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RIO Country Report 2017: Portugal

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RIO Country Report 2017

The R&I Observatory country report 2017 provides a brief analysis of the R&I system covering the economic context, main actors, funding trends & human resources, policies to address R&I challenges, and R&I in national and regional smart specialisation strategies. Data is from Eurostat, unless otherwise referenced and is correct as at January 2018. Data used from other international sources is also correct to that date. The report provides a state-of-play and analysis of the national level R&I system and its challenges, to support the European Semester.

Summary

Despite the recent improvement in the macroeconomic outlook for Portugal, in 2017 it was considered that *"Portugal has made limited progress on addressing the 2016 country-specific recommendations"* (European Commission, 2017c). In the field of research and innovation, there is explicit mention to the fact that *"Information and communication technologies are lagging behind and the cooperation between business and academia is not strong enough. This is having a negative impact on the innovation capacity of the Portuguese economy"*.

Challenges for R&I policy-making in Portugal

1. **Improving firms' innovation performance by strengthening their technological and managerial capabilities:** despite positive developments, innovation performance remains relatively weak. There are signs of insufficient in-house capabilities within firms.
2. **Stimulating the emergence of new companies in knowledge-intensive activities:** even though in 2016 medium and high-tech exports reversed the previous downward trend, growth in knowledge-intensive service exports is still tepid. Efforts to stimulate entrepreneurship led to positive results, but difficulties in attracting knowledge-intensive FDI persist.
3. **Ensuring stronger linkages between science and industry:** tackling this challenge requires sustained action from both ends. The challenge here is not just 'technology transfer', but rather the development of co-design and co-action initiatives involving players from both sides.
4. **Defining jointly developed agendas on innovation policy:** this challenge is closely related to the previous one. Measures taken to involve the business sector in R&I policy design risk remaining limited. Further efforts to stimulate real 'bottom-up' initiatives for the definition of R&I agendas are still needed.
5. **Fostering the recruitment of researchers by business firms:** Portugal has one of the lowest shares of researchers employed by businesses in the EU. Promoting employment of high-skilled workers, especially PhD holders, would enable human capital to be put to productive use. This would in turn contribute to address some of the previous challenges.

Main R&I developments in 2017

- **The [INTERFACE Programme](#)** (former CITec Capacitar programme), aimed at promoting cooperation between universities/research centres and industry.
- **The [Programme to Stimulate Scientific Employment](#)**, aimed at reducing the number of PhD graduates in non-permanent positions.
- **The [second edition of the Lisbon Web Summit](#)**.
- **The [revision of the Capitalizar Programme](#)**, aimed at improving companies' balance sheets and financing conditions.
- **The launch of [R&I Agendas](#)**.
- **The launch of [INCoDe.2030](#)**, the National Initiative for Digital Competencies.
- **The [Strategy for the Public Administration's Digital Transformation](#)**.
- **[Portugal Space 2030](#)**: A Strategy for Research, Innovation and Growth.
- **The [Industry 4.0 Programme](#)**: announced in 2016 and launched in January 2017, it is aimed at enhancing Portuguese firms' awareness and responsiveness to digitalisation.

Smart specialisation

Information on progress in the implementation of RIS3 remains limited. However, all regions have already published their priorities and seem to be well placed to fully implement the process.

One of the main issues is the limited level of implementation of the entrepreneurial discovery process. ANI is expected to relaunch this process soon. ANI also intends to develop initiatives towards the revision of national and regional RIS3 strategies. Another line of action for the near future concerns exploratory work on complementarities between national and regional smart specialisation strategies.

Information on applications is already available for the Alentejo and Centro regions. For both regions, the extent to which applications were aligned with the RIS3 criterion has played an important role in project selection.

New policy developments

At the national level, the draft report on the assessment of the implementation of RIS3 was presented to the meeting of the Council of the Coordinating Board of the National Strategy for Smart Specialisation in October 2017. It was decided to revise the report to include information from OPs other than Compete 2020. The revised report is expected to be available still in 2017. At the regional level, the Centro Region Coordination Commission (CCDR Centro) decided in November 2016 to launch a public consultation on RIS3.

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1 Economic context for R&I

The macroeconomic outlook has recently been improving in Portugal. As pointed out in the [EC's Autumn Forecast for Portugal](#) (European Commission, 2017a), "GDP and employment are set to increase significantly in 2017 driven by exports and investment. Despite some slowdown, economic performance is expected to remain strong in 2018 and 2019 amid further export growth and lower unemployment". The labour market continues to improve: unemployment is expected to have declined from 11.2% in 2016 to 9.2% in 2017, and is predicted to fall further, to 8.3%, in 2018. In addition, after reaching 2.0% of GDP in 2016, the general government deficit is set to decline and stabilize around 1.4% in 2017 and 2018.

However, despite these recent improvements and the overall positive short term outlook, significant risks persist. Portugal was withdrawn from the "excessive deficit procedure", but the country remains in the "preventive arm" of the Stability and Growth Pact, subject to a "transitional debt rule" (European Commission, 2017b). The EC's "Recommendation for a council recommendation on the 2017 National Reform Programme of Portugal" pointed out that the country continues to experience "macroeconomic imbalances [...] in particular, the large stocks of net external liabilities, private and public debt and a high share of non-performing loans constitute important vulnerabilities [...] the stock of non-performing loans remains high and, together with low profitability and relatively thin capital buffers, they pose risks to banks' balance sheets." (European Commission, 2017b: 3).

As regards economic performance, labour productivity in Portugal increased at a slower pace than the EU's average in the 2009-2016 period. Potential reasons for this relatively poor performance include: i) lower employment shares in knowledge-intensive sectors relative to the EU average, ii) a smaller share of foreign enterprises, coupled with a higher share of traditional, small enterprises, relative to the EU average², iii) productivity underperformance in the dismal financial sector, dragging aggregate labour productivity. The first point is closely related to the challenge related to the lack of high-skilled labour in business firms. Stimulating employment of PhDs beyond academia is essential for Portugal to both deepen human capital in the public administration and in business organisations and for enablers such as the "open attractive research systems" and the "innovation friendly environment" to be translated into employment and improved levels of productivity and competitiveness.

1.1 Structure of the economy

In Portugal, the employment shares in the service and manufacturing sectors, respectively 67.5% and 15.6% in 2016, differ from the equivalent EU28 shares in the same year, respectively 73.1% and 13.8%, figures indicating a relatively lower degree of tertiarization of the Portuguese economy. The contrast between Portugal and the EU average is even starker when looking at the employment shares of the knowledge-intensive service sectors and the high and medium-high-tech manufacturing sectors. While for the former the Portuguese and EU's shares were respectively 29.6% and 37.2% in 2016, for the latter the shares were 2.33% and 4.63% in 2015.

The share of foreign controlled enterprises out of the total number of enterprises is lower in Portugal than in the EU (0.65% and 1.18% in 2014, respectively), while the opposite holds in relation to the share of small ("from 0 to 9 persons employed") enterprises (95.33% and 92.98% in 2014, respectively).

² This type of firms are typically characterised by lower productivity levels.

