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Linking the "recovery and resilience plan" and smart specialisation: The Portuguese case

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Linking the 'Recovery and Resilience Plan' and Smart Specialisation. The Portuguese case

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Territorial Modelling and Analysis
No 05/2021



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Linking the ‘Recovery and Resilience Plan’ and Smart Specialisation. The Portuguese Case

Anabela M. Santos

JRC TECHNICAL REPORT

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Linking the ‘Recovery and Resilience Plan’ and Smart Specialisation. The Portuguese Case

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Abstract

Based on the case study of Portugal, the present study aims to analyse the alignment of investments in the Portuguese ‘Recovery and Resilience Plan’ with the Smart Specialisation Strategies priorities (2021-2027) of this territory, and then identify opportunities for potential synergies and complementary between funding instruments. With the information available in the Plan and its annex, a detailed analysis is performed to identify investments able to enhance Research & Development, and Innovation and/or to improve the regional innovation ecosystems. The analysis shows that up to €6 Billion of the Plan (37%) may potentially support directly and indirectly the Smart Specialisation in Portugal. However, the effect of such contribution will strongly depend on the final beneficiaries, projects selected, absorption capacity, and governance model. The paper also explains the relevance of Smart Specialisation in the Covid-19 recovery and draft some policy recommendations.

Keywords: Covid-19 crisis; Innovation; Government Policy; Portugal.

JEL Classification: E32; O31; G38.

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Executive Summary

Based on the case study of Portugal, the present study aims to analyse the alignment of investments in the ‘Recovery and Resilience Plan’ (RRP) with the cycle of Smart Specialisation Strategies priorities for 2021-2027, and then to identify opportunities for potential synergies and complementarities between funding instruments. Under the present study, complementarity means that different instruments contribute in combination to a common goal. Synergy is defined as the interaction between these different instruments able to generate a greater effect than the sum of their separate effects ⁽¹⁾. Complementarity can also be seen as a source or a way to achieve synergies.

Matching the ‘Recovery Plan’ and long-term ‘economic transformation Strategies’: Why is that so important?

The Portuguese RRP ⁽²⁾ has as short-term objective the reactivation of demand due to the Covid-19 crisis and as a long-term goal structural economic transformation, thanks to strategic actions (investments and reforms). Smart Specialisation has as medium/long-term targets economic transformation and growth, thanks to the prioritisation of investments in some selected innovation areas (Foray *et al.*, 2012). Therefore, if the investments in the Plan can contribute for reducing obstacles or challenges to innovation activities and improving the regional innovation eco-system, they can also support the implementation of Smart Specialisation. Furthermore, if investments in the Plan are targeted to priority areas for which the territories can build a competitive advantage, they can also enhance the socio-economic effect of the Plan and *vice-versa*.

Smart Specialisation Strategy to support recovery

By focusing on a placed-based approach (i.e. based on specific territorial challenges, bottlenecks, and needs), Smart Specialisation has the potential to provide more targeted and tailored support to the recovery of the Covid-19 crisis, with a strong heterogeneous effect within and between countries. Furthermore, the potential contribution of Smart Specialisation for Covid-19 recovery also lies in the singularity of this crisis. Confinement, lockdown, mobility restrictions, and physical distancing are also changing citizens’ everyday life. Demand for eco-friendly products is increasing and consumers preferences are changing in favour of online sales, teleworking, video-conference, and e-learning (Kohli *et al.*, 2020). New market niches and opportunities are emerging from the Covid-19 crisis, and innovation can play an important role to help companies adapt to and benefit from those opportunities. Therefore, in a singular context of recovery (with short-term needs) combined with the ambitious targets of the twin transitions (for a medium/long term structural transformation), short-term decisions (e.g. for demand reactivation) should ideally be aligned with

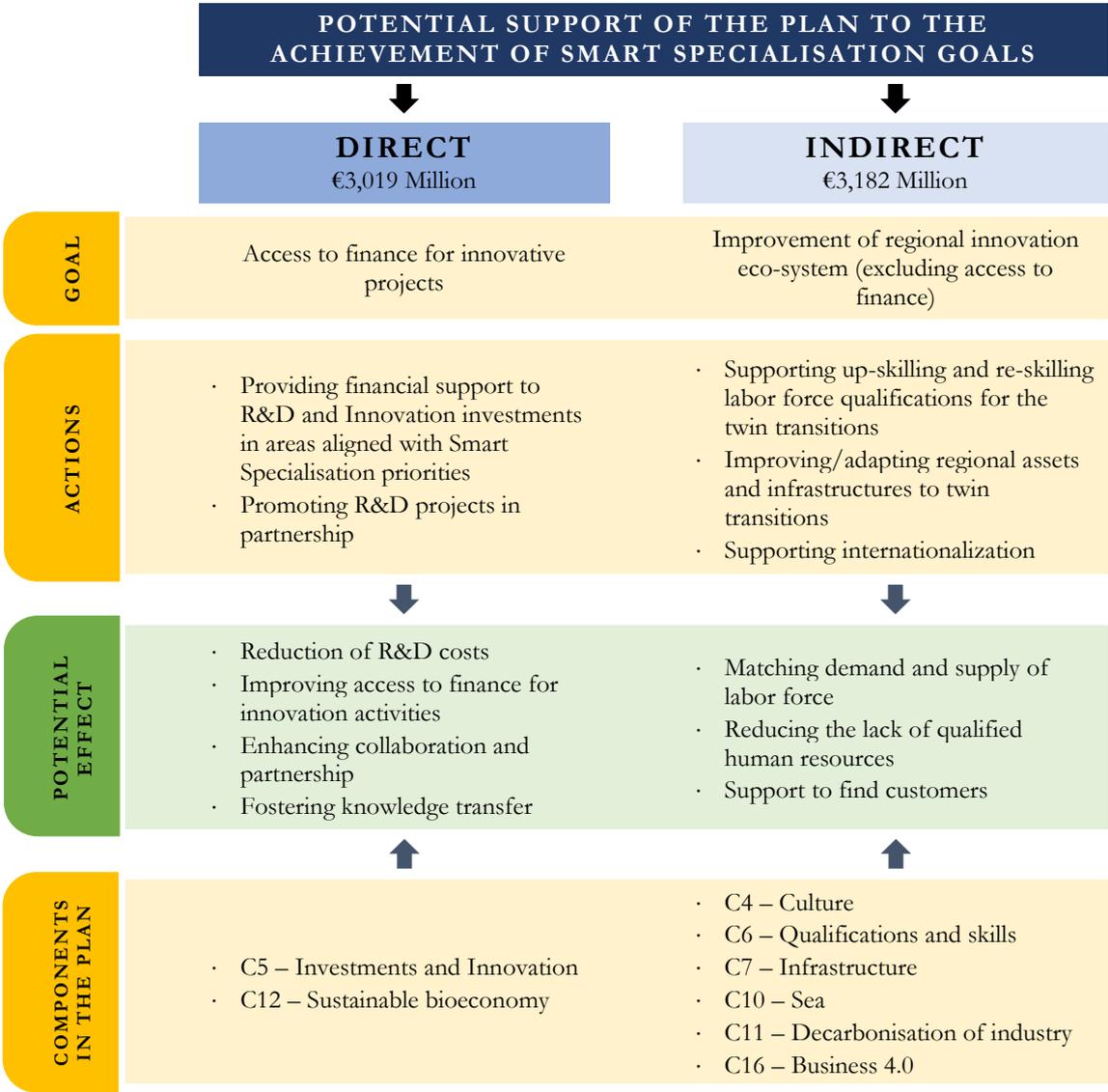
⁽¹⁾ The definitions of complementarity and synergy were adapted from Oxford (2011).

⁽²⁾ For more details about the expected macroeconomic impacts in short and long-term of the Portuguese RRP, see section 4 of the Plan (República Portuguesa, 2021: 261-282).

medium/long-term targets; and the process of entrepreneurial discovery under Smart Specialisation can help to identify such match.

Recovery and Resilience Plan as an instrument to support Smart Specialisation

By matching the investments of the Portuguese ‘Recovery and Resilience Plan’ with the Smart Specialisation innovation priorities for 2021-2027, up to ⁽³⁾ around €6,200 million (37% of the Plan) were identified with potential direct and indirect on the implementation of the Smart Specialisation Strategies of the Portuguese regions.



Source: Own elaboration based on Table 7.

⁽³⁾ In implementation this amount can be lower. When the study was performed, the accurate portion of some funds/loans for innovation-related activities was unknown. We only know that such instruments can finance R&D and innovation, among other investment typologies.

Direct support (up to €3,019 Million) refers to investments in the Plan that can financially support any phase of innovation chain (from research to market commercialisation, including knowledge transfer) and that are aligned with Smart Specialisation priority areas. Indirect support (up to €3,182 Million) refers to investments in the Plan that may affect the regional innovation eco-system of the Portuguese territories, by acting in some known barriers, obstacles, or challenges to innovation activities or business operations ⁽⁴⁾, excluding financing.

Challenges and opportunities to achieve synergies

Based on the present analysis, it is also expected that potential synergies and complementarities between funding instruments may be achieved, however, these potential contributions of the Plan to the Smart Specialisation's objectives will also depend on the following factors:

- **Final beneficiaries and projects selected:** even if the Plan is a national instrument with a top-down governance structure, the implementation of innovation actions can only be effective with a strong involvement of regional actors in the design of call for applications and in the selection of RDI investment projects to be funded ⁽⁵⁾;
- **Space for experimentation:** for investments to effectively contribute to Smart Specialisation, a certain space for experimentation under a process of entrepreneurial discovery should exist;
- **Absorption capacity:** the capacity of Portuguese companies to absorb the funds may be affected by the context of a still on-going economic crisis and the remaining uncertainty about the time and nature of recovery ⁽⁶⁾;
- **Policy-mix:** the achievement of synergies is conditional on a policy mix including consistency, coherence, integration and coordination between the different instruments ⁽⁷⁾. The present study makes a start by looking at consistency and coherence between the RRP and Smart Specialisation in Portugal. Further research can consider the analysis of the governance model of the RRP and its link with the Smart Specialisation governance, as well as on the role of monitoring and evaluation to achieve synergies.

