



EURO-CASE INNOVATION PLATFORM REPORT BARRIERS TO INNOVATION AND SCALE-UP OF INNOVATIVE SMEs



Euro-CASE

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Executive Summary

European innovation policy is organized in the context of the *Innovation Union*, one of the seven flagship initiatives of the Europe 2020 strategy for smart, sustainable and inclusive growth. Despite these and other (national) approaches, there are still several *challenges*, first and foremost regarding the transformation of research results into marketable products as well as for scaling up innovative start-ups. There is also a growing concern as to why Europe has not achieved its full potential in producing disruptive technological and social innovations. Europe with its well-educated workforce and world class research (public and private) should be able to produce much more jobs through applying innovation and new technologies.

The Euro-CASE Innovation Platform aims to contribute to the ongoing discussion about removing the barriers *in national innovation systems that inhibit the scaling-up of innovative SMEs in Europe*. The report is dealing with two interrelated subjects: first the barriers to innovation, and secondly and more importantly, with the factors which are inhibiting faster scale up of enterprises, i.e. factors which concern the whole national innovation system. This report is based on the results from the first phase of the Platform¹ (2012–2015), and is complemented with interviews and hearings with stakeholders from Brussels alongside a European-wide survey among Academy Fellows and contacts. The findings of the survey were discussed and validated in a stakeholder workshop in Brussels in December 2016. Additionally, the findings were tested through a series of deep dives (case studies) around Energy, Industrialization and Digitalization.

The discussion about scaling up has several facets. Apparently “unicorns” and technological leading companies seem to find it easier to

grow outside Europe. Another facet concerns the question of more modest forms of firm growth that seems to be more prominent in Europe. The question is thus: how to create conditions for companies that allow them to survive and ultimately increase job growth? This has less to do with cutting-edge technological innovation (which is only one factor to achieve these goals) but more with embracing change, entrepreneurial spirit, etc. The success of many of the fast-growing companies is not only based on technical innovation but more often than not marketing or organizational innovation. In either case: marketing and managerial competencies are key when scaling-up.

Apart from a lack of finance, the *main barriers to innovation* across the EU seem to be stiff regulation, risk aversion and poor interaction between research and industry. *Barriers in commercializing excellent research results* include that 1) publishing is valued a lot higher than business activities in public research organizations, 2) entrepreneurs and academicians operate in silos with hardly any interactions and 3) regulatory aspects such as limiting IP regulations and stiff employment rules. The *main factors inhibiting faster scale-up*, according to the survey, were a lack of funding (also considering the small pool of venture capitalists in Europe), market limitations (there is no real EU market) and the lack of managerial and entrepreneurial skills. In many areas (especially in those without clear links to basic research) the uncertainty of demand due to unclear signals from private and public actors also poses a strong challenge. Little risk taking and low flexibility of public and private demanders contribute to this challenge.

In this spirit, the Euro-CASE Innovation platform puts forward the following recommendations.

To the European Commission:

- The European Commission should continue its efforts to create a true European Single Market. While new ICT technologies may yield national boundaries obsolete, there is a growing need for allowing these technologies to mature. Regulation needs to be used more as a tool for growth. Business needs a unified and well-functioning internal market to scale up their operations in Europe. Therefore, open borders for economic activities are required and a removal of bureaucratic and legal obstacles to expand in all Europe should be encouraged.
- The European Commission should rigorously follow its proposal for Smart Regulation and consider any additional proposals if they are smart and viably support European SMEs (SMEs tests). The precautionary principle should be accompanied by the innovation principle. New public policies should be smart for growth.
- Public actors on all levels should provide more accurate information to SMEs where to obtain the *right kind* of funding. The conveyance of venture capital needs to be done by professional institutions. The existing European repositories should be complemented by an easy to use tool for finance and data analysis on scale-ups in the EU. An online platform that allows sharing information on “what works” should be considered. It is important to recall that private money is key. The European Union should support Member States to alter their fiscal regulations in order to encourage angel investors in start-ups and scale-ups.
- Innovation is not a goal per se, scaling up business by innovation is the issue. EU and European countries might speak more of scaling up than of innovation. All the fields of the business are important: sales, marketing, finance, etc. Europe must facilitate the development of big companies in “soft business”, or based on non-technological innovations. Also, more general support and business advice in scaling up and implementing novel technologies should be

promoted following e.g. see the Manufacturing extension partnership (MEP) in the US.

- Consider supporting cross-country marketing initiatives to increase market knowledge and ease entry within Europe and expanding the Enterprise Europe Network. Credit support / cheap insurance could assist when companies are concerned about expanding international sales.

To the EU member States

- Across Europe there is a growing need for more room for experimentation (“sandboxing”). This concerns policies as well as business ideas. The Commission as well as the Member States and regions should create spaces where policy makers and entrepreneurs in conjunction can try out new and innovative solutions. There are plenty of ideas that just need room to flourish. A culture of innovation and a bold pro-innovation stance in public administrations is required.
- A fresh re-thinking of a European Small Business Act (ESBA) could be very valuable. This could include risk taking and risk sharing components. Together with the modern approaches of innovation procurement by public administrations, an ESBA could turn into a powerful engine of SME growth.
- Favorable ecosystems are more easily created on a regional level because it is easier to bring the relevant stakeholders together. For ecosystem development it is key to first join the enthusiastic stakeholders. The voluntary engagement of enthusiasts and their subsequent commitment to continue shaping the ecosystem can then be complemented by a more official role of governments in providing infrastructure, incentives and smart regulations.
- Increase the talent and skill pool across the EU. Despite efforts from the European Commission in crafting a “Coalition for Skills” the issue remains largely in hands of the Member States. With regard to scaling up, skills are massively needed in the areas

of management, entrepreneurship and leadership. Member States should be more open in allowing school curricula to include these topics. Despite important changes over the last couple of years, the education system should reflect current and future needs of a dynamically changing environment, develop an entrepreneurial mind at early stage at school, and support the idea that innovation and business creation are essential for the future.

- Public and private procurement should be geared towards innovative scale-ups. In addition to efforts supporting public procurement, corporate engagement in buying from innovative SMEs should be encouraged to support them scaling up their operations. In order to spur public procurement, governments should think of establishing a department (or departments) that advises others on the quality of innovative solutions. This might reduce the risks involved in public (and private) procurement of innovation solutions as it allows for risk sharing. A similar thought is to consider an insurance for large companies using new innovations by SMEs.

To the European Academies

- Support an entrepreneurial culture: Successful entrepreneurs might have failed before. Their expertise in starting and scaling a business is highly valuable regardless and they need to be encouraged and incentivized to re-invest ("second chance" incentives). Also, twice as many successful entrepreneurs are over 50 as under 25. It seems important to harness to the potential of the 50+ age group in light of the lack of managerial and entrepreneurial skills.
- Limited financing opportunities are only one side of the story. Equally important is the limited mentoring and coaching of SMEs who are not necessarily aware of the whole spectrum of support instruments. This primarily concerns SMEs in traditional industries. Academies could act as facilitators and match makers and also advise government about overcoming the challenges for growing companies.

- Fellows could engage in local discussion and enrich the local discussion with EU best practices, raise general awareness and promote positive effects of regulation. National Academies should also better understand local situations, feed info into Euro-CASE and enrich the local discussion with EU best practices. They could also promote a "growth test" of policies and promote positive effects of regulation. Euro-CASE could do a quality check of received information and disseminate best practices to Academies.
- Promote the notion of "smart" money, which means that both Corporates as well as individuals within the Academies should engage actively in the start-up/scale-up arena, by providing personal coaching, access to networks, complemented by some investment.



Introduction

European innovation policy is organized in the context of the *Innovation Union*, one of the seven flagship initiatives of the Europe 2020 strategy for smart, sustainable and inclusive growth. The Innovation Union aims to make Europe into a world-class science performer; to remove obstacles to innovation and to alter the way public and private sectors work together. Horizon 2020 provides the financial means to reach these goals and to support “Excellent Science”, “Industrial Leadership” and “Societal Challenges”.

