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Implementation of Smart Specialisation Strategies in Portugal: An assessment

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Contents

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Abstract

This report assesses the implementation of Smart Specialisation in Portugal, comparing the situation today with 2013. In that year a multi-level framework was designed that included a national and seven regional Smart Specialisation Strategies (S3). The role of regions in research and innovation policy was much less advanced in Portugal than other (Western) European countries, but a logical step to implement a concept that gives local actors a prominent role in strategy development through a process of entrepreneurial discovery. Smart Specialisation is a difficult concept to implement successfully because it crosses policy responsibilities and geographical levels. This report finds that a number of problems in the governance of S3 implementation accentuated these difficulties in Portugal: a governance structure that was never really activated; a policy mix constrained by the legal framework governing R&I spending by the European Structural and Investment Funds, preventing a flexible place based approach that responds to local entrepreneurial discovery; a basic form of monitoring that only analyses project alignment to priorities rather than the achievement of strategic objectives; a fragmented national strategic framework for R&I policy; and a lack of human resources to implement what is a challenging policy approach. The Portuguese regions did however learn from this first phase of Smart Specialisation and there have been some interesting and innovative attempts to instigate entrepreneurial discovery processes, work with other European regions and build capacity for managing innovation strategies. The report recommends that S3 in Portugal is fundamentally reset to embrace a more enterprise led model of innovation. This requires a much stronger governance framework including an active inter-ministerial committee led by the Ministry of Economy and a larger mandate for the National Innovation Agency. At regional level the S3 management teams need to be substantially reinforced and act more like development agencies than regional authorities, taking a pro-active approach to working with firms and monitoring the progress of their strategies. The National Innovation Agency should support the regional management teams in these tasks by enhancing their capabilities and facilitating inter-regional cooperation. The conclusion of this report is that these type of fundamental changes are important to set Portugal on the right track to fully benefit from Smart Specialisation post-2020.

Executive Summary

Smart Specialisation Strategies[1] – S3 allow countries and, especially, regions to develop and consolidate economic strengths based on their local knowledge and innovation capabilities. The goal of an S3 is to concentrate knowledge and innovation resources in a limited number of (new and existing) domains in order to enhance the local capabilities that feed innovation and social and economic development.

A key feature of this policy approach is that the design and implementation of S3 should not rely on traditional centralised policy making but, instead be combined with an Entrepreneurial Discovery Process (EDP). Inspired by Hausmann and Rodrik's (2006) idea of "self-discovery processes", an EDP engages all relevant interest groups in a search and discovery process to identify knowledge "domains" and economic activities with the potential to become drivers of socio-economic structural change.

Following the Communication "Regional Policy contributing to Smart Growth in Europe" (European Commission, 2010), the Cohesion Policy regulations for the 2014-2020 programming period require a national and/or regional S3 as an 'ex-ante conditionality' for spending the European Regional Development Fund (ERDF) on Research and Innovation (R&I) projects. The Commission's proposals for the 2021-2027 programming period include criteria for the good governance of S3 as an 'enabling condition' for spending the ERDF on the new 'Smart Growth' policy objective COM(2018) 375.

Aim, method and scope

Given the focus of the proposed regulations, this report provides an assessment of the current situation in Portugal with regard to S3 governance, as well as the related issues of monitoring and practices of entrepreneurial discovery. It is based on empirical research carried out in 2019 (with the exception of Centro, which took place in 2018), on the initiative of the Joint Research Centre and DG Regional and Urban Policy. The research included the following forms of data collection:

- Analysis of the S3 documents, PT2020 instruments and data.
- Focus groups in each region.
- Individual semi-structured interviews.

The research was based on the following assessment questions that concern both policy design (the process of initial definition of priority-domains and the governance structure) and implementation:

1. What were/are the governance structures in place, at National and Regional level at initial elaboration and during implementation? How have the structures functioned, including the involvement of stakeholders? Has there been effective coordination of the S3 framework between regional and national levels as well as between regions?

2. *Has the Entrepreneurial Discovery Process been effectively implemented?* How has this differed between national and regional levels? Has the EDP led to revision of priorities, governance or the policy mix?

3. *What kind of monitoring and evaluation activities have been carried out?* Is there a specific follow-up monitoring of the implementation of ESIF funded projects, to make sure they contribute to S3? What types of indicators are set to ensure the measurability of the contribution of the projects to the S3?

The report provides a comparison between the seven Portuguese regions (including the five continental administrative regions and the two self-governing archipelagos of Azores and Madeira), comparing the situation today with when the S3 approach began in 2014, leading to an assessment of if and how S3 have had an impact on the different regional economies.

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[1] The term Research and Innovation Strategies for Smart Specialisation (S3) is also widely used, including as the title of the national and regional strategies in Portugal, but in this report we use Smart Specialisation Strategies (S3) as referred to in the EU regulations.

Summary of findings

The initial elaboration of S3, both at national and regional levels marked a significant shift in policymaking towards an evidence-based approach and an attempt to break with existing top-down R&I policies based on scientific excellence and technology transfer. It also brought greater participation of stakeholders into the policy making process, through multiple thematic sessions involving many actors. Based on Commission guidance (Foray et al., 2012), designing the strategy started with extensive and detailed national and regional diagnostics using statistical and other types of evidence. Although there was engagement with different types of stakeholders (both at national and regional level), this mostly involved discussion and validation of the SWOT diagnostic and choice of priorities put forward by national or regional authorities. It cannot be described as a truly participatory process of discovery and co-design. The S3 elaboration process resulted in an excessive number priority-domains, both at national and regional level, and their definition was mostly too broad to provide a focused vision to guide the development of specific knowledge-based innovation trajectories with the potential to effectively generate related variety and structural change.

At regional level, particularly for regions with less capacity and scarce R&I resources we would expect a lower number of priorities with a higher degree of granularity, focused more on enterprises or the 'Doing-Using-Interacting' mode of innovation (Jensen et al., 2007). However, the priorities are broadly defined and lean towards a scientific and technological mode of innovation. More importantly, the absence of governance and monitoring mechanisms prevents priorities being refined or modified as new information and ideas emerge. This makes it much more unlikely that the strategies lead to place based social and economic development.

In terms of policy mix, the S3 in Portugal have been implemented through a complex matrix of alignment and selectivity criteria, applied to a large set of 23 standardised funding instruments under TO1 and TO3 (also to a lesser extent under TO8 and T10). Unfortunately, at the time that the S3 framework was finalized in 2014, the ESIF instruments in Portugal (called PT2020) were already set and there was no possibility to explore a wider mix of instruments. Furthermore, regions were unable to adjust the funding instruments to their specific needs. In this way, S3 was not as an overarching strategy for national/regional innovation, but mostly a means for project applicants to access the ESIF.

Therefore, in our view, the S3 framework currently in place at national and regional levels falls short of achieving a much-needed strategic focus on vertical priorities that enable entrepreneurs to exploit knowledge by applying it to economic activities, including products, services, processes and business models. As a result, we recommend that the Portuguese authorities revise the S3 framework in order to become a truly overarching strategy focused on applying, rather than generating knowledge, across a reduced number of priorities.

Governance structures and S3 management

Portugal adopted a multi-level approach to S3 with a national strategy (ENEI) and seven regional strategies (EREI). The governance of Portugal's overall S3 strategic framework is composed of an Inter-ministerial Commission for S3 and two higher advisory councils – the National Council for Entrepreneurship and Innovation (CNEI) and the National Council for Science and Technology (CNCT). However, we found no evidence that this S3 Inter-ministerial Commission has been operational and while the composition of the two higher advisory councils looks balanced in terms of private and public sector organisations, these councils have not been active since 2015. At the implementation level, the ENEI created an Executive Committee with more than 30 members. The National Innovation Agency (ANI) chairs the Executive Committee and hosts the ENEI secretariat. However only one person – the national ENEI coordinator – appears to be dedicated full time to the task of implementing the national strategy and coordinating with the regions. It appears that agendas and minutes have not been published, but understand that since 2014, the Executive Committee met three times. Given its size and composition, it is difficult to assemble such a large and diverse committee and therefore it provides little or no operational support to the management of S3, which in practice is the task of ANI, yet it has very little resources. In summary, at the national level, the governance structures and bodies would need significant reinforcement in order to ensure effective coordination.

At the regional level, S3 has had a significant impact on local governance structures, with the creation in almost every region of Regional Innovation Councils. However, in most cases, the regions convened the councils only recently and there is a clear deficit of private sector participation. In particular, for regions with

low business density and many SMEs that lack absorptive capacity, this private sector deficit leads to a disproportionate influence on the Regional Innovation Council (and on the overall direction of S3) from public sector organisations in general and from local universities in particular.

Regional S3 also have a serious deficit of human resources in the management teams. In our interviews, we noticed that because S3 implementation is reduced to checking whether PT2020 project proposals comply with the defined alignment and selection criteria, people from the regional OP management units are considered S3 managers. A strong relationship between S3 governance and OP management may effectively bring better strategic alignment and effective articulation between the strategic and the operational levels. However, overall S3 management teams do not appear to have sufficient resources to execute their main task, which is promotion of their local entrepreneurial discovery processes and monitoring of their strategies.