These structural data show a seemingly more disadvantageous specialisation pattern of the Portuguese economy, at least in what concerns employment shares in sectors of higher knowledge and technology intensity. Additionally, an analysis of the 2009-2015 period and the year 2016, does not show significant changes in those shares, with the economy displaying an important degree of structural rigidity over the recession period. This may partially account for the contrasting trends in unemployment and labour productivity in Portugal with respect to the EU, as the unemployment rate rose more in Portugal than in the EU in the period since 2009, yet Portugal's labour productivity and total factor productivity increased at a slower pace than the EU's in the same period. Further, relative innovative performance also declined in the same period, with the Summary Innovation Index declining from 85.4 in 2010 to 83.0 in 2016 (European innovation Scoreboard, EIS, 2017), suggesting the country may have been losing ground in relation to the most innovative EU economies.

1.2 Business environment

According to the 2017 SBA Factsheet, Portugal's "score on entrepreneurship is among the best in the EU" (European Commission, 2017d). This document stresses that "Since 2008, the country has made significant progress" in entrepreneurship. However, despite the country also ranking 25th worldwide (above the EU's average) in 2017 according to the "[Ease of Doing Business](#)" index, there are certain dimensions of "doing business" in which Portugal is still lagging behind many other countries, chiefly in relation to the ease of starting a business. Access to finance still remains costly and difficult for most business firms, with Portugal ranking 82th worldwide in terms of "[ease of access to loans](#)", and 55th in terms of "[venture capital availability](#)". This problematic situation is further compounded by the excessive dependence of business firms on bank credit. The problems faced by Portugal's banking sector during the recession years, still persistent nowadays, have increased companies' financial burden, putting their sustainability at stake. More recently, however, "credit conditions have been gradually improving on the demand and the supply side", though "access to finance remains a major concern for SMEs. The percentage of Portuguese SMEs which did not manage to obtain the full amount of loans requested rose from 34% to 42%, against a falling EU average that reached 30% in 2016" (European Commission, 2017b: 7).

The analysis of entrepreneurship performance indicators reveals that the firms' birth rate (i.e., the number of enterprise births divided by the number of active enterprises) has been rising, reaching 15.7% in 2015, just above the firms death rate (i.e., number of enterprise deaths divided by the number of active enterprises), which declined slightly to 15.2%, thus signalling an improvement in this area with a net creation of firms in the most recent year for which data is available. On the other hand, the 3-year firm survival rate rose to 41.4% in 2015. This rate, however, still falls below the 45.6% recorded in 2009, and is also low relative to other EU member states.

Regarding progress towards the digitalization of the economy, the [2017 Digital Economy and Society Index](#) report shows that Portugal has slightly improved in comparison to the previous year, increasing its overall DESI score from 0.51 in 2016 to 0.53 in 2017. Nevertheless, Portugal lost one place in its ranking out of the 28 EU Member States, from the 14th to the 15th place, from 2016 to 2017. Portugal's DESI score lies, however, slightly above the EU average of 0.52. This report also highlights that "the country's greatest challenge lies in raising the digital skills levels of its population. It also states that "Portugal's businesses feature high rates of information sharing and RFID technology use ... but the share of SMEs selling online and of eCommerce in SME turnover both flattened" (DESI, 2017).

2 Main R&I actors

In terms of fund allocation and political coordination, the governance of the R&I system research has been experimenting a shift in recent years; the regions, which have traditionally had a minor role in the allocation of research funds, are becoming now more involved. Under the current national framework Portugal 2020, part of the structural funds dedicated to research has been allocated through the regional operational programmes (OPs). In 2017, 14,7% of the government budget appropriations or outlays for R&D (GBAORD) were assigned to the 5 continental regional OPs, plus the two Atlantic regional OPs ([DGEEC, 2017c](#)). On the other hand, at €1,838m in 2017, GBAORD experienced a significant improvement, rising 9,5 % over the previous year, reaching a new historic maximum.

The two entities within government in charge of R&I policy are the Ministry for Science, Technology and Higher Education (MCTES) and the Ministry for the Economy (ME). The main funding agency for academic research is the Fundação para a Ciência e a Tecnologia ([FCT](#)). This institution has performed the role of research council, providing funding for academic research units, and supporting research projects as well as advanced training, mainly at the PhD and postdoctoral levels. In parallel, the Agência Nacional de Inovação (ANI) also funds applied R&I activities. In contrast to the academia-oriented FCT, this entity has managed policies aimed at supporting firm-oriented R&D, including cooperative projects between firms and academic institutions.

Within academia, the higher education (HE) sector dominates the R&I scene. Most of the research carried out in the HE sector takes place within universities, including the semi-autonomous R&D units under their control. Most R&D expenditure by the HE takes place in the largest public universities (Universidade de Lisboa, Universidade do Porto, Universidade do Minho, Universidade de Coimbra and Universidade de Aveiro).

Within the business sector, larger companies (500 or more employees) had a 35% share in 2015 BERD, with the remainder carried out by SMEs ([DGEEC, 2017a](#)). These figures suggest that larger firms play a less-than-proportional important role in Portugal in terms of BERD than in comparable economies. The 2015 [BERD ranking](#) is led by PT (telecom), followed by SONAE (distribution), Grupo Banco Comercial Português (finance) and BIAL (pharma) ([DGEEC, 2017b](#)). One characteristic of the Portuguese BERD performers is the relative importance of banking corporations, with at least two of them among the top 10 performers in 2015. On the other hand, multinational companies do not perform a dominant role in domestic BERD. Overall, firms whose capital has mainly a foreign origin carried out 29% of the total BERD in 2015 ([DGEEC, 2017a](#)).

In terms of private non-profit (PNPs), there are two main foundations for research funding: the Gulbenkian Foundation and the Champalimaud Foundation. The former provides grants to support research and university chairs, and has its own Instituto Gulbenkian de Ciência, an institution that hosts a top biomedical research group and a PhD programme. The latter started a centre for biomedical research in 2010. Each of these two institutions awarded respectively 8 and 9 ERC grants since 2007. PNPs only accounted for 1.58% of total GERD in 2015.

The quality of the R&I system depends on the linkages between its main actors. This has traditionally been a weaker feature of the Portuguese R&I system. A revealing figure in this sense is the 6.65 public-private co-publications per million people reached in 2015, well below the EU's average of 28.67 (EIS,2017). ANI has supported academia-business links by directing structural funds towards R&I cooperation. Clustering policy has also played a role in this regard. All the main universities and polytechnic institutes have their own TTOs, but they are not operating under a common national framework.