Despite these and other (national) approaches, there are still several *challenges*. These challenges concern both the generation of social innovation and disruptive technologies but also the transformation of research results into marketable products. There is growing concern why excellent European research is not transformed into successful products on the market and why Europe has not produced disruptive technological and social innovations like, for example, the us. Companies such as Apple, Google or AirBnB in the us or Alibaba in China seem to find it easier to bring their business models and technologies to the market and tend to grow a lot faster than in Europe. So called unicorns and gazelles have challenged traditional companies and organizational models and have created new markets in a comparatively short time frame. These companies develop their own markets and not being part of this development might prejudice Europe’s long-term growth.

In the last couple of years, several important initiatives have been launched in a number of countries (e.g. UK, France, Germany, Spain) and in the EU (e.g. EIT) that aim to overcome barriers to innovation and to bring public and private researchers together to overcome silos and to fa-

Gazelles & Unicorns

Gazelles are the subset of high-growth enterprises which are up to five years old with an average annual growth greater than 20% per annum, over a three-year period, should be considered as gazelles (Eurostat/OECD 2007)

The term “unicorn” means to denote the arbitrary valuation of US\$1 billion in capital from private investors.

your private funding in general. However, what seems to be lacking is a dedicated approach to scaling up. Scaling up means first and foremost having access to a large market. The EU market remains fragmented in contrast to other large national markets like the us or China. Even though large advances have been made in the EU in creating a single market and the internet helping to reduce the distance between producer and consumers, regulatory barriers make it especially difficult in the EU for SMEs to scale-up. Since creating a single market is an important but rather long-term goal, being proactive in export is key for scaling up operations. Countries like Israel and Korea could serve as examples in this regard.

Commissioner for Research, Innovation and Science, Carlos Moedas, has put forward his approach for European Innovation that should be based on openness (open innovation, open science, open to the world). Over the course of the last year, the idea of creating a European Innovation Council (EIC) was formulated in order to act as a kind of coordinating body that could manage the multitude of innovation support

mechanisms scattered throughout the Commission. A call for ideas for creating the EIC yielded an enormous response from stakeholders (more than 1000 responses and 200 position papers) and showed some consensus that weak venture capital markets and low opportunities for scaling up continue to hamper European businesses.

While these strategic approaches by the Directorate-General for Research and Innovation (DG RTD) might certainly go in the right (conceptual) direction, it remains unclear, what exactly has to be improved in the European ecosystem for innovation and what political level (regional, national, European) has to act and how. An analysis of the European ecosystem for SMEs is surely beyond the scope of this report, but the question to both policy makers and academicians alike remains. Last but not least, this issue is of outmost importance with respect to the competitiveness of the EU vis-à-vis its competitors abroad. Europe will only maintain its competi-

tiveness when it embraces technological change and innovation. In the past we have witnessed this change occurring in the US and it appears that European businesses are following the developments elsewhere in the world slower and sometimes too slow.

However, to be certain: Europe is still one of the most competitive regions in the world; home to world class research facilities, a well-educated work force and political stability. Despite its fragmented market, Europe's variety of cultures, languages and different approaches to economic and societal challenges creates a diversity which is unparalleled in the world. While this may be difficult for politics on the European and on the national level it's this diversity that will be the basis of Europe's future growth. This is also why the Euro-CASE Innovation Platform calls for a more positive view of Europe that the Fellows of the platform and their host academies will gladly promote.

APPROACH AND GUIDING QUESTION

The Euro-CASE Innovation Platform aims to contribute to the ongoing discussion about removing the barriers to innovation for European businesses. The focus is on SMEs, innovative or not, that want to grow and expand their activities but don't find the necessary conditions to do so. In view of the above outlined challenges and developments elsewhere in the world the Euro-CASE Innovation Platform has decided to focus its activities on the question:

- **What are the barriers in the national innovation systems that inhibit the scaling-up of innovative SMEs in Europe?** What are the actual challenges in the Member States and what can the EU and the national governments do to improve the conditions for scale up of start-ups?

This report is based on the results from the first phase of the Platform (2012–2015), and is complemented with interviews and hearings with stakeholders from Brussels and a European-wide

survey among Academy Fellows and contacts. This step allowed for gathering the knowledge and expertise of outstanding academics and business representatives, both of which constitute Fellows of Academies of Engineering and Technology. As a result, it was possible to have Euro-CASE member academies actively engage in their respective local ecosystems and to provide answers to the guiding question. The Platform opted for a national approach in order to gain first-hand “information from the ground” and also to take into account the fact that there are significant differences between the Member States in terms of competitiveness and funding opportunities which, consequently, leads to different barriers.

While the Engineering Academies provide a bottom-up approach and knowledge from the ground, a continuous dialogue with the Commission was targeted. The goal was to work closer and co-create the report to make sure the recommendations of the Platform are timely and

useful for the Commission. The findings of the survey were discussed and validated in a stakeholder workshop in Brussels in December 2016. Additionally, the findings were tested through a series of deep dives (case studies) around Energy, Industrialization and Digitization that were conducted by individual Euro-CASE member academies. The main rationale for the deep dives is the assumption that the generic barriers to innovation and scale up have different effects in different sectors.

This approach allowed the Euro-CASE Innovation Platform to gain information on barriers to the scaling up of innovative start-ups from

EU Member States. It addresses the need from Brussels-based institutions to better connect with bottom-up initiatives and understand barriers for innovation in the Member States. Thus, the platform offers science-based policy advice by independent National Academies of Science and Technology and concrete balanced recommendations by academicians and business representatives.



Defining the challenge for scaling up of SMEs in EU

It is well-known that innovation is a complex process involving several actors and policies on various political levels. However, it seems that our advanced societies are having difficulties making a robust policy for a complex innovation system. “In the century of complex systems, competitive advantage will accrue to communities and jurisdictions able to adapt to unpredictable developments. Mechanistic, predict-and-control logic will systematically fail in a complex system: it will omit new actors, fail to account for feedback loops and overestimate linear returns to effort.” (Madelin & Ringrose 2016).

More often than not the linear model of innovation is used to highlight the importance of basic research. It is doubtful that there is an automatic translation from research to innovation for which the Euro-CASE Innovation Platform considers basic and applied research as equally important sides of the same coin.

Innovation is more than just science and technology. Today social, demand-driven or sustainability innovation matter more than ever given the societal challenges we face.

It is important to recognise the systemic nature of such innovation processes and carefully analyse the specific interactions between actors: public and private scientists, academic institutions and innovation funding agencies, investment funds etc. All these are specific interactions in a given eco-system, with various scales of interaction: local, regional, national, European. European and national initiatives should, therefore, be more focused on a systemic analysis of the eco-systems concerning scaling up, with the EU market as a starting ground and goal.

Innovation

The Euro-CASE Innovation Platform follows the definition of the OECD according to which an innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. There are varying degrees of novelty (new to the firm, new to the market, new to the world) (OECD 2005).

Scale-ups

Scale-ups (or high-growth enterprises) are enterprises with average annualised growth in employees (or in turnover) greater than 20 per cent a year over a three-year period, and with 10 or more employees at the beginning of the observation period (Couto 2014).

The discussion about scaling up has several facets. The above cited examples of unicorns and technological leading companies that seem to find it easier to emerge outside of Europe are only one. Another facet concerns the question of more modest forms of firm growth. It is this question that is probably more troubling for Europe currently, the question of how to create conditions for companies that allow them to survive and ultimately increase job growth. This has less to do with cutting-edge technological

innovation (which is only one factor to achieve these goals) but more with embracing change, entrepreneurial spirit, and risk taking. The success of many of the large companies is not based on technical innovation but marketing or organizational innovation. Marketing and managerial competencies are key when scaling-up.