⁽⁴⁾ We are aware of the fact that barriers to innovative activities may be different across regions and economic activities, as well as, specific to each Smart Specialisation priority, however, since information with a higher level of granularity is not available, within the scope of this study, we consider as obstacles to innovation only those commonly listed in scientific literature (see e.g. [OECD, 2018](#)); and which usually correspond to those included in the *Community Innovation Survey* or in the *Survey on the Access to Finance of Enterprises*.

⁽⁵⁾ For more details about the benefit of the involvement of regional actors in the design of calls for applications and in the selection of RDI investment projects see [Laranja \(2021\)](#).

⁽⁶⁾ At the time of conducting the present study, the Covid-19 vaccination campaigns were still ongoing in Portugal and in the rest of world, but at different speeds within and between the different territories.

⁽⁷⁾ For more details see ([Laranja, 2018](#)).

1. Context

In 2020, the COVID-19 pandemic ⁽⁸⁾ was responsible for an unprecedented contraction of the EU economy. Lockdown, confinement, mobility restrictions, and other government measures to stop the disease from spreading ⁽⁹⁾, generated new consumers preferences/behaviour, severely disrupted value chains and major slowdown of some economic activities, particularly those requiring higher levels of social interaction (see e.g. [Fana et al., 2020](#); [Marques Santos, Madrid, Haegeman and Rainoldi, 2020](#)). The real Gross Domestic Product (GDP) decreased by 6.1% in 2020 in the EU, whereas in the previous years (2014-2019), the EU had registered an average growth of 2% per year (Figure 1). GDP contraction in 2020 was also more severe than during the financial crisis of 2008/2009 (4% versus 6%).

Figure 1. GDP (% real change), EU27, 1996-2020



Source: Own elaboration based on Eurostat data [\[nama_10_gdp\]](#).

Note: Figure refers to real GDP change, estimated using constant prices (base 2015).

The magnitude of the crisis and its origin (health crisis) led the EU to deliver a singular support package to help the Member States in their recovery. For instance, during the first months of the pandemic, the [EU fiscal rules were suspended](#) (March 2020), a [temporary framework for State Aid](#) was adopted (March 2020), Support to mitigate Unemployment Risks in an Emergency ([SURE](#)) was put in place (May 2020). At the end of 2020, the Recovery and Resilience Facility was launched, as part of the NextGenerationEU within the Recovery Plan for Europe. The funds that the Member States will receive under the Recovery and Resilience Facility (from the second half of 2021) will come in addition to those from other EU sources ([Regulation \(EU\) 2021/41](#)). Therefore, EU Member States may benefit from new synergies and complementarities between these different financing schemes.

⁽⁸⁾ First identified in December 2019 in Wuhan, the capital of the Chinese province of Hubei, this infectious disease quickly spread across the world in a few weeks. On 30 January 2020, the World Health Organization (WHO) declared the outbreak a “Public Health Emergency of International Concern”, and a pandemic on 11 March 2020.

⁽⁹⁾ For instance, imposed closure of establishments and a maximum capacity in restaurants, hotels, shops and public place.

Actions related to Research, Development, and Innovation (RDI) represent an important part of the Recovery and Resilience Plans of the EU Member States. At least around €37 billion ⁽¹⁰⁾ are expected to be spent on RDI investments to support the economic recovery, twin transition, and resilience.

Alignment of actions in the Recovery Plans with the national/regional policy priorities is essential to ensure synergies, complementarities, and higher effectiveness of public funds ([COM\(2020\) 575 final](#); [Regulation \(EU\) 2021/41](#)). In the previous programming period (2014-2020), RDI subsidies under the European Regional Development Fund (ERDF) have been strongly associated with Smart Specialisation Strategies ⁽¹¹⁾, as a way to achieve a more effective return on investments. Although Smart Specialisation was born in the context of Cohesion Policy, it is recommended that the design and implementation of these strategies should include all the different funding sources available (regional, national and European), i.e. not limited to Cohesion Policy funds ([Foray et al., 2012](#)). Such a multi-funds approach aims to increase synergies between different funding instruments and policies for better efficiency and effectiveness of the resources allocated to the strategy ([Foray et al., 2012](#)).

Based on the case study of Portugal, the present paper provides a qualitative and quantitative analysis of investment ⁽¹²⁾ actions foreseen in the Portuguese Recovery and Resilience Plan (RRP) that may directly or indirectly support the implementation of the Smart Specialisation Strategies of this territory ⁽¹³⁾. Information from the Plan and its annexes together with that of the Strategies for 2021-2027 of the Portuguese territory (regional and national) are used to identify potential opportunities for synergies and/or complementarities between funding instruments. Under the present study, complementarity means that different instruments contribute in combination to a common goal. Synergy is defined as the interaction between these different instruments able to generate a greater effect than the sum of their separate effects ⁽¹⁴⁾. Complementarity can also be seen as a source or way to achieve synergies.

Assessing the alignment of the goals of the RRP and the Smart Specialisation Strategies is particularly interesting. On the one hand, the Portuguese RRP ⁽¹⁵⁾ has as short-term objective the reactivation of demand and as long-term goal a structural economic transformation, translated into strategic actions (investments and reforms). On the other hand, the Smart Specialisation Strategies have a medium-long term target of

⁽¹⁰⁾ Calculation based on investments in the Plans of 22 EU Member States, using the Bruegel classification (digital-related investment in R&D; green tech innovation; R&D and innovation in non-green and non-digital) - <https://www.bruegel.org/publications/datasets/european-union-countries-recovery-and-resilience-plans/> [accessed on 8 July 2021].

⁽¹¹⁾ For a definition of Smart Specialisation Strategy see section 3.2.

⁽¹²⁾ Reforms included in the Plan are not analysed, because it is not the scope of this study.

⁽¹³⁾ Results should be interpreted with care, as the ultimate effect of the opportunities identified will strongly depend on the nature of the final beneficiaries and projects selected during implementation of the Plan.

⁽¹⁴⁾ The definitions of complementarity and synergy were adapted from [Oxford](#) (2011).

⁽¹⁵⁾ For more details about the expected macroeconomic impacts in short and long-term of the Portuguese RRP, see section 4 of the Plan ([República Portuguesa, 2021](#): 261-282).

economic transformation and growth (Foray et al., 2012). Consequently, when investments in the RRP contribute for reducing obstacles or challenges to innovation activities and improving the regional innovation eco-system, they are likely to also support/facilitate the implementation of Smart Specialisation. Furthermore, if investments in the Plan are targeted to priority areas for which the territories can build a competitive advantage ⁽¹⁶⁾ they can enhance the socio-economic effect of the Plan. Carrying out such a kind of exercise can therefore be particularly useful for policymakers, national/regional authorities, and stakeholders involved in the design of regional development actions and the implementation of their Strategy(ies).

The paper is structured in five sections. After the introduction, section 2 details the main EU measures to support recovery (NextGenerationEU). Section 3 describes the role of innovation and Smart Specialisation in post-COVID-19 recovery. Section 4 defines the methodological approach. Section 5 presents the case study of Portugal. Section 6 concludes.

2. EU measures to support the recovery

2.1. The Next Generation EU

Faced with an unprecedented situation, singular EU measures and responses were taken. On 10 November 2020, the European Parliament and the EU Member States in the Council achieved a political agreement on the largest package ever financed through the EU budget, based on the Commission proposal from 27 May 2020 (European Commission, 2020a). This package includes the long-term budget (EU’s Multiannual Financial Framework - MFF) for 2021-2027 of €1,210.9 billion combined with the NextGenerationEU (NGEU) of €806.9 billion (Table 1). This package has the goal to help build a greener, more digital, and more resilient Europe, and to align recovery with the achievement of the EU growth strategy, the European Green Deal.

Table 1. MFF and NGEU total allocations per heading (billion euro, current price)

	Total	MFF	NGEU
Single Market, Innovation and Digital	161	149.5	11.5
Cohesion, Resilience and Values	1,203.2	426.7	776.5
Natural Resources and Environment	419.9	401	18.9
Migration and Border management	25.7	25.7	
Security and defence	14.9	14.9	
Neighbourhood and the world	110.6	110.6	
European Public Administration	82.5	82.5	
Total	2,017.8	1,210.9	806.9

NGEU	
Recovery and Resilience Facility	723.8
<i>of which grants</i>	338.0
<i>of which loans</i>	385.8
REACT-EU	50.6
Just Transition Fund	10.9
Rural development	8.1
InvestEU	6.1
Horizon Europe	5.4
rescEU	2.0

Source: European Commission [Accessed on 28/07/2021].
 Note: MFF = multiannual financial framework. NGEU = NextGenerationEU.

⁽¹⁶⁾ For instance, identified thanks to Smart Specialisation and its entrepreneurial discovery process.

The NGEU is a temporary recovery instrument, designed to help in the sustainable recovery of the EU economy from the damage caused by the COVID-19 pandemic. The largest component of the NGEU (90%) corresponds to the Recovery and Resilience Facility (RRF). The funds under the RRF (€723.8 billion) assume the form of grants (€338 billion) or/and loans (€385.8 billion). The maximum grant allocations to each Member State under the RRF ⁽¹⁷⁾ were based on their positioning regarding i) unemployment rate; ii) inverse GDP per capita; and iii) population (for more details see [COM\(2020\) 408final/3](#)).

The general objective of the RRF, described in Article 4 of [Regulation \(EU\) 2021/241](#), is “to promote the Union’s economic, social and territorial cohesion by improving the resilience, crisis preparedness, adjustment capacity and growth potential of the Member States, by mitigating the social and economic impact of that crisis”. The scope of application of the RRF is structured in six pillars as referred to in Article 3 of [Regulation \(EU\) 2021/241](#):

- 1) Green transition;
- 2) Digital transformation;
- 3) Smart, sustainable and inclusive growth, including economic cohesion, jobs, productivity, competitiveness, research, development and innovation, and a well-functioning internal market with strong SMEs;
- 4) Social and territorial cohesion;
- 5) Health, and economic, social and institutional resilience, with the aim of, inter alia, increasing crisis preparedness and crisis response capacity; and
- 6) Policies for the next generation, children and the youth, such as education and skills.

