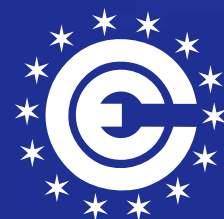


EURO-CASE
POLICY PAPER
ON EUROPEAN
INNOVATION POLICY



Euro-CASE



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Executive Summary

Innovation is one of the cornerstones for future growth and prosperity in Europe. The EU has recognized this by making the Innovation Union one of the flagship Initiatives of the Europe 2020 Strategy.¹ Still Europe is facing several challenges when it comes to being the most innovation friendly region: Fragmented markets and an unfinished European Research Area (ERA), limited financial resources due to the on-going financial and economic crises in several European countries, deteriorating venture capital markets and limited entrepreneurial activities.² The challenges are manifold and EU support for research and innovation not only in financial but also in structural terms is of great importance for strengthening Europe's innovativeness.

With Horizon 2020 the European Union has set up the largest multilateral research funding programme for research and innovation ever. Compared to its predecessor FP7, Horizon 2020 puts more emphasis on deploying excellent research results into marketable products to strengthen industrial leadership and to use research and innovation to tackle societal challenges. The mission orientation is vital because Europe is facing a profound transformation of society, driven in the first place by technological

changes of an unprecedented scope and size; by an inevitable radical change of the current energy model and by an accelerated globalisation process. The world will change faster and that will require a greater capacity to adapt.

While Euro-CASE believes that research, innovation and technology led by specific missions is a viable way to go ahead it considers a change in the innovation culture and the way entrepreneurial activities are valued in Europe as prerequisites to make Europe the most innovative region in the world. The European Union as well as the Member States should act resolutely in making their innovation systems more competitive. Europe cannot and should not compete on the basis of cheap labour. Therefore, overarching topics such as embracing technological change, driving the next industrial revolution and supporting a culture of innovation across both academia and entrepreneurs alike are important steps for Europe's competitiveness.

In this context, the Euro-CASE Innovation Platform puts forward policy recommendation in the areas of Innovation Procurement, Public-Private-Partnerships in Research and Innovation, Financing Innovation and the Transformation of Manufacturing.

ABOUT EURO-CASE

The European Council of Academies of Applied Sciences, Technologies and Engineering is an independent non-profit organisation of national academies of engineering, applied sciences and technologies from 21 European countries. Euro-CASE acts as a permanent forum for exchange and consultation between European Institutions, industry and research. Through its member academies, Euro-CASE has access to top

expertise (around 6,000 experts) and provides impartial, independent and balanced policy advice on technological and innovation issues with a clear European dimension to European Institutions and national governments.



SCANNING

COMPLETE

I. Introduction: The importance of innovation for future growth and challenges for the EU

It has long been acknowledged by policy makers and economic scholars alike that innovation is a key driver for economic growth and prosperity. Successful investments in research, development and innovation (RDI) are vital sources of economic growth, productivity and welfare in the long term. Public support measures for RDI are, therefore, cornerstones of the Europe 2020 strategy employed by the European Union in 2010 and the Flagship Initiative Innovation Union. The EU pursues a broad concept of innovation that includes both research-driven innovation and innovation in business models, design, branding and services that add value for producers and consumers alike.³ Euro-CASE strongly supports this broad concept of innovation that is not limited to (technological) product and process innovations but also encompasses organizational and marketing innovations.⁴

The ability to be able to handle modern technologies and the ability to enter competitive world markets is not only influenced by enterprises or individual actors alone. Rather it is to be understood as a result of a multi-layered network that consists of interactions with research institutes as well as formal (ministries, laws and regulations, standards, etc.) and informal institutions (culture, habits, rules of the game, etc.). The competence and the arrangement of these institutions decisively influence the performance of the respective innovation system. By acknowledging the systemic nature of the innovation process the diffusion of technologies does not occur

automatically. Because of systems failures such as capabilities, network, infrastructural or institutional failures government interventions are seen as appropriate means to strengthen national innovation systems.⁵ On the other hand neoclassical economic theory advocates public support for research due to the underinvestment in science and research given their characteristics of a public good (indivisibility, inappropriability and uncertainty). Therefore, federal governments and the EU should use public interventions to reduce systems and market failures.⁶

With shorter product cycles, more and more complex production methods and always faster changing global standards, countries will have to develop supportive institutions (ecosystems) and an ability to adapt technologies that might have been developed elsewhere in order to stay competitive (adaptation capability). The existence of diverse institutions and organizations and their modes of interaction determine the dynamic of the national innovation system which is, if organized appropriately, a powerful engine of progress and economic growth.

European Innovation systems came under strain during the financial crisis in 2008 and the following years which were marked by austerity measures. Only a few countries were able to increase their gross expenditures on R&D.⁷ The contraction of financing opportunities may have serious negative consequences for future growth.