Multi-level governance

Regarding multi-level governance at the initial stage, it would have helped if the national S3 (ENEI) had more fully explored the thematic alignment with the priority-domains proposed by the regions in their S3 (EREIs). In addition, at the implementation stage, the national level could do much more to promote potential collaboration between the different regions in areas of common research and innovation interests. Such cooperation is particularly important to mitigate the risk of duplicating similar projects and infrastructures, particularly when each individual initiative is unable to achieve the critical mass needed to be effective at the national and international levels. In other words, the ENEI could do much more to promote interregional collaboration leading to investment optimisation.

From our interviews, we learned that there is a degree of multilevel governance and communication between national and regional levels, instead of being channelled through the governance structures designed for S3 *i.e.* the ENEI Executive Committee, it works through the operational networking groups of COMPETE2020. These groups were created to help articulate the funding instruments of the national/ thematic OPs. Hence, because S3 is not operationalised as a strategy but simply as a set of alignment and selection criteria for project funding, S3 multi-level coordination works outside the strategic S3 governance structures designed in the ENEI (and which satisfied the ex-ante conditionality). In addition, because the PT2020 networks were created to ensure compliance, conformity and standardisation of project funding across instruments and OPs as well as the correct and effective disbursement of funds, we find that this current multi-level arrangement needs substantial upgrading in order to allow for coherent national and regional strategic management of S3.

Another key problem is that there is little flexibility to use specific regional or national instruments such as thematic funding calls within the priority-domains, resulting from the EDP. In our view, effective S3 implementation requires specific thematic instruments that are differentiated between regions and that can be adjusted according to their priority-domains. However, until now S3 has been mainly implemented through general calls for standardised instruments that combine funds from national and regional OPs, with extra points for proposals contributing to specific EREIs or the ENEI. Moreover, the extra points contribute relatively little to the overall score given to a proposal.

Finally, since 2015 a multiplication of new general science and innovation agendas and initiatives have created a fragmented strategic Science and Innovation policy framework that limits the effectiveness of public investment in R&I. This recent multiplicity of national agendas and plans stems from cleavages between different ministries of the current government and, as pointed out by the OECD (2019a), has prevented Portugal adopting a consistent strategy. What this means is that S3, particularly the national strategy, appears to compete with this wave of new top-down general agendas and strategies. In essence, and probably because S3 was operationalized as a set of alignment and selection criteria for accessing funding, national/regional S3 cannot be taken as overarching shared national/regional innovation strategies. In addition, because all the subsequent innovation strategies also use the ESIF as their main instrument for implementation, PT2020 is only loosely connected to the strategic orientations.

To summarise, in our view Portugal would significantly gain in terms of policy effectiveness if it moved towards fully implementing a single and integrated strategic innovation policy framework based on a focused view for S3, catering for S3 formulation and implementation at national and regional levels.

Entrepreneurial Process of Discovery

At the time of the fieldwork in 2019 there were no active entrepreneurial discovery processes, attempts to exploit national technology resources across regions and priority domains, nor processes for identifying nation-wide/horizontal initiatives that could mobilize socio-economic transformation. At the end of 2019 ANI did launch a series of events called 'Dynamics for Innovation' covering nine of the 15 ENEI priorities, with two more planned. If these events lead to permanent processes of entrepreneurial discovery then this would be a very positive development, although as already noted, sufficient resources would be required.

At the regional level there are platforms or thematic discussion-groups operational in every region except for Alentejo (not counting an interesting but incipient bio-economy forum). These platforms/groups are usually initiated by the regional authorities and support regional EDP in different priority domains. However, these platforms and thematic-groups were created quite recently (except Centro which established them earlier) and therefore, beyond the initial meetings and workshops for definition of S3 priority domains in 2013/2014, there were little or no attempts to continue the initial group dynamics. Therefore, we cannot say that there are continuous EDP processes working since S3 inception in the Portuguese regions. In cases where the EDP platforms/groups were assembled quite late, our impression is that the main motivation for this late start, is not to launch a continuous EDP, but to undertake a "tick the box" exercise at the start of the process for revision and eventual redesign of S3 for the 2021-227 programming period.

An interesting issue is that in most cases regional authorities such as Madeira and Lisbon outsource coordination of these existing platforms/groups to academic professors and researchers. Only in a few cases, local private sector companies were found to be coordinators. In cases where university-based researchers coordinate EDP groups/platforms, the EDP and indeed the whole S3 appears to focus primarily on scientific research capabilities of the local universities, overlooking the needs for "non-technological" innovation and of upgrading capabilities in local SMEs.

In many cases, we were not able to obtain lists of participants that compose the platforms/groups, but it was possible to learn that there is a need to overcome resistance to collective action and participation in these processes, notably among SMEs. In all regions, participation of the private sector is low and particularly lower in regions with a higher proportion of SMEs lacking capacity, such as in the Azores and Madeira. The objective should now be to increase the involvement of the private sector, including low and mid-tech businesses, whose needs are usually not based on technological innovation but are more related to enhancing their operations and industrial skills as well as their managerial capabilities.

Current EDP process are implemented essentially through "events" and "meetings" that bring together actors to discuss and debate new opportunities for technological development and innovation in the regions. However, such meetings do not necessarily constitute an entrepreneurial discovery process. Search-identification processes (of discovery) require higher levels of engagement and collective learning based on deeper insights into the most appropriate, place based opportunities for innovation. Higher levels of engagement could be obtained through the use of participatory methods to support the search, identification and exploration of innovation opportunities.

While the more recent EDP platforms/groups are motivated by the need to revise and redesign S3 for the 2021-2027 funding period, in general, participants in the platforms see these processes as networking mechanisms, strengthening university-business cooperation in the pursuit of opportunities for technology transfer and innovation. In general participants in the platforms/groups do not perceive EDP as a means of policy-input for the (re)definition of S3 domain-priorities.

Feedback from EDP platforms/groups to the regional innovation councils or to the regional authorities regarding identification of projects and adjustments to the priority domains is still tepid. Nevertheless, it is clear that the output of the work carried out by the current platforms and thematic groups could contribute, and in regions such as the Azores, it is already contributing to the co-design of specific thematic S3 calls for proposals. However, regional authorities usually face high resistance from the central agency ADC and national OPs to any suggestions that imply a modification or adaptation of existing standardised funding instruments.

Overall, because at the time of interviewing, we found no revised or adjusted S3 at national or regional levels it is straightforward to conclude that EDP effectiveness in bringing changes to the original S3 formulation is very low.

Monitoring

Current monitoring activities at national and regional levels do not form what we would call a monitoring system for strategic intelligence, due in particular to the existence of a fragmented governance framework and a general lack of resources and skills for S3 operational management at national and regional levels.

At the national level, the first and only report produced by ANI published in 2019 (ANI, 2019) provides little or no indication of whether the national S3 strategy is being accomplished. At the regional level monitoring appears to focus on how well tuned are the funding instruments of the regional OPs and whether alignment and selection criteria effectively capture projects classified by the broadly defined priority-domains. Hence, what we find in every region is monitoring activities based on input indicators including the number and type of projects funded (and not funded), investment amounts by type of instrument and by priority domain. We find little or no monitoring activities enabling to understand how the regional/national contexts are (or not) changing towards an intended specialisation, even if based on qualitative evidence.

This reductionist view of strategic monitoring, probably results from the original decision that operationalization of S3 would be accomplished by just adding an administrative procedure concerning the use of criteria for funding research and innovation projects, through multiple funding instruments in national and regional OPs.

However, monitoring based only on input and execution data provides little guidance for future actions. Current S3 monitoring practices do not use context information (early indicators) or report any reflections on whether changes in specialisation trends (if any) can be associated to funded (or non-funded) projects. In other words, existing monitoring is unable to determine whether the strategy is on track and if there is a need for any adjustments or revisions. Consequently, there are almost no adjustments or changes to the initially defined domains of specialisation and to the S3 implementation at national and regional level since they were originally defined in 2013/2014.

When regional authorities referred to adjustments and/or redefinition of priority-domains, they highlighted the low level of demand for project funding in some domains. However, it may be precisely because demand is low that such domains are strategic in order to gain new capabilities that would enable regions to engage in innovation trajectories of related variety, which again suggests that their current monitoring practices are clearly insufficient to provide strategic intelligence.

Recommendations

The findings of our research lead us to recommend not just a refocus of national and regional S3 but also fundamental changes in governance structures, in EDP and in monitoring practices.