3 R&I policies, funding trends and human resources

Main R&I policy developments in 2017

<p>INTERFACE Programme</p> <p>February, August and November 2017</p>	<p>It has two main objectives: i) promoting the cooperation between universities and industries to encouraging the strengthening of knowledge-based activities throughout the whole territory, ii) fostering the development of cluster initiatives and the establishment of joint cooperative R&I agendas. The programme includes four initiatives:</p> <ul style="list-style-type: none"> • Support to Technological Intermediary Organisations-CIT. –Technology Interface Centres • Competitiveness Clusters. • Collaborative Laboratories (CoLAB). • Suppliers Clubs.
<p>"Programa de Estímulo ao Emprego Científico"</p> <p>February, July and November 2017</p>	<p>This program defines a new regime for the recruitment of PhD holders, with a view to 'rejuvenate' S&T organisations. An important element of this program is its focus on the recruitment of PhD holders through longer-term contracts.</p> <p>In February 2017, the MCTES disclosed the Scientific Employment Stimulus Programme, with 4 objectives: (1) to strengthen advanced education; (2) to promote the scientific system's inter-organisational cooperation (<i>Cooperative Laboratories</i>); (3) to improve scientific employment as well as the development of scientific careers; and (4) to strengthen the internationalization of scientific and academic activities.</p>
<p>National Science and Technology Plan-NSTP 2017-2020</p> <p>July 2017</p>	<p>The plan intends to involve a "process of societal dialogue", led by FCT in cooperation with ANI and with the involvement of stakeholders. The exchange of views has taken into consideration three main objectives for Portugal's S&T policy: (1) to strengthen and consolidate the present institutional make-up of public and private R&D organisations; (2) to stimulate the flexibility and the adaptation of the S&T system, and (3) to promote inter-organisational cooperation while stimulating the system's internationalisation.</p>
<p>National Initiative on Digital Competencies e.2030 (INCoDe.2030)</p> <p>March and December 2017</p>	<p>This initiative sets up "a national strategy for the promotion of digital competences among the active population" (FCT, ANI, MCTES, 2017: 13). It is aimed at bringing higher education and research organisations together with companies and the public administration. It addresses three main challenges: (1) spreading digital literacy; (2) stimulating employability and digital specialization; and (3) improving Portugal's participation in international R&D networks on the digital revolution (República Portuguesa, 2017).</p>
<p>Portugal Space 2030 – A research, innovation and growth strategy for Portugal</p> <p>June 2017</p>	<p>Building upon the positive experience of the Portuguese participation in the European Space Agency (ESA), it has three objectives: (1) "to promote economic growth and the creation of skilled jobs through market uptake and exploitation of satellite data and signals"; (2) "to foster the generation of satellite data through new space technologies and space-related infrastructures"; (3) to contribute to the country's development as well as to its international cooperative relations (MCTES, 2017).</p>
<p>Atlantic Interactions - Atlantic International Research Centre, AIR Centre</p>	<p>Atlantic Interactions is an intergovernmental initiative to unleash the potential of the Atlantic for Society. It fosters knowledge-driven solutions for the Atlantic and Global Societal challenges that require interdisciplinary research and innovation of complex</p>

(See also this link) April, July and November 2017	Earth systems through cooperation targeting the Atlantic.
National Action Plan for the Circular Economy June and November 2017	The Action Plan is intended to implement the principles of the circular economy with a view to promote the efficient use of resources, the minimisation of environmental impact, and the creation of value added and employment. This entails the promotion of business models which incentivize circularity, including collaborative platforms, proximity-based production/consumption systems, product-to-service, and reverse logistics systems to recover components and materials (Ministério do Ambiente, 2017).
TIC 2020 - Strategy for Public Administration's Digital Transformation March, July 2017	The strategy is aimed at promoting a better management of ICTs in Public Administration as a tool for administrative simplification, enabling to provide better services to citizens and companies. Additional objectives are related to cost reduction and resource sharing. The strategy, which will run until 2020, encompasses 12 measures clustered around three axes: integration and interoperability; innovation and competitiveness, and resource sharing.
The Discoveries Centre for Regenerative and Precision Medicine May 2017	This Centre was established as a partnership between five Portuguese universities (Minho, Porto, Aveiro, Lisboa, and Nova Lisboa) and University College London (UK). Its goal is "to create a unique and sustainable multipolar centre of excellence on Regenerative and Precision Medicine that can set a positive precedent in the Portuguese science landscape, have high international visibility, a clear scientific and economic impact, and a global effect on the quality of life of a significant number of patients".
Revision of the Capitalizar Programme May, June 2017	This Programme, part of the National Reform Programme 2016, is aimed at business sector (especially SMEs) recapitalisation to reduce this sector's level of indebtedness. In 2017, the Council of Ministers defined a procedure for the evaluation of the implementation of the initial measures, presenting a new set of measures. These include initiatives on the following: administrative simplification; company restructuring; taxation; financial leveraging; and stimulus to the use of capital markets.
Creation of the Portugal In Mission Structure March, April 2017	This initiative is aimed at attracting investors who are deterred by Brexit, but plan to invest in the EU. <i>Portugal In</i> addresses five main tasks: identify investment opportunities; promote Portugal as a business location; design integrated approaches to entice <i>would-be</i> investors, following a one-stop shop model; follow up investment projects in cooperation with other public organisations, and suggest to the Government improvements to respond to the constraints identified in specific investment projects.
Technical Rules for the National Participatory Budget January 2017	As mentioned in the Portugal RIO Country Report 2016 (Godinho, Simões & Sanchez-Martinez, 2017), a National Participatory Budget was established, with four areas of intervention: science, culture, agriculture and tertiary education. To streamline the process, a set of rules regarding budgetary assignments and the balloting process was issued by the Council of Ministers. The total amount for the National Participatory Budget amounts to €3 million.
Programa Internacionalizar November and December 2017	This programme is intended to foster the internationalisation of the Portuguese economy. It has five main objectives: a) the exports of goods and

	<p>services; b) the number of exporters; c) the number of export markets; d) Foreign Direct Investment; e) Portuguese Direct Investment abroad; and the added value of exports, The Programme has the contribution of all Government areas, with special emphasis for the Ministry of Economy, under the coordination of the Ministry of Foreign Affairs.</p>
<p>Further measures aimed at promoting the entrepreneurship ecosystem: the implementation of Industry 4.0, Qualifica Programme, Administrative Simplification (SIMPLEX+), Social Innovation, Ecological Public Purchasing, and Electrical Mobility.</p>	<p>Other ancillary initiatives mentioned in the 2017 National Reform Programme include:</p> <ul style="list-style-type: none"> • Start-Up Portugal: this programme has been implemented, and the success of the Web Summit provided an important boost to international linkages. • Indústria 4.0: "meant to contribute to the development and modernization of the national industry, with the ultimate goal of rendering it globally more competitive" (Godinho, Simões & Sánchez-Martinez, 2017). • Qualifica Programme: Learning and skilling of adults. • SIMPLEX+: aimed at administrative simplification. Main developments in 2017 include the launch of two new projects, the 'space death' and the 'public expenditure roadmap', and the upgrade of the FCT website to a "single web portal". • Social Innovation: The present government assigned by assigning €150 million in this area. The budget comes from the European Social Fund financing of Portugal 2020. • Ecological Public Purchasing: Ministerial decree regarding the operational coordination to implement the National Strategy for Ecological Public Purchasing. • Electrical Mobility. • Fund for Innovation, Technology and Circular Economy (FITEC): Ministerial decree defining the rules for the management of the Fund. • Environmental Fund: Ministerial decree defining the financial support to environmental-related R&D for the pursuit of objectives of sustainable development. • Co-Investment Fund 200M: co-investment scheme to finance SMEs with projects of product and/or process innovation, through equity and <i>quasi-equity investments</i>. • Public Procurement Code – New revision: following the transposition of EU Directives towards facilitating the contracting of innovative projects by Public Administration Services.

R&I funding trends

The GERD/GDP ratio declined over the last few years; after reaching a historical high of 1.58% in 2009, this ratio diminished to just 1.27% in 2016. Underlying this evolution there are a number of shifts, both in funding patterns and in the structure of R&D performance.