2.2. Recovery and Resilience Plans

To request the RRF funds, Member States have to submit a Recovery and Resilience Plan (RRP), which describes how the funds will be used, as well as the foreseen milestones and targets to be achieved with the Plan. The Plans include reforms and investment projects to be implemented by 2026. They should address relevant country-specific challenges and priorities identified in the context of the European Semester ([Regulation \(EU\) 2021/241](#)) and comprise measures to support and speed up the green and digital transitions ⁽¹⁸⁾. For instance, they have to include a minimum of 37% for climate investments and reforms, as well as, a minimum of 20% to foster the digital transition. The Plans should describe how they contribute to the achievement of the main objectives of the RRF, which refer to policy areas of European relevance structured in six pillars, as referred to in Article 3 of [Regulation \(EU\) 2021/241](#).

In addition, the Plans should also be aligned with the four dimensions outlined in the Annual Sustainable Growth Strategy 2021 ([COM\(2020\) 575 final](#)): environmental sustainability, productivity, fairness, and

⁽¹⁷⁾ See maximum grant allocations by Member States in Table 9 in Appendix.

⁽¹⁸⁾ [COM\(2020\) 575 final](#).

macroeconomic stability. Furthermore, to support a robust recovery, the Commission also encourages the Member States to include in their Plans actions related to the flagship areas listed in Table 2. These flagships should address issues that need significant investment to create jobs and growth, and which are needed for the green and digital transitions ([COM\(2020\) 575 final](#)).

Table 2. Recovery and Resilience Facility: Flagship areas for investments and reforms

1. Power up	<ul style="list-style-type: none"> ▪ Frontloading clean technologies ▪ Acceleration of the development and use of renewables ▪ Modernization of networks and enhancing interconnectivity to support the integration of renewables
2. Renovate	<ul style="list-style-type: none"> ▪ Improving the energy and resource efficiency of public and private buildings to contribute to achieving the EU’s climate objectives ▪ Fostering digital development through smart living and metering
3. Recharge and refuel	<ul style="list-style-type: none"> ▪ Accelerating the use of sustainable, accessible, and smart transport charging and refueling stations (hydrogen stations) ▪ Expansion of public transport ▪ Enhancing the industrial transition
4. Connect	<ul style="list-style-type: none"> ▪ Enhancing access to broadband services (fiber and 5G networks) for citizens and businesses in Europe
5. Modernise	<ul style="list-style-type: none"> ▪ Enhancing the digitalisation of public administration and services, including justice and healthcare system ▪ Ensuring the provision of European digital identity (e-ID) accessible to all
6. Scale-up	<ul style="list-style-type: none"> ▪ Increasing the European industrial data cloud capacities ▪ Improvement of the ability to develop the most powerful, cutting edge, and sustainable processors
7. Reskill and upskill	<ul style="list-style-type: none"> ▪ Ensuring investments in re- and upskilling to support: green and digital transitions, enhancing innovation and growth potential, fostering economic and social resilience, and ensuring quality employment and social inclusion ▪ Focusing on digital skills and educational and vocational training for all ages

Source: Own elaboration based on [COM\(2020\) 575 final](#).

The funds under the RRF come in addition to the contributions Member States will receive under the EU cohesion policy ⁽¹⁹⁾ or from other EU sources (e.g. European Agricultural Fund for Rural Development - EAFRD -, European Maritime and Fisheries Fund – EMFF -, InvestEU and Horizon Europe missions and partnerships). Member States can combine funding coming from different instruments, but avoiding double funding, to ensure synergies or complementarities.

⁽¹⁹⁾ Cohesion policy receive funding from the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund.

3. Innovation and Smart Specialisation for recovery

3.1. The importance of innovation in a time of crisis and aftermath

Even if innovation is an important driver to foster growth (Schumpeter, 1934; Griliches; 1979; Hall and Mairesse, 1995; Hasan and Tucci, 2010), studies have demonstrated that in a period of crisis firms tend to reduce (Archibugi *et al.*, 2013) or to stop innovative projects (Paunov, 2012). Nevertheless, despite the slowdown of innovation activities during periods of economic contraction, there is also empirical evidence that innovation can mitigate the negative effect of the crises (Makkonen *et al.*, 2014; Marques Santos, Haegeman and Moncada-Paternó-Castello, 2021) and foster recovery (Hausman and Wesley, 2014; Borunsky *et al.*, 2020; Cucculelli and Peruzzi, 2020). Indeed, Marques Santos, Haegeman and Moncada-Paternó-Castello (2021) demonstrated that innovating during the first year of the Covid-19 crisis (2020) reduced significantly the negative effect of this downturn for innovative firms on turnover. These authors also demonstrated that during the economic crisis of 2008/2009 and the Covid-19 crisis in 2020 (Figure 2), the probability of turnover growth for innovative firms was around four times more than for their counterparts, whereas in the non-crisis period this difference was round the double (Figure 3). Furthermore, the study also highlights that this difference in terms of performance between innovative and non-innovative firms was 13% higher in 2020 than in 2009. Such findings highlight the importance of innovation persistence during crises and also the relevance of policies to support innovation during downturns.

Figure 2. Estimated probability of turnover growth, by innovation behaviour and period (EU27)

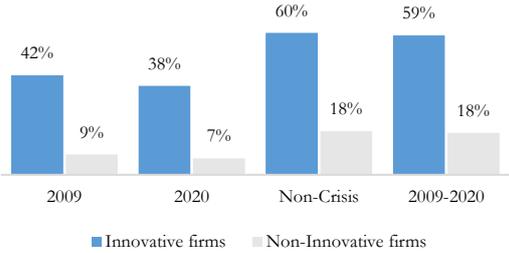
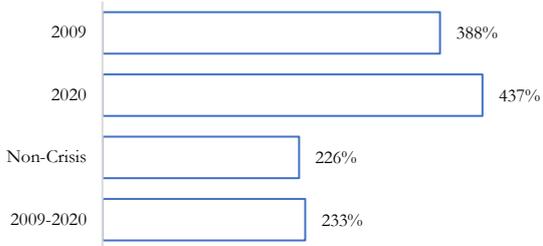


Figure 3. Relative difference in the probability of turnover growth: Innovative versus non-innovative firms (EU27)



Source: Marques Santos, Haegeman and Moncada-Paternó-Castello (2021).

Note: Figure 2 refers to the results of the mean-comparison tests, where differences are significant at 1% level. The non-Crisis period includes the years between 2009-2020, excluding 2009, 2013 and 2020.

Similarly, firms that have innovated during the crisis, by being less affected are also in a better position to continuously innovate in the aftermath. Furthermore, these entities have improved their market positions, thanks to innovation persistence during the downturns (Guellec and Wunsch-Vincent, 2009; Amore, 2015), and have also learned from the crisis (Cucculelli and Peruzzi, 2020).

In the case of the Covid-19 health crisis, R&D and innovation (RDI) are particularly important as a response to the pandemic itself, namely in the areas of virology, vaccines development, treatments, and diagnostics ([Borunsky et al., 2020](#)). RDI is also central to support the economic recovery ([European Commission, 2020b](#)) and the needed green transition ([Borunsky et al., 2020](#)). Indeed, the pandemic affected the world at a time when the EU was starting to take more concrete actions to become a climate-neutral economy by 2050 ⁽²⁰⁾, thanks to its new growth strategy, the **European Green Deal** and supported by a [package of proposals to transform EU economy](#), proposed by the Commission on July 2021. Mobilising research and fostering innovation are key elements to achieve the Green Deal goals, as they are essential for the development of more sustainable products and solutions in all sectors ([COM/2019/640 final](#); [COM\(2021\) 550 final](#)). Altogether, there are strong arguments and evidence to put RDI at the heart of the recovery.

3.2. Smart Specialisation for recovery

Even if RDI is crucial for the recovery and for achieving the desired sustainable growth, it is important to promote a wider diffusion of innovation and to identify the right innovation priorities for public and private investments, in order to ensure a more effective use of the money. Smart Specialisation Strategies (Box 1), as a place-based approach to innovation, can help in the recovery process ([Marques Santos, Madrid, Haegeman and Rainoldi, 2020](#)) and the direction of the transitions ([Pontikakis et al., 2020](#)) ⁽²¹⁾.

Box 1. Definition of Smart Specialisation Strategy

Smart Specialisation Strategy (S3) refers to a governance model, based on a place-based approach, where stakeholders are involved in the policy-making process, under the so-called Entrepreneurial Discovery Process - EDP ([Foray et al., 2009](#)). It aims to support regional and/or national innovation policy to be more effective, by helping in the identification of well-targeted innovation priorities for investment. The concept of S3 is related to the concentration of funds within some innovation areas but also with the notion of diversification and complexity within these priorities ([Foray, 2013](#); [Baland et al., 2019](#)). The selection of thematic priorities, by a process of ‘discovery’, should take into account the regional assets, territorial competitive advantages, market trends, and potential for excellence ([Foray, 2013](#)).

By focusing on a place-based approach (i.e. based on specific territorial challenges, bottlenecks, and needs), Smart Specialisation has the potential to provide more targeted and tailored support to the recovery. Indeed, studies (see e.g. [Conte et al., 2020](#); [Marques Santos, Madrid, Haegeman and Rainoldi, 2020](#)) have demonstrated that even if the Covid-19 crisis negatively impacted almost all the countries and regions in Europe, the magnitude of the effect depends on sectorial patterns, government responses and the size of

⁽²⁰⁾ On December 2019 the Commission presented European Green Deal and on March 2020 Commission proposed European Climate Law.

⁽²¹⁾ For more details on how place-based approach can contribute to the new EU policy framework in the context of Covid-19 see also [Neto \(2020\)](#).

the health crisis (number of cases/deaths). Therefore, faced with a strong heterogeneous socio-economic effect of the pandemic, the path to recovery is also more likely to be local and tailored to territorial specificities than globally designed with the same targeted actions ([Marques Santos, Madrid, Haegeman and Rainoldi, 2020](#)).

