

## INNOVATION AND INDUSTRY: POLICY FOR THE NEXT DECADE

### Key messages

- This document contributes to the discussion on the post-2020 policies that will start with the next EU multiannual financial perspectives and the subsequent preparation of the ninth Framework Programme (FP9).
- We identify seven major challenges posed by the industrial transformation. These challenges will shape the future economic landscape and should be at the heart of the next generation policies.
- Four main ingredients are proposed for future EU policies: they should i) be based on (truly) new policy vision, aims and objectives; ii) promote coordination, simplification and openness; iii) target EU specificities; and iv) embody experimentation.

### The context

The worldwide industrial landscape is rapidly changing and innovation continues to transform industries and society. In order to discuss the research, business and policy challenges for the decade to come and provide guidance to the EU industrial research and innovation policy agenda, the European Commission's JRC and the OECD co-organised the 6<sup>th</sup> European Conference on Corporate R&D and Innovation (CONCORDi 2017) on 26-29 September 2017.

This document outlines seven challenges (and opportunities) the industrial transformation already poses and then proposes four main elements that policy makers should take into account when elaborating the next generation of policies. This is especially relevant as the coming years present a crossroads where the EU needs to define the post-2020 industrial and innovation strategies as part of the structural framework.

### 7 challenges from industrial transformation

#### 1) Upgrading and updating the industrial base

The EU is facing two simultaneous issues. On the one hand, more should be done to favour the emergence of EU champions in the ICT industry, a key industry where the EU is still under-represented compared to its role among the top R&D investors worldwide (Guevara *et al.*, 2015). On the other, it is vital to ensure that more traditional (non-ICT) sectors also benefit from the digital transformation. Indeed, the

EU is a global leader in a number of manufacturing industries where the adoption and development of digital technologies is becoming the key for success, e.g. via the implementation of manufacturing 4.0. This has also been pointed out in the recently renewed EU Industrial Policy Strategy (EC, 2017a), which also stipulates that the EU should enhance its capacity to grasp new technological opportunities, create new sectors and make them grow. This makes it all the more crucial for the EU to support leading (mature) sectors in absorbing new technologies and updating their business models (Moncada-Paternò-Castello, 2017).

This would in turn contribute to the development of the next generations of technologies. In this process, the key role of new technology-based firms should be optimised and so the conditions for their scaling-up prioritised. Indeed, the potential for innovative firms to scale up is crucial for the emergence of new knowledge-intensive sectors. This calls for a better understanding of the role played by recent market trends and structural changes in this process.

#### 2) Data revolution and non-R&D intangible assets

The data revolution, brought about by the knowledge economy, offers new opportunities related to innovation and the potential to multiply its impact on socio-economic development. The availability of an increasing volume of data produced within short timeframes calls for clear data protection, handling and storage strategies as well as more and better use of micro data. The use of new emerging data sources

will allow for the measurement of key aspects of the innovation and business dynamics.

To fully exploit these new data, we need to develop meaningful and operational (possibly real-time) metrics for system assessments. For example, we are used to measuring entrepreneurial quantity to assess an economy's potential. However, economic growth has a much stronger relationship with entrepreneurial quality (Stern, 2017). This suggests that it would be beneficial to focus on measuring quality rather than only pursuing quantity. The data revolution can also help to better grasp the growing role of non-R&D intangible assets for firm competitiveness. The nature, measurement, complementarity and impact of non-R&D intangible assets deserve much more scrutiny. In this context, the support to and the protection of firms' intangible assets are pivotal for full socio-economic exploitation of the knowledge generated.

Most of the evidence on the industrial transformation and digitalisation comes from the US. To guarantee better targeted and efficient policies, the EU needs more evidence from this side of the Atlantic and new theoretical and empirical approaches to the direction and assessment of innovative activities. This would allow better alignment of the industrial transformation with the EU's wider socio-economic goals.

### 3) Innovation is dynamic and specific

Because of its changing nature, our understanding of the innovation process requires continuous dedication to explore new possible aspects relevant for policy making. While differences across sectors are nowadays taken for granted, awareness of the heterogeneity of innovation strategies among firms in the same industrial sectors is still in its infancy.

The high heterogeneity of R&D intensity among firms within the same sector (Coad, 2017) indicates the coexistence of firms with different (R&D) investment strategies. These are probably linked to different business models and to specific product niches in which firms operate. Such heterogeneity should be further investigated to assess which policy mix can be most effective to support a specific industry or technology.