The questions of scaling up primarily concerns established models, innovative products/ services and an early market. There are two questions:

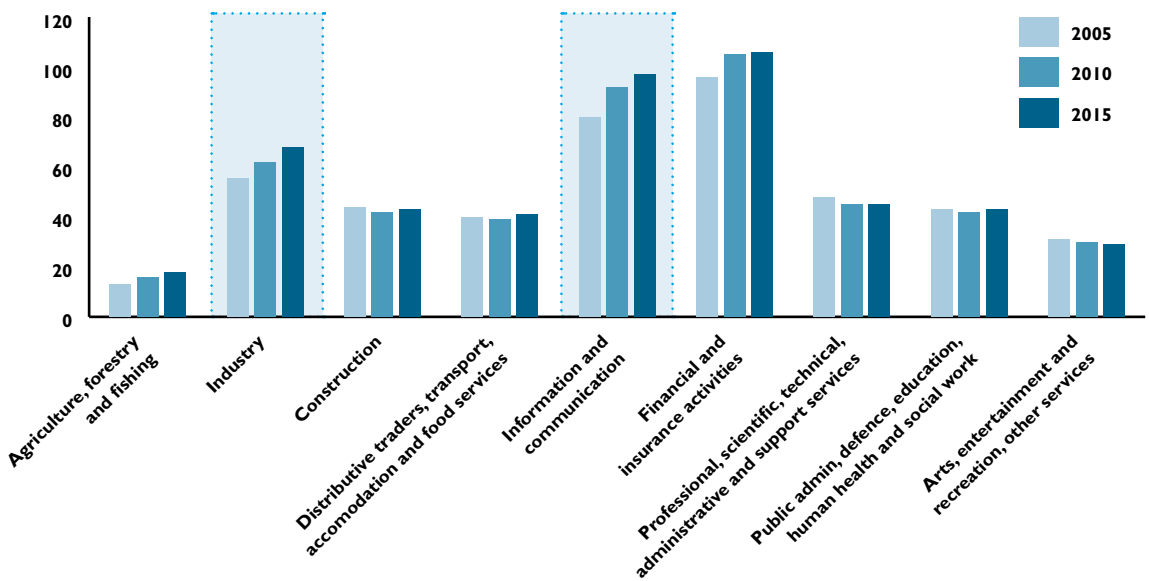
1. How to support high risk, high promise ideas before a market is fully established?

2. How do we help those companies to grow that already have tested the market? The innovation is out there, but the company does not grow for reasons external or internal to the company

For the first group there is a strong need for high risk innovation funding - not science or technology but innovation. Here funding in a competitive approach will need to be closer to the market, but daring to fail with public money. This could be the remit of the proposed EIC.

For the second group a very different kind of support is needed. Here it's much more about

Figure I: Real Labour productivity in 28 EU countries, in 1000€/ employee
Source: SATW 2017 (based on Eurostat data, chain linked volumes 2010 = 100)

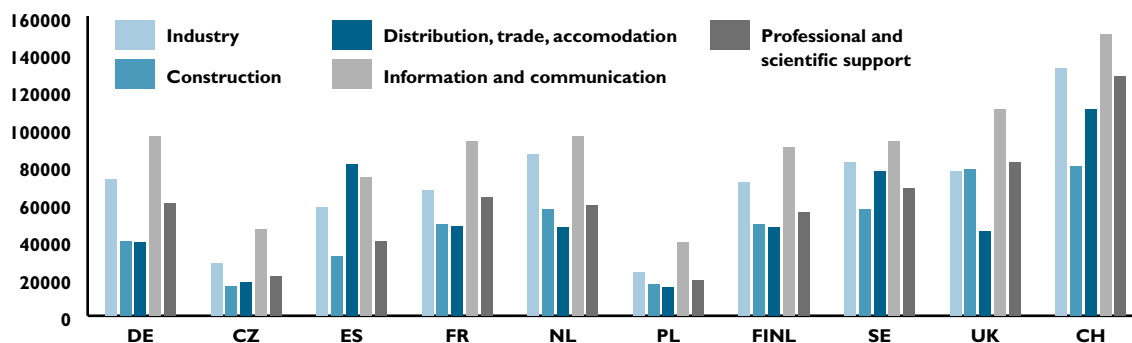


The National Institute of Standards and Technology's Manufacturing Extension Partnership (MEP)

The National Institute of Standards and Technology's Manufacturing Extension Partnership (MEP) is a nationwide system of centers aiming to transform manufacturers to compete globally, supporting greater supply chain integration, and providing access to technology for improved productivity. The network provides a variety of services, from innovation strategies to process improvements to advanced manufacturing.

Figure 2: Gross value added per employee per sector in selected EU countries, in EUR

Source: SATW 2017 (based on Eurostat data)



diffusion of modern technologies, strengthening the absorption capacity of firms, complementary services/ infrastructure, management support advisory services, etc. This could be done by a more decentral structure of centers that are close to the companies. The Manufacturing Extension Partnership (MEP) from the US could be an example in this regard.²

The importance of the industrial sector cannot be overstated. Manufacturing provides about 20% of all jobs in Europe and generates an estimated turnover of about €7 000 billion in 25 industrial sectors and over 2 million companies (European Commission 2017). The modernization of this sector is of crucial importance for exploiting future growth opportunities. It is one of the key challenges for European companies in traditional sectors to embrace what has been coined the next technological revolution: Cyber-physical systems/ Industry 4.0, digitization, advanced manufacturing. This is also highly important for European growth since jobs in these areas show above average productivity as Figure 1 clearly shows.

Industry and ICT related jobs show a higher value added than jobs in other areas. Therefore, investments in these areas and the support for digitization and (re-)industrialisation in the EU are important. Figure 2 shows the gross value added per employee in different sectors in se-

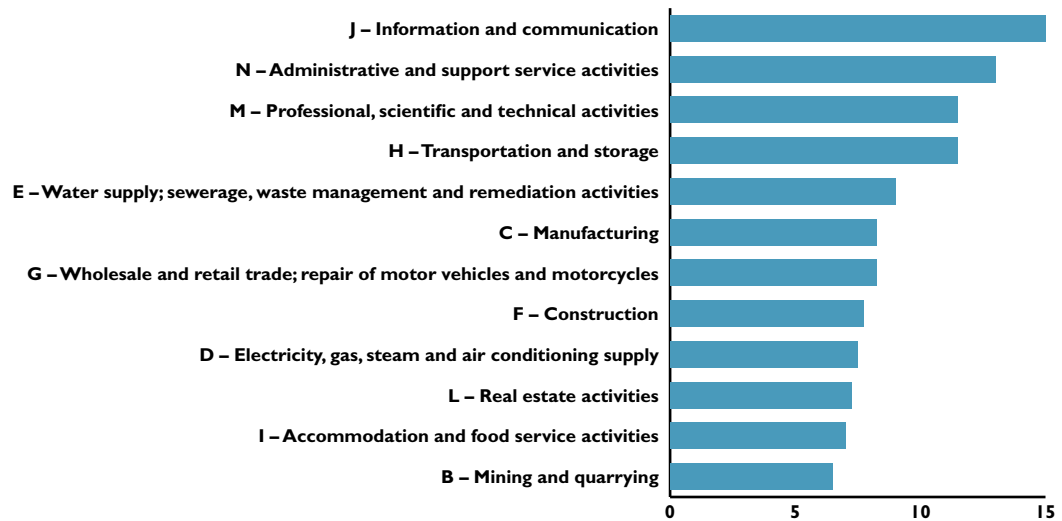
lected EU countries. There are notable differences across countries but, as a general rule, industry and communication (sectors that the engineering academies represent) are very high contributors.

However, even though the importance of industry and manufacturing cannot be neglected companies in this sector seem to find it difficult to grow. There are more high growth companies in ICT and services sectors as Figure 3 clearly shows.

The European Commission recognized this with its 2014 Communication “For a European Industrial Renaissance” (European Commission 2014) in which a policy mix for strengthening the European manufacturing sector was outlined. European Structural and Investment Funds (ESIF) of at least 100 billion would be made available in the multiannual financial framework 2014–2020 to finance investment in innovation, in line with industrial policy priorities. ESIF will be guided by the concept of ‘Smart Specialisation’ and include venture capital support to 140,000 start-ups and scale-ups. EFSI agreements already target 377,000 SMEs, including start-ups (European Commission 2016).

The EU has a number of initiatives at its disposal that aim to contribute to job creation and growth such as the European Fund for Strategic Investments (EFSI), the Single Market Strategy,

Figure 3: Share of high growth companies per sector
Source: SATW 2017 (based on Eurostat data)



the Digital Single Market and the Capital Markets Union. The main challenge in Europe, in this regard, is that too few European start-ups survive beyond the critical phase of 3 years and even fewer grow into larger firms. If the share of scale-ups would match that of the US there could be up to 1 million new jobs created and up to €2 000 billion added to GDP in the EU over the next 20 years, according to estimates by the European Commission (European Commission 2016).

The Single Market is still too fragmented which limits the potential for start-ups and scale-ups to grow. Start - ups are particularly concerned about tax and the burden to comply with 28 different tax regimes.