Moreover, the potential contribution of Smart Specialisation for Covid-19 recovery lies also in the singularity of this crisis. Indeed, whereas most of the previous crises started in the financial sector, the Covid-19 crisis had its origin in a health crisis in a context of high uncertainty about its end ⁽²²⁾. Additionally, Covid-19 is also changing the way in which citizens work, consume, communicate and learn ([Kohli et al., 2020](#)). Many of these market trends (e.g. increase in demand for eco-friendly products, preferences for online sales, teleworking, video-conference, e-learning) are just the acceleration of previous ones and then some may stay forever ([Kohli et al., 2020](#)). New market niches and opportunities are emerging from the Covid-19 crisis, some may stay forever and others only in the short-term, but in both cases innovation can play an important role to help companies to adapt to it and to benefit from it.

The identification of innovation priorities in the context of Smart Specialisation should be undertaken by a process of discovery by regional actors ([Foray et al., 2012](#)). A Strategy for Smart Specialisation can also be seen as an economic transformation agenda, where the direction of the transition is based on market trends and EU/national policies goals ([Foray et al., 2012](#)). Therefore, in a singular context of recovery (with short-term needs) anchored to the twin transitions (for a medium/long term structural transformation), short-term decisions (e.g. for demand reactivation) must be aligned with medium/long-term targets; and the process of entrepreneurial discovery under Smart Specialisation can help to identify such match.

Within the EU Cohesion Policy 2014-2020, Smart Specialisation was an *ex-ante* conditionality that Member States should meet before receiving EU financial support through the Structural Funds for their R&D and Innovation measures, i.e. on the Thematic Objective for Research and Innovation (TO1) ([COM\(2011\) 615 final/2](#)). For the period 2021-2027, the good governance of Smart Specialisation is an enabling condition for the Structural Funds under Cohesion Policy objective 1 (A Smarter Europe - Innovative & Smart Economic Transformation). However, even if the legal requirement of Smart Specialisation is related to innovation actions funded by Structural funds, the European Commission has also encouraged the Member States to have a multi-funds approach ⁽²³⁾ ([Foray et al., 2012](#); [Perrin and Tilman, 2020](#)). Such a method can ensure synergies or complementarities between Structural Funds and other EU funds, avoid the duplication of efforts and enhance spillover effects/economies of scale for more effective use of money ([Foray et al., 2012](#)).

⁽²²⁾ At the time of this study (July 2021) and after about one year and half of the Covid-19 pandemic, the EU is preparing for potential new vague, despite an on-going vaccination campaign.

⁽²³⁾ For more details about an effective implementation of Smart specialisation using a multi-funds approach see also [Conte and Ozbolat \(2016\)](#) and [Doussineau et al. \(2018\)](#).

4. Methodological approach

The present study aims to identify and describe investments in the Portuguese Recovery and Resilience Plan that can potentially support the implementation of the Smart Specialisation Strategies of this territory. Such actions, depending on the final beneficiaries and projects selected, may also generate potential complementarities and synergies between the investments in the Portuguese RRP and those of the support by the ERDF under the framework of the Smart Specialisation Strategy, if an alignment of their final goals exists.

Portugal was selected as a case study for being the first country to present its Plan (and therefore having information available about it), as well as, being among the countries most affected by the pandemic (Figure 4 and Figure 5), with a real GDP drop by 7.6% in 2020, whereas the EU27 average was 6.1% (Figure 4).

Figure 4. Real change (%) of GDP (2020/2019), by EU countries

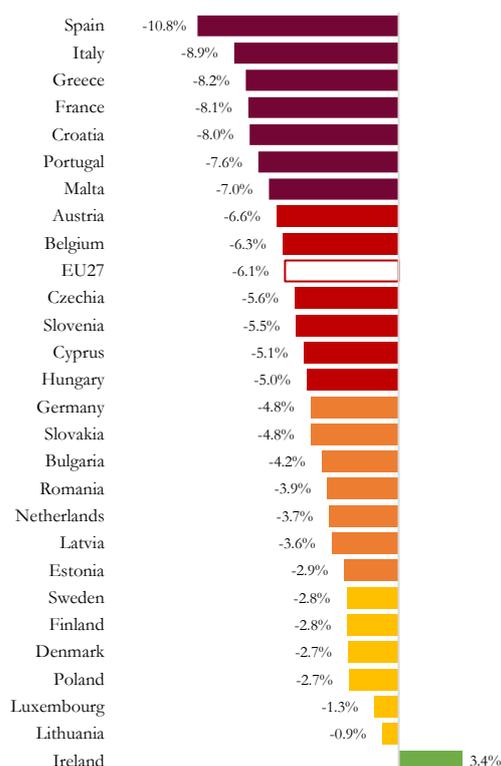
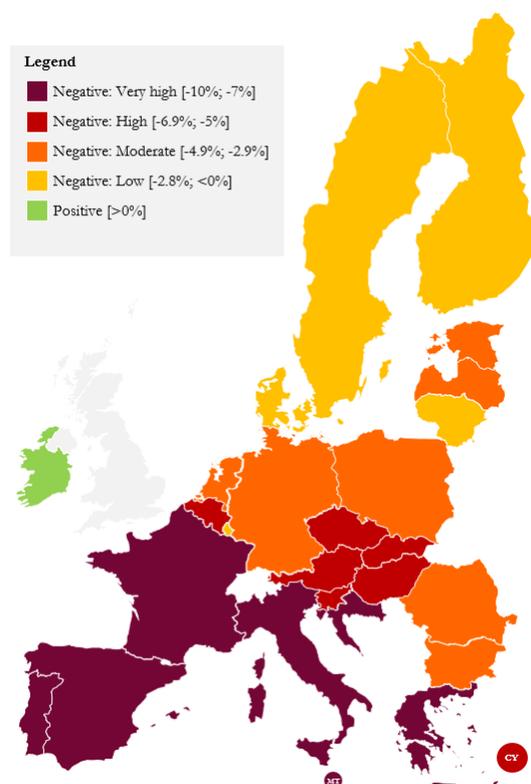


Figure 5. Intensity of real change of GDP (2020/2019), EU27



Source: Own elaboration based on Eurostat data [\[nama_10_gdp\]](#).

Note: Figure refers to real GDP change, estimated using constant prices (base 2015).

Box 2. Obstacles to innovation activities and business operation in Portugal

During the first months of the pandemic (April-September 2020), obstacles to business activities for both innovative and non-innovative Portuguese companies were essentially related to Covid-19 issues (such as

mobility/travel restrictions and disruption of the value chain) together with finding customers (Figure 7). These obstacles are felt with greater intensity by innovative companies than by non-innovative ones. Before the pandemic (2016-2018), the main obstacles to innovative activities in Portugal were related to high R&D and innovation costs, high competition, and the lack of qualified employees within the company (Figure 6).

Figure 6. Hampering factors for innovation activities, Portugal, 2016-2018

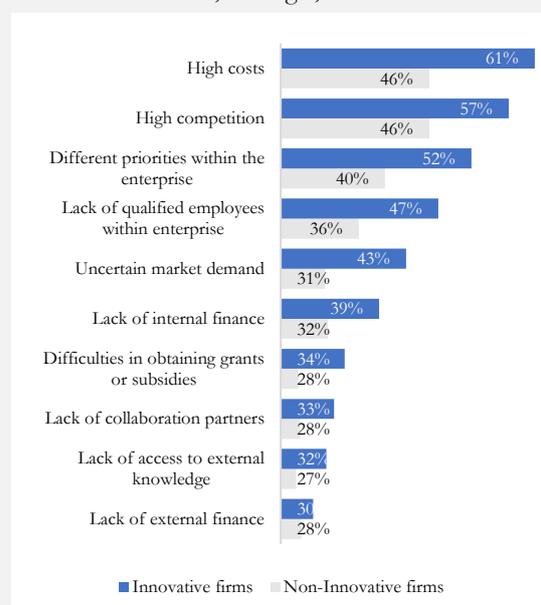
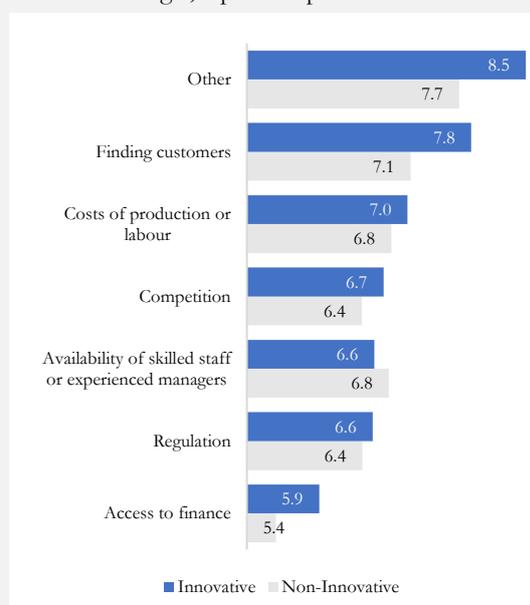


Figure 7. Problems to business operations, Portugal, April – September 2020



Source: Own elaboration based on *Community Innovation Survey* (Figure 6) and *Survey on the Access to Finance of Enterprises* (Figure 7). Note: Figure 6 includes the percentage of firms that have indicated the level of importance of hampering factors as high or medium. Error! Reference source not found. refers to the average level of importance of the obstacles on a scale of 1-10, where 1 means it is not at all important and 10 means it is extremely important. The category “Other” in Figure 7 refers to Covid-19-related issues.

To answer the main research question “*How can the RRP contribute to the achievement of the Smart Specialisation goals of the Portuguese territories?*”, the following methodological approach was followed:

- **Step 1: Mapping S3 innovation priorities** for the 2021-2027 period, to understand which regions can potentially benefit from the actions of the Plan.
- **Step 2: Mapping the different components of the Plan by six thematic pillars** ⁽²⁴⁾ as listed in Article 3 of [Regulation \(EU\) 2021/241](#), to pre-screen components with investments in R&D and Innovation.
- **Step 3: Identifying components/investments** in the Plan that may be explicitly **associated with Smart Specialisation**, using text analysis. This analysis is only a pre-screening because some

⁽²⁴⁾ The 6 thematic pillars are: Green transition; Digital transformation; Smart, sustainable and inclusive growth; Social and territorial cohesion; Health, and economic, social and institutional resilience; Policies for the next generation, children and the youth.

investments or components, even without reference to Smart Specialisation, may also be related to it if they are aligned with the objectives of the innovation priorities of a region.

