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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN
ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE
REGIONS**

**A renewed European Agenda for Research and Innovation - Europe's chance to shape
its future**

*The European Commission's contribution to the Informal EU Leaders' meeting on
innovation in Sofia on 16 May 2018*

"Our future cannot remain a scenario, a sketch, an idea amongst others. We have to prepare the Union of tomorrow, today."

Commission President Jean-Claude Juncker
State of the Union, Strasbourg, 13 September 2017

"Research and Innovation are crucial for our future. They are the only way to simultaneously and sustainably tackle low economic growth, limited job creation and global challenges such as health, and security, food and oceans, climate and energy."

European Commission's contribution to the Informal leaders' meeting on 23 February
2018

"We will allow for the necessary room for manoeuvre at the various levels to strengthen Europe's innovation and growth potential."

Rome Declaration, Rome, 25 March 2017

The European Commission welcomes the decision of the President of the European Council to schedule a debate among Leaders on Research and Innovation and the steps necessary to ensure Europe's global competitiveness. This Communication presents a set of concrete actions to boost the EU Research and Innovation agenda and to feed the informal discussion that the Heads of State or Government will hold in Sofia on 16 May 2018.

1. Europe's chance to invest in the future

Investing in research and innovation is investing in Europe's future. It helps us to compete globally and preserve our unique social model. It improves the daily lives of millions of people here in Europe and around the world, helping to solve some of our biggest societal and generational challenges. From making 1.6 million Ebola vaccine doses available, to creating a battery 100 times more powerful than ordinary ones, through to developing hydrogen fuel cell powered buses for our cities, research and innovation is everywhere around us.

This reflects the fact that society can only move forward as fast as it innovates. It can only provide lasting prosperity if it makes the most of the knowledge, entrepreneurial spirit and productivity of its people. And it shows that any economy can only stay ahead of the competition if it stays at the frontier of cutting-edge research and innovation.

This is the challenge facing our Union today as we seek to maintain and improve the European way of life. It is time to invest in the future. Technology-driven innovations, the increasing digitisation of all sectors and global megatrends are changing the way we live, offering huge opportunities, but also creating new challenges. As this trend accelerates, the need to innovate will be ever more acute. Countries around the world are investing massively on research and innovation in all areas of the economy. This is intensifying global competition and threatens the leading competitive position of Europe in key industrial sectors. Deepening Europe's innovation capability, ensuring the necessary investments, and accelerating the diffusion of innovation across Europe is therefore a question of necessity for our future prosperity.

The stakes are high – but so is Europe's potential. The next wave of innovation, combining physical and digital, will be rooted in science, technology and engineering, where Europe has and needs to maintain a competitive edge. With 7% of the global population, Europe accounts for 20% of global research and development investment and around one third of all high-quality scientific publications.¹ Europe is also home to a strong industrial base.

Europe must build on these assets and on its values to develop its own distinct model of innovation. It should make the most of its collaborative, partnership-based culture, which helps to foster innovation right across our Union. And as it does so, it must ensure the high-level of European protection of citizens' data and privacy – which is now the global benchmark – becomes a source of competitive advantage when it comes to new technologies, such as Artificial Intelligence or big data.²

¹ Report "Science, Research and Innovation Performance of the EU 2018".

² COM (2018) 237.

The EU is the most open research and innovation area in the world. Not only does it welcome research organisations from all over the world into its projects, but it also collaborates extensively with international partners on joint programmes. In order to promote a level playing field, it should encourage new market opportunities for innovative goods and services. It should also stimulate synergies and cross-border investment in research and innovation bringing mutual benefits to people and businesses,³ while ensuring that the EU can uphold its interests in strategic sectors.

In other areas, however Europe is experiencing an innovation deficit. This is not down to a lack of ideas or initial start-ups: the problem is rather a lack of scale-up and diffusion, with innovations not always being translated into new market and growth opportunities. And industry investment in research and innovation has to step up. The EU is being outpaced by China and the United States in levels of investments in the technologies that are set to dominate in the future.

To make the most of its potential, and to overcome its obstacles, Europe must focus its approach on three levels. First, substantial investment is needed in scientific and technological research, with a focus on major societal and industrial challenges such as security, climate change, and the impact of an ageing population. Second, the business environment must be made more innovation-friendly and less risk-averse. Third, European citizens must be supported through what will be a fast and, for some, turbulent transition.

Europe's chance to lead the next wave of innovation will depend on our ability to put together the right mix of policies and instruments. It is essential for Europe to support the competitive development of strategic value chains of the future.⁴ The Digital Single Market⁵, the Energy Union,⁶ Industrial Strategies⁷ and our Competition Policy provide us with a solid framework. Tools such as the Investment Plan⁸, the Horizon 2020 programme for research and innovation⁹ and the European Structural and Investment Funds¹⁰ have a proven track record. This foundation has helped put Europe at the forefront of many areas of global science and technology and created better conditions for firms to innovate and compete.

It is now time to move to the next level. And we can only do so if we take a truly European approach, collaborating across borders and acting on a Union-wide scale. Success will depend on our capacity to use private capital and public investment together effectively. It will depend on future-proof European and national regulatory frameworks that are favourable to

³ This is particularly relevant when the EU negotiated trade agreements. See the Commission's proposal for a regulation establishing a framework for screening Foreign Direct Investments into the EU, COM(2017)487.

⁴ Report "*Re-finding Industry –Defining Innovation*", of the independent High Level Group of Industrial Technologies chaired by Jürgen Rüttgers, European Commission, 2018.

⁵ COM (2015) 192 , COM (2015) 550.

⁶ COM (2015) 80, COM (2016) 763.

⁷ COM (2017) 479.

⁸ 30% of the funds allocated by the Investment Plan were devoted to Small Medium Enterprises, 22% to research and innovation projects and 11% to projects that aim at enhancing Europe's digital capacity.

⁹ The EU is currently spending close to EUR 80 billion for its Horizon 2020 Research and Innovation Framework Programme over 2014-2020.