Across the EU, the regulatory and administrative barriers obviously discourage SMEs from innovating and scaling up. Instead SMEs may choose to start global in countries with more growth potential, larger markets and less bureaucracy which, in turn, leads to job losses in the EU (European Commission 2016).

Euro-CASE welcomes all the initiatives by the European Commission as laid out in the “Startup and Scale-up Initiative” (European Commission 2016). Especially the call for removing regulatory barriers, continue working on creating an actual single market and collaborating with the private sector in important initiatives like the proposal to create a pan-European Venture Capital Fund of Funds to overcome the fragmented European Venture Capital (vc) market and the Startup Europe initiative to create an ecosystem for Entrepreneurs in Europe.

Barriers to Innovation and Scale up – Results of our Survey

The Euro-CASE innovation platform conducted a survey in late 2016 among its members to get a clearer picture of what barriers to scaling up are perceived in the individual Member States (see Annex 1). The questionnaire was distributed to all 14 Member Academies of the Euro-CASE Innovation Platform.³ The majority of the responses came from universities and research organizations (55%), 35% came from business (large corporate and SMEs almost equally represented) and 10% from financial institutions and the public sector. Inevitably, there is a slight bias of overreporting science and transfer related challenges. The results were reviewed and validated in an expert workshop in Brussels with representatives of the European Commission and other stakeholders.

Main barriers to innovation

Apart from a lack of finance the *main barriers to innovation* across the EU seem to be

- stiff regulation
- strong aversion to risk
- poor interaction between research and industry, and
- not enough attention to define/imagine new business model and new organization

There are still too many regulations and bureaucratic administrative approaches in setting up an innovative company in several countries. Apparently, there is little room for experimentation in both the public as well as private sector with new business models, new technologies or more flexible approaches to policy.

In many countries, there is an almost general aversion on risk. Failure is considered not as a learning experience, but as a (personal) fault. In turn, risk taking is not recognized in society. A reason for this could be seen in the broad lack of entrepreneurial curricula in schools. Risk taking and innovativeness is also not recognized in the public sphere as, for example, low bidding companies often win rather than high bidding rivals with more innovative proposals in public procurement calls.

However, even though risk aversion is real, there is also a visible change happening in the EU. Start-ups are becoming more and more common as economies are becoming more and more open. This has led to the development of several favorable start-up ecosystems have developed such as Berlin, Cambridge, Helsinki, Barcelona, Paris and several others. However, Euro-CASE firmly believes that more efforts should be undertaken to create a more favorable business environment to harvest the creativity of young entrepreneurs across the EU.

Barriers in commercializing excellent research results

Europe is an excellent place for creative and excellent research. However, it suffers from the fact that little of this results in marketable products (European Paradox). With a view on scaling up this barrier addresses the generation of an innovation (based on publicly funded research activities) and its initial insertion into the market. This is an important barrier especially in countries with less developed innovation systems and a stronger reliance on public research

activities. The survey yielded the following reasons for this situation:

- Publishing is valued a lot higher than business activities
- Entrepreneurs and academicians operate in silos with hardly any interactions
- Regulatory aspects such as limiting IP regulations, stiff employment rules, etc.

In many countries, the traditional approach to evaluate professors according to their publication list still prevails. There are certainly huge differences between the EU Member States in this regard but especially in countries ranking in the lower half of the EU Innovation Scoreboard⁴ transforming inventions into innovations is not well rewarded in a public research career. Business activities of professors or the creation of spin-offs by staff members are hardly ever recognized, in some cases even prohibited. This seriously limits the transfer of most current knowledge to the market. Despite the fact that this is a well-known fact and that there are several valuable ideas⁵ to counter this situation it is taking a long time to mobilize this potential and to put the “third mission” of universities into a more positive light.

Technology transfer offices (TTOS) do have capabilities, but their operations could be professionalized. There are several answers that suggest that universities are protectively keeping and only very slowly commercializing the results. This leads to a situation that companies are buying old technologies from universities which is not favorable neither for the business (as it uses “old” technologies) nor for the university (which could have developed the technology further). Public research should thus be more market-oriented. In all cases, private-public Intellectual Property Rights are difficult to negotiate and contracts often contain conditions which are unfavorable for companies which have to bear an important cost of product development, from research to market. Public sector procurement could also be geared more towards cooperative arrangements of research organizations and business to support interaction.

Main factors inhibiting faster scale-up

According to the survey, the main factors inhibiting faster scale-up of SMEs were:

- lack of funding, also in light of the small pool of venture capitalists in Europe
- market limitations (there is no real EU Market) and regional orientation of start-up founders and investors
- lack of managerial and entrepreneurial skills
- not enough ambition
- not enough speed

Funding appears to be the major problem, still. However, the situation is very diverse across countries as well as across sectors (see also JRC 2016). While it is possible to argue that there is always funding for brilliant ideas, there seems to be more a lack of knowledge of information about where to obtain the right kind and right amount of funding. While seed funding for start-ups seems to be widely available (typically $\leq 2\text{M€}$), the lack of venture capital becomes problematic mainly in the second stage of start-up development (typically $2\text{--}20\text{M€}$). Big tickets are very difficult to obtain.

Sectorial differences are visible as technology intensive businesses such as IT services, Biotech, pharmaceuticals etc. obtain venture capital easier than traditional sectors. This has serious negative consequences on SMEs operating in traditional sectors aiming at scaling up their operations and may even have negative effects in the longer term when considering their need for capital in view of restructuring their activities to a more digital economy (industry 4.0, advanced manufacturing, etc.).

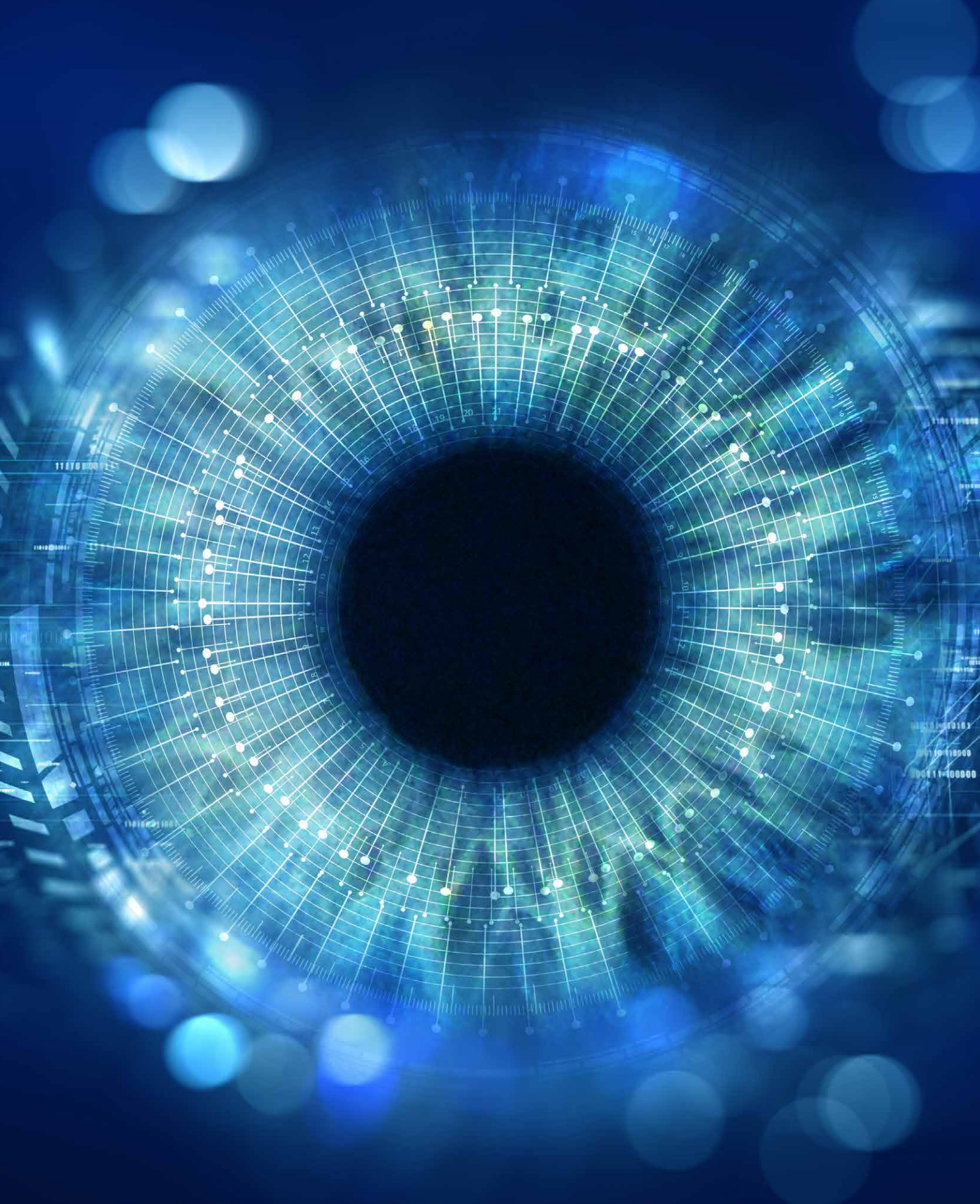
In contrast to European start-ups, their US counterparts have the chance to attract a large and homogeneous market, compared with the very heterogeneous EU market. A real and unified European market could help to “think big” and be a driver for innovation and scaling up. Unfortunately, many reasons prevent this market from being a perfect single market: cultural, administrative, legal, regulatory, behavioral and linguistic gaps. To a large degree, the few people eager to grow tend to consider in this order: (i) the national domestic market and (ii) the US