Since the mid-2000s, the trends in R&D ex-

penditure have not varied significantly between the EU and the US.⁸ However, Japan and China have shown contrasting developments. In terms of total and business R&D intensity, the EU is far from those of the US, Japan, South Korea, Israel and Switzerland. Europe is facing a situation of innovation emergency as it is spending 0.8% of GDP less than the US and 1.5% less than Japan every year on R&D. Thousands of researchers and innovators have moved to countries where conditions are more favourable. Although the EU market is one of the largest in the world⁹, it remains fragmented and not innovation-friendly enough especially in terms of researcher mobility and interaction of national innovation systems. The completion of the European Research Area (ERA) is unforeseeable as it has seriously lost momentum in recent years.

The European Union aims to counter this situation with a series of policy measures under the headlines of the Innovation Union and the new Framework Programme for research and innovation Horizon 2020. The Innovation Union flagship initiative, together with the Digital Agenda, Industrial Policy and Resource Efficient Europe flagships¹⁰, and the Single Market Act, aim to create favourable framework conditions for Europe's researchers and entrepreneurs to innovate. With the adoption of the Europe 2020 document the EU has set the framework towards a new economic-industrial model in an increasingly globalised and rapidly changing future. Based on prior evaluations of FP 6¹¹ and the interim evaluation of FP 7¹² (that both called for a major simplification of funding rules) Horizon 2020 brings all EU research and innovation funding together under a single programme. Apart from supporting excellent science major emphasis is given to strengthening industrial leadership and innovations to tackle societal challenges¹³ shared across Europe. As DG Research and Innovation is on its way to becoming a more policy oriented DG with associated agencies responsible for handling the management of the projects funded under Horizon 2020 it remains to be seen how effective this structure will be in providing the best support possible for European innovators – be it from the academic or the private sphere.

It needs to be noted that the overall position of Europe is still relatively strong. The EU is one of the world's top performers in terms of producing high-quality science and innovative products. Despite the recent economic downturn due to the financial crises the EU is still able to capture the largest and a stable share (28%) of income generated in global manufacturing value chains. However, the aggravation of reduced innovation financing opportunities might prejudice this situation as the gap between excellent science and the translation of its results into marketable products and services (the so-called European Paradox¹⁴) might increase.

The role of manufacturing is crucial in many respects. In terms of productivity and the development of technologies, manufacturing is still the leading sector. It also accounts for largest share of business R&D and a high share of product and process innovations.¹⁵ The European Commission established a new objective to increase the share of industry on the GDP from the current 16% to 20% by 2020¹⁶. Nowadays there is a broad consensus about the fact that it is not possible to create quality employment without a competitive industrial, technologically advanced and economically viable base. As one of the flagship initiatives of the EU the Innovation Union initiative touches upon reforming framework conditions and aims to remove obstacles that prevent innovators from translating ideas into new marketable products and services such as faster standard-setting, cheaper retention of patent protection, smarter public procurement of innovative products and services, and better access to finance for innovators and SMEs.

Competitiveness is inherently related to the capacity for renewal.¹⁷ Policy interventions can have an impact on the direction and pace of the change. This requires consistent and forceful EU and national policy measures to accelerate this development.

2. The Euro-CASE Innovation Platform – formation and scope

Europeans are on the verge of a profound transformation of society, driven in the first place by technological changes of an unprecedented scope and size; by an inevitable radical change of the current energy model and by an accelerated globalisation process; interrelationships in real time inevitably entail an acceleration of international processes. To a great extent, the driver behind the technological revolution and globalisation is the digital revolution that, in turn, is driven by the exponential development of technologies related to microprocessors. Scientific development is preparing for new technological advances in biology and new materials at a molecular and atomic level. This will bring unprecedented advances in production processes, food, medicine, new materials and new energy sources.¹⁸ European SMEs as well as its large enterprises need the best framework conditions possible to endure in the international competition.

In order to support EU policymaking in the area of innovation policy and to provide advice how Europe can keep its advantage vis-à-vis its international competitors Euro-CASE has launched an Innovation Platform which consists of members of 14 Euro-CASE academies from science, engineering and business. The platform develops policy recommendations relevant for the Member States as well as for the EU.

The Euro-CASE Innovation Platform took up its work at the beginning of 2012 under the leadership of acatech (DE) and IVA (SE). The platform has convened six times over a two and a half year period and has drafted policy papers after each respective meeting. In the light

of the importance for European innovation policy the following topics have been discussed by the platform:

- Innovation Procurement
- Public-Private Partnerships
- Financing Innovation
- Transforming Manufacturing

Additionally two working papers on *Boosting innovation in Europe* and *Changing Industry Structures* have been endorsed by the Platform.

The current paper summarizes the works of the platform and provides policy recommendations for the Member State and EU level. Euro-CASE views both applied and basic research as being equally important drivers for future growth. Still Europe as a whole needs to do more when it comes to commercialization of knowledge and the exploitation of excellent research results. More often than not excellent results of publicly funded research are not translated into real world products. Therefore Euro-CASE does not merely call for an expansion of public funding but for removing existing barriers to innovation be they legal, financial or entrepreneurial – which primarily means strengthening the entire ecosystem for innovation.