3.1 Public allocation of R&D and R&D expenditure

The government's share of R&D funding slightly rose during the recession years up to 47% in 2014. At 44% in 2015 that share returned however to the historical low it had reached in 2008. In nominal prices R&D investment funded by the government declined by 12%, from € 1,130m in 2008 to € 991m in 2015. The reason for the rise in the government's share between 2008 and 2014 owed to the evolution of private business

funding, which decreased faster than public funding. This was against an economic background in which GDP in the period 2008-2014 declined, in nominal market prices, from € 179b to € 173b, only to raise more recently to € 185b in 2016.

In terms of R&D performance, the weight of the government sector is much smaller compared to funding. The government R&D sector has been shrinking in relative weight in recent decades, down to only 5.5% of total GERD in 2016. The dominance of public R&D until the early 1980s gave way by a rise of the share of the HE sector, which reached 43% in 1992. Since that year, the share of higher-education R&D (HERD) expenditure first decreased to 30% in 2007, coinciding with the rise in the share of business, but then increased to 45% in 2016.

3.2 Private R&D expenditure

Business expenditure on R&D (BERD) rose slightly to 0.61% of GDP in 2016, but it is still far from the 0.75% reached in 2009. The recession years impacted severely on business R&D. While in 2008 BERD reached € 1,243m, by 2015 it had fallen to € 1,037m. The €1,123m recorded in 2016, though signalling a recovery, is still about 13% below the 2008 level.

These trends owe partly to the investment climate that ensued the 2008 recession. Faced with significant liquidity problems, firms slashed their R&D budgets. Moreover, shrinking profits meant that firms did not have an incentive to claim fiscal credits provided by the SIFIDE measure, and thus R&D expenditures might not have yet been reported as before.

3.3 Supply of R&I human resources

Data from Eurostat shows that Portugal outperforms the EU average in terms of the number of researchers per 1,000 inhabitants and in the proportion of female researchers. While the former indicator stood at 7.81 in Portugal versus 5.61 in the EU28 in 2015, the latter indicator was 44.1% in Portugal versus 33.4% in the EU28 also for 2015.

Nonetheless, Portugal fares worse than the EU in terms of both the total supply of new graduates and the proportion of graduates in the workforce. Despite recent faster growth relative to the EU since 2009, at 35 % in 2016 the proportion of the population aged 25-34 with tertiary education in Portugal still lags behind the EU's 38.2%. Partly as a result of this, the country is not expected to close the observed gap with the EU in terms of the share of employees aged 25-34 with completed tertiary education, which was 28.4% and 35.4%, respectively, for Portugal and the EU28 in 2016.

With regard to the supply of new S&T graduates, Portugal has performed slightly above the EU's average.³ This may eventually lead Portugal to get closer to the EU average share of scientists and engineers in the age group 25-64 as percentage of the active population (6.9% in Portugal and 7.4% in the EU28 in 2016).

In relation to the supply of doctorates, the most recent data reveals a significant decline in the proportion of new doctorate graduates in the 25-34 age bracket.⁴ This trend stems partly from the sharp decline in grants awarded by the FCT for new graduates pursuing doctoral studies during the recession years, but also partly from the low employment levels of new doctorates in the business sector. In fact, the number of FTE researchers employed in the business sector in Portugal declined from 12,198 to 11,785 in the 2011-

³ The ratio of new graduates in science, maths, computing, engineering, manufacturing and construction per 1,000 people in 2015 was, respectively, 2.01% in Portugal and 2.32% in the EU28.

⁴ The share of new doctorate graduates per 1000 people aged 25-34 dropped from 0.98 in 2012 to 0.71 in 2015 (EIS 2017).

2015 period. With a share of just 0.37% of FTE R&D personnel out of total employment in business in 2015, Portugal stands well below the EU28 share in that year (0.66%).

All in all, even though the data confirms that Portugal performs relatively well in terms of the supply of R&I human resources, it is still to be confirmed that the recent economic upturn will reverse the negative impact the recession had in some critical indicators of the availability of R&I human resources.

4 Policies to address innovation challenges

This chapter is intended to identify the main challenges faced by the national innovation system. Since those challenges have to a large extent a structural nature, it is not surprising to find a significant overlap with those that were presented in the [Portugal RIO Country Report 2016](#) (Godinho, Simões & Sánchez-Martinez, 2017). All the challenges have however been reviewed and updated taking into account new evidence, the analysis developed and the assessment of progress in relation to the 2016 and 2017 recommendations regarding the National Reform programmes (República Portuguesa, 2017; European Commission, 2016b, 2017b, 2017c). The main novelty in the 2017 challenges below concerns challenge #5 on the recruitment of researchers by business firms. Furthermore, although no recommendation was made by the European Council in 2017 on science-industry cooperation, the present report retains the relationships between science and industry as an important challenge. It is also important to remark that our perspective has not been influenced by the ongoing OECD evaluation of Portugal's Science, Technology and Higher Education Systems, whose final report is expected to be available by March 2018.

4.1 Challenge 1: Improving firms' innovation performance by strengthening their technological and managerial capabilities

Description

In spite of positive developments, innovation performance remains relatively weak. This is mainly due to the very characteristics of the industrial fabric and the lack of relevant technology-intensive firms. In fact, the 2014 share of high and medium-tech in overall manufacturing value-added was 21% *vis-à-vis* 47% for the EU. In addition, signs of insufficient in-house capabilities within firms persist, as the level of SMEs innovating in-house declined in 2016, to 79% of the EU average ([EIS 2017](#)). Therefore, continuing to stimulate the upgrading of firms' technological capabilities remains a key challenge, especially for SMEs.

Policy response

The main policy responses have been provided through the 'Operational Programme for Competitiveness and Internationalisation' ([Compete 2020](#)), which has six axes: (1) Company innovation and entrepreneurship; (2) SMEs' capabilities and internationalisation; (3) Firms' research and technological development; (4) Public Administration modernisation and capacity building; (5) Scientific and technological research; and (6) Support to collective actions, including clustering. Axes 1 and 3 comprise a wide set of policy tools to support R&I by business firms. Measures falling under Axis 2 are taken at the national and especially regional levels. They encompass the SMEs' Capabilities and Internationalisation Incentive System and the SMEs' Productive Innovation scheme, which aim at market creation and stimulation for SMEs by supporting the launch of new products and the adoption of new processes and organization methods. Further, the [Indústria 4.0](#) initiative, launched in January 2017, is intended to

enhance Portuguese firms' awareness and responsiveness to digitalisation. Another relevant measure pursued in 2017 is the [INTERFACE Programme](#). Although focussed on the promotion of science-industry cooperation, its measures are likely to have positive effects on firms' capabilities, particularly on: the improvement in the quality of services provided by technology intermediary organisations; the dynamisation of the clustering initiative; the launch of the Collaborative Laboratories; and the setting up of suppliers' clubs, aiming at integrating Portuguese firms in international value chains. The revision of the COTEC Innovation Scoring, first launched in 2007, involving cooperation with IAPMEI, is intended to improve the self-assessment of firms' innovation capabilities. The launch of *INcoDe.2030*, the initiative on digital competences, may contribute towards improving digital specialisation as well as for companies to invest further in ICT training, a field in which Portugal is already performing well relative to the EU average ([EIS, 2017](#)).