At the national level, we recommend establishing one single high-level inter-ministerial commission in order to support a wider cross-ministerial decision-making concerning S3. This inter-ministerial commission should include the Ministry of Economy, the Ministry of Science and Higher Education and the Ministry responsible for the ESIF. As S3 is a knowledge-based and innovation strategy for economic development (it is not a Science and Research strategy), the Ministry of the Economy should take a clear leading role in this inter-ministerial commission. Given the priority domains already identified during the first cycle of S3, in 2013/2014, the Ministries of the Sea, Agriculture, Forestry and Rural Development, as well as the Ministry of Health should also have an important role in S3. Technical staff drawn from the different ministerial cabinets would support this inter-ministerial commission. In addition, instead of two higher national councils for the same policy (CNEI and CNCT), there should be just one single National Advisory Council for Innovation Policy, composed by people (not organisations) known for their work as high impact entrepreneurs and innovators.

At the operational level a large executive committee, hosted by ANI currently manages the national S3. Instead of this current large non-operational body, we recommend a more agile S3 management team focused on EDP and strategic-monitoring. Such a smaller team needs the skills to perform the difficult task of executive-coordination of the national S3 as well as building capacity in the regions.

The new governance structure should also provide a clearer definition of the role of fundamental agencies such as ANI and the National Science and Technology Foundation (FCT). These bodies should help the Management Team and the Inter-ministerial commission on S3 policy implementation by helping with EDP and monitoring. Agencies such as AdC and management structures of the major thematic programmes

related to research and innovation such as COMPETE2020, should also be involved, but it should be understood that management of ESIF cannot substitute the need for S3 strategic steering.

At the regional level there needs to be changes to the composition and function of the Regional Innovation Councils. These bodies are too large and dominated by public sector organisations and/or local universities. In addition, the management teams at regional level require a much higher level of resources and political leadership. There is also a need to disentangle strategic management of S3 from the administrative management of the regional OPs. Management teams need to have the time and resources to support S3 implementation through organisation and facilitation of EDP processes and, in particular, need to establish monitoring activities that feed strategic intelligence into the overall S3 management.

Current monitoring practices do not form what we would call a monitoring system aligned with S3 strategic intelligence. At national level the single monitoring report available fails to provide relevant information to inform our understanding of whether the national S3 is on track to achieve any of the specialisations envisioned. It focuses only on how OPs fund projects aligned with the S3 priority domains. At the regional level, monitoring activities also focus on how the regional OP supports projects aligned with S3 priority-domains, hence also neglecting much needed information on early signs of possible effects that the S3 may have on economic and social dynamics.

1   Introduction

1.1   Context and purpose of the report

The research for this report began in 2019 within the context of the European Parliamentary Action on 'Support to S3 implementation in Lagging Regions', managed by the Joint Research Centre (JRC)[2]. The purpose was to understand more about how Smart Specialisation Strategies (S3) had been implemented in the regions of Norte, Alentejo and Algarve, since Centro had been involved in the action from the outset in 2016 and much more was known about this region. The stocktaking exercise took place in 2019 and coincided with preparatory work by DG Regional and Urban Policy for the enabling condition on good governance of S3 included in the proposed regulations for the Cohesion Policy 2021-2027. Consequently, DG Regional and Urban Policy decided to enlarge this stocktaking exercise to those regions not included in the European Parliamentary Action, namely Azores, Lisbon and Tagus Valley[3] and Madeira. Therefore, the research in all regions followed the same methodological approach, with the exception of Centro for which knowledge had been acquired over a longer period of time but which covered the same issues, including the overall S3 framework in Portugal and the relationship between the national and regional strategies.

This document represents a consolidated stocktaking report on governance of S3 in Portugal, presenting conclusions and recommendations to improve the implementation of Smart Specialisation at national and regional levels. It is a JRC technical report, authored by external experts as well as JRC researchers.

1.2   Objective and focus

The overall aim of the research was to assess the state of play of S3 governance, monitoring and practices of "entrepreneurial development processes" in Portugal. The specific objectives were to assess:

Objective 1: The monitoring and evaluation systems (*e.g.* is there a specific follow up of the implementation of the projects to make sure they are contributing to the S3, what kind of monitoring? What types of indicators are set to ensure the measurability of the contribution of the projects to the S3, etc.)

Objective 2: The functioning of the different S3 governance structures, including the participation of various stakeholders in the different phases of S3 implementation, (initial elaboration, follow up, implementation and revision) and the effectiveness of the Entrepreneurial Discovery Process in contributing to the design and implementation of the national and regional strategies.

Objective3: The coordination of the S3 between regional and national levels as well as cross-regional coordination.

The analysis compares the current situation between regions. It also compares the situation in each region today and before 2014. It details the differences, explaining if and how the processes in place effectively contribute to the intended smart specialization of the regions.

1.3   Organisation of the report

The report is organized as follows. Chapter 2 presents conceptual and methodological considerations. Chapter 3 proceeds with a detailed overview of S3 and governance structures at national and regional levels. Chapter 4 analyses whether an effective EDP is in place, including the engagement of the various stakeholders in the initial definition stage of S3 and throughout the continuous enfolding of entrepreneurial discovery processes. Chapter 5 assesses the existing monitoring and evaluation systems. The final chapter provides recommendations and suggestions on how to change S3 governance, EDP and monitoring in order to improve the next cycle of S3.

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[2] For more information see: https://s3platform.jrc.ec.europa.eu/ris3-in-lagging-regions
[3] Lisbon and the Tagus Valley is the area of intervention for one of five mainland Regional Development and Coordination Offices. However, since 2007 the Lisbon NUTS II statistical region (for allocation of the European Structural and Investment Funds) does not include the Tagus Valley, which is part of the Alentejo region. The Tagus Valley is therefore also included in the Alentejo S3.

2 Concepts and Methodology

This section introduces and briefly analyses the conceptual issues that are behind the questions and assessment criteria relating to S3 governance, EDP and monitoring activities. It then lists the assessment questions and describes the methods used to answer them.

2.1 S3 fundamentals

The S3 approach focuses on the deployment of innovative activity and the creation of new connections among innovation actors within and beyond the region, enabling the region concerned to transform its structures and develop new competitive advantages based on these transformations. Structural transformations through innovation can lead to various outcomes – including the modernisation of traditional industries, the diversification or transition of such industries towards new emerging markets and the radical foundation of new (sub-) sectors.

The other policy rationale of S3 is to encourage regions to drive such transformations and thereby build new competitive advantages on the base of their specific strengths, potentials and opportunities, rather than doing as others do. Following this logic of regional differentiation, regions have a chance to yield better results than those produced by homogenous recommendations of undifferentiated "best policy practices". Such non-differentiation had the adverse effect of countries and regions setting their sights on the same "good things" to foster the same forms of innovation, which in the end proved to be inconsistent and unrelated to the region's existing assets and potential, and did not provide any comparative advantage.

To attain these very general objectives, three fundamental principles can be highlighted:

1. Concentrate on specific discovery priorities. This principle has two purposes:

   - First, it aims to generate a certain density of actors and projects that are related as they are dedicated to the same priority – an imperative condition to benefit from the resulting synergies, complementarity and agglomeration, which are essential determinants of innovation, creativity and R&D productivity.

   - Second, this is also an important condition for a government to be able to reach the level of input specificity required to support innovation in a given industrial or technological domain. This has been a constant argument by Hausmann and Rodrik (2006) – that "the public inputs that innovators require tend to be highly specific in the area in question. There are really very few truly generic inputs for innovation". But Governments cannot address all specific innovation infrastructures and specific services for all markets and activities. Government capacities, both in terms of information (what does each industry need in terms of specific inputs?) and resources (can we afford the provision of all industry-specific public inputs for all sectors?), are indeed limited. They need to choose.

2. Concentrate not on structures (for example, the region's three most important industries) but on the transformation of these structures. This principle has one main purpose, which is to allow for preferential interventions, while minimizing distortions: it is not enough to be part of a targeted structure (one particular industry) to be helped. It is also necessary to be involved in activities with the potential to trigger a transformation process.

3. Favour a logic of bottom up and decentralized discovery, which means simply that the targeted transformation process will not follow a path that is decided from the top, but will be discovered as the process unfolds. Therefore, in principle, there is no need for ex ante plan; the "plan" will emerge as the process enfolds. The importance of this principle is related to the recognition that no one government can acquire innate wisdom or prior knowledge about the path to be followed, once a priority area has been selected. A logic of decentralised discovery implies then flexible mechanisms based on rigorous feedback and monitoring.