¹⁰ The European Structural and Investment Funds are investing over EUR 44 billion in research and innovation, including some EUR 30 billion in transition, less developed, outermost and sparsely populated regions.

innovation. It will depend on a single market where effective and fair competition rewards and incentivises private investment in innovation. It will depend on the capacity to push European universities to be more entrepreneurial. It will depend on ensuring that every Member State and every single region in Europe can contribute to a rising tide of excellence in science and innovation. All of these factors are in the collective control of our Union, now is time to take our future in our own hands.

2. A renewed agenda for a stronger European Research and Innovation Ecosystem

Research and innovation cuts across our whole society, with different players, instruments and policies involved at local, national and European levels. Europe needs to bring these different drivers and levels of governance closer together to create a research and innovation friendly environment. This includes connecting the different local and regional research and innovation ecosystems to foster innovation across EU value chains.

At European level, regulation, cross-border cooperation and the EU budget can all be effective policy levers. Policies in areas like energy, transport and industry contribute to a low-carbon, sustainable economy. Economic development through innovation is hard-wired into cohesion and agricultural policies. Specific programmes have been set up to help drive the digital revolution in the EU. Research and innovation is at the heart of the full range of education and training policies. Internal market and competition policies are designed to support and empower innovative firms, in particular Small and Medium-Sized Enterprises, and help them to scale-up and develop new markets.

Nevertheless, there are gaps and emerging issues where Europe can and should improve. This Communication highlights the progress made and proposes new actions where the European Union can make a difference.

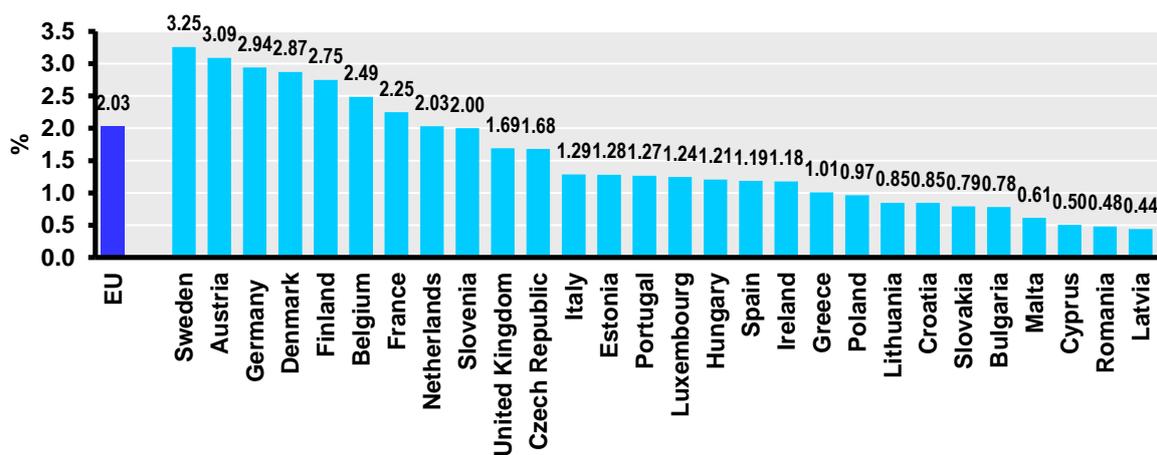
2.1 Ensuring essential public investment and stimulating private investment

Evidence confirms that the scale of private and public investment in research and innovation has a direct impact in enhancing productivity and boosting global competitiveness.¹¹ However, the EU is a long way off the overall 3% of Gross Domestic Product Research and Development investment target.¹²

¹¹ COM (2018) 2.

¹² COM (2010) 2020, COM(2017) 690. See also Report "Science, Research and Innovation Performance of the EU 2018", and report "*Lab, Fab, App*" of the independent High Level Group on maximising the impact of EU research and innovation programmes, chaired by Pascal Lamy.

Research and Development intensity 2016¹³



Public investment

The vast majority of public investment in research and innovation in the EU – around 85% – comes from national funding. While public funding for research and development in the EU and its Member States is broadly comparable to US spending, there are large differences across Member States. Boosting public research and innovation investment in the low-spending Member States is essential to maximise the EU's innovation potential.

At the European level, the current EU Research and Innovation programme, **Horizon 2020**, has been very successful – placing the EU as global leader in many areas of science and technology.¹⁴ With a total budget of over EUR 13.1 billion for the period 2014-2020, the **European Research Council**¹⁵ has helped to drive scientific excellence in frontier research and attract some of the best talent to Europe.¹⁶ With a budget of EUR 6.2 billion, the **Marie Skłodowska Curie Actions** have supported high quality researchers throughout their careers.¹⁷

The **Investment Plan for Europe** has supported innovative projects and small and medium sized enterprises in particular.¹⁸ The **European Structural and Investment Funds** have been vital for public investment in research and innovation and for its regional spread.¹⁹

In its proposal on the **Multiannual Financial Framework 2021-2027** of 2 May 2018,²⁰ the Commission made it clear that research and innovation must continue to be an essential EU

¹³ Source: European Commission, Directorate-General for Research & Innovation. Data: Eurostat.

¹⁴ COM (2018) 2, and report "*Lab, Fab, App*".

¹⁵ The European Research Council was established in 2013 for implementing a part of Horizon 2020. It is composed of an independent Scientific Council, its governing body consisting of distinguished researchers, and an Executive Agency, in charge of the implementation. It forms part of Horizon 2020.

¹⁶ To give an example, Prof Feringa, a European Research Council grantee and scientist in charge for a Marie Skłodowska-Curie co-fund project, won in 2016 the Nobel Prize for Chemistry.

¹⁷ Marie Skłodowska-Curie actions are part of the Horizon 2020 programme. Since 2013, nine Nobel Prize winners have been either former Marie Skłodowska-Curie fellows or supervisor.

¹⁸ 30% of the funds allocated by the Investment Plan were devoted to SMEs, 22% to research and innovation projects and 11% to projects that aim at enhancing Europe's digital capacity.

¹⁹ See report "Science, Research and Innovation Performance of the EU" in BG, CZ, EE, HR, LV, LT, HU, MT, PL, RO, SI and SK the European Structural and Investment Funds are the main source of funding for research and innovation.