3. Euro-CASE recommendations on EU Innovation Policy

INNOVATION PROCUREMENT

Despite strong efforts from the EU for putting the topic of **innovation procurement** on the agenda of national governments only a few countries have an approach that seeks to integrate demand- and supply-side instruments.¹⁹ By “innovation procurement” is meant the procurement of prior unknown solutions to a defined problem or the need for a solution that is not yet established on any market. In many countries across Europe the rhetoric on the importance of public innovation procurement is visible but there is still a strong confusion on the instruments, one of the main challenges being the question of responsibility for implementation of public innovation procurement schemes (vertical and/ or horizontal). The EU’s procurement regulations already include the principal option for strategic procurement, meaning that there are in fact no legal obstacles. However, the interpretations and applications of procurement and competition regulations – the old-fashioned attitudes – towards the procurement process in the Member States have a restrictive and detrimental effect. The orientation to award contracts only on the criteria of low costs needs to be questioned in this respect and a new, more risk-taking attitude in public procurement institutions throughout Europe seems desirable.

There is a need for the EU and its Member States to move from their current restrictive interpretations and applications of procurement and competition regulations to public innovation procurement schemes, through engagement

in demand driven policies. By doing so the public sector will actively contribute to stimulate innovation and entrepreneurship. The importance of creating such processes is highlighted in the context of the scale and impact of the public sector in Europe, where 44% of the EU’s GDP is state revenues. The spending by governments and their agencies in public procurement was 19.4% of GDP in 2009. Euro-CASE proposes using it more efficiently. It is important for all countries to offer public innovation procurement initiatives. A key aspect of this is to spread knowledge and inspiration and to develop tools so that more players take advantage of innovation procurement. The initiatives should be targeted at public procurers as well as their suppliers, especially small and medium-sized enterprises.

In order to benefit from the opportunities that joint public procurement offers, not only a regional and national but also a European dialogue is of utmost importance, being strengthened by the organisation of various conferences and concrete initiatives. The real opportunities for innovation procurement lie in the hands of the member states. The Euro-CASE Innovation Platform thus acknowledges and highly welcomes the initiatives put forward by the European Commission in the past and recommends that the future dialogue should clearly express the innovation ambitions within the public sector and establishes when and how various needs can be met through innovation procurement.

Recommendations for the Member States

In order to encourage the respective organisations in the Member States to establish national delegations to stimulate innovation procurement, we put the following three proposals to the EU Member States:

- **Initiate pilot trials of innovation procurement.** A number of public authorities are given a clear innovation procurement responsibility. The selection of the authorities should be based on an assessment of whether there is a need for innovative solutions in the authority's area of activity. The authorities will be allocated sufficient funds for it to be practical for them to impact markets through innovative procurement, certification, and standardisation work.
- **Introduce a 'Small Business Innovation Research' programme for innovation procurement.** It should be ensured that the SBIR programme is experimental in nature and that procurement is financed within the authorities' normal budgets. 3 % of the total research budget for extramural research should be allocated to SMEs. There should also be an exchange of experiences to inspire the use of incentives of this type used in other countries, e.g. risk funds and insurance solutions.
- **Train a new generation of public officials to become the vanguard of innovation procurement.** It is important that public procurement officials are trained in a new mindset of possibilities rather than risk aversion. A positive attitude needs to be created where moderate risk-taking is part of the routine.

Recommendations for the European Union

- **Lobby for a higher innovation share in public procurement.** The EU should lobby for a goal of 15% of the national and regional procurement expenditures to be spent on the basis of innovation procurement instead of following low-cost tenders.
- **Create a stronger dialogue between the regional, Member State and EU-Level.** The current initiatives for establishing a broader dialogue about innovation procurement should be expanded and an extended catalogue of best practice in the Member States and the regions should be created.
- **Establish a strong European working group for innovation procurement.** A European working group should give science-based policy advice in the field of innovation procurement and identify practical measures that can be implemented to strengthen innovation procurement in Europe. It should follow up and evaluate these measures and promote a dialogue about the application of European regulations and laws on types of public procurement.
- **Identify and support the important public procurers of innovation.** The European Commission should build a team of innovation procurement developers who share their know-how with the procurers in the Member States and regions. Transnational model projects should be supported and successful initiatives should be a new Innovation Procurement Award (similar to the German prize "Innovation schafft Vorsprung" (Innovation creates a lead)).