The failure to identify and diffuse best practices throughout the economy and to recognise constraints faced by new innovative incumbents are important hurdles for EU competitiveness.

### 4) From static to dynamic efficiency

Efficiency has become a dynamic rather than a static concept. A firm is dynamically efficient when it reduces its cost curves and/or improves its products over time by introducing new products and processes. Empirically, dynamic efficiency tends to be underestimated by competition science and policy, perhaps because comparative static approaches are easier to measure (Walker and Myers, 2017).

Dynamic efficiency gains are often associated with a sufficient number of larger businesses earning and reinvesting above-normal profits,<sup>1</sup> combined with a sufficient number of smaller firms able to innovate in industry niches. Furthermore, competition plays an important role. On the one hand, excessive competition in product markets, by reducing the innovator's payoff, can reduce incentives to invest in R&I. On the other hand, if there is excessive concentration (e.g. due to M&A), firms with a huge market power can pre-empt rivals; making it unprofitable for others to catch up and thus slow down the pace of innovation.

These dynamics should be studied in much more depth. This also comprises ways to guarantee that the high productivity of firms active at the global frontier 'spills over' to other firms. Preventing an excessive concentration of resources and knowledge in just a few players (markets, territories) is essential in a period of slow growth and increasing inequality.

### 5) Internationalisation and cooperation between firms

Knowledge, production and consumer markets are increasingly fragmented and spread across borders. This brings opportunities, but also new challenges. Many new technologies find applications in multiple sectors, but also involve increasingly complex systems where no single country or company is able to dominate the full value chain.

In this new 'multipolar paradigm', firms may profit from different R&I cooperation strategies to enhance their performance. However, international (cooperation) strategies are not carved in stone. There are big differences in innovation and production processes across sectors and (global) value chains. In addition, the large disparities in national (regional) R&I capabilities may prevent (small/local) firms from

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<sup>1</sup> However, large firms do not necessarily reinvest all profits deriving from their superior R&D/innovation efficiency and privileged market position.

fully grasping the opportunities offered by participation in international markets.

### 6) Improving university-business cooperation

Building successful university-business cooperation is not always easy. An approach has been to try to make universities more similar to business. However, it seems vital to both strengthening public basic research and fostering their cooperation in the transfer and commercial exploitation of research results.

The difference in performance among firms collaborating with universities and those that do not has increased steadily in the last 20 years in favour of the former. Businesses can learn from and take advantage of the interaction with academia and grasp the opportunities offered by scientific knowledge, which is not always obviously applicable, but can have a huge potential.

Recent cuts in public research funding may have unforeseen negative effects as national and regional research capacities shrink and longer-term objectives are neglected together with more basic research. The metrics to assess public research cannot be the same as those for private or collaborative projects, but need to attach more value to future societal returns. Revitalising the collaborative funding and use of supra-national public research agendas and infrastructures is an important policy instrument for interregional (national) collaboration and technology development.

### 7) Innovation and Employment

Recent evidence suggests that the innovation-employment link is not straightforward and that the quality of new jobs remains an issue for the design of labour-friendly innovation and industrial policy interventions.

This is particularly true when considering that this link may vary across sectors and firms of different sizes. Similarly, the so-called "jobless recovery" points to the importance of understanding what other lessons can be learned from the last financial crisis. The possible negative impacts of technology on jobs are nowadays widely discussed, although history suggests new jobs that are complementary to digital technologies will emerge too.

Beyond determining possible negative aspects, the point is more about understanding which skills will be required in the medium-long term, how to efficiently

allocate human capital to sustain a technology-rich environment and if (and how) this can be done without putting a further burden on the labour force.

## 4 ingredients of the next generation policies

### 1) New policy vision, new aims and objectives

Social values may be under pressure in many parts of the world, but they are and should remain at the core of the EU project. The way forward is to rethink R&I policy to give the EU a long-term vision based on learning and experimentation.

There is a dramatic need for a common definition of an aim or "mission" and the relative design of existing, or the development of new, R&I instruments to realise that mission.

The new R&I framework should be shaped according to three straightforward objectives: 1) supporting "science for science"; 2) supporting "science for society", R&I for (super)national priority missions; 3) supporting "science for industry", R&I to help firms defining their innovation space (Soete, 2017).