market and (iii) the Chinese market rather than the European market.

The lack of managerial and entrepreneurial skills remains a strong barrier for scaling up in Europe. According to the survey, most entrepreneurs have a strong technical perspective and only little commercial, marketing, financial or management competencies. The lack of skills is also reported in other pertinent studies (Couto 2014). This barrier goes hand in hand with an often reported “lack of ambition”. There are several reports for selling promising start-ups at an early stage to a large national or international company as opposed to continued growth (“I’d rather have 10M€ in my pocket today than aim-

ing for having 1B€ in my pocket tomorrow”).

Twice as many successful entrepreneurs are over 50 as under 25 (Harvard Business Review, June 27, 2013). Therefore, with regard to overcoming the lack of managerial and entrepreneurial skills, it seems important to harness to the potential of the 50+ age group. While it’s probably the younger generation that starts up bold and tech-driven businesses the working experience of the 50+ is still highly valuable. To dwell on the experiences of the 50+ seems especially vital for the group of companies that already have an innovation and have tested the market but find it difficult to grow.



Deep dives/Case studies

While some of the above-mentioned barriers are generic in nature (i.e. they affect companies similarly) there are differences across sectors. Therefore, the platform conducted case studies (“deep dives”) that provide the opportunity to highlight the specifics of a certain sector. The underlying assumption of the case studies is the reasoning that innovation occurs differently

in different sectors. The deep dives were conducted by the Polish Academy of Sciences (PAS) for Energy, the Royal Spanish Academy for Engineering (RAIng) for Industrialization, and the UK Royal Academy of Engineering (RAEng) for Digital. They reflect the generic barriers mentioned above and address the peculiarities of each sector.

SUMMARY DEEP DIVE ENERGY

Regulation

On the energy market, the relevant legislation and regulations are of particular importance. This is related to the system operation on several levels, each of them is strictly regulated. National regulations often differ from EU regulations. This is the result of different energy policy objectives at national levels. The energy market and, in general, the energy sector is very susceptible to political influence, particularly in terms of access to fuels.

From the point of view of the market regulation, the issues of opening up the whole EU internal market and eliminating the so-called “energy islands” are the most important. From a macroeconomic point of view, such an approach enables the transmission of large amounts of energy through national energy systems and can also contribute to an enhanced energy security of individual countries. There are certain limitations in each energy system in which energy is transmitted between its various energy sub-systems.

Restrictions have to be imposed on subsystems using new energy sources due to the need of monitoring their operation so as to maintain reliability and safety of the entire energy system.

This creates additional barriers at the local level. The European Commission has started work on linking energy systems of individual countries. The barriers stemming from the existing regulations are the factors which seriously limit market access for new products and relatively small companies.

Risk aversion

There is a relatively high level of trust in the energy sector, i.e. many entrepreneurs are keen to make investments. The energy sector has a large potential of possible profits in the event of a successful investment. Risk aversion seems to be more common in a group of operators and end users (end investors) of proposed solutions. This risk is related to operational problems in managing a heavily distributed grid and end investors facing difficulties in the inclusion of new energy sources in a grid due to problems in managing heavily distributed systems. The problem in managing distributed systems is typical for this type of systems and occurs in each EU country. The unwillingness to take risks associated with the system functioning causes the reluctance of operators to incorporate new small energy sources into this system.

Poor interaction between research and industry

This depends on many factors and conditions that exist in the energy sector. In this sector, because of the size of the enterprises, many large entities have their own research and development centres (both in the group of operators and manufacturers of energy devices). Additionally, there is a group of smaller producers benefiting from cooperation with research entities, often based on support from national or regional funds. Therefore, it is difficult to make clear assessments of the interaction between science and industry in this field.

European Paradox

For scientific communities, scientific publications and scientific effects in general are important, especially those which have an impact on the scientific career. On the other hand, publishing the results of research is not acceptable for virtually all research results that are to be used for commercial purposes. This difference in the priori-

ties is present in the whole (broadly understood) R&D sector and for all thematic issues, energy issues are not an exception at all. Many people from scientific communities think that these different priorities affect the so-called “European Paradox”, resulting in a lower number of implementations of new technologies in Europe than in the USA, taking into account the financial resources that are involved in the research.

Factors inhibiting faster scale-up of SMEs

With respect to the issues related to power engineering, problems with the growth of SMEs are present both in the area of generation and supply of electricity. The reasons for this situation are the same as for other industries (stiff regulation, market limitations, and managerial skills). An interesting issue is a connection of problems with the growth of SMEs with problems in gaining access to the market (the cost of this process, e.g. certification costs). Very often, it is a lack of capital that holds back development.

SUMMARY DEEP DIVE INDUSTRIALIZATION

The digital revolution will enable connectivity, automation, robotization and virtual simulation levels with the potential to change the whole productive fabric. The technologies that are contributing to the extensive introduction of digital revolution into the productive fabric will foster the creation of an integrated space of value creation.

An advanced production base is a high priority

The main conclusion, for the consideration of policy makers, is that keeping an advanced production base able to compete in the global markets in 2030 and provide a high level of employment and quality jobs, must remain a high priority as the cornerstone of the welfare state and political stability. Without a strong industrial base the future of Europe will be compromised. The anatomy and composition of the production fabric –the Integrated Spaces of Value Creation- will experience profound changes

in next decades with consequences on labour market composition and employment rates. To adapt industries to this scenario will require a huge public and private effort.

Developments in connectivity, automation and robotics and, in particular, the combined advances of the Internet of things (IoT), artificial Intelligence, virtual reality and cooperatives robots will transform the processes and the industrial value chains. Boosted by the digital revolution, the cyber domain will continue to enlarge in comparison with the physical domain. Most innovation processes and competition will take place on in the growing convergence domain. Job opportunities will also migrate from the physical domain to the cyber and convergence domains. It is worth stressing that jobs in the cyber and convergence domains will require new different skills and that the software and hardware infrastructure of most of the SMEs operating in the physical domain will become obsolete.

Towards integrated spaces for value creation

Technology is enabling a rich integrated fabric of companies, public and private knowledge generating nodes, all increasingly connected by different nets. The level of connectivity and interdependency among the different actors requires a holistic view and new tools of analysis. The development of integrated spaces for production and value creation across Europe requires broad collaboration within (between incumbents and new-comers) and across different sectors (digitalisation, etc.) as well as over the private and public domains (PPPs, co-regulation, etc.). Much of such reorganisation can be seen around digital platforms.

Focus on transformation: embrace creative destruction

Despite the transformative potential of platform ecosystems, current policies addressing platforms within the market and system failure paradigms

attempt to optimise the benefits and mitigate the downturns (European Commission, 2016). Such market and system failure approaches are more useful for dealing with a steady state situation in which public policy intervene to correct a stagnant market, but not to dynamically create and shape new trajectories (Mazzucato, 2016). In order to harness the disruptive potential of platform economy for societal transformation and direct such developments towards societally beneficial pathways, these need to become an integral part of governance rationales.