EU PUBLIC-PRIVATE PARTNERSHIPS IN RESEARCH AND INNOVATION

European Initiatives such as Public Private Partnerships in Research and Innovation (PPPs) are an effective instrument for turning research findings into innovative and marketable products but their potential has to date not been fully exploited.²⁰ The massive investments foreseen by the continued implementation of Joint Technology Initiatives (JTIs) and

PPPs by public and private actors requires a unified, comprehensive, open, and competitive framework for the development of new public-private partnerships at European level complemented by a corresponding legal and regulatory structure. In the past, modern mechanisms of governmental control, such as target and performance agreements, supplemented by

a streamlined and effective auditing process were missing which led to a certain degree of underperformance.²¹

Euro-CASE supports the recent changes in research funding legislation from FP7 to Horizon 2020 which put more emphasis on innovation and applicability of research results. These should, however, be complemented with appropriate Public-Private Partnerships measures. PPPs provide structures and incentives for the collaboration of researchers and industry and, properly managed, can be an effective instrument for turning research findings into innovative and marketable products. They can be strong instruments to foster innovation in general, to bring together academia, research institutions and industry, to leverage private funds for research and innovation and to increase industry participation in the European Union's research programmes.

JTIs have been selected by the European Commission as a result of a long dialogue with industry interest groups where strong interest groups have finally succeeded.²² Especially the Recovery Programme PPPs have been selected for political reasons. There has been no competitive framework for their selection and inviting further potential interest groups to participate. It is unclear whether this process provides equal opportunities to all interest groups, makes the most effective use of all possible synergies and ensures the degree of competitiveness which is necessary for justifying government interventions in favour of industrial sectors.

Despite recent conceptual advances especially regarding the governance of the Joint Technology Initiatives (JTIs) and Knowledge and Innovation Communities (KICs) we recommend the following mainly to the European level:

Recommendations for the European Union

- **Concentrate on providing the best possible framework conditions** and incentives for the development of public-private partnerships and make use of more modern mechanisms of governmental control, such as target and performance agreements, supplemented by a **streamlined and effective auditing process.**

- **Establish a unified, comprehensive, open, and competitive framework for the development of new public-private partnerships** at European level complemented by a corresponding legal regulatory structure. The funding programme needs to be dedicated to excellent research and to the most convincing and impactful strategies for dealing with challenges Europe is faced with. This new programme should not be confined to certain technologies, companies or industrial sectors. Politicians should refrain from picking winners beforehand.
- **As a vision for an upcoming “FP9” following Horizon 2020, Euro-CASE proposes the implementation of a separate funding programme** dedicated to the development of new public-private partnerships. In Horizon 2020, already, the path towards such a programme should be paved. For example, the new programme could gather and develop further the existing JTIs and Recovery Programme PPPs but also initiatives leading towards new partnerships such as the European Technology Platforms (ETPs), European Innovation Partnerships (EIPs) and, possibly, KICs as well.
- **New public-private partnerships should be provided with more independence and autonomy.** It goes without saying that autonomous actions which go beyond research funding measures have to be financed with resources coming from the private sector. Granting more independence and autonomy to the PPPs is a viable mechanism to raise more private funds.

FINANCING INNOVATION

The financial crisis has further aggravated the difficulties of European entrepreneurs to gain access to debt and equity finance for their business ideas.²³ When transforming innovative ideas into successful business models the first obstacle is often access to finance. This situation worsened after the crisis when Europe experienced a 45% drop in venture capital fundraising. According to the EU, Business Angel investment is currently some five times greater in the US than in Europe.²⁴

Especially for countries with less developed financial markets and those who come under strain in the financial crisis this poses a serious challenge. The EU Regulation for creating a European Venture Capital Fund adopted in 2012 is an important step in the right direction but more efforts in particular on the Member State level are required in this respect.

The fall in lending and availability of Venture Capital (VC) funding after the financial crisis has been aggravated by the strengthening of rules, which has led investors to become increasingly risk-averse. Especially both early and growth-stage investments are hit by these developments. VC funding is becoming increasingly focussed on later stage enterprises and less capital-intensive industries, principally ICT.

The transfer of knowledge from RTOs and universities to the market remains one of Europe's most pressing issues. Much can be done in this area that is not primarily concerned with the expansion of financial resources for innovation. The underlying "European Paradox" has many causes: Rigid structures in universities, incentive systems based more on publications and less on economic activities, difficult and/or different rules for patent exploitation for businesses working together with universities. Universities across Europe should be encouraged to be more entrepreneurial than in the past and new incentive structures that value not only the number of publications but also the start-up activities of professors and their cooperation with industry should be put in place. Much more interaction between the two spheres is required;

especially career paths should be better inter-linked: changes between academia and business need to be made more flexible and welcome. A notable exception to the European rule is the UK's university system which is not hampered like the rest of Europe.

Euro-CASE welcomes the considerable efforts by the EU to strengthen financial support mechanisms in Horizon 2020 and puts forward the following recommendations for follow up activity.