Assessment

In Portugal, employment in knowledge-intensive activities increased to 67% of the EU average in 2016, from 44% in 2010 (EIS, 2017). However, this was not matched by a similar improvement in neither knowledge-intensive service exports nor in medium and high tech manufacturing exports (EIS 2017). Portugal still has an excessive share of low knowledge-intensive activities. Even though the number of firms conducting R&D activities on a permanent basis has been steadily increasing, the room for improvement in this area remains large. For instance, there is potential for gains from economies of scale and knowledge spillovers, enhanced by the concentration of several clusters in regions Norte and Centro. Also, it is expected that the Competitiveness Clusters may expand the possibilities for cross-fertilisation. The same applies to the other measures included in the [INTERFACE Programme](#), namely the ITCs and Suppliers' clubs. The revision of the [Capitalizar programme](#) may also have a positive effect, since it is aimed at responding a key burden faced by many SMEs: excessive levels of indebtedness. Even though the evaluation of the measures included in the former Compete 2007-2013 programme was positive, no evaluations have been carried out so far with regard to Portugal 2020, with the first round of evaluations likely to be available in the first half of 2018.

4.2 Challenge 2: Stimulating the emergence of new companies in knowledge-intensive activities

Description

Portugal has experienced significant improvements in its "business environment conditions", particularly on what regards it offering an "attractive research system" and its "innovation-friendly-environment", with respective increments of 31.7 and 50.3 percentage points from 2010 to 2016 ([EIS 2017](#)). Measures for entrepreneurship promotion appear to have delivered some positive results: in the 2012-14 period the rate of "births of firms with more than 10 employees" was slightly higher than the EU average (1.7% versus 1.5%). However, in 2016 medium and high-tech exports continued to be on a downward trend, and growth in knowledge-intensive service exports has stagnated ([EIS 2017](#)). Despite the expansion of centres of excellence and shared service centres by some established MNE groups and the establishment of several investment contracts with foreign investors, difficulties in attracting knowledge-intensive FDI persist. Therefore, this challenge is still relevant to Portugal's R&I policy.

Policy response

The promotion of entrepreneurship has ranked high in the policy agenda since 2011 (Godinho, Simões & Sánchez-Martinez, 2017). Main measures taken in this respect include: in 2011, the creation of [Portugal Ventures](#) as a merger among different public venture capital organisations, and the launch of the Strategic Programme for

Entrepreneurship and Innovation (+E+I); in 2014, the approval of a Research and Innovation Strategy for Smart Specialisation, followed by regional RIS3 strategies, and the launch of Compete 2020, which includes several measures aimed at stimulating the creation of knowledge-intensive start-ups; in 2014, the reorientation of [ANI](#) to spur technology-based entrepreneurship by focusing on upstream support, providing advice for entrepreneurs before having access to venture capital; in 2016, the launch of the '[Start-Up Portugal](#)' programme aimed at rationalising entrepreneurship support facilities, improving the fiscal regime for investment in start-ups and promoting their internationalisation, and the first edition of the Lisbon Web Summit, which acted as an international showroom for Portuguese high-tech firms and a forum for putting Portugal in the radar of international venture capitalists.

Initiatives taken in 2017 have followed this vein. The most relevant initiative was the launch of the [Internacionalizar Programme](#) (Council of Ministers Resolution 189/2017). This is aimed at promoting the internationalisation of the Portuguese economy. Although it is mainly focused on the promotion of exports and the 'Portugal brand', it is also intended to foster investment in the country, both domestic and foreign, and to increase domestic value added. A [Compete 2020](#) call was launched in April 2017 to support skilled and creative entrepreneurship. Also, work in the context of the '[Start-Up Portugal](#)' programme has been pursued. The second edition of the [Web Summit](#), in November 2017, was successful, attracting many potential investors. Some measures in the context of the [INTERFACE Programme](#) are also likely to have a bearing on the promotion of new knowledge-intensive activities, namely the dynamisation of the Competitiveness Clusters, the promotion of the Collaborative Laboratories (CoLABs), and the Suppliers' Clubs. This may have a very positive effect in enhancing the content and the internationalisation of value chains. The [Portugal In](#) initiative, aimed at exploring international investment opportunities stemming from Brexit, may also contribute to attract knowledge-intensive FDI.

Assessment

The procedure leading to the design of the RIS3 was appropriate and the ex-ante evaluations of [Compete 2020](#) were positive. A call for tenders regarding the evaluation of the implementation of RIS3 was launched in June 2017. The long-awaited assessment carried out by [ANI](#) is expected to be delivered by the end of 2017 (see Godinho, Simões & Sánchez-Martínez, 2017). The initiative to set up an Incubators network, in the context of the [Start-Up Portugal](#) programme, is likely to increase the quality of support and the sharing of know-how among start-ups. The second edition of the Web Summit is expected to consolidate the achievements of the successful first edition.. However, Portugal's environment for investment between established and would-be foreign investors is seen more favourably by the former group (IESE/Quatenaire, 2013). This is something that needs to be addressed. On the a positive note, the government change in July 2017 lead to the appointment of new Secretary of State for Industry who has an excellent track record in FDI policy both as an academic and as leader of *InvestPorto*. While some voices have expressed concern over developments in entrepreneurship promotion policy, due to the leave of the former Secretary of State for Industry, the main policy pillars have been maintained. The [Internacionalizar Programme](#) recognises that there is a need to attract more inward investment, and states that this should be geared towards the development of value chains and the attraction of technology based firms. Since this initiative was launched in December 2017, it is still too early for an assessment.

4.3 Challenge 3: Ensuring stronger linkages between science and industry

Description

This is a persistent challenge which is difficult to be successfully addressed, given its structural nature. There is widespread agreement that interactions between academia and industry continue to be weak (European Commission, 2016b; European Council, 2016; Council of Ministers Resolution 84/2016), reflected in the behaviour of indicators regarding SME cooperation and public-private co-publications ([EIS 2017](#)). Recognising that “the government has made some efforts in encouraging the interaction between universities and the business sector” (European Commission, 2017b), European authorities abstained from making recommendations in this field. However, the challenge remains, and the response requires a systemic approach, considering the perspectives of both scientific and technological organisations and business firms (European Commission, 2017b).

Policy response

In the 2007-2013 National Strategic Reference Framework (NSRF) several measures were launched, with relative success (Mamede, 2012; IESE/Quatenaire, 2013). A similar approach was followed in the present [Compete 2020](#). The reorientation of the innovation agency (ANI), in 2014, created better conditions to promote academia-industry cooperation. In 2017, the main measure is the [INTERFACE Programme](#). This follows the launch of the [CITec programme](#) in December 2016. INTERFACE encompasses four distinct areas: (1) support to CITs, with a view to use them to ‘bridge’ science and industry; (2) the dynamisation of the Competitiveness Clusters, aimed at promoting synergies among multiple players or in addressing cross-cutting issues; (3) the setting up of Collaborative Laboratories, including at least one business firm, a higher education organisation, and a research centre; and (4) the launch of the Suppliers’ clubs, anchored around specific foreign subsidiaries. The process of accreditation of Interface Centres has started already, and 28 organisations have been recognised as Interface Centres. These work in different technological and industrial fields, and include from the traditional Technological Centres to key players in Portugal’s S&T landscape (as INESC TEC, in ICT and engineering, IBET, in biotechnology, and INL, the International Iberian Nanotechnology Laboratory). The National Science and Technology Plan, particularly the thematic R&D agendas, is also intended to stimulate science-industry cooperation. These issues have been discussed in two Conferences held in Lisbon in November 2017: [one organised by OECD and FCT](#); and [another by the Representations/European Semester Officers \(ESOs\) of the European Commission in Portugal and Denmark](#).