The S3 approach is thus marked by a high level of intentionality and strategic focus. But, it is also characterised by a high level of discovery and initiative by the actors of the innovation process. It is this combination of two policy logics – a planning logic and a self-discovery logic (frequently opposed in the literature and in practice) – that constitutes its trademark

2.2 A three step guide to S3 and entrepreneurial discovery

The process of designing and implementing an S3 involves three fundamental steps:

1. Identifying thematic priority areas

2. Translating these priority areas into a roadmap of projects

3. Implementing the roadmap with an action plan.

Extensive experience of S3 design and implementation (between 2014 and 2020 the learning about specific S3 policy practices, successes and failures has been massive), suggest that, for most regions, the first step is not really where entrepreneurial discovery will kick in. At the initial S3 stage, selection of priority areas is not done through a prototype Entrepreneurial Discovery Process (EDP). Step 1 involves the planning component of the whole approach. All our observations of processes in the EU so far (including Portugal) show very clearly that there may be no entrepreneurial discovery at this stage and what is needed is a more simple participatory process. Having no entrepreneurial discovery here is not a problem because the S3 approach is structured to involve two complementary logics of policy action – a planning mode and a self-discovery mode. While clearly, the first step has a planning aspect, entrepreneurial discovery is rightly used to capture what is happening in steps 2 and 3 – which involves the discovery of the path to transformation (within a given priority area, or re-definition of the priority) and then the discovery of the characteristics and properties of the experimental projects that have been identified and selected.

Identifying the locus of the entrepreneurial discovery process is important to help policy makers. Experience with S3 so far shows that the recommendation of defining initial priority areas through an EDP did not help: For many regions it was very difficult to follow and generated a high level of unnecessary stress for policymakers. Such a three stage process makes it much easier for policymakers to understand and implement – and it is more consistent with the concept of S3 having two logics of policy intervention[4]. In any case, what matters is that S3 – which involves explicitly a planning component (prioritization and strategic intentionality at step 1) – does recognize the existence of great uncertainty about the path to meet the priority and the development of the projects – which implies relying on a logic of decentralized and entrepreneurial discovery – at steps 2 and 3. In the following we bring a few qualifications about each step of an S3 process

2.2.1 Identification of priority-domains

This is the starting point. Each identified priority-domain should associate one (or several) sector(s) with a single direction of change. Indeed the essence of S3, which is an innovation policy and not a sectoral policy, is to concentrate *not* on a structure (a sector) but on the *transformation* of a sector (or a set of sectors). Hence, each priority domain includes one or several sectors as well as a direction of change. If both elements are combined and sufficiently well-defined, they build a *priority domain*, a cornerstone of an S3.

The implication of such a definition is that not all actors will be part of S3 simply because they belong to a specific sector. They need to belong to the sector while being contributing to the transformation process, which is part of the definition of the priority domain. Beyond such association between a sector and a direction of change, three other criteria need to be taken into account:

First, a delicate balance must be found between a too broad and a too narrow definition of the priority domain. Too broad will make it difficult to generate the density and agglomeration effects, which is a crucial objective of S3. While too narrow will result in the exclusion of many actors that were ready to be involved in some kind of transformation and will ignore for instance the role of potential users or application sectors in the considered transformation. A too narrow focus would simply concentrate resources and effort on a too small number of pre-determined champions.

Second, the priority domain needs to reflect specific regional capacities (strengths and potentials) and opportunities (innovation and megatrends). This is the simple concretization of the second *raison d'être* of S3 (above).

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[4] It is perhaps important to stress that no entrepreneurial discovery at step 1 does not mean no participatory process. These two concepts are very different and of course the identification of priority areas need to rely on the participation of many stakeholders – but this is not entrepreneurial discovery.

- Third, the identification of priority domains needs to take into account the meaning of innovation and innovative activities in the particular context of the region and the industries in question. As Trajtenberg (2010) writes regarding innovation, "there is not only one game in town". There are many types of innovation-related activities and not all are about the generation of new to the world advanced technologies. The fact that innovation-related actions – such as building up human capital, adopting (not inventing) new technologies, diffusing novel management practices or generating complementarities between key enabling technologies and traditional sectors – ultimately represent the key to economy-wide growth in most regional economies; this fact needs to be reflected in the choice of the relevant priority domains for a given region.

The identification of priority domains naturally relies on a considerable effort being made to acquire statistical knowledge of the economy, assess its competitive position and define the innovation capacities of the region. Furthermore, it requires a participatory process aimed at complementing statistical knowledge with specific tacit knowledge at the micro level, resulting from bringing together the maximum number possible of public and private stakeholders

2.2.2 Translating each priority into a transformational roadmap

This is certainly the most difficult step – which is about the operationalisation and implementation of these priorities. Yet this is the crucial phase: the conversion of each priority into a more concrete transformational roadmap to develop the corresponding transformational activities – a set of projects and actors – all committed to following the same direction of change – and thus linked by this goal.

This conversion from priority area to transformational roadmap is a complex process. The problem can be expressed thus: the priority is a specific transformation of a certain industry (for example the transition of the mechanical and machine-tool sectors towards "industry 4.0"). In the beginning, the industry in questions is at a given level of technology, employment and qualification, business model and performance. Based on a S3 approach, the aim is to move the industry to a higher level of technologies, qualifications and economic performance. Why has this level not already be reached? What constraints, market and coordination failures, and other obstacles prevented this evolution? Some are obvious, or can be deduced by careful analysis, while others remain hidden. It is during the identification and search for problem specifications and proposals for removing the identified obstacles where entrepreneurial discovery kicks in. Project proposals and actors need to address these problems and constraints that concern not only R&D, but also new skills and qualifications, new forms of management, specific public goods (specialised services), adoption of certain key technologies (diffusion), and so on. Projects can thus address very different issues. All of these diversified projects constitute the transformative activity. A transformative activity can thus be defined as a collection of related capacities, projects, activities and people that have been "extracted" from an existing structure or several structures, to which extra-regional capacities can be added, and which is oriented towards a certain direction of change.

We can add one important effect of this translation phase. It operates as a feedback mechanism to verify the pertinence of the priority areas. If the transformative activity comprises only a few projects, projects that are not very innovative or unconnected, it indicates that the priority was perhaps badly formulated or premature, and therefore the region should go back to square one and discuss the pertinence of the priority in question again.

2.2.3 Implementation with an action plan

The action plan step is about implementing the transformational activities. It involves mobilising and coordinating financial instruments, which often have different objectives (R&D, training, infrastructure), as well as evaluating projects to receive financial support.

One crucial element is allowing the plan to fit the profound logic of smart specialisation; the goal of the funding agencies should not be selecting the best project for funding and development and rejecting the others. The logic of S3 – as highlighted above – recognizes the value of a simultaneous support of coordinated projects and investments – because potentials for systemic transformation are likely to result entirely from the positive feedback effects that each project has on the others. In other words the various

projects identified and selected through an S3 approach are mutually complementary and so should be adopted together, with each making the others more attractive.

Secondly, the action plan is characterized by a high level of uncertainty regarding individual projects as well as the whole process of developing the transformational activity. It is therefore critical for the action plan to include feedback mechanisms, monitoring principles and flexibility to maximise the informational spillovers of all discoveries.

These three procedural steps may be used by policy makers as a guide to support the process of design and implementation of S3. The first step results in a collection of priority areas. This is the planning logic of the approach and what is delivered here has a certain degree of stability and continuity. As a coordination device, a priority area must not change continuously. The second step delivers a transformational roadmap made of programs and projects and the third step is where the action plan is implemented. Decentralized discoveries become the main informational mechanism, which can evolve and change over the different stages. Projects can be discontinued while new ones can be started at any time. This depends on the knowledge and information (success, failures, surprises) produced as the action plan is running.

2.3 Policy Governance of Smart Specialisation Strategies

In order to be effective S3 needs, to be supported by adequate national/regional innovation policy governance, monitoring and evaluation. In the research and innovation policies arena the use of the term "governance" is relatively recent (Boekholt and Arnold, 2002; Edler et al. 2003). Although "governance" has different definitions (Rhodes 1997; Kersbergen and Waarden 2004), the term is usually associated with both the organizational structure of government and the decision making process that support policy formulation and implementation. According to de la Mothe (2001, p.3): "…governance is about the handling of complexity and the management of dynamic flows. It is fundamentally about interdependence, linkages, networks, partnerships, co-evolution and mutual adjustment."

Issues of governance structure include the composition of the bodies, the relative representation of the different types of stakeholders (in particular the higher education sector and private sector companies), as well as their expected roles and functions. In a quadrupled helix approach, innovation users are also an important component of the governance structure. Governance as a process of arriving at decisions concerns political steering, priority setting, implementation of the national/regional innovations policies, etc. In the context of S3 policies, this would include the EDP process and how this process feeds the innovation policy agenda (Gassler et al., 2008).

Because innovation policy is a wide policy umbrella (Borras, 2009) crossing different policy areas, governance structure is an important issue to consider. The usual top down hierarchical command and control governance models are often more rigid, leaving little or no space for mutual adjustment. Vertical top-down structures are less flexible and favour policy silos, sectorial divisions and fragmented policy interventions. On the other hand, decentralised governance models are more flexible, may facilitate integration and multi-domain approaches but may suffer from "strategic drift". There are many variations between highly centralised or decentralised models.