²⁰ COM(2018) 321.

priority. The Commission proposed to increase investments in research and innovation by allocating EUR 100 billion to the future programme **Horizon Europe** and **the Euratom Research and Training Programme**. Equally, the Commission proposed to mobilise around EUR 11 billion for market based instruments including financial instruments and budgetary guarantees in a dedicated window under the **InvestEU Fund**, which in return will mobilise EUR 200 billion of private investment to support research and innovation.²¹ This reflects the consensus that investment in research and innovation is not only critical to the EU's jobs and growth; it is also an area with a very high European added value.

Innovation must be a central driver for EU policies and programmes for 2021-2027. Complementarities and synergies with EU funding programmes will be fully exploited, so that funding is streamlined and coordinated for the benefit of improved research and innovation activities. In this way, in addition to the Horizon Europe programme, other major funding programmes such as the Connecting Europe Facility the European Regional Development and Cohesion Funds, the Digital Europe Programme, the European Defence Fund, the Common Agricultural Policy and the Space Programme will also provide a significant stimulus to innovation.

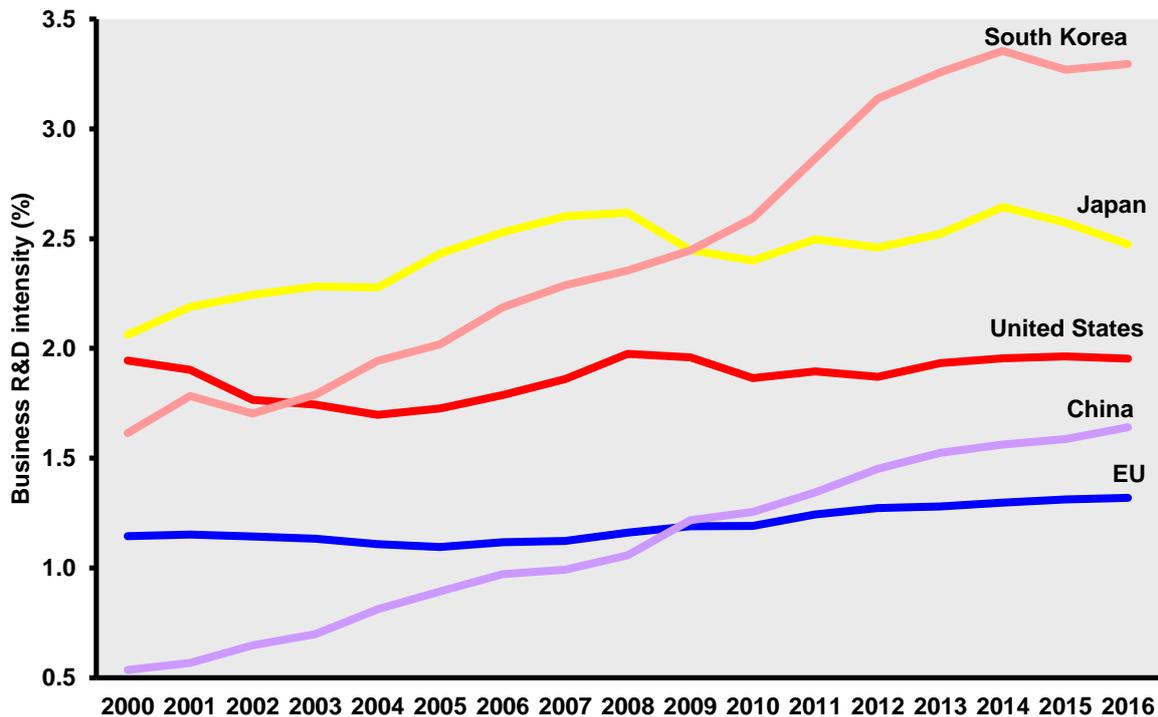
Private investment

Low private investment in innovation is a persistent weakness in Europe. The level of business research and innovation investment in the EU is at 1.3% of Gross Domestic Product. This pales in comparison to China (1.6%), the United States (2%), Japan (2.6%), or South Korea (3.3%).²²

²¹ Other programmes such as the Innovation Fund, Single Market Programme, Funds for agriculture and maritime policies, the European Social Fund, Erasmus + , the EU Culture and Values programmes, will have key innovation components.

²² Report "Science, Research and Innovation Performance of the EU 2018".

EU companies spend less on Research and Development than their competitors²³
 Evolution of business R&D intensity, 2000-2016



Europe needs an industry that innovates and invests in innovation. To boost private investment, Europe needs an improved environment for businesses with a simple, clear and effective regulatory framework. It needs to provide the open and competitive markets, the right incentives for investment, and easier access to finance, particularly for small and medium-sized businesses. Funding for industrial research, notably through public-private partnerships, is also particularly important to keep up with global competition.

The **EU Industrial Policy Strategy** seeks to improve overall business conditions for private innovation investment, including facilitating the public procurement of innovative solutions. This is done through a comprehensive set of actions ranging from the modernisation of intellectual property frameworks to the adoption of Digital Single Market initiatives such as cyber-security and data flows regulation.²⁴ It complements the **EU Better Regulation Agenda**, which ensures that EU policies and laws are as effective and efficient as possible through systematic stakeholder consultation, evaluations and impact assessments.²⁵ Recent initiatives on **Artificial Intelligence, High Performance Computing** and the **Data Economy** amongst others will help place Europe to be at the forefront of the next innovation wave.²⁶ The **Investment Plan for Europe** removes obstacles to investment, provides visibility and technical assistance to investment projects, and makes smarter use of financial resources.²⁷

A specific European weakness is venture capital – a key source of financing for innovative start-ups. Overall investment in venture capital is at one fifth the level of the United States.²⁸

²³ Source: European Commission DG Research and Innovation. Data: Eurostat, OECD.

²⁴ COM(2017) 479.

²⁵ COM(2015) 215 and COM(2017) 651.