Assessment

The [Compete 2020](#) measures to promote cooperation, the reorientation of [ANI](#), and the launch of the [INTERFACE Programme](#) suggest that policy is on the right track. The support to ITCs is also positive. The long-awaited revision of the clustering initiative had two positive elements: an assessment of existing clusters, and the reinforcement of the international outlook. The Collaborative Laboratories is, in principle, a very interesting initiative. However, the election of the creation of skilled employment as the main objective of CoLABs raises some doubts about their focus on the effective promotion of strong linkages between science and industry. The participation of large Portuguese companies in the proposals presented so far seems limited, with the exception of the CoLABs on cement technologies and on forest and fire management. Although some policy documents continue to focus on ‘technology transfer’, suggesting that knowledge should ‘flow’ from the so-called “knowledge centres” to companies, it appears that a more balanced approach is emerging which includes demand factors, instead of focussing on the supply-side only. This lack of apparent coordination is probably the reason why the European Commission has pointed out that “a comprehensive and integrated strategy

is still missing” (European Commission, 2017b: 38). In fact, there are still challenging issues that require a systemic approach. At the same time an understanding of the non-technological dimensions as well as the behavioural and institutional barriers hampering university-industry cooperation remains crucial (Godinho, Simões & Sánchez-Martinez, 2017:13). It is expected that the evaluations of the RIS3 and the Compete 2020, expected to be available in 2018, will shed new light on the recent developments on science-industry cooperation.

4.4 Challenge 4: Involve central stakeholders in the process of co-design and implementation of R&I agendas

Description

This challenge is closely related to the previous one. R&I policies in Portugal are gradually changing their focus to promote interactions among stakeholders and to embrace the idea of ‘participation’ (Godinho, Simões & Sánchez-Martinez, 2017). Measures were taken in 2016 and 2017 to involve the business sector in R&I policy. These include the creation of Collaborative Laboratories and the R&I agendas in the context of the Science and Technology Plan. The revision of the clustering initiative goes also in the same direction. There is however the risk that involvement from the companies’ side remains limited. There may still exist room for further efforts to stimulate real ‘bottom-up’ initiatives, whereby the business sector makes a significant contribution to the definition of medium- to long-term R&I agendas. The challenge here is not just to promote ‘technology transfer’, but rather to develop ‘participatory’ co-design and co-action initiatives involving key players from both the demand and the supply sides.

Policy response

Several measures were taken to promote the co-design and co-implementation of R&I agendas. In 2016, besides the initiatives in the context of the ‘Commitment to Knowledge and Science’, the decisions regarding the National Participatory Budget, the National Strategy for Ecological Public Purchasing, the revision of the Public Contracts Code, and the SIMPLEX + are also worth mentioning. In 2017, the scope of activities of [LabX](#) was extended to two additional areas, and the National Strategy for Public Administration Digital Transformation (TIC 2020) was disclosed. [TIC 2020](#) includes three axes: integration and interoperability of systems; innovation and competitiveness, fostering access to and trust in electronic services; and resource sharing. Demand-driven measures on electrical and soft mobility (República Portuguesa, 2017) may also contribute to mobilise stakeholders. On the research policy front, two initiatives are paramount: the launch of the National Science and Technology Plan (NSTP 2017-2020), and the creation of the Collaborative Laboratories. The NSTP 2017-2020 sets up 14 thematic R&I agendas to be developed by joint teams involving players from academia and business companies. Examples of themes included are: Agrofood, Forests and Diversity; Health, Clinical and Translational Research; Industry and Manufacturing; Sustainable Energy systems, Space and Earth Observation. Collective Laboratories are also expected to define and implement R&I agendas towards the creation of economic and social value.

Assessment

In the last couple of years there has been increased focus on encouraging the involvement of stakeholders in the definition of research agendas. However, it is still early to assess whether such drive will be sustained and powerful enough to bring about a sustainable cooperation from the diverse stakeholders. Unfortunately, the [TIC 2020](#) seems to be more concerned with efficiency and rationalisation of resources than with making the public sector a trigger for innovation in the ICT field. The Collaborative Laboratories initiative has good intentions, but there are doubts regarding its potential to

mobilise business companies. The focus on increasing scientific employment does not help on this regard. As mentioned above, information on the first seven CoLAB proposals suggests that the involvement by large business firms in science-based industries is weak, the absence of a CoLAB on biotech and pharmaceuticals being particularly noteworthy. Many thematic R&I agendas are still in the 'teething' phase, and the level of company involvement appears to be uneven. It may be argued that there are still a limited number of 'bottom-up' initiatives, confirming an insufficient involvement by the business sector, despite the interest shown by a few specific companies, including foreign subsidiaries. The scope for public policies in this sense is wide. The control of wild fires still an important issue (Godinho, Simões & Sánchez-Martínez, 2017), and led to a CoLAB proposal on the integrated management of forest and fires. Demographic change is an area in need of an integrated response, while the exploitation of oceanographic resources is starting to be addressed.

4.5 Challenge 5: Foster the recruitment of researchers by business firms, thereby promoting the development of human capital

Description

Portugal is among the EU countries with the lowest share of full-time researchers in the business sector as a percentage of total R&D employment. However, measures aimed at enhancing the levels of scientific employment, including the recent [Law 57/2017](#), are mostly focussed on recruitment by public research organisations. Besides putting a burden on such organisations, especially universities, faced with budgetary restrictions, the policy has not addressed a key bottleneck for promoting high-skilled employment; existing barriers to attracting and keeping PhD holders in business companies. Additionally, there are no strong incentives for the recruitment of PhD holders by public services in general. Promoting employment of PhD holders might contribute to both fighting the problem of the lack of high-skilled employment, and increase the human capital stock in non-academic organisations, particularly in the business sector. Indeed, "firms do not perceive academic publications as relevant sources of information for innovation" (FCT, 2013). In the same vein, firms are not "inclined to take on more qualified human resources such as PhD holders despite the tax incentives in place (European Commission, 2017c).

Policy response

With the publication of the [Decree-Law 57/2016 and the Regulation on Scientific Employment](#), important steps have been taken to increase the sustainability of the profession of scientific researcher. The process involved a wide public discussion, including a 'march for science'. The new legislation provides a basis for the recruitment, through longer-term contracts, of PhD holders which have worked for several years under temporary grants in research units. According to the President of [FCT](#), this law "has changed the situation of scientists in Portugal". It means that "the norm for the employment of PhD holders is a [labour] contract, and not an internship grant", thereby "taking the scientist to normality" in terms of the labour market.

In February 2017, the MCTES disclosed the Programme, which has four objectives: (1) to strengthen advanced education; (2) to promote the scientific system's institutional capacity, including inter-organisational cooperation (Cooperative Laboratories); (3) to improve scientific employment and the development of scientific careers; and (4) to strengthen the internationalization of scientific and academic activities.⁵ A set of 8 action lines for scientific employment are defined. These are mostly focused on academic organisations, namely universities and research units. Only the last line addresses

⁵ The main funding source is public financing by FCT, through the national budget, at least during the first 3 years

scientific employment by business firms, using the system of R&D tax credits ([SIFIDE](#)) as an inducement instrument.