For example, an important issue in centralised models of innovation governance is that, regional or national higher-level councils, formed by recognized experts in different domains, tend to dominate the strategic conception process (Lajendijk and Cornford, 2000; Mytelka and Smith, 2002). In this case, intermediary organizations (second level in the hierarchy) and private sector are left with the mission of implementation and translation of general guidelines into proposals for more concrete projects and actions (Gassler et al, 2008). Hence, centralised governance models may suffer from a relative disconnection between the strategic conception of policies and the implementation of programmes and measures for action. In these governance models, there might be the so-called policy appropriation by principal–agents (Braun, 1993; Braun and Guston, 2003). For example, when intermediaries obstruct vertical multi-level governance, they are effectively appropriating the process, leading to biased agency inside public structures.

In innovation policy, vertical top-down coordination is often the most common model, usually based on definition of regional/national visions and strategic planning followed by operational objectives, programmes and procedures, and budgeting for public funding. This has been the case for Portugal and Portuguese

Regions for many decades. Less common are participatory governance approaches requiring the use of semi-formal decentralised coordination methods, based on dialogue, negotiation and collective deliberation.

Given the complex challenges associated with S3 process and the multidisciplinary nature of their focus-domains, centralised governmental structures need perhaps to be combined with other ways of decision-making, that are less centralised and more oriented towards problem solving and collective deliberation. For example, at the first step of the S3 policy process, governance may be more centralised involving a mix of top-down and bottom-up processes and enabling multi-layering of priorities. However, at the implementation stage (steps 2 and 3) the process may be thematically and/or regionally decentralized. In addition, intermediary levels need to be much more involved in gathering inputs, in monitoring and giving fast feedback for adjustments during implementation.

However, to be successful participatory governance needs a high level of engagement from all types of participant actors and a delicate balance between the governance structure and the specific participatory methods used to promote engagement. Low engagement (by absence or intended-exclusion) of private sector representatives, for example, may result in an excessive dominance of public sector views and to partial interpretations of general market and societal issues that may not serve the needs of local sectors. A truly participatory governance process should also not be mistaken with choice of format i.e. workshops, focus groups, platforms, thematic working group meetings, etc. Participatory practices usually involve facilitation techniques such as Art-of-Hosting, group sessions of Design Thinking, joint creativity sessions for ideas generation and problem solving (hackathons), sensing journeys, roadmapping, prototyping and project design sessions, etc.

In addition assessment of any participatory process in general, is often undervalued. There is no single method to evaluate participatory governance. However, it is important to consider how the S3 design and implementation processes unfolded, whether they are truly participatory instead of just "widely participated". Based on current participatory policy practices in areas such as urban and environmental policies we propose to evaluate the S3 policy cycle using three dimensions, as shown in table 1, inclusiveness means that discovery, definition and exploration of a particular priority-domain are processes that enable wide participation of actors with different identities that perceive their participation as being valued, and the whole process as fair i.e. not captured by particular stakeholder interests. This can be assessed using proxies such as the actor composition of EDP groups or platforms, as well as the perceptions of participants. Effectiveness means that there are many opportunities for regional actors to participate and to express their views. This can be assessed by looking at the format and frequency of events and meetings and to participatory methods employed. Finally, S3 is a collective and individual learning process and therefore the methods employed must enable creativity thinking.

Table 1. S3 policy process assessment

Dimensions	Process	Outcomes
Inclusiveness	Continuous in time Open to a wide and balanced variety of actors Open to changes in the local economy and/or in the innovation ecosystem Accessible and Equitable – every actor has the same opportunities. Sufficient opportunities for participation.	Participants perceive they are valued Process is not biased, not captured or favouring particular stakeholder interests Perception of public interest well served
Effectiveness	Ample opportunities for participants to provide inputs Process-event designed / facilitated with participatory methods	Originates "insights", ideas, identification of new opportunities Influences policy decision making

Learning	Enables divergence and convergence thinking	Behaviour aditionality
	Uses different kinds of evidences-based practices	Builds trust
	Develops group dynamics	Builds linkages between actors
		Enables collaboration opportunities

Source: own elaboration

To summarise, the type of governance that one would normally expect to see associated with S3 is a flexible approach based on multiple interactions amongst regional actors both inside and outside public administration, helping to create a shared decision-making, focusing the policy scope, breaking with old divisions and intensifying participatory practices for policy learning and action.

2.4 Monitoring and Evaluation

In this section, we seek to clarify concepts and definitions associated to monitoring in general and to monitoring of S3 in particular (Gianelle and Kleibrink, 2005).

First, it is important to distinguish monitoring from evaluation. While, usually, evaluation is integrated at particular stages of the policy cycle, monitoring is an ongoing activity that involves continuous gathering of information during implementation, in order to identify possible deviations and changes to the intended national/regional strategies. Hence, the monitoring main objective is to enable to track progress in the strategy and to detect unexpected or unforeseen results, relative to the strategic objectives initially designed.

Therefore and second, effective monitoring cannot be based only on operational input and results indicators associated to the number of publicly funded projects classified as contributing to the defined S3 priority-domains. Input/output indicators convey the progress in implementation and result indicators present the results of selected activities, indicating whether they are contributing to the strategic goals *e.g.* deepening of specialization and/or generating potential for related variety, etc. However, because strategic monitoring relates to knowing whether the strategy is on track it must also include context indicators. Nevertheless, because the available context information and statistical data related to R&D, innovation and/or to economic development (e.g. value added or employment per economic sector) usually lags behind in time, this type of evidences are not much useful for continuous monitoring. Therefore, while context indicators are an important component of monitoring systems they must be obtained from other sources. Data sources that may useful provide proxy data for monitoring the national/regional contexts may, for example be: agency reports and records; information from non-governmental organizations (NGOs) or business associations; university studies; university data on number of students; mass media (newspapers, radio, television) reports; community organization records, etc.

Third, another important issue when assessing policy-strategy monitoring systems is the quality of the system. Collecting data for monitoring is a resource-intensive activity, so it is important to limit indicators and other evidences to key priority areas and to define data sources including administrative data, quantitative and qualitative secondary data, primary data from interviews, key informants and focus groups, and other observations. Without quality indicators monitoring can be ineffective and the whole monitoring system loses credibility. Therefore, there must be an action plan for monitoring, indicating the concerns/objectives of monitoring in the short and medium term, the types of indicators to be used, how they are constructed from the data sources and how revision of monitoring indicators and procedures will work.

In summary, the main objective of S3 monitoring should therefore be to enable a continuous assessment of not just the contribution of current activities and projects to the defined regional specialization strategy but also an assessment of possible context changes, indicating that the strategy is producing the desired effects. In addition, S3 monitoring should also enable to see whether current innovation projects and experimental initiatives are not discontinued too soon, nor continued too long when available information might already indicate the need to shift support to alternative initiatives or even to redefine the priority-domains.

S3 monitoring should not however be mistaken with evaluation of the strategy *i.e.* with evaluation of results and social-economic impacts of the specialisations defined. The focus of ongoing S3 monitoring is on whether or not opportunities identified through local EDP processes are viable and if they truly have the potential to induce structural social-economic changes. This involves understanding and reflection around whether spill-overs and related variety between and within targeted priority-domains is potentially being generated. Finally, another key aspect in any monitoring system is to include arrangements to ensure that the readings are used to feedback the enfolding S3 process i.e. that lessons learned are feedforward and incorporated into future projects and initiatives to implement S3.

2.5 Smart Specialisation as a condition for the use of European Structural Investment Funds on Research and Innovation

The Communication on "Regional Policy contributing to Smart Growth in Europe (European Commission 2010), called on Member States do develop S3. The existence of a national or regional S3 was consequently made an 'ex-ante conditionality' for spending the European Structural and Investment Funds (ESIF) on research and innovation projects. In the Commission's proposals for the Cohesion Policy 2021-2027, one of the 'enabling conditions' is "Good governance of national or regional Smart Specialisation Strategy", for which fulfilment criteria are laid down in Annex IV and which are shown in Table 2 below. The key difference between the current ex-ante conditionalities and the proposed enabling conditions is that the latter will be monitored by the Commission services throughout the implementation phase, allowing funding to be suspended if they do not remain in place.

Table 2. Enabling condition for the use of ESIF on Research and Innovation

Policy Objective	Specific Objective	Name of enabling condition	Fulfilment criteria for the enabling condition
A smarter Europe by promoting innovative and smart economic transformation	ERDF: All specific objectives under this policy objective.	Good governance of national or regional smart specialisation strategy	Smart specialisation strategy(ies) shall be supported by: 1.Up-to-date analysis of bottlenecks for innovation diffusion, including digitalisation 2.Existence of competent regional / national institution or body, responsible for the management of the smart specialisation strategy 3.Monitoring and evaluation tools to measure performance towards the objectives of the strategy 4.Effective functioning of entrepreneurial discovery process 5.Actions necessary to improve national or regional research and innovation systems 6.Actions to manage industrial transition 7.Measures for international collaboration

Source: COM(2018) 375

2.6 Assessment questions and methodology

Based on the concepts outlined here and the research objectives introduced in the first section of this report, a set of assessment questions were formulated as set out in Table 3. These questions apply to both the national and regional levels, enabling comparison between regions. They also refer to the initial S3 policy design (the process of initial definition of priority-domains and setup of the governance structure) and to the activities of S3 implementation and revision.