- **Step 4: Classifying** actions in the Plan, directly and indirectly, related to **R&D and Innovation investments**, where direct and indirect linkages are defined as follows:
 - **Direct linkage:** refers to investments in the Plan that can financially support any phase of innovative projects (from R&D to market commercialisation, including knowledge transfer and diffusion) that are aligned with Smart Specialisation priority areas.
 - **Indirect linkage:** refers to investments in the Plan that may affect the regional innovation ecosystem of the Portuguese territories, by acting in some known barriers, obstacles, or challenges to innovation activities or business operations. It also implies knowing at least some of the most hampering factors for innovative Portuguese firms, as described in Figure 6 and Figure 7 in Box 2. We are aware that barriers to innovative activities may be different across regions and economic activities, as well as, being specific to each Smart Specialisation priority, however, since information with a higher level of granularity is not available, within the scope of this study, we consider as obstacles to innovation only those commonly listed in the scientific literature (see e.g. [OECD, 2018](#)), which usually correspond to those included in the *Community Innovation Survey*, or in the *Survey on the Access to Finance of Enterprises*.
- **Step 5: Categorisation of R&D and Innovation actions** in the Plan by thematic areas, when applicable and when information is available. This is an important step to help in the identification of common actions areas of intervention between Smart Specialisation Strategies and the RRP. If no information is available in the Plan about the thematic area(s) of the investment, this action is considered with a potential benefit for all the innovation priorities of the strategy(ies).
- **Step 6: Regionalisation of investments** (when information available), to identify regions (NUTS 2 level) that will benefit from them. Table 10 in Appendix explains the reasoning for the regionalisation for the identified investments. This step aims to understand the intensity ⁽²⁵⁾ of the potential contribution for each region. If no information is available regarding the localisation of the investment, because the Plan describes that it is targeted to the whole national territory, investments are categorized with a potential benefit for all the regions. Nevertheless, if the investments are targeted for specific economic activity(ies), regionalisation can also be related to the sectorial concentration of the territory.
- **Step 7:** Using information from steps 1, 5, and 6, **drafting a map** to identify potential links between the RRP and the Smart Specialisation Strategies. Links between actions in the Plan and the Smart Specialisation goals are classified into three categories (strong, medium, and weak) as described below.
 - **Strong link (●●●):** means that the actions in the Plan may potentially benefit the region(s) because investment is channeled to the territory to support directly or indirectly the implementation of Smart Specialisation; furthermore, areas of actions of the Plan are also aligned

⁽²⁵⁾ Measured by the percentage of RRP investment attributed to a NUTS 2 region.

with the innovation priorities of Smart Specialisation. When applicable, a strong link also means that the intensity of investment in the region is above the average;

- **Medium link (●●)**: refers to a situation when the investment intensity in a region is relatively close to the average and/or the area of action of the Plan is also aligned with the innovation(s) priority(ies) of Smart Specialisation. Final beneficiaries are not only actors of the regional innovation ecosystem, but actions are related to the mitigation of main known barriers to innovation activities;
- **Weak link (●)**: refers to a situation when the investment intensity is below the average or non-existent in the territory but the region can also benefit from it, even if not implemented in the territory. Areas of action of the Plan are also aligned with the innovations priorities of Smart Specialisation. The benefit of the action in the Plan is not only targeted for actors of the regional innovation ecosystem and/or priority areas of Smart Specialisation.

In short and as summarised in Table 3, the link classification depends essentially on three factors: i) the final beneficiaries; ii) the RRP investment area and its alignment with S3 innovation priorities; and iii) RRP investment intensity in the territory. For more details about the reasoning for the link typology attributed to each identified investment see Table 11 in Appendix.

Table 3. Summary of the criteria to classify the link intensity between RRP and S3

Criteria	Strong (●●●)	Medium (●●)	Weak (●)
Final beneficiaries	Only actors of the regional innovation ecosystem	Not only actors of the regional innovation ecosystem, but actions are related to the mitigation of a main known barrier to innovation activities	Not only targeted for actors of the regional innovation ecosystem and/or priorities areas of Smart Specialisation
RRP investment area or sector	Aligned with S3 innovation priorities	Aligned with S3 innovation priorities	Aligned with S3 innovation priorities
Location of the investment (% Total)	Above the average	Close to the average	Below the average or non-existent in the territory but the region can benefit from its results

Source: Own elaboration.

As a source of information the Plan and its annexes, together with the Strategies of the Portuguese regions are used to perform such analysis. For non-published revisions of the Strategies information, information on priorities was provided directly by the regions on a provisional basis.

5. Case study of Portugal

5.1. Smart Specialisation Strategies in Portugal: Revision and Challenges

Since 2014, Portugal has adopted a multi-level approach to Smart Specialisation that includes a national and seven regional strategies: five continental regions and two autonomous archipelagos of Azores and Madeira;

and therefore, different priorities by each of them. For the programming period 2021-2027, some regions have revised, and others are still revising ⁽²⁶⁾, their strategies (Figure 8) in a very singular macroeconomic context: the health and economic crisis, due to the Covid-19 pandemic. Furthermore, the revision of the strategies was even more challenging due to physical distancing and mobility restrictions, imposed to stop disease spread. Such circumstance has also led regions to reinvent themselves. Re-thinking the support to stakeholders' involvement, and adopting a digital approach allowed Portuguese regions to ensure the continuity of the policy-making process in difficult times, but also helped them to learn how to improve the process (Laranja *et al.*, 2021).

Figure 8. S3 Innovation Priorities, Portugal (2021-2027)

	Algarve (PT 15) [6] (*)	Alentejo (PT 18) [1]	Lisboa (PT 17) [2]	Centro (PT 16) [3]
Societal Challenges	<ul style="list-style-type: none"> • Tourism and leisure • Sea, fisheries and aquaculture • Health, Wellness, Life Sciences • Agrifood, agro-transformation, forest and green biotechnology • ICT and cultural and creative industries • Renewable energy 	Digitalization of economy Circular economy <ul style="list-style-type: none"> • Sustainable bioeconomy • Energy and mobility • Tourism services • Creative and cultural industries • Social innovation and citizenship 	Digital transition Higher education <ul style="list-style-type: none"> • Agrifood • Blue economy • Creative and cultural industries • Mobility and transport • Health • Tourism and hospitality 	<ul style="list-style-type: none"> • Natural resources and bioeconomy • Material, tooling and production technologies • Digital technology and space • Energy and climate • Health and well-being • Culture, creativity and tourism
	Norte (PT 11) [4] (*)	Madeira (PT 30) [5,6] (*)	Azores (PT 20) [6] (*)	National [7] (*)
	<ul style="list-style-type: none"> • Creativity, Fashion and Habitats • Industrialization and Advanced Manufacturing Systems • Agri-Environmental Systems and Food • Sustainable Mobility and Energy Transition • Life Sciences and Health • Territorial Assets and Tourism Services • Resources and Sea Economy • Technologies, State, Economy and Society 	<ul style="list-style-type: none"> • Health and wellness • Agriculture, food and bioeconomy • Circular economy, energy transition, climate change action and biodiversity • Digital technologies and economy 4.0 • Sea resources and technologies • Tourism 	Societal Challenges (circular economy, environment, climate, digitalisation and quality of life) <ul style="list-style-type: none"> • Agriculture and Agroindustry • Sea and blue growth • Tourism and Heritage • Space and data science 	<ul style="list-style-type: none"> • Economy 4.0 and Digital KET • Materials and advanced production technologies • Circular Economy, Energy Transition and Decarbonisation • Health, biotechnology and food • Territory, creativity and brands • Large natural and emerging assets (sea, space technologies and Earth observation)

Source: Own elaboration based on [1] CCDR-Alentejo (2021), [2] CCDR-LVT (2020), [3] CCDR-Centro (2021), [4] CCDR-Norte, [5] Decreto Legislativo Regional n.º 17/2020/M, [6] information provided by regional managing authorities (Algarve, Azores and Madeira) and [7] ANI and Quaternaire Portugal (2021).

Note: (*) The list of innovation priorities is provisional as the EDP workshop and/or other public consultations were still ongoing at the time this study was carried out.

In addition to the recovery of the Covid-19 crisis, regions across the world are also faced with **grand societal challenges** (such as climate change and environmental degradation; demographic changes and aging population; digitalisation and automation), pushing for new market trends and needs, as well as new consumer preferences and behaviour (European Commission, 2020c). Moreover, and as mentioned

⁽²⁶⁾ During the period the study was conducted.

previously, the [European Green Deal package](#) to support the transition to a climate-neutral economy is also enhancing investment in that direction.

The combination of all these factors (recovery, market trends, and legal framework) have certainly influenced the investment choices and priorities of the EU region for the coming years. Revised innovation priorities of the Portuguese regions (Figure 8) display common elements and have the ambition to concentrate resources in support of actions for a greener, more digital, and more inclusive economy. This directionality of Smart Specialisation’s innovation priorities was already expected by [Mccann and Soete](#) (2020), as the result of the new regulatory and financial incentive schemes to be implemented by the European Commission. In the revised version of their strategies, some Portuguese regions - e.g. Centro⁽²⁷⁾, Norte⁽²⁸⁾, and Algarve⁽²⁹⁾ - include, in addition to Cohesion Policy funds, the recovery and resilience Plan together with the national initiatives (e.g. R&D tax credit) and other EU funds (e.g. Horizon Europe and Common Agricultural Policy) as instruments to support the achievement of their goals. Such a policy-mix approach shows the desire of the regions to achieve synergies and complementarities by enlarging the scope of Smart Specialisation beyond funds of Cohesion policy.

