate elements of work-based learning into different levels and streams of education and training (e.g. mandatory traineeships or projects between schools and companies; students' ability to integrate courses from other faculties).

IMMIGRATION OF SKILLED WORKFORCE

- ▶ **Strengthen the reputation of European universities to attract international students.** For most overseas students willing to study abroad, the US remains the destination of choice. Reasons go from the stronger reputation of US universities to the fact that some European universities do not see the enrolment of international students as part of their priorities. Also, foreign students that enrol in a European university do not necessarily get the right incentives to stay in Europe at the end of their studies and therefore prefer to return to their home countries. Whilst universities could play a more active role in attracting and retaining foreign students, the EU could help them in multiple ways. For instance, efforts to bring selected universities to world-class performance could be amplified through European funding programmes, the design and award of MSCA grants could reflect the objective of sustainably attracting foreign PhD students, and pilot projects by forward-looking universities to increase the intake of international students could be eligible for EU support.
- ▶ **Promote the immigration of skilled labour from non-European countries,** so as to attract foreign talents. The currently ongoing **revision of the Blue Card Directive should be concluded** in order to effectively attract highly skilled third country nationals.

4 ENHANCED COLLABORATION

EUROPEAN PARTNERSHIPS

- ▶ **Strengthen partnerships**, in particular contractual Public-Private Partners (cPPPs) and Joint Technology Initiatives (JTIs), and allocate the budget to partnerships and collaborative calls according to their technology content, objectives and expected impact, so as to ensure that partners continue to deliver impactful results. Capping at cluster level should be avoided, including in informal ways during the different stages of pre-planning and preparation. Critical mass is one of the key criteria for success.
- ▶ **Design partnerships so as to make them attractive for companies.** In an early stage, structured dialogues with the business community shall be set up on future needs and challenges for more relevant public-private partnerships and industry related RDI. Private partners shall continue to be involved in the decision-making throughout the whole life-cycle of the partnerships, as they commit from the start to jointly fulfil together long-term objectives. Involving stakeholders from different sectors right from the beginning and all along the process in the programming would enhance the synergies and the success of the programme. It would require concerted efforts and engagement from stakeholders.
- ▶ **Allow private partners to always have the possibility of contributing through in-kind commitments.** Strictly limit the private partners' financial contributions to partnerships' administrative costs in order to make partnerships accessible and attractive for all participants. At present, private partners already contribute more than 50% of the partnerships' operational costs, through in-kind commitments to RDI projects.
- ▶ **Develop a strategy for innovation clusters** (i.e. RDI networks between universities, research institutes and industry): based on an extensive assessment of existing cases, the strategy should promote the creation and specialisation of these clusters.

TECHNOLOGY INFRASTRUCTURES

- ▶ **Develop a European approach and shared vision for technology infrastructures to support industry scale-up and technology diffusion.** With the sole exception of the existing offer by the Digital Innovation Hubs, there is no offering to companies, SMEs, start-ups, mid-caps but also large enterprises, to get access to technology infrastructure services and facilities. As a follow up to the Commission Staff Working Document "Technology Infrastructures", the EU should enact a framework to provide quick and easy access to such infrastructures, so as to foster networking and reduce companies' needs to invest in proprietary infrastructures.
- ▶ **Conduct a comprehensive gap analysis covering the provision of technology infrastructures in the EU**, so as to identify which infrastructures need to be upgraded or developed to respond to the industrial needs. Understand the place and role that these technology infrastructures may play in strategic global value chains and assess the potential need to develop an ESFRI-like roadmap for unique and state-of-the-art European technology infrastructures.
- ▶ **Support industry access to world leading R&D infrastructures in Europe** (e.g. ESS in Sweden). These are important factors for attracting R&D investments to Europe.



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