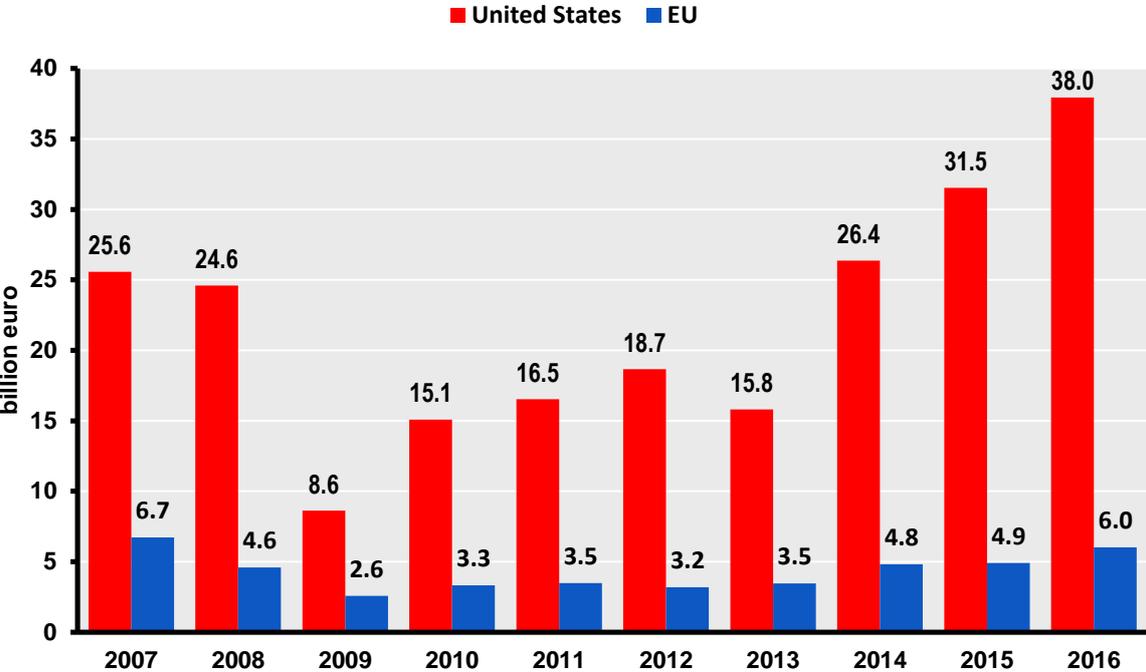
²⁶ COM(2018) 008, COM(2018)237.

²⁷ <http://www.consilium.europa.eu/en/policies/investment-plan/>

²⁸ PwC / CB Insights MoneyTree™ Report, Q4 2017.

The average size of these funds in Europe is too small to attract major institutional and private investors. This leads to a shortfall in the financing of companies as they grow as well as to an over-reliance on public support.

Venture capital funds raised (billion euro) in the EU and in the United States, 2007-2016 ²⁹



The European Fund for Strategic Investments has revived investment in strategic projects, with a third of an expected total investment of more than EUR 500 billion expected to go on research and innovation.

The Commission has placed a strong focus on facilitating access to finance for innovation, at both early and growth stages. This is done through the InnovFin financing tools under 'Horizon 2020' (expected investments of EUR 30 billion) and the Programme for the Competitiveness of Enterprises and Small and Medium-Sized Enterprises (expected investments of EUR 40 billion). Small and Medium Enterprises can also access finance for innovation through financial instruments supported by the European Regional Development Fund.³⁰

In the future, we need to "do more with less" by using financial instruments smartly and efficiently to attract and target a critical mass of private investment. To go with it, we also need a **tax system that supports innovation** by allowing the costs of research and innovation investment to be tax deductible, with additional allowances for young companies. The Commission's proposal the **Common Consolidated Corporate Tax Base** seeks to make this happen. It is now essential the European Parliament and the Council swiftly adopt the

²⁹ Source: European Commission, DG Research and Innovation – Data: Invest Europe, NVCA / Pitchbook /
³⁰ Currently EUR 9.2 billion are planned for smart growth related loan, guarantee and equity instruments leveraging important additional public and private funding.

proposal to allow Member States to make full use of this key instrument to facilitate private research and innovation investment.³¹

A major new initiative has combined Horizon 2020, the European Fund for Strategic Investments and the Programme for the Competitiveness of Enterprises and Small and Medium-Sized Enterprises to launch **VentureEU**. This initiative aims to boost **venture capital in Europe**, led by private managers and majority financed by private investment.³² VentureEU should stimulate institutional investors and encourage more fund managers to enter the European market and operate cross border to tackle existing deficits in longer term finance. With investments totalling EUR 410 million from the EU, its initial target is to raise over EUR 2.1 billion in the next 12 months, leading to an estimated EUR 6.5 billion investments in around 1500 European start-ups and scale-ups. **VentureEU has the potential to double venture capital investment in Europe**. In addition to that, the Commission is currently developing the concept of Escalar initiative, whose objective would be to help Venture Capital funds to reach a larger size more quickly by mobilizing large private funds , such as pension or insurance funds.

To support this, initiatives launched under the **Capital Markets Union** are simplifying regulatory frameworks for raising and managing venture capital funds in Europe. This will ultimately help to make risk capital more readily available. However, further efforts are needed to reach a scale adequate to Europe's economic weight.

Key steps

- **Swiftly adopt the next Multiannual Financial Framework to ensure that research and innovation continues to be one of the essential EU policy and funding priorities in the future, across different budgetary instruments.**
- **Member States to take the necessary steps to maximise their investments in research and innovation to reach the 3% of Gross Domestic Product target.**
- **Increase private investment in research and innovation and scale up initiatives such as the VentureEU to boost private investment and patient capital.**

2.2 Making regulatory frameworks fit for innovation

Well-functioning markets that incentivise competition and innovation create jobs and growth. Europe's economy needs a **regulatory framework** geared towards innovation with the flexibility to adapt to a rapidly evolving industry and society. Regulation and enforcement of competition rules play a crucial role to level the playing field for new market entrants and to provide incentives for innovation. Common standards and interoperability rules facilitate take-up and market deployment of innovative solutions. Regulation, at both European and Member State levels should therefore strike a balance between predictability and flexibility. It should guarantee fair competition without sanctioning failure or risk-taking.