5.2. Portuguese Recovery Resilience Plan

Portugal submitted its Plan on 22 April 2021. The Portuguese RRP is composed of 20 components (Table 4), divided by 83 investments and 37 reforms, and represents an amount of €16,644 million (84% grants). These components are also associated with three structural dimensions (Resilience; Green transition; Digital transition) and the six thematic pillars referred to in Article 3 of [Regulation \(EU\) 2021/241](#) (Green transition; Digital transformation; Smart, sustainable and inclusive growth; Social and territorial cohesion; Health, and economic, social and institutional resilience, and; Policies for the next generation, children and the youth).

Table 4. Components of the Portuguese RRP by structural dimensions (million euro)

Resilience		Green transition		Digital transition	
C1. Health	1,383	C10. Sea	252	C16. Business 4.0	650
C2. Housing	2,733	C11. Decarbonisation of industry	715	C17. Quality and sustainable public finance	406
C3. Social response	833	C12. Sustainable bioeconomy	145	C18. Econ. justice and business environ.	267
C4. Culture	243	C13. Energy efficiency in buildings	610	C19. Public admin. Digitalization	578
C5. Capitalization and Innovation	2,914	C14. Hydrogen and renewables	370	C20. Digital school	559
C6. Qualifications and skills	1,324	C15. Sustainable mobility	967		
C7. Infrastructure	690				
C8. Forest	615				
C9. Water management	390				

Source: Portuguese RRP - [República Portuguesa](#) (2021).

⁽²⁷⁾ For more details see section 4 (pp.22-25) in [CCDR-Centro](#) (2021).

⁽²⁸⁾ For more details see page 198 in [CCDR-Norte](#) (2021).

⁽²⁹⁾ Based on information exchanged with the managing authority of Algarve region.

The *ex-ante* evaluation of the actions in the Plan, conducted by the Member State, foresees a short-term effect associated with demand incentives to accelerate the economic recovery, with estimated GDP growth of 0.7 p.p. per year in the first two years. The long-term effect, based on the structural transformation of the economy, foresees an annual increase of 2.22% of the GDP in comparison with a situation without the Plan.

The Plan describes potential complementarities with other funding instruments, namely the MFF 2021-2027 and the EU's centralised programmes (e.g. Erasmus, Horizon Europe, Invest EU, Single Market, and Digital Europe). For more details and some examples see Table 5.

Table 5. Portuguese RRP complementarities with MFF 2021-2027 and other European funding source

Comp#	MFF 2021 - 2027					Other European funds										
	PO1	PO2	PO3	PO4	EMFF	InvestEU	CEF	JTF	Horizon Europe	Digital Europe	SMP	Erasmus	Health	AMIF	LIFE	CAP
C01				✘									✘			
C02														✘		
C03				✘										✘		
C04	✘			✘						✘						
C05	✘					✘			✘							✘
C06				✘				✘				✘				
C07	✘		✘			✘	✘									
C08		✘													✘	✘
C09		✘													✘	✘
C10	✘	✘			✘	✘			✘	✘					✘	
C11		✘				✘		✘								
C12		✘							✘							
C13		✘				✘										
C14		✘				✘										
C15		✘	✘			✘										
C16	✘					✘				✘	✘					
C17											✘					
C18																
C19	✘									✘						
C20				✘												

Source: Adapted from the Portuguese RRP - [República Portuguesa](#) (2021:214).

Legend: Comp# = Number of the component in the Plan; MFF = EU's multiannual financial framework 2021-2027; PO1 = Policy Objective 1 – A Smarter Europe; PO2 = Policy Objective 2 - A greener, low-carbon Europe ; PO3 = Policy Objective 3 - A more connected Europe = ; PO4 = Policy Objective 4 - A more social Europe; EMFF = European Maritime and Fisheries Fund; CEF = Connecting Europe Facility; JTF = Just Transition Fund; SMP = Single Market Programme; Health = EU4Health programme; AMIF = Asylum, Migration and Integration Fund; LIFE = Funding instrument for the environment and climate action; CAP Common agricultural policy funds

On 16 June 2021, the European Commission provided a positive assessment of the Portuguese Plan ([SWD\(2021\) 146 final](#)). On 13 July 2021, it was formally [approved by the European Council](#), which allows Portugal to sign the grant and loan agreement and start receiving the funds for the implementation of its Plan. The Commission analysis of the Portuguese Plan ([SWD\(2021\) 146 final](#)) concludes that:

- i. The Plan pursues the general objective of the RRF by promoting the EU's economic, social and territorial cohesion, and contributing to the six pillars referred to in Article 3 of [Regulation \(EU\)](#)

[2021/241](#) - the Commission has also classified each of the components of the Plan by typology of contribution to the pillars (significantly or partially); the result of such analysis is reported in Table 6, which combines an analysis of the Plan by the Member State and the Commission.

Table 6. Components of the Portuguese Recovery and Resilience Plan by pillars

Components	Amount €Million	Green transition		Digital transformation		Smart, sustainable and inclusive growth		Social and territorial cohesion		Health, and economic, social and institutional resilience		Policies for the next generation, children and the youth		
		MS	EC	MS	EC	MS	EC	MS	EC	MS	EC	MS	EC	
Resilience	C1. Health	1,383	●	□	●	■	●	□	●	■	●	■	●	□
	C2. Housing	2,733	●	□		□	●	□	●	■	●	■	●	□
	C3. Social response	833	●	□		□	●	□	●	■	●	■	●	■
	C4. Culture	243		□	●	■	●	□	●	■			●	■
	C5. Capitalization and Innovation	2,914	●	□	●	□	●	■			●	□		
	C6. Qualifications and skills	1,324	●	□	●	■	●	■	●	■	●	□	●	■
	C7. Infrastructure	690	●	□		□	●	□	●	■	●	□		
	C8. Forest	615	●	■	●	□		□	●	□	●	□		
	C9. Water management	390	●	■				□	●	□	●	□		
Green transition	C10. Sea	252	●	■	●	□	●	□	●	□				
	C11. Decarbonisation of industry	715	●	■			●	□						
	C12. Sustainable bioeconomy	145	●	■			●	□		□				
	C13. Energy efficiency in buildings	610	●	■			●	□	●					
	C14. Hydrogen and renewables	370	●	■			●	■						
	C15. Sustainable mobility	967	●	■				□	●	■				
Digital transition	C16. Business 4.0	650			●	■	●	■						
	C17. Quality and sustainable public finance	406			●	■	●	■			●	■		
	C18. Econ. justice and business environ.	267			●	■	●	□			●	■		
	C19. Public admin. Digitalization	578		□	●	■	●	□		□	●	■		□
	C20. Digital school	559			●	■	●	■	●	■			●	■

Source: Own elaboration based on the Portuguese RRP - [República Portuguesa \(2021:23\)](#) – and Commission analysis of the Plan - [SWD\(2021\) 146 final](#).

Note: MS corresponds to the Member State classification - ● component contribute to the EU pillar; EC corresponds to the European Commission classification - ■ component significantly contribute to the pillar; □ component partially contributes to the pillar.

- ii. The Plan provides a significant response to common challenges, in particular, the flagships identified in the 2021 Annual Sustainable Growth Strategy;
- iii. 16 out the 20 components of the Plan are directly related to the green transition (Table 6), and measures supporting climate change objectives account for about 38% of the total;
- iv. 14 out the 20 components of the Plan directly address the digital transition (Table 6), and actions with a digital impact represent about 22% of the total;

- v. The Plan is expected to contribute to addressing a subset of the challenges identified in the European Semester ⁽³⁰⁾, namely regarding: i) improvement of the health system; ii) improvement of population's overall level of skills, including digital skills; iii) promoting access to finance; iv) introducing reforms and investments to enhance investment in research and innovation; v) improving the quality of public finances, business environment and efficiency of the justice system; among others.

5.3. RRP as a potential instrument to support Smart Specialisation

By matching the analysis of the Portuguese RRP and that of Smart Specialisation innovation priorities for 2021-2027, up to ⁽³¹⁾ around €6,200 million (Table 7) - 37% of the Plan - were identified as a potential ⁽³²⁾ contribution to the implementation of the Smart Specialisation Strategies of Portuguese territories.

Even if the Plan only refers to the national Smart Specialisation Strategy as a framework for actions in two components (C5 and C10), the analysis carried out on the 83 investments in the Plan identified investments in eight components with potential direct and indirect linkages with the S3 of the Portuguese territories. The direct linkage, of more than €3,000 million, comprises actions to financially support R&D and innovation investments in their different implementation phases (from development to market). Additionally, around €3,200 million were also selected as potential inputs to indirectly contribute to the implementation of Smart Specialisation, thanks to actions for skills and infrastructures improvements.

For instance, some actions in C5 and C12 of the Plan include **funding schemes to support R&D and innovation** projects associated with the twin transition in general (€930 million) and for some specific objectives, like sustainable agriculture and agro-industry (€93 million) and circular economy in the fashion industry (€135 million). Moreover, alignment with the innovation priorities of the national Smart Specialisation Strategy ⁽³³⁾ will be a pre-condition ⁽³⁴⁾ for final beneficiaries to access some of the funding schemes for business investment (€930 million).

⁽³⁰⁾ For more details about the 2020 European Semester – Country report of Portugal see [SWD\(2020\) 521 final](#).

⁽³¹⁾ Up to €6,200 million, since when the study was performed, the accurate percentage that will be imputed to some funds/loans for innovation-related activities was unknown. Indeed, we only know that such instruments can finance R&D and innovation, among other investment typologies.

⁽³²⁾ Potentially by the sense that any cause-effect of the Plan in the implementation of the Smart Specialisation will depend in the final projects selected and the governance model adopted (e.g. involvement of regional stakeholders).

⁽³³⁾ Even if the alignment is with the national strategy, its innovation priorities are also aligned with the regional ones, as we can see in Figure 8.

⁽³⁴⁾ Based on information in the Plan.