Recommendations for the Member States

- **Use R&D tax credits to encourage innovation.** Lower levels of capital gains tax should be put in place for innovative companies and income tax breaks should be made available for angel investors as a reward for investing in early stage companies.
- **Expand the capacity for universities to feed into innovation ecosystems.** A cultural norm should be promoted within university technology transfer offices for a 2% 'golden share', whereby universities defer immediate payment for the intellectual property invested in spin-out companies in favour of 2% of proceeds when the company owner exits. In addition 'Easy IP' schemes should be adopted, where the university can grant free use of a new technology developed within the university to spin-offs. The university would then re-gain that IP if it had not been exploited.
- **Governments should commit money to provide seed funding where the market fails to do so** and in particular to technology platforms and ecosystems likely to generate further innovation. Where governments invest in venture capital funds, they should ensure that the public purse is rewarded for wins.
- **Implement arms-length public bodies that provide innovation financing.** These bodies should consist of staff with the appropriate skills to make and manage investment in innovation following the example of the Technology Strategy Board (TSB) in the UK or SITRA in Finland.

Recommendations for the European Union

- **Prevent budget decreases for R&D support.** For the sake of Europe's international credibility and future economic growth, the increases in innovation spending in Horizon 2020 from its predecessor programme (FP7), should be safeguarded and attempts to further reduce the budget in this area should be prevented.
- **Provide early stage seed capital to fund very early stage, risky innovations** that the private sector is not prepared to fund, in particular technological platforms and ecosystems that are likely to be productive of further innovation. It is also recommended to secure and reinforce already existing instruments and to expand seed activities by the European Investment Bank (EIB) and the European Institute for Technology (EIT).
- **Put special emphasis on Member States with low innovation performance.** The EU needs to develop programmes that provide particular support to the governments and agencies involved in innovation in those states with the lowest innovation performance as possible growth potentials may be exploited more easily.
- **Develop a European loan guarantee system for high growth companies.** This would help to address the problem of banks failing to lend to innovative SMEs.
- **Ease current state aid rules.** Currently national government input into venture capital funds in European states is restricted by EU state aid rules. In most countries, there is a demand for public venture capital on a greater scale than currently exists. Restrictive state aid rules should be relaxed to allow larger funds (of €100 million typically) to be established with some measure of public underpinning.
- **Support the evolution of a strong decentralised savings banking system** that focusses on investing in the regional economy and building strong ties with regional companies. Traditional forms of banking continue to play a vital role for business across Europe despite competitive pressures and the need to amend business models. National governments should not take on the role of banks, but should ensure a functioning and diverse banking sector that includes large investment banking as well as more traditional commercial banking.

TRANSFORMING MANUFACTURING

There is a broad consensus about the fact that it is not possible to create quality employment without a competitive industrial, technologically advanced and economically viable base. The European Commission established the objective to increase the share of industry in GDP from the current 16% to 20% by 2020.²⁵ This goal can only be met by strengthening the innovativeness of traditional industrial sectors while at the same time strongly supporting the trends regarding core and key enabling technologies. Innovations in the fields of robotics, digitalization, synthetic intelligence, 3D printing, new materials and nanotechnology and others will revolutionize the production centres as we know them today and therefore they will profoundly alter the current social organization of work. In the light of these developments all fields of business

are challenged: the upcoming growth cannot be based just on previous modes of operating or on former comparative advantages that ensured good positions in global value chains. That is why both policy makers and entrepreneurs need to seek ways to accelerate structural change in existing sectors and to diversify the economy and its knowledge into new fields of industry and expertise. Concepts such as Advanced Manufacturing or Industry 4.0 are of central importance in this respect. For policy the focus should therefore be mainly on keeping the leadership in those advanced production processes and on the manufacturing of high-complexity and high-value manufacturing products (HCHVM), since this type of production is the actual driver of technology and innovation.

Increased automatization, real-time produc-

tion and smart factories will ultimately require not only a new skill set for workers but will also lead to unprecedented changes on the labour markets. Just as other technological revolutions Industry 4.0 and High Complexity, High Value Manufacturing (HCHVM) will lead to new profiles and new job opportunities as new business models emerge that in turn need more qualified workers that have exceptional knowledge of ICTs. Interaction, training and quality will become key factors for the newly emerging job profiles. If governed prudently the new forms of manufacturing may lead to great economic and social benefits, a new and more sustainable production structure may emerge and new job opportunities will arise.²⁶

Industry is a driver of innovation that requires a new scientific-technological ecosystem cognisant of the needs for competitiveness, adaptability, flexibility and speed to market. In the light of new technological developments in several areas Euro-CASE put forward the following recommendations:

Recommendations for the Member States

- **Member states should consider robotization according to their industrial specialization patterns** in order to lay the idiosyncratic foundations for the third industrial revolution. Robots are bound to bridge the gap between digital technologies and actual manufacturing.
- **Implement initiatives similar to Manufacturing Technology Centers**, easing the incorporation of innovative solutions to the productive processes especially of SMEs. It is vital for future growth to combine the knowledge generation base with the industrial base.
- **Continue and increase efforts in advancing education in science, technology, engineering, and mathematics (STEM)**. It is further recommended to introduce specific curricula and research activities at higher education institutions to meet the challenges of the Third Industrial Revolution.