In Annex 1 we provide a more complete development of the questions and their assessment criteria, indicators and other evidences needed for assessment as well as sources of information. Information to address all the different assessment issues associated with S3-governance, EDP, monitoring and the governance comes essentially from two major sources: secondary information gathered by desk research and primary information resulting from interviews.

Desk research was based on a number of important documents, in particular the National S3 (ENEI, 2014) and all the relevant regional S3 documents. Other important sources that were consulted included:

- An assessment of how S3 are translated into alignment and selection criteria for the evaluation of project proposals, submitted to PT2020 Operational Programmes 2014-2020 (Technopolis, 2017)

- S3 monitoring report produced by the National Innovation Agency (ANI, 2019)

- An assessment of how S3 was operationalised in Portugal, commissioned by the Agency for Cohesion and Development (AD&C, 2019)

Table 3. Assessment Questions

Q1: What were/are the governance structures in place, at National and Regional level at initial elaboration and during implementation?	How governance enabled elaboration and initial definition of priority-domains?
	What types of bodies compose the governance structure? What is their composition? In particular how Higher Education Establishments and Private Sector participate?
	How Regional governance structures fit with the National structures?
	How the governance structures enable inter-regional/international cooperation?
	What changes were undertaken is S3 governance structures?
Q2: Is the Entrepreneurial Discovery Process effectively implemented?	When where the EDP platforms/groups created?
	Who coordinates/organises EDP processes/events?
	What actors are called to participate?
	How is the EDP implemented? Whether it is a continuous process since definition of S3? What is the number/frequency of EDP meetings/events so far? What participatory methods are used?
	What is the perceived goal of the EDP?
	How EDP processes feed the decision making process regarding identification of projects and adjustments to the priority-domains?
	Is there a revised/adjusted S3 to the initial proposal?
Q3: Is there a specific follow-up monitoring	What are the objectives of the Monitoring System?

of the implementation of the projects, to make sure they contribute to S3?	What are the indicators used? Provide Examples
	What sources of information are used?
	How the performance towards the objectives of S3 is measured?
	What changes were made to the initial S3 strategy as consequence of Monitoring?

This secondary data was complemented by interviews with key informants at national level and in the regions. Group interviews are becoming more and more common as a method for gathering primary data in social sciences and were used whenever individual interviews were not possible.

We interviewed the main and most relevant actors of regional and national innovation systems in the priority-domains. Key informants include the national and regional authorities responsible for coordination of S3 at national level and in the regions. It also included relevant public and private intermediary organisations involved in the design and implementation of S3 and/or relevant projects supported in the context of S3 implementation. Universities and other Higher Education Institutions as well as private sector companies and stakeholders, in particular those more directly involved in leading or facilitating local processes of entrepreneurial discovery were also interviewed. With the support of the regional authorities, the field missions were organized in June, July and September 2019 (except for Centro which took place earlier). In Annex 2 we provide the list of all actors interviewed.

The interviews focused on different aspects related to current governance practices, structures and processes in place but also on how is EDP being implemented. The interviews also covered the existing monitoring systems and evidence that such systems provided (e.g. types of indicators used) and whether the information produced by the monitoring system allows for an assessment of whether the regional/national context is changing and the bottlenecks and difficulties concerning innovation and diffusion. The interview guide for fieldwork carried out in 2019 is displayed in Annex 3, along with the interview guide for Centro, which took place in 2018.

3   Overview of S3 governance in Portugal at national and regional levels: Does S3 set innovation and knowledge based priorities?

This chapter presents a critical overview of S3 governance in Portugal at national and regional levels and at the initial and implementation stages. It includes changes to the initial strategy since 2013 and how it fits within the overall policy framework for science, technology and innovation[5]. We will focus on what are/were the S3 governance structures and, in particular, the coherence between the national and regional strategies and the extent to which the S3 framework does in fact set knowledge and innovation priorities. The information presented is based on triangulation of the results of desk research and the interviews. Section 3.1 focuses on the governance of S3 initial elaboration process at national and regional levels. Section 3.2 summarises how S3 was operationalised in Portugal. Section 3.3 presents the most relevant changes in R&I policies undertaken since the initial S3 elaboration, in particular after 2015. Section 3.4 analyses S3 governance at national level during the implementation stage, which is followed by a comparison between regions in section 3.5. The final section 3.6 presents our conclusions regarding the first assessment question and its associated criteria.

3.1   Governance of S3 initial elaboration at national and regional levels

In May of 2013 the Portuguese Government created an inter-ministerial committee (RCM nº33/2013, 20 de Maio), for the elaboration of the National Research and Innovation Strategy for Smart Specialisation (ENEI). The committee was created to ensure Portugal met the S3 ex-ante conditionality to spend European Structural Investment Funds (ESIF) for R&I, in the programming period of 2014-2020. Due to shared responsibilities for innovation policies, the committee was composed of representatives from the Ministry of Education and Science and the Ministry of Economy and Employment (XIX Government 2011-2015). It also initiated collaboration with the Regional Development and Coordination Committees (CCDRs) and the Autonomous Regional Governments of Madeira and Azores[6]. However, the CCDRs has in fact started developing their regional S3 a year before in 2012, following instructions from the Ministry of Economics, and were fairly advanced when the national process began. The mainland regions that have much fewer competences than the autonomous governments, saw S3 as an opportunity to shape a policy area which is increasingly important for regional development (Edwards and Rosa Pires 2015).

3.1.1   Governance of national S3

Shortly after being created this inter-ministerial commission assembled a working-group to conduct the initial definition of the national S3. This group was constituted by public sector institutions such as IAPMEI – Agência para a Competitividade e Inovação (National Agency for Competitiveness and Innovation), FCT-Fundação para a Ciência e a Tecnologia (National Science Foundation) and supported by ANI – Agência Nacional de Inovação (National Innovation Agency) and by the Operational Programme COMPETE2020. Although intended to inquire and include views of higher education, private sector, "end users", and other interest groups, these were not included in the working group and therefore instead of a quadruple helix, at the beginning of the process there was only a single helix.

Based on the Guidelines provided in the S3 Guide (Foray et al, 2012) the national S3 process was divided in three different stages namely: diagnostic, initial elaboration of priority domains and selection of priorities (ENEI, 2014 pp.102).

The first stage of diagnostic – from December 2012 to May 2013 – started with a SWOT analysis of the National Research and Innovation System[7], led by the National Science Foundation (FCT). This was considered by the working group as an essential step for identification of potential topics for debate and strategic reflection within the scientific community, universities, the enterprise sector and by other central government institutions and intermediaries usually involved in research and innovation policies. As recommended by the

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[5]   For information on the Portuguese economy see OECD (2019b).

[6]   Portugal is essentially a centralised country with Territorial Administration Regions (CCDRs – Regional Development and Coordination Commissions) in mainland Portugal and two autonomous regions – the islands of Madeira and Azores. Both mainland Portuguese regions and in the autonomous regions, have increasing agencing powers. For an overview of territorial governance in Portugal including recent developments and debates see OECD (2020).

[7]   See report http://www.fct.pt/esp_inteligente/

S3 Guidebook (Foray et al., 2012) a combination of methods was used. First, a longitudinal analysis for the period 2000 to 2010 identified the strengths and weaknesses of the innovation system. In addition, scorecards and calculation of indexes of specialisation, combined with the analysis of connectivity and related variety provided further insights. Second, Benchmarking comparison with a group of 10 selected countries was carried out. The first stage of "diagnostic" also involved inputs and views from innovation experts, regional policy makers and from a selected group of stakeholders through a workshop at the beginning of the process and through a high-level conference for debating preliminary findings (ENEI, 2014). At this first stage other reports and studies were also taken as important inputs, namely evaluations of the previous ESIF funding period (2007-2013) and the evaluation of clusters and poles SPI/Inno TSD (2012).

The second stage of defining the national S3 took the SWOT diagnostic and added a foresight reflection on future scenarios. To arrive at a set of priority-domains the working-group developed the following steps: Firstly, the most relevant economic, scientific and technological domains identified in the SWOT analysis were listed and characterised regarding critical mass, impact, growth and related variety potential. Secondly, each theme was classified through a series of quantitative and qualitative criteria, namely: scientific capacity and growth potential; technological and innovation capacity, and; economic and entrepreneurial capacity. Lastly, the different "domains" were compared and classified as lower, intermediate and higher performance. The final result was a set of 15 priority-domains, classified in 5 axes, as shown in Table 4.

Table 4. 15 priority domains grouped into 5 thematic axes.