Table 7. Matching actions of the Portuguese RRP and Smart Specialisation innovation priorities

Component	#	Description	Amount € Million	Contribution for Smart Specialisation	Innovation area-related	Linkage with Smart Specialisation	
C5. Investment and Innovation	1	- Incentive mechanism (grants) for business investment in R&D and innovation associated with green and digital transitions	930	DIRECT LINKAGE	- Providing financial support to R&D and Innovation investments	- All innovation areas	●●● All regions
	2	- Funding (grants) to support research and innovation projects related to sustainable agriculture, food and agro-industry	93		- Reducing one of the main barriers to innovation activities (high cost of R&D)	- Sustainable agriculture	●●● Norte ●●● Centro ●●● Alentejo ●●● Algarve ●● Lisboa
	3	- Funding (grants) to support the non-economic R&D activities of the non-business research center	186		- Supporting knowledge transfer	- All innovation areas	●●● Norte ●●● Centro ●●● Lisboa ●●● Alentejo ●●● Algarve
	4	- Financial instruments (mainly loans) to support the liquidity of the business sector under the <i>Banco Português de Fomento</i> (BPF)	1,675		- Improving the firm's liquidity (e.g. working capital), essential to support the launch of a new product/service in the market and to support knowledge absorption	- All innovation areas	●● All regions
C12. Sustainable Bioeconomy	5	- Funding for R&D and innovation activities (from fundamental research to transfer to the market) to support more sustainable textiles, clothing, and footwear sectors, thanks to the use of bio-based raw materials or bio-based by-products	135	- Providing financial support to R&D activities	- Circular economy textiles, clothing, and footwear sectors	●●● Norte ●●● Centro ●●● Lisboa ● Alentejo ● Algarve	
SUBTOTAL (DIRECT LINKAGE)			3,019				
C10. Sea	6	- Construction/upgrading R&D infrastructures - Construction/upgrading of infrastructures to support business activities related to the blue economy - Improvement of fisheries and aquaculture infrastructures (more energy-efficient and environmentally friendly)	140	INDIRECT LINKAGE	- Improving the network infrastructure to support R&D	- Blue economy	●●● Azores ●●● Centro ●●● Norte ●●● Algarve ●●● Lisboa ● Alentejo ● Madeira
C11. Decarbonisation of industry	7	- Enhancing and financially support projects on the adoption of new technologies, new production processes, or business models by industry sector for supporting decarbonisation	715		- Improvement of business infrastructures (Hub and Network)	- Industry-related areas	●●● Norte ●●● Centro ●●● Alentejo ●●● Algarve ●●● Lisboa

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Table 7. Matching actions of the Portuguese RRP and Smart Specialisation innovation priorities (continuation)

Component	#	Description	Amount € Million		Contribution for Smart Specialisation	Innovation area-related	Linkage with Smart Specialisation
C4. Culture	8	- Modernisation of the cultural facilities network - Modernization of conservation/restoration laboratories - Rehabilitation and conservation of national museums, monuments, palaces, and national theatres - Internationalisation of intangible cultural heritage - “Saber Fazer” programme	243	INDIRECT LINKAGE	- Improving the regional assets and the attractiveness of the territory - Improvement of R&D infrastructures (laboratories)	- Tourism - Cultural and creative industries	●● Lisboa +● Norte +● Centro ● Alentejo ● Algarve
C6. Qualifications and skills	9	- Modernisation of the centers for Vocational Education and Training - Financial support to job creation - Supporting training for up-skilling and re-skilling labor force (linking demand and supply) - Modernisation of Higher Education Institution infrastructures and equipment	1,324		- Supporting the development of skills and qualifications for innovation and industrial transitions - Adjusting labor force qualifications to the new market needs	- All innovation areas	●● Lisboa ●● Norte ●● Centro ●● Alentejo ●● Algarve ●● Azores
C16. Business 4.0	10	- Providing training in digital skills - Supporting (financial, coaching and infrastructure) the digital transition of enterprises - Funding for the implementation of Digital Innovation Hubs	650		- Reducing barriers to innovation activities and business operations related to the lack of qualified human resources	- All innovation areas (digitalisation as an horizontal priority)	●● Lisboa ●● Norte ●● Centro ●● Alentejo ●● Algarve
C7. Infrastructures	11	- Modernisation of business parks, science and technology parks, technological poles, and interface centers for adapting them to new market trends and technologies (digital and green transitions)	110		- Improving the quality of infrastructures/spaces for the location of companies, start-ups, and incubators	- All innovation areas	● Lisboa ● Norte ● Centro ● Alentejo ● Algarve
SUBTOTAL (INDIRECT LINKAGE)			3,182				
TOTAL			6,201				

Source: Own elaboration based on information in the Portuguese RRP.

Note: # refers to the sequential number. For some components, the values in the column ‘amount’ do not include the total of the component because only investments/actions related to Smart Specialisation were included. For more details about the reasoning on the intensity of the linkage see Table 11 in Appendix.

Legend: ●●● strong link, ●● medium link and ● weak link.

Additionally, most of the actions will focus on supporting R&D and Innovation projects in partnership. In some cases, the funding scheme will also follow a more **integrated approach** covering the overall innovation cycle, from R&D to commercialisation in the market. Indeed, previous empirical evidence ([Marques Santos, Edwards and Neto, 2021](#)) demonstrated that combining a higher amount of funds to partnership projects together with funds covering all the phases of the innovation process create the conditions to generate a higher effect on the competitiveness of Portuguese regions.

Measures to support firms' liquidity ⁽³⁵⁾ - up to €1,675 million -, namely working capital, are also included in C5, which are also essential in the last phase of the innovation cycle (production and commercialisation).

The C5 and C10 also comprise several investments to **strengthen the innovation eco-system, support knowledge transfer, and foster collaboration** between the business sector and research centers. Complementarily, investments (C6 and C16) to support the development of **skills and qualifications for innovation and economic transformation** are also described in the Portuguese RRP. Indeed, the interaction between Portuguese stakeholders in the EDP workshop already points out the lack of adequate skills and the disarticulation between market needs and the education/training available as an important barrier to innovation (see e.g. [Marques Santos, Edwards and Laranja, 2020, 2021](#)).

Actions aimed to **improve regional assets** (C4), **R&D infrastructures** (C4 and C10), and infrastructures to **support business activities** (C7) are equally included in the Plan. These investments can support the goals of the national and regional strategies by providing better framework conditions for the development of R&D and innovation activities. For instance, the S3 goal of the Lisbon region 'digital transition of tourism sector' can benefit from the investments in the Plan included in C4 which aim the digitalisation and rehabilitation of national museums, monuments, and palaces located in this region. Furthermore, investments in the C7 aim to support the green and digital upgrade of existing business park areas, by promoting the self-production of renewable energy, the improvement of solutions for charging electric vehicles, and increasing the broadband (5G) coverage. Such investments are essential to support the green and digital transitions by acting as framework conditions for structural change. Indeed, as highlighted by [Pontikakis et al.](#) (2020), successful transitions imply changes in the entire production and consumption system.

⁽³⁵⁾ Even if we include the total amount of this measure in Table 6, only part of it (unknown value when the study was performed) can be used to support innovation-related activities. In fact, R&D and innovation activities are just one of the typologies that this instrument can support financially.

6. Conclusion and policy recommendations

The present study shows how the investments under the Portuguese RRP may potentially **support directly and indirectly the implementation of Smart Specialisation**, by acting in some known barriers to innovation activities and business operations in Portugal:

- Reduction of R&D and innovation costs (C5; C12)
- Improving access to finance for innovation activities (C5; C12)
- Supporting up-skilling and re-skilling labor force - matching demand and supply (C6; C16)
- Enhancing collaboration and partnership (C5)
- Fostering knowledge transfer (C5; C11)
- Supporting internationalisation - finding customers (C5; C4)
- Improving regional assets and infrastructures (C10; C4; C7)

Based on the present analysis, it is also expected that potential **complementarities between the Plan's actions associated with the regional innovation ecosystem and other EU R&D funding** instruments (e.g. Horizon Europe and Cohesion Policy funds) may be achieved. However, it is important to highlight that the potential input contributions of the RRP to the Smart Specialisation objectives, identified in this study, will also strongly depend on the final beneficiaries and selected projects. Indeed, even if the RRP is a national instrument with a top-down governance structure, the implementation of actions in C5 and C12 ⁽³⁶⁾ can only be effective with a strong involvement of regional actors (e.g. regional managing authorities) in the design of calls for applications and in the selection of RDI investment projects to be funded ⁽³⁷⁾. To effectively contribute to Smart Specialisation, a certain space for experimentation under a process of entrepreneurial discovery should also exist. Furthermore, the effects will also depend on the quality of the projects to be funded and the absorption capacity of Portuguese companies in a context of economic crisis and still with uncertainty ⁽³⁸⁾.

Finally, the achievement of synergies between funding instruments is also very challenging. Several studies (see e.g. [Flanagan *et al.*, 2011](#); [Conte and Ozbolat, 2016](#); [Ferry *et al.*, 2016](#); [Doussineau *et al.*, 2018](#); [Laranja, 2018](#)) already identified as potential bottlenecks the regulatory and strategic framework, governance, and implementation approaches. The achievement of synergies is also the result of a good policy- mix, where consistency, coherence, integration, and coordination between the different instruments exist ([Laranja, 2018](#)) - for more details see Table 8.

⁽³⁶⁾ For more details about the entities described in the Plan to be in charge of the implementation and selection process of the projects to be funded see Table 10 in Appendix.

⁽³⁷⁾ For more details about the benefit of the involvement of regional actors in the design of calls for applications and in the selection of RDI investment projects see [Laranja \(2021\)](#).

⁽³⁸⁾ At the time of the present study, the Covid-19 vaccination campaigns were still ongoing in Portugal and in the rest of world, but at different speeds within and between the different territories.

Table 8. Main characteristics of a good policy-mix

Characteristics	Description
Consistency	<ul style="list-style-type: none"> • Alignment of the instruments' objectives • Linkage between the different dimensions of the policy-mix
Coherence	<ul style="list-style-type: none"> • Contribution of the different elements to a common objective
Integration	<ul style="list-style-type: none"> • More than a sum of different instrument • Unique policy, with a holistic approach
Coordination	<ul style="list-style-type: none"> • Government mechanism to achieve the goal(s) • Main inputs come from monitoring and evaluation

Source: Own elaboration based on [Laranja \(2018\)](#).