The policies struggle especially with platform ecosystems⁶ that share common schemata between stakeholders and entail emerging properties and resilience. They require policy approaches that also align with, and adapt to, complexity rather than reduce it because in complex systems unwanted impacts of policy measures tend to be the rule rather than exception (see, e.g. Bauer 2014).

SUMMARY DEEP DIVE DIGITAL

The impact of digital technologies across all industry is so pervasive and far-reaching that it is imperfect to identify digital as a single sector, nevertheless the EU cannot afford not to develop its leadership credentials in this area.

In January 2017 the UK government launched a consultation to inform the development of a UK Industrial Strategy. The consultation specifically identifies the UK's scale-up challenge, acknowledging that 'Scaling up is not just a question of capital. It is also about having the leadership and management skills to make the right decisions for a business.' As part of the Royal Academy of Engineering's response to the consultation, "Engineering an economy that works for all", which it led on behalf of the 38 professional engineering organisations in the UK, an online survey was completed by nearly 1,300 engineers. The survey included a question about scale-up, and the answers relating to the digital sector form the basis of the information below

Of particular importance to scaling digital companies, most sectors lack the multi-skilled

workforce required to convert data analytics theory into genuine changes to business practice and performance. Furthermore, in both industry and research there is a paucity of knowledge of the basic techniques needed for good data governance including data definition, data collection, curation and linkage as well as data protection and cyber-security issues. The required combination of skills is challenging, drawing on engineering, computer science, mathematics and statistics as well as specific sector knowledge. Tackling this will require changes to be made to undergraduate and postgraduate education as well as continuous professional development to reflect the new demands for multi-skilled individuals and teams with data science skills.

A clear message from the engineering community to our consultation is that, for engineering specifically, increasing the digital skills of the workforce is essential. The ability of UK engineers to be confident and competent to a high level in digital skills will be central to their competitiveness in high-value manufacturing and

engineering across a range of sectors. In fact, the digital economy is so pervasive that digital skills are absolutely vital to the workforce, and the report argues for digital skills to be added to the definition of basic skills. However, such skills training needs to start in schools. An essential requirement of ensuring that young people have the basic skills and foundational knowledge in

STEM subjects, including digital skills, is the adequate supply of specialist teachers in those subjects. In the UK, there are currently shortages of specialist teachers in all the key disciplines that lead to engineering skills. Of particular concern in English secondary schools is that 44% of computer science lessons are taught by non-specialists.

ANALYSIS OF DEEP DIVES

Participants at the Innovation Platform workshop in London focussed on the barriers to scale-up of digital SME’s, and came to the conclusion that many of the barriers identified for scaling up SME’s are common across the energy, industrial and digital sectors. Particular exam-

ples discussed were access to finance as companies’ progress along the investment spectrum and limited access to skills training and to experienced executives, particularly those with high quality leadership and management skills.

The results can be summarized as follows:

Generic barrier	Energy	Industrial	Digital
Barriers to innovation			
Regulation	+	=	+
Risk aversion	=	+	+
Poor interaction between research and industry	=	-	-
European Paradox			
Publishing > business	=+	=+	-
Different worlds, silos	=	-	-
Regulatory aspects (IP regulations,	=	-	=
Factors inhibiting faster scale-up of SMEs			
Lack of venture capital	-	=	-
Market limitations	-	+	-
Lack Managerial and entrepreneurial skills	-	+	+

“+” denotes that generic barrier appears to be more significant in this sector

“=” denotes that generic barrier appears to be equally significant in this sector

“-“ denotes that generic barrier appears to be less significant in this sector

There seem to be several similarities between the industrial and digital sector which points out to the growing interdependences of these two sectors. In contrast, the energy sector, being perceived as sector dominated by large companies, seem to face fewer but apparently more significant barriers especially with regard to regulation. Interestingly companies in the digital sector don't seem to be limited to “traditional” barriers such as the fact that publishing activities are more valued than business activities in public research organizations. This points to the “can do” attitude of researchers and digital businesses. The energy and industry sectors still feel these barriers related to traditional forms of measuring research output. According to the assessment industry is especially hampered by market limitations in the EU. Companies in the energy and digital sectors are less hampered by these as they find it easier to expand their activities across borders.

Recommendations

It remains a challenge for European policy makers how to adapt European SMEs (which account for more than 90% of the European economic activity) to the ongoing technological revolution. This revolution is extremely challenging for the countless mini and micro SMEs across Europe. Their survivability largely depends on their ability to adapt and on intelligent public support to increase their size and scale up the structure and composition of the European productive fabric.

Competitive advantages in future markets rest on embracing new emerging technologies that will change the productive landscape which requires a holistic approach across the whole of society. This requires not only an upgrading of managerial skills but also a reconsideration of the education system to make the most effective use of European research and development institutions with the aim of commercialising high complex and value added products and services.

In the light of the findings above it is obvious that there are no simplistic solutions for creating a more favorable environment for innovative European SMEs to scale up. Instead a policy mix of European, national and regional policies is required to create an ecosystem that is conducive to experimentation, trial and error and innovation. In that spirit, the Euro-CASE Innovation platform puts forward the following recommendations.

To the European Commission:

- The European Commission should continue its efforts to create a true European Single Market. While new ICT technologies may yield national boundaries obsolete, there is a growing need for allowing these technologies to mature. Regulation needs to be used more as a tool for growth. Business needs a unified and well-functioning internal market to scale up their operations in Europe. Therefore, open borders for economic activities are required and a removal of bureaucratic and legal obstacles to expand in all Europe should be encouraged.
- The European Commission should rigorously follow its proposal for Smart Regulation and consider any additional proposals if they are smart and viably support European SMEs (SMEs tests). The precautionary principle should be accompanied by the innovation principle. New public policies should be smart for growth.
- Public actors on all levels should provide more accurate information to SMEs where to obtain the *right kind* of funding. The conveyance of venture capital needs to be done by professional institutions. The existing European repositories should be complemented by an easy to use tool for finance and data analysis on scale-ups in the EU. An online platform that allows sharing information on “what works” should be considered. It is important to recall that private money is key. The European Union should support Member States to alter their fiscal regulations in order to encourage angel investors in start-ups and scale-ups.
- Innovation is not a goal per se, scaling up business by innovation is the issue. EU and European countries might speak more of scaling up than of innovation. All the fields of the business are important: sales, marketing, finance, etc. Europe must facilitate the development of big companies in “soft business”, or based on non-technological innovations. Also, more

general support and business advice in scaling up and implementing novel technologies should be promoted following e.g. see the Manufacturing extension partnership (MEP) in the US.

- Consider supporting cross-country marketing initiatives to increase market knowledge and ease entry within Europe and expanding the Enterprise Europe Network. Credit support / cheap insurance could assist when companies are concerned about expanding international sales.

To the EU member States

- Across Europe there is a growing need for more room for experimentation ("sandboxing"). This concerns policies as well as business ideas. The Commission as well as the Member States and regions should create spaces where policy makers and entrepreneurs in conjunction can try out new and innovative solutions. There are plenty of ideas that just need room to flourish. A culture of innovation and a bold pro-innovation stance in public administrations is required.
- A fresh re-thinking of a European Small Business Act (ESBA) could be very valuable. This could include risk taking and risk sharing components. Together with the modern approaches of innovation procurement by public administrations, an ESBA could turn into a powerful engine of SME growth.
- Favorable ecosystems are more easily created on a regional level because it is easier to bring the relevant stakeholders together. For ecosystem development it is key to first join the enthusiastic stakeholders. The voluntary engagement of enthusiasts and their subsequent commitment to continue shaping the ecosystem can then be complemented by a more official role of governments in providing infrastructure, incentives and smart regulations.
- Increase the talent and skill pool across the EU. Despite efforts from the European Commission in crafting a "Coalition for Skills" the issue remains largely in hands of the Member

States. With regard to scaling up, skills are massively needed in the areas of management, entrepreneurship and leadership. Member States should be more open in allowing school curricula to include these topics. Despite important changes over the last couple of years, the education system should reflect current and future needs of a dynamically changing environment, develop an entrepreneurial mind at early stage at school, and support the idea that innovation and business creation are essential for the future.