In the context of new Multiannual Financial Framework, the Commission will further simplify its **State aid rules** to enhance synergies and support public funding of innovative projects. It will facilitate the blending of EU and national funds. It will also allow Horizon

³¹ The Common Consolidated Corporate Tax Base proposal aims at incentivising R&D investment with a super-deduction. COM(2016) 685.

³² VentureEU is a pan-European venture capital Fund of Funds encompassed by a set of six private-led funds (http://europa.eu/rapid/press-release_IP-18-2763_en.htm).

Europe projects with the 'Seal of excellence' label to be easily funded at regional level under European Structural and Investment Funds.³³

Regulators are key players in innovation, both in creating the right conditions and ensuring that regulation innovates as quickly as products and services do. To ensure that European policies are developed with innovation in mind, the European Commission already applies the **Innovation Principle**³⁴ when preparing major legislative initiatives. Member States should step up similar efforts. Regulatory frameworks need to enable more testing, learning and adaptation and public policies to make better use of all existing data and analytics.

To make it clearer how existing regulatory requirements apply to innovative ideas, the Commission is piloting **Innovation Deals** to help innovators address perceived EU regulatory obstacles. Early results in pilots on batteries and water re-use suggest the experience can provide useful feedback to improve regulation and promote innovation.

To stimulate a culture of experimentation and risk taking, effective regulation at national level is also critical. With this in mind, the Commission has proposed **a new insolvency law** to allow struggling companies to restructure early on and to prevent bankruptcy. It would provide honest innovators and entrepreneurs with a second chance by being fully discharged of debt from previous business ventures after a period of 3 years, with appropriate limitations to safeguard duly justified general interests.³⁵

To help to create and foster demand for innovative solutions by public authorities, the Commission has published today **Innovation Public Procurement Guidelines** on how procurement of innovation can be implemented, including many concrete examples of good practice.³⁶

Key steps

- **Build future-proof EU and national regulatory frameworks that apply the innovation principle. This would ensure that whenever policy and legislation are reviewed, developed or implemented, the impact on innovation is fully assessed.**
- **Give priority to the transposition of the Directive on preventing restructuring frameworks, second chances and measures to increase the efficiency of restructuring, insolvency and discharge procedures.**
- **The Commission will further simplify its state aid rules. This will help facilitate the seamless combination of different funds, as well help improve the use of common assessment standards for research and innovation projects.**

³³ The Seal of Excellence certifies internationally excellent, but unfunded projects, submitted to the Horizon 2020 programme so that they can be financed by the Structural Funds.

³⁴ The Innovation Principle is an integral part of the EU Better Regulation approach, and ensures that whenever policy and legislation are developed, the impact on innovation is fully assessed.

³⁵ European Commission proposal for a Directive on preventive restructuring frameworks, second chance and measures to increase the efficiency of restructuring, insolvency and discharge procedures (http://ec.europa.eu/information_society/newsroom/image/document/2016-48/proposal_40046.pdf).

³⁶ C(2018) 3051.

2.3 Making Europe a frontrunner in market-creating innovation

Europe is a world leader in science. We are home to some of the most creative and entrepreneurial minds and some of most innovative ideas anywhere in the world. This takes a long way but we still struggle to bring that innovation to the market.

Europe is relatively strong in adding or sustaining value for existing products, services and processes, known as incremental innovation. We have seen this in sectors as varied as space, aeronautics, pharmaceuticals, electronics, renewable energy, bio-based industries and advanced manufacturing. We have also taken strides forward in supporting innovation through Key Enabling Technologies, such as robotics, photonics, and biotechnology.³⁷ These technologies can be used and applied across many industries, generate knowledge and new forms of participation and are crucial for addressing key societal challenges, while supporting the EU's industrial leadership.³⁸

But Europe needs to do better at generating disruptive and breakthrough innovations.

A *breakthrough innovation* leads to entirely new products, services or processes or to substantial improvements in the quality of existing ones. An example would be doubling the energy density in a battery for an electric car. This opens up whole new business models and market opportunities. Compared to incremental innovation, breakthrough innovations tend to come from new entrants, often start-ups without existing assets or cash flows. They tend to entail higher risks, in terms of technology, market and regulation. A *disruptive innovation* is one that threatens to make an existing solution or industry obsolete. Classic examples include the smart phone and on-line music and video streaming services. Disruptive innovations create entirely new products and services, as well as new business models or in some cases even new markets.

Disruptive and breakthrough innovations are still too rare in Europe. This is down to a range factors, including lack of venture capital, a deep-rooted aversion to risk, lack of transfer of new technologies from the research base, and an inability to exploit the scale of the Union. Too few European start-ups survive beyond the critical initial phase of 2-3 years. Of those that make it beyond that point, too few end up growing into larger firms and scaling up globally.³⁹ Less than 5% of European Small Medium Enterprises grow internationally.⁴⁰

To help boost major breakthrough innovations in Europe, the Commission proposes to create a **European Innovation Council**. The European Innovation Council will offer a one-stop shop for high potential and breakthrough technologies, as well as for innovative companies with potential for scaling up. It will support the commercial pathway of promising ideas from the research to industry. This will be done via start-ups, spin-outs or transfers to industry. It will support the scaling up of innovation in the start-up phase to make sure that it translates to

³⁷ http://ec.europa.eu/research/industrial_technologies/pdf/re_finding_industry_022018.pdf#view=fit&pagemode=None

³⁸ Report "Re-finding Industry –Defining Innovation", High Level Group of Industrial Technologies, European Commission, 2018.

³⁹ The percentage of firms that do not grow at all or by less than 5 % is over 45 % in Europe compared to 37 % in the USA. European Parliament (2017), Helping European SMEs to grow.
[http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_IDA\(2017\)603967](http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_IDA(2017)603967)

⁴⁰ The EU's shortcomings are evident from the almost complete absence of EU based companies in leading global technology companies.

more jobs and growth.⁴¹ It will do so by streamlining, rationalising and simplifying existing structures. It will work in complementarity with the **European Institute of Innovation and Technology**.