5 Thematic axes	15 smart specialization priority domains
Key Enabling Technologies	Energy Information and Communication Technologies Raw Materials and Materials
Production technologies and Industries	Production Technologies and Product Industries Production Technologies and Process Industries
Mobility, Space and Logistics	Automotive, Aeronautics and Space Transports, Mobility and Logistics
Natural Resources and Environment	Agri-food Forestry Economy of the Sea Water and environment
Health, Wellness and Territory	Health Tourism Cultural and Creative Industries Habitat

Source: ENEI (2014)

The third stage of the initial elaboration of the national S3 consisted of a wide consultation process through thematic sessions on each of the axes. The objective of the sessions was to stimulate creative thinking to explore new links between topics and to promote a collective reflection on the importance of each domain for objectives to be achieved by 2020 (ENEI, 2014). The method used was that of "structured brainstorming

sessions" organised in three parts. An "aggregate" overview of the theme and its relevance and importance for Portugal and/or the regions. A second part with parallel sessions on topics and types of stakeholders to discuss difficulties and challenges. A final part in plenary to report conclusions and recommendations of the parallel sessions and overall conclusions. Around 500 participants (52% private sector companies) for these sessions were selected and invited according to their relevance to the national innovation system including: universities, public laboratories, technology centres, business incubators, private companies, relevant European organisations and institutions of civil society such as professional and industrial associations. After such wide ranging discussions, the proposal of 15 priority-domains arising from stage two was not altered, but the working-group recommended to group these final domains into five axes as this would help to focus and align key players and strategic interests on multiple topics (see Table 4). Finally, after validation from the Scientific Councils of the National Science Foundation- FCT and of the relevant Ministries a draft of the National S3 strategy was submitted for approval to the two supervisory Councils CNEI – National Council for Entrepreneurship and Innovation and CNCT – National Council of Science and Technology.

Following the need to comply with yearly obligations related to the European Semester 2014, the National S3 – ENEI was considered at the time as an important component of the Portuguese National Reforms Programme – NRP 2014. In addition, because it was an ex-ante conditionality for the ESIF, the ENEI was strongly associated to the design of the Partnership Agreement 'Portugal 2020'. ENEI was also aligned with other plans and strategies elaborated in 2014 such as the "Industrial Development Strategy for Knowledge and Growth 2014-2020 (2014) (Estratégia de Fomento Industrial Para o Crescimento e o Emprego 2014-2020 – EFICE) developed in 2013 by the Ministry of Economy.

3.1.2 Governance of regional S3

At the Regional level, S3 initial elaboration, including the definition of regional priority-domains and governance structures, occurred earlier or in parallel with the national process. However, multi-level articulation at this initial elaboration stage was somewhat difficult. Some regions like the Azores and Norte were the first to register on the European 'S3 platform'[8]. Overall, the regions followed some variation of the recommended methodological approach in the Commission's S3 Guide (Foray et al, 2012). Based on available statistical data all regions departed from a regional diagnostic analysis of their R&I capacities and economic profiles. Some regions carried out a regional survey of local companies, aimed at detailing their knowledge about local R&I capabilities, particularly in the private sector. At the regional level, this initial diagnostic was considered an important component of wider regional development planning processes including those related to the ESIF. At the end of this diagnostic stage, all regions were able to propose their conceptual vision of regional S3 domains and in a few cases, notably Centro, regions went even further in attempting to identify related variety between and within the proposed priority domains. In other regions such as the Azores, the result of the SWOT analysis was the definition of priority-domains and a straightforward identification of local projects ("projectos bandeira") that could materialize the search and discovery processes related to the priority domains. At a second stage, all regions organized a large scale participated process with many local actors, through workshops and thematic group discussions. As with the national S3 this participatory process, in general, did not change the initial proposals for priority domains. However, in some cases it helped the regions to define in more detail activities inside the domains of specialisation. Despite following the S3 Guide which recommends that the process of defining priorities is led by entrepreneurs, regions with less knowledge resources favoured a definition of priority domains linked to scientific strengths, particularly those of their local higher education institutions. Table 5 provides an overview of the priority domains selected in each region.

In summary, governance of S3 initial elaboration at national and regional levels followed many but not all of the recommendations in the S3 Guidebook (Foray et al., 2012). While at the regional level, strategic innovation planning was not a novelty, at the national level elaboration of ENEI can be considered a first attempt to break with existing top-down processes, usually centred around research policy and on the linear policy model of research and technology transfer, common in Portugal since the 1990s (Laranja, 1997). However, despite the relative novelty of such S3 governance processes, particularly at national level, there were/are a number of important lessons for the design of the strategies in the next S3 cycle.

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[8]   S3 Platform, managed by the Joint Research Centre: https://s3platform.jrc.ec.europa.eu/

Table 5. Regional priority domains of specialisation

Region	Regional priority-domains	Region	Regional priority-domains
Alentejo	Food and forestry Economy of mineral, natural and environmental resources Critical technologies, energy and smart mobility Heritage, cultural and creative industries and tourism services Technologies and specialised services of the social economy	Centro	ICT Materials Agri-Industry Forest Sea Biotechnology Health and well-being Tourism
Algarve	Tourism and leisure Agri-food industries and forestry IT and creative industries Life sciences, health and recovery Renewable energies Sea industries, fisheries and "aquicultura"	Lisboa	Transports and mobility Exploration and exploitation of marine resources Research, technologies and health services Tourism and hospitality Cultural industries and resources for creativity
Norte	Health and Life Sciences Culture, Creativity and Fashion Maritime Resources and Economy Human capital and specialised services Mobility industries and environment Advanced manufacturing systems Food and agri-environmental systems Symbolic capital, technologies and tourism services	Madeira	Tourism Resources and technologies of the sea Health and well-being Food quality Sustainability and infrastructure management and sustainability Energy, mobility and climate change Information and communication technologies
Azores	Agriculture, livestock and agri-business Fisheries and sea Tourism		

Source: Regional Smart Specialisation Strategies (EREI)

First, it is clear that there are difficulties in making priority choices. For a relatively small country without large research and innovation resources, it is difficult to justify international strength and comparative advantage in 15 domains. At the regional level, in particular for regions of lower density it is also difficult to lend credibility to regions that claim simultaneous international R&DI strengths and opportunities in seven or even eight priority-domains. Even if in some cases these domains are recognized as "potential" or "emergent", or in other cases closer to the Doing-Using-Interacting -DUI innovation mode (Jensen et al., 2007), it is not credible to prioritise so many R&I domains.

Second, not only are there too many priority domains as their definition clearly escapes the right level of granularity at which S3 knowledge application domains need to be defined. In some cases, the identified priority-domains are KET – Key Enabling Technologies (e.g. Energy, ICT, Materials) or "GPT – General Purpose Domains" at the technology frontier (e.g. Production Technologies and Production Industries) instead of specific application domains using knowledge of science and technologies in energy, ICT and materials. As mentioned in section 2.2 a delicate balance must be found between a too broad and a too narrow definition of priority domains. Too broad will make it difficult to generate the density and agglomeration effects, which are one crucial objective of a S3. In addition the focus (priorities) appears to be on structures not on transformation of the structures, and therefore there is lack of direction for changes within each priority domain, in line with the second principle of S3 referred in section 2.1. In general, we would expect that the participation of the enterprise sector in the definition of priority domains, at both national and regional levels would have helped to achieve that delicate balance, focusing the definition of priority-domains on more immediate entrepreneurial development of new products, processes and/or business model innovations. In regions of low density, difficulties in mobilizing SMEs with less capacity to the debate, may have contributed to the top down definition of areas of scientific strength aligned with local universities' research interests in accessing ESIF, hence favouring the STI innovation mode. However, an S3 grounded in the STI mode for regions of scarce R&D capacity clearly overlooks the need to include projects and activities related to non-technology innovation, aligned with the needs of local SMEs.

Third, in our view initial governance of S3 was shaped by the prevailing tradition of top-down R&I policy design. At national and regional levels, discussions involving higher education institutions and the private sector only started after the priority-domains were already defined by smaller elite groups driven essentially by regional/national authorities and the scientific university-based system. The results of those later participatory exercises did not alter the choices previously made to any significant extent. In addition, from our interviews we concluded that there is still a general belief that the country/regions lack scientific and technological infrastructure and that there is a need for horizontal policies favouring better conditions to explore transversal domains of inter-disciplinary knowledge, followed by translation of scientific results into commercial innovation. Moreover, there is a belief that broad research domains and the STI innovation mode will open wider fields of future possibilities and will avoid possible economic lock-in to lower value-added positions of global value chains. Hence, again justifying the preference for the definition of broad "general" domains and the difficulties of focusing in specific innovation application domains.