Recommendations for the European Union

- **Widen the concept of manufacturing** and consider supporting High Complexity, High Value Manufacturing (HCHVM) that will allow European manufacturing businesses to compete on a global level.
- **Update and enhance the cybernetic infrastructure** to support wide digitalization, connectivity, robotization and automation of the industrial base so as to favour the establishment of global integrated spaces of value creation.
- **Extend research activities regarding Key Enabling Technologies (KETS)** and complement the supporting measures with a clear focus on industrial manufacturing. KETS will become vital to the new knowledge-based intensive industrial fabric.
- **Launch a “Bio Foundries” initiative** allowing to design a system engineering framework for the manufacturing of biological products at industrial level. The goal is to spur innovation by combining biology and engineering that enables on-demand production of new and high-value materials.
- **Support the development and implementation of new technologies of system engineering** in order to maintain leadership in processes such as “Integrated Computational Material Engineering” which combine design, characteristics of new materials, production methods and virtual simulation of results.
- **Put forward a long-term global strategy that expands beyond 2020** to provide investor security and to integrate the multiple initiatives launched on the different aspects related to the transition towards a new sustainable energy paradigm.
- **Implement a funding mechanism in Horizon 2020** that provides financing channels and fiscal measures encouraging the **development of the new industrial fabric** required to compete in the Third Industrial Revolution.

4. Outlook

Despite the efforts on behalf of the EU and the Member States there are still several challenges ahead. EU countries are very different in terms of the level of public R&D investments, sectorial specialization and budget austerity measures. For small countries in particular, and those that are very dependent on just a few sectors, sudden changes in market conditions can render the economy vulnerable. The process of convergence and growth in innovation performance in the EU has stagnated. Less innovative Member states are not catching up, while growth by the more innovative has been fading.²⁷ In terms of innovation there is truly a multi-speed Europe. To ensure sustainable growth and employment, the EU needs favourable framework conditions for a diversified knowledge-based economy that combines manufacturing and service sectors.

Euro-CASE strongly supports the principle of subsidiarity. The EU institutions cannot and should not steer private innovation efforts. Instead the EU should be considered as one (though highly important) actor in a multilevel governance framework that also includes regional and national governments. Regarding innovation policy this means that not only the Brussels based institutions are called to action but also the Member States. The Commission sent the right signal when the budget for its new Framework Programme for Research Horizon 2020 was negotiated and ultimately increased to 80 billion € for the period between 2014 and 2020 – which still remained well below the Euro-CASE recommendation of 100 billion €.²⁸ While financing for research and innovation remains worrisome across Europe several actors on all levels of the political system be they private or public need to increase

their efforts to increase Europe's innovative capabilities. The EU should continue to play a leading role in putting the topic of innovation on the political agenda.

The constant decline of industry participation in FP7 is worrisome as it fell from 39% in FP4 to 31% in FP6 and accounts for only 25% in FP7.²⁹ While large enterprises have their own resources for R&D their participation is important especially when it comes to standard setting and defining research priorities. Therefore they play an important role in Joint Technology Initiatives (JTIs) and European Innovation Partnerships (EIPs). For Europe's SMEs it is well appreciated that Horizon 2020 aims at reducing the administrative burden which is expected to raise their participation. At the moment it remains to be seen if the efforts by the EU are enough to bring more SMEs and industrial companies to apply for EU funding and to engage in international activities. A constant monitoring of business participation in all instruments of Horizon 2020 should be professionalised in order to give insights of possible needs for reform. Increased industry participation rates are important for both economic growth and tackling the Grand Challenges that cannot be solved by research alone but require application.

Last but not least, what is needed across Europe is a change in the way we perceive businesses. A cultural change that values innovation and entrepreneurial activities would help to unleash much of today's unused potential. This is even more important as European industries are facing increased competition from countries all over the world. It is not only the BRICS but other regions across Asia, Africa and South America have the potential for catching up fast. Also, if

the EU is serious about the Transatlantic Trade and Investment Partnership (TTIP) two entrepreneurial cultures will be brought together in the world's largest free trade zone. While this treaty brings about unprecedented trade opportunities for European companies there is also the danger that especially innovative entrepreneurs will find it easier to conduct business in the US than in the EU which might have negative effects for Europe's growth potential. Therefore, the EU should support a cultural change that embraces

risk taking and values entrepreneurial activities when it comes to innovation.