A pilot has already been launched, grouping relevant existing schemes and introducing first reforms in Horizon 2020. EUR 2.7 billion has been earmarked for this between 2018 and 2020. The future, fully-fledged European Innovation Council will be managed in a way that allows for investments in higher risk projects. Based on strategic advice from leading innovators, it will prioritise excellence and scale of impact. It should accelerate the commercialisation and scale up of innovations by start-ups emerging from Horizon Europe projects. It should also provide advice on research and innovation funding schemes to ensure focus, scale and delivery of European policy priorities.

The Commission will complement this with the **Innovation Radar** initiative, a tool that allows to spot innovations with market potential financed by the EU budget.

Key steps

- **Establish a European Innovation Council to identify and scale up breakthrough and disruptive innovations. The focus will be on fast moving, high risk innovations that have a strong potential to create entirely new markets.**

2.4 Setting EU-wide research and innovation missions

European support for research and innovation helps the EU deliver on its priorities, makes the daily life of citizens that bit easier, and helps make major breakthroughs that will affect millions right around the world. From delivering our Paris Agreement commitments on climate change, to discovering new planets, making major advances on cancer treatment, EU funding has a real and demonstrable added-value. It may even help you to print a 3D version of your dream house in the near future.

Europe can take this added value and impact one step further by setting EU-level research and innovation missions. These would set ambitious goals that would push the boundaries for research and innovation, drive our jobs, growth and competitiveness agenda, and help solve some of society's biggest challenges. These missions would be defined in close cooperation with Member States, stakeholders and citizens. They could range from the fight against disease, to clean transport, or plastic-free oceans.

Recognising that what gets measured gets done, these missions would need to set ambitious, targeted and time-bound objectives. Taking the example of oceans plastics, these objectives could include, for instance, reducing the amount of plastics entering the marine environment by 90% and collecting more than half of the plastics present in our oceans by 2025'.

The missions will encourage investment and participation across multiple sectors throughout the value chains, policy areas (e.g. energy and climate, transport, advanced manufacturing, health and nutrition, digital), scientific disciplines (including social sciences and humanities), as well as different actors and stakeholders. This requires an inclusive process which

⁴¹ High Level Group of Innovators in their report "Europe is back: accelerating breakthrough innovation" (https://ec.europa.eu/info/sites/info/files/eic_hlg_bz_web.pdf).

identifies areas with greatest potential in terms of scale of economic impact on the one hand, and addresses societal challenges on the other. Missions could have a societal, scientific or technological focus and should create synergies with research and innovation strategies at Member State, regional and local level.

Missions should encourage and even require experimentation and risk-taking. They will be able to build on and continue the experience of the Graphene and the Human Brain flagship projects⁴², and more recently the Quantum project, all of which have shown ambition and a strong technology-driven approach based on multi-disciplinary research.

Key steps

- **Launch a first set of EU level research and innovation missions with bold, ambitious goals and strong European added value.**

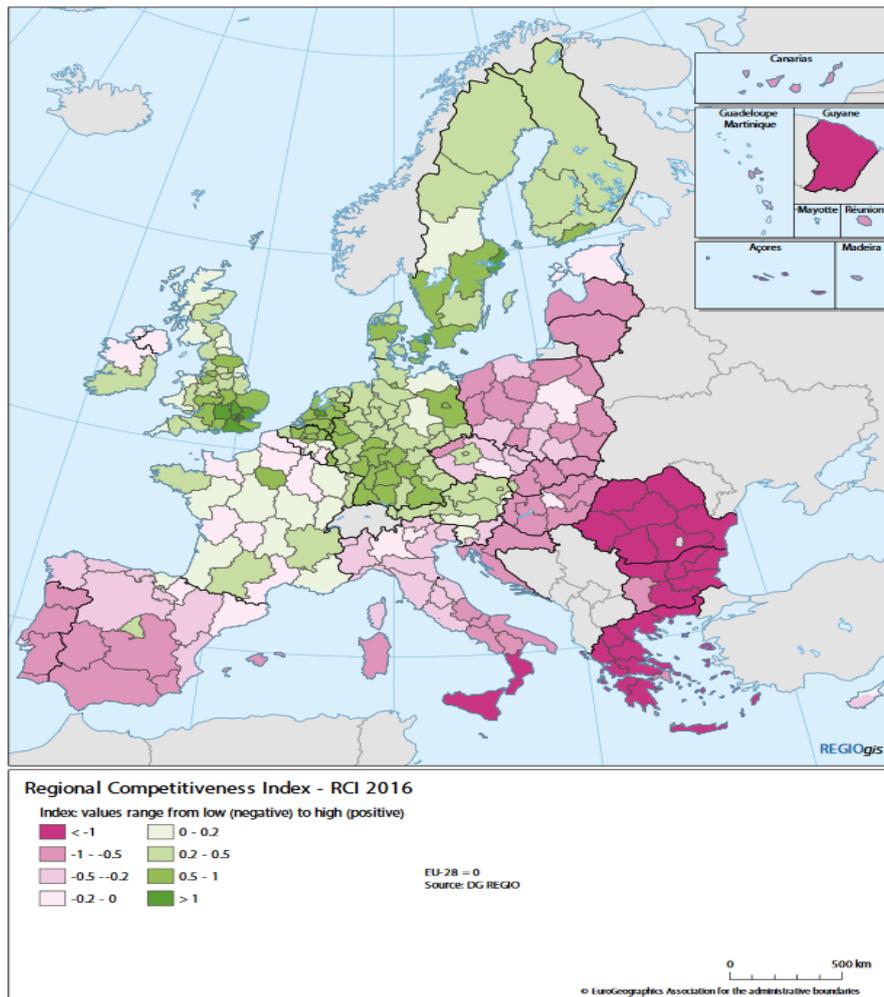
2.5 Support rapid dissemination of innovation and uptake throughout the Union

There used to be a clear innovation divide in Europe between North and South, and West and East. However, that division is now much more nuanced, as a number of countries have made significant progress in catching up, notably in terms of investment levels. Pockets of scientific and technological excellence have emerged in all parts of Europe. But the innovation divide between regions still persists, with several areas lagging significantly behind in terms of investment, innovation capacity and performance. Weaknesses in innovation dissemination explain a large part of Europe's slow aggregate productivity growth.⁴³

⁴² Graphene is a Horizon 2020 Project launched by the EU in 2013. It is one of Europe's biggest ever research initiatives that aims to take graphene (an ultra-thin carbon material that could replace silicon) and two-dimensional materials from laboratories to the European society. Human Brain is a Horizon 2020 Project launched in 2013, which strives to accelerate the fields of neurosciences, computing and brain related medicine. They are both facilitated by the European Development Fund investments, respectively in the Graphene Institute in Manchester and the European Institute for Neuromorphic Computing in Heidelberg.