Assessment

The new legal framework is very positive in that it will provide improved conditions for research activities as well as for the employment of PhD holders. However, the Scientific Employment Stimulus Programme is biased towards scientific research. It is important to also promote the employment of PhD holders in other organisations, mainly the public administration and business firms. In some instances, the political discourse implicitly assumes that the best career for PhD holders is in research organisations, suggesting that they should follow a basic research career. This reinforces the negative attitude of many PhD holders towards an ordinary employment outside academic institutions.⁶ Portugal will profit most from its investment in high-skilled education if PhD holders spread through different types of organisations to spur a fertilisation process.. Furthermore, [SIFIDE](#) has been the only instrument used for promoting such route with so far rather poor results obtained so far (European Commission, 2017c). There is thus a need for the stimulation of PhD employment beyond academia. This is essential for Portugal to both deepen human capital in the public administration and in business organisations and for enablers such as the "Open attractive research systems" and the "Innovation friendly environment" ([EIS 2017](#)) to be translated into employment creation and improved levels of productivity and competitiveness.

5 Focus on R&I in National and Regional Smart Specialisation Strategies

New policy developments

The main policy developments in 2017 took place in the context of the implementation and monitoring of the national and regional RIS3 strategies. At the national level, a meeting of the Coordinating Board of the National Strategy for Smart Specialisation (ENEI) was held on April 20, 2017. [ANI](#), which chairs that Coordinating Board operationally, considered that to proceed with a sound assessment of the RIS3 implementation, a relatively rich set of data was needed. Therefore, it was decided to organise the meeting of the [ENEI Coordinating Board](#) only after closing the call on mobilising projects, and after carrying out an assessment of the take-up level and the fit with RIS3 priorities. In the meantime, the follow up of the implementation of Compete 2020 and the RIS3 was indirectly undertaken in the context of the Compete 2020 incentive system network as well as the Science network (in fact, most of the members of these networks are also part of the ENEI Coordinating Board). The draft report on the assessment of the implementation of RIS3, as a result of the cooperation between ANI and the Agency for Development and Cohesion ([ADC](#)), was completed in July 2017. It was presented to the meeting of the ENEI Coordinating Council in October 2017. A decision was taken to expand the analysis to include measures from other programmes in the context of the Portugal 2020 Partnership Agreement, and not just those under the purview of Compete 2020.

At the regional level, special reference should be made to the initiative, taken by the Centro Region Coordination Commission (CCDR Centro) in November 2016, to launch a public consultation on RIS3. This initiative is aimed at "stimulating an increased citizen participation in the process of strategy design as well as at inviting specialists to become involved in the working groups on the four Innovation Platforms" of the regional RIS3 (CCDR Centro, 2016). Such platforms are the following: sustainable industrial solutions; valorisation of endogenous natural resources; technologies for quality of life; and

⁶ PhD holders place "employment in business firms" as the last employment option (among eight), implying most high-skilled individuals refrain from following a career in industry.

territorial innovation. This was a very interesting initiative, confirming the role of the Centro region as a leader of the RIS3 approach in Portugal. Participation in the process fell, however, short of expectations. The report on the public consultation underlines that there have been many expressions of interest but the level of “critical participation” was limited. Nevertheless, the public consultation has helped identify a number of areas of improvement (CCDR Centro, 2017). The Centro Region is one of the European regions participating in the JRC’s *RIS3 Support to Lagging Regions* project. In May 2017, a S3 Platform Entrepreneurial Discovery Focus Group meeting was held in Viseu (in the Centro Region) to discuss innovation opportunities in the wine value chain.

Even though initiatives in other regions were less relevant, a few developments are worth mentioning. In the Alentejo region, the December 2016 issue of the Alentejo Hoje newsletter provides interesting information on the implementation of RIS3 (more information in the next section). In the Algarve region, the RIS3 priorities were revised in 2016. There was a delay in the nomination and launch of the Regional Innovation Council, whose first meeting was held in December 2016. Meanwhile, the Regional Innovation Council of the North region was established in May 2017. Both Regional Innovation Councils have participants representing different types of stakeholders.

Progress on implementation

Information on the progress of implementation of RIS3 is limited. All regions have published their RIS3 strategies in due time as well as the headlines regarding the RIS3 priorities to be considered for assessing the alignment of such priorities with the Portugal 2020 projects. The pace of implementation has been uneven. While some regions, namely the Centro region, have been fast in implementing RIS3 (even though with adjustments in the process; see CCDR Centro, 2016), others have taken longer to establish the organisational set up envisaged by RIS3 strategies. Our conclusion is that in 2017 all the regions are already well-placed to fully implement the process.

However, the implementation of the entrepreneurial discovery process remains limited. There is the risk that bureaucracy has interfered in the RIS3 implementation, through the definition of RIS3 alignment metrics, instead of profiting from RIS3 to strengthen interactions and to promote promising projects. A sound response to this concern certainly requires an independent evaluation. We expect that it might be addressed in the evaluation process, which was recently launched. The public consultation exercise undertaken by the Centro region provides a useful precedent in that regard, especially on the role to be played by the Innovation Platforms working groups in stimulating opportunities for entrepreneurial discovery. It is expected that the initiative of [ANI](#) to relaunch the entrepreneurial discovery process at the national level might set a positive precedent in driving and stimulating similar processes in regions lagging behind in terms of RIS3.

One of the interviewees for this report expressed concerns regarding the weaknesses of the national “smart specialisation for science” policy, mainly in terms of promoting basic research. The main concern is that smart specialisation priorities may be a ‘straitjacket’ for carrying out broad policies of stimulus to doctoral training and basic science projects.

Information on the characteristics of projects from the RIS3 strategy are available at national level as well as for the Centro and Alentejo regions.⁷

At national level, the work carried out by [ANI](#) in cooperation with [ADC](#) focuses especially on collaborative R&D project calls, mainly Mobilising Projects. According to the information provided by one of our interviewees, the main findings so far are the following: (1) the number of applications, participant firms and eligible investment

⁷ This information is currently available only in a *tentative* draft. The final report is expected to be published in December 2017.

project sizes more than doubled compared to first calls under the NSRF 2007-2013; (2) Mobilising projects involve more participants and have a wider industry scope; (3) the variety of projects has improved, with an increased value chain integration perspective; and (4) Mobilising projects have been awarded both in consolidated (e.g., manufacturing technologies, ICT, fashion) and in emerging (e.g., sea and health) fields. It is important to underline, however, that these are just preliminary results.

ANI intended to develop in the second half of 2017 initiatives towards the revision of national and regional RIS3 strategies in connection with the re-launch of the entrepreneurial discovery process. Another action line for the near future concerns exploratory work on complementarities between national and regional smart specialisation strategies. For instance, while the 'Health' area is a priority at national and regional levels, a closer analysis suggests that regional specialisations differ in focus. Therefore, the process of investigating the tensions between similarities and differences needs to be improved. According to the President of ANI, this approach will rely on two main inputs: the monitoring report of RIS3 developed by ANI and the ongoing work on thematic R&I agendas in the context of the NSTP 2017-2020 (see chapter 3 above).