The present study already shows consistency and coherence between the RRP and Smart Specialisation in Portugal. So, this study opens the door to further research that can explore the analysis of the governance model of the RRP and its link with the Smart Specialisation one, as well as, on the role of monitoring and evaluation to achieve synergies.

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Appendix

Table 9. Recovery and Resilience Facility: Maximum grant allocations (billion, current price)

Country	Max Allocation
Italy	68.9
Spain	69.5
France	39.4
Germany	25.6
Poland	23.9
Greece	17.8
Romania	14.2
Portugal	13.9
Hungary	7.2
Czechia	7.1
Bulgaria	6.3
Croatia	6.3
Slovakia	6.3
Netherlands	6.0
Belgium	5.9
Austria	3.5
Sweden	3.3
Lithuania	2.2
Finland	2.1
Latvia	2.0
Slovenia	1.8
Denmark	1.6
Estonia	1.0
Ireland	1.0
Cyprus	1.0
Malta	0.3
Luxembourg	0.1
Total	338.2

Source: [European Commission](#) [Accessed on 30/07/2021].

Table 10. Justification under the regionalisation of selected investments

Comp.	#	Investment code, name, and amount (RRP)	€ M	Justification for the regionalisation of investments	
C5	1	RE-C05-i01.01 - Mobilising Agendas/Alliances for Reindustrialisation	558	930	Entities evaluating the proposal: ANI, IAPMEI, AICEP, COMPETE2020, and FCT. First call (n° 01/C05-i01/2021) refers that beneficiaries can be entities in any of the NUT 2 regions of the national territory.
		RE-C05-i01.02 - Agendas/Green Alliances for Reindustrialisation	372		
	2	RE-C05-i03 - Research and innovation agenda for sustainable agriculture, food and agro-industry	93	93	Location of the investment: Clusters of the Innovation Network will spread across the mainland Portugal
	3	RE-C05-i02 - Interface mission - Renewal of the scientific and technological	186	186	Entities responsible for the implementation: IAPMEI, FCT, and ANI. Location of Collaborative Laboratories only in the mainland.
	4	RE-C05-i04-RAA - Recapitalisation of the Business System of the Azores	125	1,675	Specific measure for the Azores region
RE-C05-i06 - Capitalisation of enterprises and financial resilience/Banco Português de Fomento		1,550	BPF has instruments to support entities in all the Portuguese regions, including the Azores and Madeira regions => all regions can benefit from these funds		
C12	5	TC-C12-i01 - Bioeconomy: only (1) research, development and innovation lines	135	135	Entities in charge of the implementation: APA, Ministry of Environment and Climate Action, and Ministry of Finance => probably funds only for regions in mainland Portugal
C10	6	TC-C10-i01 - Blue Hub, Blue Economy Infrastructure Network	87	140	Location of the investment: Lisboa, Oeiras, Peniche, Aveiro, Porto and Algarve
		TC-C10-i02 - Green and Digital Transition and Security in Fisheries	21		Entities in charge of the implementation: IFAP and DGRM => probably funds only for regions in mainland Portugal
		TC-C10-i04-RAA - Development of the 'Cluster do Mar dos Azores'	32		Location of the investment: Azores region
C11	7	TC-C11-i01: Decarbonisation of Industry	715	715	Entities involved in the implementation: IAPMEI, APA, DGEG, ADENE, and the Secretariat-General for the Environment/Environmental Fund => probably funds only for regions in mainland Portugal
C4	8	RE-C04-i01 - Networks and Digital Transition	93	243	Location of the investment (68% of total): Algarve (1%), Alentejo (3%), Norte (8%), Centro (11%), and Lisboa (78%)
		RE-C04-i02: Cultural heritage	150		
C6	9	RE-C06-i01: Modernisation of vocational education and training provision and institutions	710	1,324	Entity involved in the implementation: ANQEP => probably funds only for regions in mainland Portugal
		RE-C06-i02: Sustainable Employment Commitment	230		Entity involved in the implementation: IEFEP => probably funds only for regions in mainland Portugal
		RE-C06-i03: Adult incentive	225		Entity involved in the implementation: ANQEP => probably funds only for regions in mainland Portugal
		RE-C06-i04: Young STEAM impulse	130		Entity involved in the implementation: National Agency for Scientific and Technological Culture (CV-ANCCT) => probably funds only for regions in mainland Portugal
		RE-C06-i05-RAA: Adult Qualification and Lifelong Learning	29		Specific measure for the Azores

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Table 10. Justification under the regionalisation of selected investments (Continuation)

Comp.	#	Investment code, name, and amount (RRP)	€ M	Justification for the regionalisation of investments	
C16	10	TD-C16-i01 - Digital Empowerment of Enterprises	100	650	Entities involved in the implementation: IEFP, ANQEP, and FCT => probably funds only for regions in mainland Portugal
		TD-C16-i02 - Digital Transition of Enterprises	450		Entities involved in the implementation: DGAE, IAPMEI, COTEC, and AICEP => probably funds only for regions in mainland Portugal
		TD-C16-i03 - Catalyst for the digital transition of enterprises	100		Entities involved in the implementation: IAPMEI and AMA => probably funds only for regions in mainland Portugal
C7	11	RE-C07-i01: Business Reception Areas (AEAs)	110	110	Potential location of the investments all the regions in mainland Portugal First call (PRR AAE 2021) refers that investment should be located in the intervention areas of “Regional Coordination and Development Committees” (CCDR) which exist only in the mainland.
		Total	6,201	6,201	

Source: Own elaboration based on information in the Portuguese RRP.

Table 11. Reasoning behind the typology of link between actions in the RRP and the Smart Specialisation goals

Comp	#	Is regional information available?	Is there an alignment with S3 innovation priority?	Typology of linkage
C5	1	No. Call for applications will be open for entities in all the regions. Based on information on the entities responsible for their implementation and that of the first call we consider that all regions have the potential to benefit.	Based on the Plan, investment projects to be selected will be aligned with the national innovation priorities (S3) and all areas are listed. Once national priorities are aligned with regional ones, all the regions may potentially benefit.	STRONG for all the regions
	2	No. Call for applications will be open for entities in all the regions. Based on the information on the Plan only regions in the mainland can benefit.	Actions targeted to investments in sustainable agriculture and agro-industry. Both are innovation priorities in all the regions (except in Lisbon, where only sustainable agro-industry is an innovation priority)	STRONG - Norte, Centro, Alentejo, Algarve; MEDIUM – Lisboa
	3	No, but the location of potential beneficiaries (Collaborative Laboratories) is only on the mainland.	It may potentially benefit all the innovation priorities of the regions	STRONG for regions in the mainland
	4	No. Financial instrument to the business sector in all the regions.	It may potentially benefit all the innovation priorities of the regions. However, the final beneficiaries are not only actors of the regional innovation ecosystem, but actions are related to mitigation of main known barriers to innovation activities	MEDIUM for all the regions
C12	5	No. Call for applications will be open for entities in all the regions. Based on information on the entities responsible for the implementation, we consider that only the mainland can benefit.	Actions targeted to investments in textiles, clothing, and footwear economic sector, but related to a circular economy (use of bio-based raw material or bio-based by-products). About 75% of companies in the fashion industries are located in Norte ⁽³⁹⁾ , then this region may have a greater absorption capacity. Lisboa and Centro (+ 20% of the companies) may have a more moderate absorption capacity, and the remaining regions a lower one.	STRONG - Norte; MEDIUM - Centro/Lisboa; WEAK - Alentejo, Algarve
C10	6	Yes, there is information for the location of 85% of the investment of this component (Lisboa, Centro, Norte, Algarve, and Azores). No investment in the Alentejo and Madeira regions, but they can benefit from a partnership with other regions	Blue economy is an innovation priority for all regions.	STRONG - Azores, Lisboa, Centro, Norte and Algarve WEAK – Alentejo and Madeira
C11	7	No. Potential location of the investments in all the regions; however, based on information on the entities responsible for the implementation, we consider that only the mainland may benefit.	Related to transversal innovation priorities (green transition) listed by all the regions, then may potentially benefit all regions.	STRONG for regions in mainland
C4	8	Yes, there is information for the location of 68% of the investment of this component (Algarve - 1%; Alentejo - 3%; Norte - 8%; Centro -11%; Lisboa VT - 78%).	It is related to the innovation areas "tourism" and as all regions have listed "tourism-related activities" as priorities, all regions may potentially benefit. Final beneficiaries are not only actors of the regional innovation ecosystem, but actions are related to the improvement of regional assets (important in the tourism sector)	MEDIUM - Lisboa, MEDIUM-WEAK - Norte and Centro; WEAK - Alentejo and Algarve

Continued on the next page ...

⁽³⁹⁾ Based on data from INE – Statistics Portugal.

Table 11. Reasoning behind the typology of link between actions in the RRP and the Smart Specialisation goals
(Continuation)

Comp	#	Is regional information available?	Is there an alignment with S3 innovation priority?	Typology of linkage
C6	9	No. Potential location of the investments in all the regions. Based on information on the entities responsible for the implementation, we consider that only the mainland and Azores may benefit.	It can potentially benefit all the innovation priorities of the regions. Final beneficiaries are not only actors of the regional innovation ecosystem, but actions are related to one of the main known barriers to innovation/business activities	MEDIUM for regions in mainland + Azores
C16	10	No. Potential location of the investments in all the regions; however, based on information on the entities responsible for the implementation, we consider that only the mainland can benefit.	Related to transversal innovation priorities (digitalisation) listed by all the regions, then can potentially benefit all regions. Final beneficiaries are not only actors of the regional innovation ecosystem, but actions are related to one of the main known barriers to innovation/business activities	MEDIUM for regions in mainland
C7	11	No. Potential location of the investments in all the regions in mainland Portugal	It can potentially benefit all the innovation priorities of the regions. However, final beneficiaries are not only actors of the regional innovation ecosystem and not related to the main known challenges to innovation activities	WEAK for regions in mainland

Source: Own elaboration based on information in Figure 8 and Table 10.



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