- Public and private procurement should be geared towards innovative scale-ups. In addition to efforts supporting public procurement, corporate engagement in buying from innovative SMEs should be encouraged to support them scaling up their operations. In order to spur public procurement, governments should think of establishing a department (or departments) that advises others on the quality of innovative solutions. This might reduce the risks involved in public (and private) procurement of innovation solutions as it allows for risk sharing. A similar thought is to consider an insurance for large companies using new innovations by SMEs.

To the European Academies

- Support an entrepreneurial culture: Successful entrepreneurs might have failed before. Their expertise in starting and scaling a business is highly valuable regardless and they need to be encouraged and incentivized to re-invest ("second chance" incentives). Also, twice as many successful entrepreneurs are over 50 as under 25. It seems important to harness to the potential of the 50+ age group in light of the lack of managerial and entrepreneurial skills.
- Limited financing opportunities are only one side of the story. Equally important is the limited mentoring and coaching of SMEs who are not necessarily aware of the whole spectrum of support instruments. This primarily concerns SMEs in traditional industries. Academies could act as facilitators and match makers and also advise government about overcoming the

challenges for growing companies.

- Fellows could engage in local discussion and enrich the local discussion with EU best practices, raise general awareness and promote positive effects of regulation. National Academies should also better understand local situations, feed info into Euro-CASE and enrich the local discussion with EU best practices. They could also promote a “growth test” of policies and promote positive effects of regulation. Euro-CASE could do a quality check of received information and disseminate best practices to Academies.
- Promote the notion of “smart” money, which means that both Corporates as well as individuals within the Academies should engage actively in the start-up/scale-up arena, by providing personal coaching, access to networks,

complemented by some investment.

The Euro-CASE Innovation Platform believes that the issue is not just about creating jobs, but about creating better jobs.



A new role for the European Academies?

In the light of the current discussion on a more dynamic Europe that values entrepreneurship and encourages scaling-up of innovative SMEs, Euro-CASE with its expertise in innovation and its Fellows, coming from business and academia alike, could drive European topics on the national level more than in the past. Euro-CASE can not only provide science-based policy advice but could also act as a forum for exchange of innovative policy ideas. Member Academies could gain insights in other organizational models in EU member states and acquire additional knowledge (“learning from each other”). This can be used to further stimulate the national dialogue on innovation and scaling up.

Engineering academies across Europe perform different functions in their respective countries. They are seen as providers of excellent science-based policy advice to their respective governments and often perform several other functions in the national innovation system. There are, however, excellent examples of what engineering academies can be in addition to this: forums for practical information for SMEs, match-makers in bringing young scientists and experienced entrepreneurs together, act as source for information for ambitious start-ups that look for information how to obtain funding to scale their operations. The Enterprise Hub of the Royal Academy of Engineering or YES!Delft (An initiative that helps entrepreneurs to build leading technology companies: <https://www.yesdelft.com>) are such examples.

The Innovation Platform encourages the Euro-CASE Member Academies to be more engaged in local activities and in supporting the local ecosystems. While it is certain that not all academies can follow this encouragement due to their current statutes, the platform nevertheless considers this an important step in creating ecosystems for

young, dynamic SMEs. The following table provides preliminary suggestions for a new role of engineering academies in Europe.

RAEng Enterprise Hub

The Royal Academy of Engineering’s Enterprise Hub was established in 2013 and forms part of the Academy’s commitment to stimulate excellence and promote creativity and innovation in engineering. The Academy offers a number of grants aimed at identifying and supporting the next generation of high potential entrepreneurs and prizes celebrating success in innovation and entrepreneurship (e.g. SME Leaders programme, Launchpad Competition). The awards include provision of money-can’t-buy bespoke support and one-to-one mentoring from its Fellowship, which comprises many of the country’s most successful engineers from across academia and industry, including prominent entrepreneurs and business leaders. To date, over 100 Fellows have pledged their time to mentor Hub Members.

The Enterprise Hub is supported by a network of partner organisations. Each partner brings a unique contribution, from financial support to time and expertise, benefiting from the extended network and event opportunities that the Academy provides in turn.

The Royal Academy of Engineering opened the Taylor Centre – a physical home for the Enterprise Hub with meeting and networking facilities for its Members – in February 2017.

For more information see:
<https://enterprisecentre.raeng.org.uk/>

Generic barriers	What can Fellows do?	What can Engineering Academies do?	What can Euro-CASE do?
Main barriers to innovation			
Stiff regulations	Engage in local discussion and enrich the local discussion with EU best practices Raise general awareness Promote positive effects of regulation	Engage in local discussion, understand local situation, feed info into Euro-CASE and enrich the local discussion with EU best practices Apply “growth test” of policies (growth institute) Raise general awareness Promote positive effects of regulation	Quality check of received information and disseminate best practices to Academies Act as interface between Academies and European Commission
Risk Aversion	Active role of Fellows as mentors (smart money), so more people consider the entrepreneurial track. Fellows can lead by example and “switch sides” Entrepreneurs teaching at schools	Stress the role academies play in promoting entrepreneurship, encourage fellows to be active as mentors and facilitate infrastructure: RAEng: enterprise hub	Promote examples of entrepreneurs that have failed before leading successful businesses (on website, in a series of European conferences, etc.) Contribute to making young successful start-up entrepreneurs role models
Poor interaction between research and industry	Lead by example Fellows from industry could share their business experiences within the Academies	Promote measuring impact not only by articles but also in terms of business activities Support creating more incentives for researchers to become involved in business	Explicitly underline the notion of high quality research activities in companies in the provision of scientific advice to policy
European Paradox			
Focus on publishing	Join with other fellows to call for more liberty to conduct business activities in local ecosystems	Join examples from local eco-systems Call for more entrepreneurial liberty in Higher Education institutions Recommend new incentives that value business activities as well as publishing	Share national examples of incentives that value business activities as well as publishing
Regulatory aspects (IP regulations, employment...)	Help professionalise university technology transfer offices	Cooperate with national governments and universities to identify regulations that could be eased	Sharing best practices from EU countries on how to get academic research results to the market faster
Main factors inhibiting faster scale-up of SMEs			
Access to or lack of funding	Fellows can provide guidance for young entrepreneurs	Academies could act as match maker	Benchmarking study of European financing instruments Sharing best practices
Market limitations (there is no real EU Market)	Promote common market for new technologies, Support using regulation as a smart tool (e.g. 3G standard)		Same as EU level
Lack of managerial and entrepreneurial skills	Identify disruptive technologies & feedback into the education system, for example Blockchain Promote sharing - Fellows (or academies) providing space and training	Promote maps/overviews of available and necessary skills and competencies Bring the topic of “Reskilling” of over 50s to the attention of policy makers	Bring the topic of “Reskilling” of over 50s to the attention of policy makers
Other topics			
Leadership/mentorship	Active and practical engagement of fellows	Mapping who is doing what; academies can provide some international support	Sharing best practices
Infrastructure	Engage in local ecosystems, spur discussion and use facilities as spaces for bringing enthusiastic people together	Provide space as Academy = enterprise hub @ RAEng Embrace an active role in local ecosystems	
Technology	Understanding life cycle (when technologies become obsolete), transfer of government to private sector.	Share failures and promote learning from them	Share failures and promote learning from them

References

- Bauer, J. M. (2014) 'Platforms, systems competition, and innovation: Reassessing the foundations of communications policy', *Telecommunications Policy*. Elsevier, 38(8–9), pp. 1–12. doi: 10.1016/j.telpol.2014.04.008.
- Coutu, S. (2014). The scale-up report on UK economic growth, London. Available at: <http://www.scaleupreport.org>
- Euro-CASE 2015: Euro-CASE policy paper on European Innovation Policy, Paris. Available at: http://www.euro-case.org/images/stories/pdf/platforms/Euro-CASE_Innovation-Platform-Paper.pdf
- European Commission (2014): For a European Industrial Renaissance, COM (2014) 14 final, Brussels.
- European Commission (2016): Europe's next leaders: the Start-up and Scale-up Initiative, COM(2016) 733 final, Brussels.
- European Commission (2017): An analysis of drivers, barriers and readiness factors of EU companies for adopting advanced manufacturing products and technologies, Brussels.
- Eurostat/OECD (2007): Manual on Business Demography Statistics, Paris.
- JRC (2016): Improving access to finance: which schemes best support the emergence of high-growth innovative enterprises? A mapping, analysis and assessment of finance instruments in selected EU Member States, Brussels.
- Madelin, R. and Ringrose, D. (ed.) (2016). Opportunity now: Europe's mission to innovate. European Commission. Luxembourg: Publications Office of the European Union.
- Mason, C. and Brown, R. (2014) Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship.
- Mazzucato, M. (2016) 'From market fixing to market-creating: a new framework for innovation policy', *Industry and Innovation*, 23(2), pp. 140–156
- OECD (2005): Oslo Manual. Guidelines for Collecting and Interpreting Innovation Data, Paris.
- Russell, M. G., Still, K., Huhtamäki, J., Yu, C. and Rubens, N. (2011) 'Transforming Innovation Ecosystems through Shared Vision and Network Orchestration', in Triple Helix IX International Conference: Silicon Valley: Global Model or Unique Anomaly? Stanford: Stanford University, H-STAR Institute Center for Innovation and Communication, pp. 1–21
- SATW (2017) Internal slideset presented at the Euro-CASE Innovation Platform meeting in London, 3./4.052017.