Approved by the Euro-CASE Board
September 2014

This paper complies with the "Euro-CASE Guidelines on advising policy makers and society"

Appendix

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Euro-CASE Innovation Platform meeting n° 2 Brussels, 29–30 May 2012

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Euro-CASE Innovation Platform meeting n° 3 London, 11–12 October 2012

- Hermann Hauser, Amadeus Capital Partners
- Iain Gray, Technology Strategy Board (TSB)
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Euro-CASE Innovation Platform meeting n° 4 Helsinki, 23–24 January 2013

Invited speakers 23 January:

- Esko Aho, Harvard University, Nokia, Former Prime Minister of Finland
- Jukka Heikkilä, University of Turku
- Kai Husso, Research and Innovation Council in Finland
- Marko Janhunen, UPM
- Timo Kauppila, Catchbox
- Tero Ojanperä, Vision+

Euro-CASE Innovation Platform meeting n° 5 Madrid, 05–06 June 2013

- María Luisa Ponce, General Secretary of Science, Technology and Innovation, Ministry of Economy and Competitiveness, Spanish Government
- Alejandro Cros, Deputy General Director of Industrial Politics, Ministry of Industry, Energy and Tourism
- Sarah Lambert, Deputy Director of the European Commission in Spain

**Euro-CASE Innovation Platform meeting n° 6
Lisbon, 30–31 October 2013**

- Paulo Sá e Cunha, Vice-President of Agência de Inovação (Portuguese Agency for Innovation)
- M. Paula Diogo, Professor, FCT/UNL (Department of Social Sciences, Faculty of Science and Technology, New University of Lisbon)

**Euro-CASE Innovation Platform meeting n° 7
Paris, 17 March 2014**

- Alain Bugat, NATF (FR)
- Wolf Gehrisch, NATF (FR)
- Alain Schmitt, French Ministry of Industry (FR)
- Bruno Revellin-Falcoz, NATF (FR)

**INNOVATION RELATED REPORTS AND PAPERS BY THE EURO-CASE
MEMBER ACADEMIES (NONEXHAUSTIVE LIST)**

acatech

- [acatech \(2014\): Smart Service Welt, Recommendations for the Strategic Initiative Web-based Services for Businesses, Berlin.](#)
- [acatech \(2014\): Resilien-Tech. "Resilience by Design": a strategy for the technology issues of the future, Berlin.](#)
- [acatech \(2013\): Securing the future of German manufacturing industry. Recommendations for implementing the strategic initiative Industrie 4.0, Berlin.](#)

ARB

- ARB Royal Belgium Academies (2009): Interaction between high school education and private enterprise, Brussels.
- ARB Royal Belgium Academies (2009): Stimulating innovation, Brussels.

IAE

- [IAE \(2013\): IAE/Intel Labs Europe Lecture Series on Engineering Research and Innovation, Dublin.](#)
- [IAE \(2013\): The Future of Manufacturing in Ireland – Interim Report, Dublin.](#)
- [IAE \(2010\): Engineering Research in Irish Economic Development, Dublin.](#)

IAS

- IAS Engineering Academy of Slovenia (2014): Comparative Analysis of Higher Education, Research, Development and Innovations of Slovenia (92 pages – slo), Ljubljana.
- IAS Engineering Academy of Slovenia (2014): Slo-

venia Needs a New Vision for the Development of the Economy and Society (16 pages – en), Ljubljana.

- IAS Engineering Academy of Slovenia (2010): Technology Highway: Consensus for an Innovative Slovenia, Ljubljana

IVA

- [IVA \(2013\): Innovationskraft Sverige – förslag från Innovationskraft Sverige \(slutrapport\), Stockholm.](#)
- [Larsson, W Jan \(2011\): Förutsättningar för ett innovationspolitiskt ramverk, Rapport från Innovation för tillväxt, Stockholm.](#)
- [IVA \(2011\): Innovationsplan Sverige – underlag till en svensk innovationsstrategi, Förslag från Innovation för tillväxt \(slutrapport\), Stockholm.](#)
- IVA (2014): Understanding Innovative Sweden – From farming nation to innovation leader, Stockholm.

NATF

- NATF (2011): Ruptures technologiques, compétitivité et innovation (Technological breakthroughs, competitiveness and innovation).
- NATF (2012): Dynamiser l'innovation par la recherche et la technologie: le cas des régions (Boosting innovation by research and technology: the case of regions).
- NATF (2014): PME : le moment d'agir. Pour un small business act à la française (SMEs : time to act. Towards a French small business act).

NTVA

- NTVA Norwegian Academy of Technological Sciences (2012): Innovation and technology research, abstracts from NTVA Technology forum 2011, Trondheim.

RAEng

- [RAEng \(2013\): Additive Manufacturing – Opportunities and Constraints, London.](#)
- [RAEng \(2013\): Made for the Future: Challenges in Creating a Sustainable Domestic Supply Chain, London.](#)
- [RAEng \(2012\): Industrial Systems – Capturing Value through Manufacturing, London.](#)

RAI

- RAI Real Academia de Ingenieria (2009): Defence technology in the XXI century. The digital combat, Madrid.
- RAI Real Academia de Ingenieria (2010): Innovation on Aeronautics engineering, Madrid.
- RAI Real Academia de Ingenieria (2011): Mathematical models for science and engineering, Madrid.