When crafting the policy design for (re)directing innovation activities, we should clarify if the State should only have a "repair-shop function" or whether we need a "new role of the State for innovation" (Mazzuccato, 2015). Indeed, (re)directing innovation activities means amending market/system failures, but also filling missing markets (State as producer) and avoiding unacceptable market outcomes. In the latter case, the justification for policy action comes from outside the economic sphere and implies the eventual shutdown of detrimental markets and the creation of conditions for beneficial market solutions.

Also, EU industrial and innovation policy should contribute in reversing the rising tide of inequality. A different type of inclusive innovation-led growth is possible in the EU and is in line with economic theory (e.g. Acemoglu & Robinson, 2012). This could be an opportunity for Europe to overtake competing economies on specific issues by favouring the prioritisation of urgent social challenges such as sustainable 'green' growth.

The policy-relevant questions should not be just about the intensity of innovation but also about its direction (Cantner, 2017). Analyses in this area require a great degree of interdisciplinary and strong connections in different areas of research. The JRC, with its cross-disciplinary nature, can play a prominent role in putting together different approaches to best support future policy design.

## 2) Coordination, simplification and openness

In Europe, R&I policy is a “shared” responsibility between actors at different governance levels. This creates coordination problems, legal challenges and accountability issues.

National and regional policy making agendas should be brought closer together. Regionalised support is more sensitive to the local context than nationally defined interventions, which in turn may have a broader impact on the economy. How can we align national and regional capacities, advantages and priorities? Stakeholders and policymakers at different levels need a shared understanding.

There are always good reasons to come up with new policy instruments, while it is much more difficult to close or replace existing ones. The result is a growing list of instruments, nowadays extremely long in the EU, which is already too long. We need a simplification of policy instruments, in other words “a minimum objective should be to eliminate one third of R&I funding schemes, instruments and acronyms across the landscape” (EC, 2017b).

The simplification of policy instruments should be done while embracing a more open approach. In particular, “openness” could represent the tool to address the grand societal challenges of our time. The EU should play a central role in those challenges with application at the local and global level. Since commons depend essentially on trust, the creation of networks and communities focusing on people as actors of change (both as innovators and consumers) seems a precondition to reach higher levels of thinking and properly address these challenges.

## 3) Targeting EU specificities

Well-intentioned approaches may end in the “Boulevard of Broken Dreams”. The innovation policy boulevard is paved with numerous failed attempts to replicate the success of Silicon Valley, also in the US.

We should turn European “weaknesses” into our strengths by better targeting and tailoring R&I policies to EU-specific conditions. This can guarantee that efforts to accelerate growth and competitiveness will not fail to turn “ideas” into action.

Tailoring also means that different instruments should be foreseen to address different challenges. Sometimes large firms would be crucial in realising the innovation mission, while in other cases SMEs or even new technology-based firms would be the essential targets/partners.

The challenge for policy becomes how to integrate sector innovation specificities into tailored policies based on a shared European vision.

## 4) Policy experimentation

Causality is fascinating, but it is extremely difficult to draw causal links outside an experimental framework and to draw sound policy implications.

We should embrace experimentation on a larger scale. This requires design thinking in policy formulation, experimental policies and a proper data collection. However, at the same time, we can also try to fully exploit the potential offered by big data and algorithm developments.

Sometimes is not all about causality and predictive analytics may prove to be extremely useful. Some relevant topics (e.g. where new innovation opportunities will arise) do not necessarily require a causal setting to be investigated.

Moreover, to monitor and evaluate policy actions, data should be collected before, during and after the policy implementation. A clear understanding of what should be actually measured should provide guidance for designing data collection.

## Concluding remarks

The speed and complexity of recent technological, industrial and social changes pose fundamental challenges to industry and to our capacity of sustaining proper levels of job creation and economic growth. Understanding the direction of technological, industrial and societal change is not trivial. In this context, the EU should aim at designing policies tailored to its specificities and needs and building on its historic strengths.

This is especially important in the framework of the discussions on the negotiations on the next EU multiannual financial perspectives (post-2020), the subsequent preparation of the next Framework Programme for Research and Innovation (FP9) and the implementation of the measures deriving from the proposal for “A Renewed EU Industrial Policy Strategy” to foster industrial competitiveness, innovation and technological leadership.

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- <http://iri.jrc.ec.europa.eu/concord/2017/index.html>
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- <http://ec.europa.eu/research/>
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