Additional literature

Bravo-Biosca, A. (2011). A look at business growth and contraction in Europe. Nesta Working Paper 11/02. Available at: www.nesta.org.uk/wp11-02

BUSINESSEUROPE, the European Risk Forum and the European Round Table of Industrialists. (2015). *Better Framework for Innovation. Fueling EU policies with an Innovation Principle*. Available at: http://www.ert.eu/sites/ert/files/generated/files/document/20150619_businesseurope-erf-ert_innovation_principle_joint_statement.pdf

Deloitte, (2014). *The Scale-up Challenge*. Available at: <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/strategy/deloitte-uk-scale-up-challenge.pdf>

European Digital Forum (2016a). *From Start up to Scale-up. Growing Europe's Digital Economy*. Available at: <http://www.lisbon-council.net/publication/publication/136-from-startup-to-scale-up-growing-europes-digital-economy-.html>

European Digital Forum (2016b). *The 2016 Startup Nation Scoreboard. How European Union Countries are Improving Policy Frameworks and Developing Powerful Ecosystems for Entrepreneurs*. Available at: <http://www.lisboncouncil.net/publication/publication/132-the-2016-startup-nation-scoreboard.html>

Hern, A. (2015). In search of a European Google. *The Guardian*. Available at: <https://www.theguardian.com/technology/2015/dec/06/europe-google-silicon-valley-digital-industry>

Kollmann, T., Stöckmann, C., Linstaedt, J. and Kensbock, J. (2015). *European Startup Monitor 2015*. http://europeanstartupmonitor.com/fileadmin/presse/download/esm_2015.pdf

Lisbon Council, Nesta and Open Evidence, (2016). *A Manifesto for Change and Empowerment in the Digital Age*. Available at: http://scaleupeuropemanifesto.eu/pdf/Scale_Up_Europe_Brochure.pdf

Startup Europe Partnership (SEP), (2015). *SEP Monitor. From Unicorns to Reality*. Available at: <http://startupeuropepartnership.eu/wp-content/uploads/2015/07/SEP-Monitor-From-Unicorns-to-Reality.pdf>

Footnotes

1. Euro-CASE (2015): Euro-CASE policy paper on European Innovation Policy, Paris.
2. Source: <https://www.nist.gov/sites/default/files/documents/mep/MEP-PARTNERING-IMPACTS-2013-2.pdf>
3. The individual members were responsible for distributing the questionnaire among their respective networks. Academy fellows and other experts were asked to provide their assessment on 12 questions all dealing with the generic barriers to innovation and scale up. In total the survey was answered by more than 120 individuals with a good spread across Europe. Most answers came from the Czech Republic, Finland, France, the Netherlands, Slovenia and Spain, respectively. The survey was conducted electronically and was open for 4 weeks.
4. http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en
5. Euro-CASE suggested that governments should promote a cultural norm 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. Also, governments should encourage the adoption of ‘Easy IP’ schemes, where the university can grant to spin-offs the free use of a new technology developed within the university.
6. This holds true also with other types of ecosystems, such as those of innovation (Russell et al., 2011) and entrepreneurship (Mason and Brown, 2014).

Annex

ANNEX I: QUESTION IN THE EURO-CASE QUESTIONNAIRE

1. The lack of funding is only one among many barriers to innovation. Based on your expert knowledge, what are the top three barriers to innovation in your country apart from a lack of finance?
 - a On the European level
 - b On the national level
 - c On the regional level
2. Based on your expertise, what are the three main reasons for the fact that only little of the excellent research produced is translated into marketable products (European Paradox)?
3. More start-ups from academia (universities or public research organizations) could become innovative start-ups due to their science-based business models. What are the main barriers (max. 3) in your ecosystem that inhibit the formation of more academic start-ups?
4. There are several examples outside the EU, especially in Silicon Valley, where innovative start-ups grew very fast after founding ("gazelles", "unicorns" (start-up company valued at over \$1 billion)). What are the main factors inhibiting faster scale-up of SMEs in your country?
5. How would you rate the availability of venture capital in your country in general on a scale of 1 (very low availability) to 10 (very high availability)?
6. Based on your personal opinion, how would you rate the willingness of companies to invest in scaling up production on a scale 1 (very low willingness) to 10 (very high willingness)?
7. What would you suggest to be appropriate policies and/or instruments to support innovation and scaling-up?
 - a SME instrument (<https://ec.europa.eu/programmes/horizon2020/en/h2020-section/sme-instrument>)
 - b FTI pilot (<https://ec.europa.eu/programmes/horizon2020/en/h2020-section/fast-track-innovation-pilot>)
 - c Prizes (<https://ec.europa.eu/research/horizonprize/index.cfm>)
8. How would you assess the importance of the following EU approaches? Are these viable instruments to support innovation and scaling-up? If not, how do these instruments need to be modified?
9. From your perspective, is your country doing enough in terms of innovation-oriented procurement? If not, what are the barriers to implement innovation-oriented procurement?
10. The EU disposes of a wide array of funding mechanisms. What should the EU add to its portfolio to accelerate innovation across Europe?
11. In view of a growing importance of digitizing European industries (Industry 4.0, Advanced Manufacturing, etc.) what role should national governments play?
12. Room for ideas outside the box. What should European and/or national policy makers do to support the scaling-up of innovative SMEs?

ANNEX 2: MEMBERS OF THE EURO-CASE INNOVATION PLATFORM

Surname	Name	Position	Academy	Country
Breidne	Magnus	Vice President	Royal Swedish Academy of Engineering Sciences	Sweden
Brevard	Christian	Fellow	National Academy of Technologies of France	France
Carlstedt	Johan	Project Director Innovation for Growth	Royal Swedish Academy of Engineering Sciences	Sweden
Caristan	Yves	General Secretary	Euro-CASE/National Academy of Technologies of France	France
De Koning	Kees	Fellow	Netherlands Academy of Technology and Innovation	Netherlands
Frackowiak	Elzbieta	Fellow	Polish Academy of Sciences	Poland
Hämäläinen	Jari	Fellow	Swedish Technical Science Academy in Finland	Finland
Haugland	Anders	Fellow	Norwegian Academy of Technological Sciences	Norway
Hügli	Rolf	General Secretary	Swiss Academy of Engineering Sciences	Switzerland
Janosec	Jiri	Fellow	Engineering Academy of the Czech Republic	Czech Republic
Lackowski	Marcin	Fellow	Polish Academy of Sciences	Poland
Nilsson	Björn O.	President	Royal Swedish Academy of Engineering Sciences	Sweden
Pleško	Mark	Fellow	Slovenian Academy of Engineering	Slovenia
Ritchie	Ian	Fellow	Royal Academy of Engineering	UK
Sanjurjo Jul	José Manuel	Fellow	Royal Academy of Engineering of Spain	Spain
Sanz	Germain	Fellow	National Academy of Technologies of France	France
Stehnken	Thomas	Scientific Officer (Platform Coordinator)	National Academy of Science and Engineering	Germany
van Ee	Bertrand	President (Platform Chair)	Netherlands Academy of Technology and Innovation	Netherlands

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