At regional level, information on applications is available for the Alentejo and Centro regions until mid-2016. For Alentejo, around 70% of projects were aligned with the RIS3 priority areas. More than 40% of the projects addressed the 'Food & forestry' priority. A significant share of projects (around 20%) fell into the 'Critical technologies, energy & smart mobility' category. Interestingly, this priority seems to provide high incentives to business firms (Alentejo Hoje, 2016). The analysis carried out for the Centro region is deeper. It enables to compare the characteristics of all submitted projects with those approved. The differences are not significant, except for their relative alignment with RIS3, in which approved projects consistently show a higher match. This suggests that the RIS3 alignment criterion has played an important role in project selection. Almost half of the projects approved (47%) were concentrated in priority line 1.1 (development of sustainable processes, materials and systems). Two interesting policy observations stemming from the analysis are the absence of a priority regarding cultural and creative industries and the need to launch actions to support regional players in preparing applications that are more aligned with RIS3 (CCDR Centro, 2017).

Reference is also due to a positive experience of joint cross-border smart specialisation strategy involving the Norte and the Spanish Galicia region. The earlier cooperation established between the two regions and the awareness of the importance of cross-border business linkages, especially in the automotive sector, led to the set-up of a joint Working Group, including representatives from the Galician Innovation Agency and the CCDR Norte. This positive experience has already been acknowledged in the handbook on the implementation of smart specialisation strategies (European Commission, 2016a).

Monitoring mechanisms and the feedback loop

As mentioned in the [2015 Portugal RIO Country Report](#) (Godinho, Simões & Zifciakova, 2016), a multi-level governance model, combining the national and regional levels, was established to monitor the development of RIS3 implementation. It was "based on the cooperation and the sharing [of resources] among the multiple players participating in the collective and systemic process of carrying out R&D and innovation activities" (Governo de Portugal, 2014: 167).

At the operational level, [ANI](#) was assigned a key role, chairing the [ENEI Coordinating Board](#) and being responsible for the Executive Secretariat. While there are some differences at the regional level, the coordination of the monitoring process was assigned to the Regional Coordination Commissions (CCDRs) with the support of the regional innovation council to assess and assist CCDRs in the process of RIS3 development. These councils have already been established, and the advice and monitoring systems are reaching cruise speed.

ANI also has the mandate to produce an annual monitoring report on the RIS3 strategy. However, for the reasons mentioned above, this process was delayed. It was concluded that sounder and more complete empirical information was needed to develop the final report. According to information provided by ANI, the report is still expected for December 2017.

Evidence of impact

Available evidence of the impact of the smart specialisation strategy is still very limited. [ANI](#) has developed an interesting approach to assess the impact, similar to the one adopted by other European regions. The approach involves four levels of assessment: (1) Implementation, including quantitative and qualitative data on resource allocation and upgrading, the level of selectivity, and project implementation indicators; (2) First level results, including the analysis of results according to thematic objectives and intermediate result evaluation (e.g., patents, consortia size and diversity, research-industry cooperation); (3) Structural change, including specialisation and knowledge-intensity patterns, and value chain alignment and extension; and (4) Long-term impacts, along the dimensions of growth, employment (mainly the share of PhD holders in companies), and sustainability (energy intensity).

In the regional domain, as mentioned above, the Alentejo and Centro regions have already published information about project application and approval. However, the information disclosed is very basic, and not intended for impact assessment (see subsection on implementation). Evidence collected so far suggests that a sound reflection on appropriate impact indicators is still lacking at the regional level. The set of indicators developed by ANI may provide an example the regional bodies may follow to develop similar specific impact indicators.

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Abbreviations

ADC	Agency for Development and Cohesion
ANI	National Innovation Agency
BERD	Business Expenditures for Research and Development
BES	Business Enterprises Sector
Compete 2020	Competitiveness and Internationalisation Operational Programme
EC	European Commission
EIS	European Innovation Scoreboard
ERC	European Research Council
EU	European Union
EU28	28 EU Member States
FCT	Science and Technology Foundation
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
HERD	Higher Education Research and Development expenditures
Horizon 2020	EU Framework Programme for Research and Innovation
IAPMEI	Agency for Competitiveness and Innovation
ICT	Information and Communication Technologies
JRC	European Commission's Joint Research Centre
MCTES	Ministry for Science, Technology and Higher Education
OPs	Operational Programmes
PhD	Doctor of Philosophy
PNP	Private non-profit sector
R&D	Research and development
R&I	Research and Innovation
RIS3	Research and innovation strategies for smart specialisation
SME	Small and Medium Sized Enterprise

TIC	Technological Intermediary Organisation
TTO	Technology Transfer Office

Factsheet

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GDP per capita (euro per capita)	16600	17000	16700	16000	16300	16600	17400	17900		
Value added of services as share of the total value added (% of total)	75.41	75.19	75.84	75.99	76.17	76.03	75.26	75.6		
Value added of manufacturing as share of the total value added (%)	12.56	13.15	12.94	13.01	13.14	13.49	13.94	13.92		
Employment in manufacturing as share of total employment (%)	15.12	14.93	14.93	14.98	15.14	15.27	15.53	15.6		
Employment in services as share of total employment (%)	62.81	63.66	64.4	65.05	65.7	66.68	67.17	67.48		
Share of Foreign controlled enterprises in the total nb of enterprises (%)	0.58	0.6	0.61	0.62	0.61	0.74	0.73			
Labour productivity (Index, 2010=100)	96.9	100	101.4	102.4	103.6	102.7	102.7	103.2		
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	1.5	0.95	0.74	0.98	0.8	0.83	0.71			
Summary Innovation Index (rank)	13	15	16	16	16	14	15	14		
Innovative enterprises as a share of total number of enterprises (CIS data) (%)				54.6		54				
Innovation output indicator (Rank, Intra-EU Comparison)			25	24	24	24				
Turnover from innovation as % of total turnover (Eurostat)		14.4		12.4						
Country position in Doing Business (Ease of doing business index WB)(1=most business-friendly regulations)						23	23	25	25	29
Ease of getting credit (WB GII) (Rank)						80	81	84		
Venture capital investment as % of GDP (seed, start-up and later stage)	0.024	0.036	0.007	0.01	0.017	0.026	0.039			
EC Digital Economy & Society Index (DESI) (Rank)						14	15	14	15	
E-Government Development Index Rank		39		33		37		38		
Online availability of public services – Percentage of individuals having interactions with public authorities via Internet (last 12 months)	21	26	37	39	38	41	43	45		
GERD (as % of GDP)	1.58	1.53	1.46	1.38	1.33	1.29	1.24	1.27		
GBAORD (as % of GDP)	1	0.98	1	0.92	0.93	0.94	0.98	0.91		
R&D funded by GOV (% of GDP)	0.72	0.69	0.61	0.59	0.62	0.61	0.55			
BERD (% of GDP)	0.75	0.7	0.69	0.68	0.63	0.6	0.58	0.61		
Research excellence composite indicator (Rank)	14	15	14	14	16	15				
Percentage of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country		8.44	8.65	9.36	8.69	8.85				
Public-private co-publications per million population	9.75	11.44	13.71	10.43	9.06	9.01	6.65			
World Share of PCT applications	0.11	0.08	0.06	0.07	0.07	0.08	0.08			
Global Innovation Index				34	32	30	30	31		

Data sources: various, including Eurostat, European Commission and International scoreboard data.

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