⁴³ "Science Research and Innovation Performance of the EU 2018" (https://ec.europa.eu/info/support-policy-making-eu-and-horizon-2020-associated-countries/srip-report_en).

Performance of EU regions in terms of innovation⁴⁴



Additional efforts are needed to accelerate the uptake of innovation in less developed regions and in more traditional sectors. Investments need to be made more efficient, effective and better tailored to regional and local needs. EU funding has been instrumental in developing regional innovation eco-systems, including "Innovation Hubs" that give Small and Medium Enterprises easy access to infrastructure and expertise to experiment with new technologies. To support these efforts, **Smart Specialisation Strategies** are key to ensuring that all EU regions can harness their potential and succeed with innovation-based industrial transition.⁴⁵

Since 2014, the focus on innovation within the **European Structural and Investment Funds** has been reinforced through 120 Smart Specialisation Strategies that promote innovation based on the strengths of each region. Around EUR 80 billion is available from the **European Regional Development Fund** to encourage entrepreneurship, digitisation and business research, in particular in the least developed regions. The **European Social Fund and the Erasmus + Programme** support investment in developing people's skills. The **Common Agricultural Policy** strengthens innovation capacity in rural areas through support for the uptake of digital-based opportunities.

⁴⁴ Source: European Commission, Directorate –General for Regional and Urban Policy.

⁴⁵ COM(2017) 376.

For Europe to build a stronger innovation capacity and more effective and faster innovation diffusion across the Union, we need a stronger and more strategic coordination across different EU funding schemes, with a better alignment of priorities at European level, including between Smart Specialisation Strategies and Horizon Europe. More support is needed for cross-border and cross-region collaborations across European and international value chains. Institutional capacity at regional and local level also needs to be strengthened to support reforms of innovation systems and help develop the new skills needed.

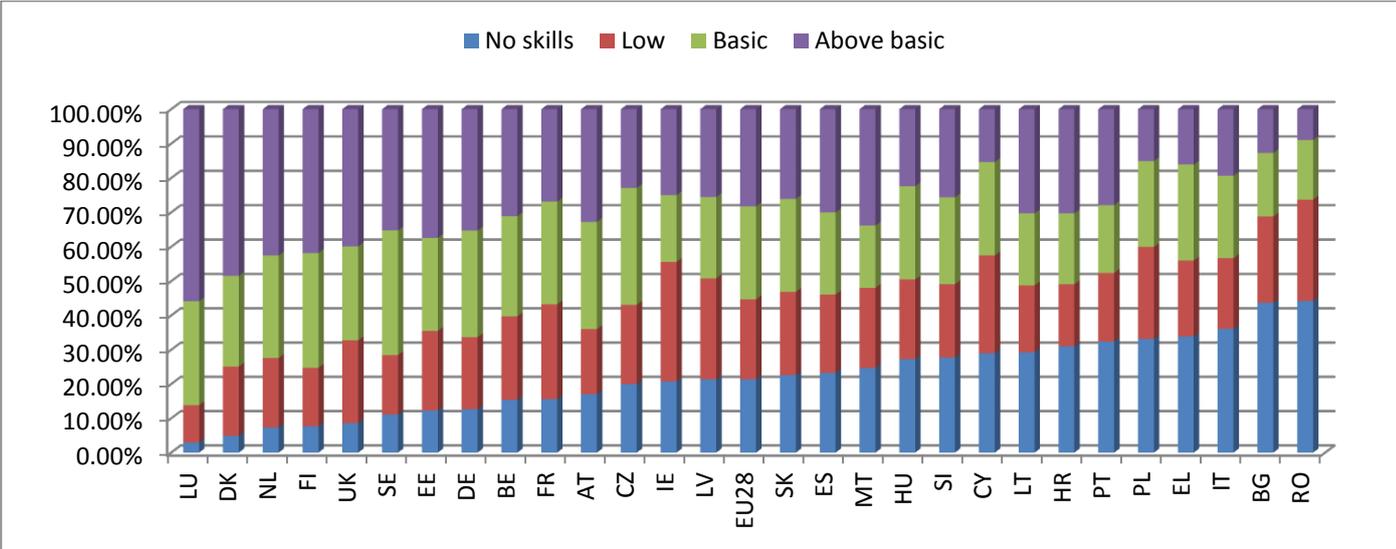
Key steps

- **Use European Structural and Investment Funds to bring regions into the innovation economy. Smart specialisation strategies should be strengthened and streamlined to enable interregional innovation support. Synergies should be created with the Horizon Europe Programme, InvestEU Fund, the European Social Fund, the Erasmus +Programme, the Digital Europe Programme, the Common Agricultural Policy and other programmes.**

2.6 Invest in skills at all levels and empower European universities to become more entrepreneurial and interdisciplinary

Developing a learning and entrepreneurial society in Europe is crucial to spur innovation across all sectors of the economy and all segments of the population. It requires major changes in the education and training and research system, as well as in the workplace to ensure that life-long-learning and upskilling becomes a reality for all. This is needed to address skills gaps and mismatches that exist in Europe. It is estimated that around 40% of the workforce in Europe needs digital upskilling, while 70 million Europeans lack basic literacy and numeracy skills.