SATW

- [SATW \(2014\): Stem Careers Barometer, Zürich.](#)
- [SATW \(2014\): Swiss Energy Strategy 2050 and the Consequences for Electricity Grid Operation, Zürich.](#)
- [SATW \(2013\): Innovative Manufacturing Processes as an Opportunity, Zürich.](#)

Additional Papers from associated academies

- Royal Society of Edinburgh (2014): The Supply of Growth Capital for Emerging High-Potential Companies in Scotland, RSE Advice Paper 14–06, Edinburgh.
- Royal Society of Edinburgh (2012): The Financing of Business Innovation in Scotland. RSE Advice Paper 12–10, Edinburgh.

FOOTNOTES

1. COM(2010) 2020 final: EUROPE 2020 – A strategy for smart, sustainable and inclusive growth.
2. European Commission (2014): State of the Innovation Union, Taking stock 2010 – 2014. Commission Staff Working Document accompanying the COM(2014) 339 “Research and innovation as sources of renewed growth”.
3. European Commission (2010): Europe 2020 Flagship Initiative “Innovation Union”, COM(2010) 546 final.
4. Som, O. et al. (2012): Organisational and Marketing Innovation – Promises and Pitfalls? PRO INNO Europe: INNO-Grips II report, Brussels: European Commission, DG Enterprise and Industry.
5. Department for Business, Innovation and Skills (BIS) 2014: The Case for Public Support of Innovation, London.
6. OECD and Eurostat (2005): The Measurement of Scientific and Technological Activities: Oslo Manual. Guidelines for collecting and interpreting innovation data, third edition, Paris.
7. Ibid.

8. OECD (2012). Main Science and Technology Indicators, volume 2012/2. OECD, Paris.
9. According to consolidated 2011 data the EU, US and China together account for almost half of world GDP. GDP of the EU28 represented 18.6% of the world's GDP (in purchasing power parities), while the United States accounted for 17.1% and China for 14.9%. Eurostat (2014): 2011 results of the International Comparison Program, online: http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/2-30042014-DP/EN/2-30042014-DP-EN.PDF
10. The seven Flagship Initiatives are “Digital agenda for Europe”, “Innovation Union”, “Youth on the move”, “Resource efficient Europe”, “An industrial policy for the globalisation era”, “Agenda for new skills and jobs”, “European platform against poverty”.
11. European Commission (2009): Ex-post, Evaluation of the Sixth Framework Programmes (2002–2006), Report of the Expert Group, Berlin and Brussels.
12. European Commission (2010): Interim Evaluation of the Seventh Framework Programme, Report of the Expert Group, Brussels.
13. Health, demographic change and well-being; Food security, sustainable agriculture, marine and maritime research and the bio-economy; Secure, clean and efficient energy; Smart, green and integrated transport; Climate action, resource efficiency and raw materials; and Inclusive, innovative and secure societies.
14. It is worthy to note that the European Paradox has been mentioned by the European Commission as early as 1995 in its “Green Paper on Innovation”, online: http://europa.eu/documents/comm/green_papers/pdf/com95_688_en.pdf
15. European Commission (2011): Innovation Union Competitiveness report 2011, Brussels.
16. European Commission (2012): A Stronger European Industry for Growth and Economic Recovery, COM(2012) 582 final, Brussels.
17. See the Euro-CASE Innovation Platform Discussion Paper on “Innovation and Changing Industry Structures: Seizing Opportunities for New Growth in the EU”.
18. For these developments see extensively the Euro-CASE policy paper on “Transforming Manufacturing” – A path to a Smart, Sustainable and Inclusive growth in Europe.
19. See Euro-CASE Policy Paper on “Innovation Procurement”.
20. See Euro-CASE policy paper on EU Public-Private Partnerships in Research and Innovation.
21. JTI Sherpas’ Group Report, Designing together the ‘ideal house’ for public-private partnerships in European research. Final report, January 2010; European Commission (2010): Interim Evaluation of the Seventh Framework Programme. Report of the Expert Group, November 2010.
22. Ibid.
23. COM(2013) 149 final: State of the Innovation Union 2012 – Accelerating change.
24. Ibid.

25. European Commission (2014): For a European Industrial Renaissance, COM(2014) 14 final, Brussels.
26. A recent study based on expert interviews in six economic sectors (mechanical engineering, electronics, car manufacturing, chemical industry, agriculture and ICT) in Germany concluded an annual growth potential of 1,7% and a total of 78 bn € additional value added until 2025 when employing Industry 4.0 features (see Bitkom 2014: Industrie 4.0 – Volkswirtschaftliches Potenzial für Deutschland, Berlin).
27. European Commission (2013). Innovation Union Scoreboard 2013. European Union, Brussels.
28. It is worthy to note that the resources provided through Horizon 2020 can be no substitute for domestic expenditures of R&D. Consolidated data for Germany alone shows that public expenditures for R&D amounted to 22,5 bn. € in 2011 (BMBF 2014: Bundesbericht Forschung und Innovation 2014 (Federal Report on Research and Innovation 2014), p. 441).
29. European Commission (2010): Interim Evaluation of the Seventh Framework Programme, Report of the Expert Group, Brussels, p. 48.

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