More than half of all citizens have either basic or no digital skills⁴⁶



At the other end of skills spectrum, European universities need to better tap-in to their innovation and entrepreneurship potential.⁴⁷ This will help generate the ideas and new

⁴⁶ Source: Data from the Digital Scoreboard, European Commission.

business models that can translate into start-ups and spin-offs. Universities should also be more ready to break down disciplinary barriers and work with business and civil society. Moreover, both general and technical education should better match emerging business and societal needs by offering more agile learning programmes that will help to close the skills gap as well as help the faster diffusion, reuse and access to knowledge.

At the Gothenburg Summit in November 2017, Europe's leaders recognised the key role of higher education in providing the future-oriented skills and competences to successfully innovate.⁴⁸ The European Council called on Member States, the Council and the Commission to take work forward on a number of initiatives, including encouraging the emergence by 2024 of some twenty "European Universities" made up of bottom-up networks of universities across the EU.⁴⁹ The "European Universities" will bring cross-border cooperation to a new level, going beyond what exists today through the development of long-term strategies for top-quality education, research and innovation, more mobility for students, staff and researchers, and true transnational European knowledge-creating teams. They should become key drivers in the **European Education Area** and contribute to the international competitiveness of universities in Europe.⁵⁰

The take up of open science practices at different stages of the researchers' careers can also stimulate attractive career environments for all, give more recognition and reward international and science-business mobility.⁵¹ The modernisation of universities and public research organisations should therefore also be supported with an **Open Science label**. Such a high-quality label could be awarded to individual universities and trans-national university partnerships, and would be recognised in future EU support for trans-national projects involving universities.⁵²

At the European level, we should pursue and further improve initiatives that have proven to bear good results, such as **the European Institute of Innovation and Technology, the Marie Skłodowska-Curie Actions** and the **Higher Education Innovate Initiative**.⁵³ They connect business, education and research organisations and promote entrepreneurship and stronger knowledge flows throughout the value chain.

To strengthen knowledge transfer, a stronger link between vocational education and training and innovation systems is needed, to contribute to skills intelligence and better skills matching in line with the **Skills Agenda for Europe**.⁵⁴

⁴⁷ <https://heinnovate.eu/en>

⁴⁸ https://ec.europa.eu/commission/publications/eu-leaders-meeting-education-culture_en

⁴⁹ European Council of December 2017. In response, the Commission presented on 17 January 2018 a first package of measures addressing key competences, digital skills as well as common values and inclusive education. A second package on facilitating recognition, boost language learning, increase quality of early childhood education and care and present progress on European universities and the EU student card, has been presented on 16 May 2018 with the COM (2018) 267-272.

⁵⁰ Work on the "European Universities" has progressed fast since the European Council Conclusions and a first call for pilot projects will already be published next October in the framework of Erasmus+.

⁵¹ <https://ec.europa.eu/research/openscience/index.cfm?pg=home§ion=monitor>

⁵² A package of incentives shall be put in place, recognising existing successful schemes and supporting new ones that develop digital and entrepreneurial skills, knowledge transfer, innovative curricula, career incentives, cross-sectorial mobility, and trans-disciplinarity.

⁵³ The 'HEInnovate' Initiative enables universities to assess their entrepreneurial capabilities and supports Member States in enhancing them.

⁵⁴ COM(2016) 381.

Moreover, to meet the demands of the new economy and help develop a more agile and entrepreneurial workforce, **the European Social Fund** will continue to help Europeans to re-skill and up-skill, while the **Blueprint for sectoral cooperation on skills**⁵⁵ can help adjust training for new occupations in selected sectors. The **Digital Education Action Plan** and the **Digital Skills Strategy** work towards identifying and developing future skill needs.

Key steps

- **Contribute to the modernisation of universities and public research organisations with an Open Science label.**

3. Conclusions

Europe's economic and social prosperity depends on our ability to innovate. Sustaining Europe's social and economic model, modernising industry and building a cohesive and inclusive European Union means ensuring that innovation permeates all policies as well as social, economic and industrial decisions.

The changing nature of innovation will bring new opportunities to drive job creation and growth in Europe. We must be in a position to seize these opportunities, while addressing the challenges and uncertainty. In doing so, we must be vigilant that the benefits are fairly distributed within our society.

This transformation will require a shared ambition and a change in mind-set regarding innovation and science in Europe. A shared agenda between regions, Member States and the European Commission is essential. We must build on Europe's strengths and give a new direction and a new impetus so that Europe becomes a true global leader in innovation for all.

The Commission invites Leaders to discuss and give strategic orientation with a view to:

1. *Swiftly adopting the next Multiannual Financial Framework with the proposed innovation funding to ensure that research and innovation continues to be one of the essential EU policies and funding priorities in the future, across different budgetary instruments.*
2. *Member States taking the necessary steps to maximise their investments in research and innovation to reach the 3% of Gross Domestic Product target.*
3. *Increasing private investment in research and innovation and scale-up initiatives such as the VentureEU initiative to boost private investment and patient capital.*
4. *Building future proof EU and national regulatory frameworks by applying the innovation principle, ensuring that whenever policy and legislation are reviewed, developed or implemented, the impact on innovation is fully assessed.*
5. *Giving priority to the transposition of the Directive on preventing restructuring frameworks, second chances and measures to increase the efficiency of restructuring, insolvency and discharge procedures.*
6. *Further simplifying state aid rules to facilitate the seamless combination of different funds and the better use of common assessment standards for research and innovation projects.*
7. *Establishing a European Innovation Council to identify and scale up breakthrough and disruptive innovation, focusing on fast moving, high-risk innovations that have a strong potential to create entirely new markets.*

⁵⁵ <http://ec.europa.eu/social/main.jsp?catId=1415&langId=en>

8. *Launching a set of European research and innovation missions with bold, ambitious goals and strong European added value.*
9. *Using European Structural and Investment Funds to bring the regions into the innovation economy. Smart Specialisation Strategies should be strengthened and streamlined to enable interregional innovation support. Synergies should be created, with the Horizon Europe programme, InvestEU Fund, the European Social Fund, the Erasmus+ Programme, the Digital Europe Programme, the Common Agricultural Policy and other programmes.*
10. *Contributing to the modernisation of Universities and public research organisations with an Open Science label.*