Fourth, another critical element of designing the S3 governance framework was that the ENEI did not fully explore national-regional thematic alignment. In our interviews we learned that there was little effort to integrate the existing regional processes of S3 elaboration (which had started first) into a single multi-level governance framework. In Table 6, we compare the 15 national priority domains with those of all seven regions. There are only a few priorities at national level relevant to several regions, in particular "The Economy of the Sea", "Tourism" and the "Agro-food sector". However, there are also national domains with no correspondence in the regions, e.g. "Production Technologies and Product Industries" and "Automotive, Aeronautics and Space" and domains of specialization proposed by the regions that find little or no correspondence at the national level e.g. "Human Capital and Specialised Services", "Technologies and Specialised Services of the Social Economy". As an illustration of this apparent lack of national-regional coordination and alignment, we can perhaps look closer at the tourism priority domain. While tourism is identified at national and regional levels (and indeed is one of the main economic sectors in different regions), little or nothing is said on the tourism market-segmentation in different regions. In addition, what would be the R&I resources and activities needed to support the generation of related variety i.e. what specialised suppliers, what downstream segments and what sales channels are related to the strategic choices of different tourism segments in different regions?. For example, what research on natural-resource sustainability solutions would be needed to improve relevant tourism segments e.g. business breaks, health

or religious tourism. The same could be said for national-regional coordination relating to specialisations in energy, mobility or the sea, etc. Again, while surely these domains will offer multiple new opportunities to develop innovative products, processes or services, narrowing the definitions of the domains and coupling domains with specific direction of changes or transformation objectives would provide a much useful focus for the definition of strategic directions.

Table 6. National / Regional thematic alignment of priority-domains

National level	Regions						
	Norte	**Centro**	**Lisbon and Tagus Valley**	**Alentejo**	**Algarve**	**Madeira**	**Azores**
Energy				Critical technologies, energy and smart mobility	Renewable energies	Energy and climate change	
ICT		ICT			IT and creative industries	ICT	
Raw Materials and Materials		Materials		Economy of mineral, natural and environmental resources			
Production Technologies and Product Industries							
Production Technologies and Process Industries	Advanced manufacturing systems						
Automotive, Aeronautics and Space							
Transports, Mobility and Logistics	Mobility industries and environment		Transports and Mobility	Critical technologies, energy and smart mobility			
Agri-food	Food and Agri-environmental systems	Agri-Industry		Food and Forestry	Agri-Food Industries and Foresty	Agri-food	Agriculture, Lifestock and Agri-businness

National level	Regions						
	Norte	**Centro**	**Lisbon and Tagus Valley**	**Alentejo**	**Algarve**	**Madeira**	**Azores**
Forestry		Forest		Food and Forestry	Agri-Food Industries and Forestry		
Sea Economy	Maritime Resources and Economy	Sea	Exploration and exploitation of marine resources		Sea Industries, fisheries and "aquicultura"	Maritime – Bio sustainability	Fisheries and the sea
Water and environment							
Health	Health Life Sciences	Biotechnology Health and well-being	Research, Technologies and Health Services		Life Sciences, Health and recovery		
Tourism	Symbolic Capital, Technologies and Tourism services	Tourism	Tourism and Hospitality	Heritage, Cultural and creative industries and tourism services	Tourism and leisure	Tourism	Tourism
Cultural and Creative Industries	Culture, Creativity and Fashion		Cultural industries and resources for creativity	Heritage, Cultural and creative industries and tourism services	IT and creative industries		
Other	Human Capital and specialised services			Technologies and specialised services of the social economy			

Source: own elaboration

3.2 How S3 was operationalised

The national strategy (ENEI, 2014) included a policy mix to operationalise S3 at both national and regional levels, divided into the following six areas:

1. Expand skills and qualifications in the priority domains.

2. Enhance the excellence of the R&D system in the priority-domains.

3. Increase and deepen knowledge interactions and networks.

4. Measures to mobilize innovative grassroots entrepreneurship.

5. Strengthen the base of the innovation system and its competitiveness.

6. Internationalisation of R&D and innovation.

Different ministries would translate the general national objectives of ENEI into specific sectoral policies, and implement the wide policy mix across the different priority domains. However, because S3 is an ex-ante conditionality for the use of ESIF in support of R&I, its operationalisation was interpreted narrowly as an alignment of specific and standard funding instruments under Thematic Objectives (TOs) 1 and 3 with the priority domains of the national and regional S3. There has in fact been some alignment of TO8 and 10 investments (related to human capital) with the S3 priority domains. In some, such as those that financing doctoral and post-doctoral programmes as well as technical professional courses, alignment with S3 is an eligibility condition, whereas in others it is only part of the selection criteria. However, other non-funding measures in the S3 policy mix related to human capital, such as changes to the incentive structures of higher education careers, were not implemented (ANI, 2019)

Crucially, since much of the ESIF architecture and instruments were already defined before the completion of the S3 design phase, there was no opportunity to differentiate national or regional instruments according to S3 domain-priorities or to develop specific instruments for individual regions. In other words, a major concern is that neither the national nor regional S3 had sufficient influence on the design of the policy instruments employed by thematic and regional operational programmes under PT2020[9]. While the Partnership Agreement 2014-2020, PT2020 (2014) often refers to S3, it says nothing about how instruments under the relevant Thematic Objectives would be customised to operationalise the different strategies at regional and national level. In fact, the instruments used are highly standardised across regions, and in many instances are instruments carried forward from previous programming periods.

Operationalisation of the S3 policy mix was therefore an exercise of adding a structure of eligibility and selection criteria on top of pre-existent instruments associated with the relevant TOs (mainly TO1, TO3 but also TO8 and TO10). Considering the relevant TOs for the S3 policy mix, we find a wide set of 23 instruments. These 23 policy instruments use a complex matrix of eligibility and selection criteria that depends on the OP in which the projects are submitted (national versus regional) and in particular on the specific instrument and on the specific measure and typology of projects (Technopolis, 2017; ANI, 2019).

Evaluation of whether this complex structure is effective in implementing S3 was already the object of a study undertaken by Technopolis (2017). It notes the excessive bureaucracy and lengthy administrative procedures in launching calls and in evaluating submitted proposals as the main problems encountered with this model of operationalisation (Technopolis, 2017; pp. 67-71). Such a complex system produces

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[9] It should be noted that the Cohesion policy is delivered in Portugal, during 2014-2020, through the Partnership Agreement Portugal 2020 (PT2020, 2014). PT2020 is operationalized through 16 Operational Programs, in addition to Territorial Cooperation Programs in which Portugal participates alongside other Member States: 4 Thematic Operational Programs on the Mainland (Competitiveness and Internationalization, Social Inclusion and Employment, Human Capital, Sustainability and Efficiency in the Use of Resources), 5 Regional Operational Programs on the Continent (Norte, Centro, Lisboa, Alentejo, Algarve), 2 Regional Programs in the Autonomous Regions (Azores, Madeira), 3 Rural Development Programs (1 Rural Development Program in the Continent, 2 in the Autonomous Regions), 1 Program for the European Maritime and Fisheries Fund (EMFF) MAR 2020 Operational Program, 1 Technical Assistance Operational Program. There are more 6 Operational Programs for European Territorial Cooperation (Spain-Portugal, Madeira-Azores-Canarias, Atlantic Area, Southwest Europe, Mediterranean, Espon, Urbact, Interact and Interreg Europe).

inefficiencies and does not facilitate the need for experimentation with processes of collective and individual entrepreneurial discovery, which according to S3 conception would lead to a better set of projects and initiatives. According to our interviews, actors from the private sector often prefer not to apply for funding because decisions take so long that when funding finally comes the market has already changed, rendering the projects worthless.

In addition, from our interviews with the regions, we concluded that central authorities responsible for PT2020 do not welcome the design of specific regional thematic calls aligned with S3 priority domains or with sub-areas of activity. Yet in our view these calls would be an essential instrument, as they would allow for the experimentation of new ideas and activities emerging from the regional EDP platforms/groups. Nevertheless, in regions such as Azores and Lisbon and Tagus Valley, we identified S3 calls directly associated to the workings of the groups/platforms that support EDP in these regions (for example Aviso nº45-2015-25[10]).

Finally, another important issue is that parts of the initially proposed policy mix (ENEI, 2014) have not been operationalised. While criteria for preferential selection of support to PhD studies in the priority-domains in the regions are being used (TO8 and TO10), important changes in the regulation of academic careers at the universities, enabling less academic in-breeding and higher mobility and knowledge transfer from the universities and research centres to the private sector were not, as initially intended, implemented.

To conclude, operationalised of S3 in Portugal has become less of a strategy for economic development based on entrepreneurial discovery as intended, but instead simply a set of criteria for the approval of projects submitted for funding from operational programmes that compose "Portugal 2020".

3.3 Overview of recent changes in National Research and Innovation Policies

After initial elaboration and following a change of government in 2015, it is not clear how governance of national and regional S3 relates to other more recent policy agendas and plans. The proliferation of multiple high-level strategies for research and innovation after 2015, suggests an explicit return to innovation policies focused on creating "general conditions that favour science and innovation" and a departure from the need to find domains of specialisation where Portugal and the regions would develop relative advantages (OECD, 2019). The main plans and strategies for R&I elaborated after 2015 are presented in Figure 1.

First, following consultations with higher education institutions and the council of rectors of public HEI, in 2016 the government launched the Commitment to Knowledge and Science Agenda. The agenda is a package of on-going flagship measures initiated by the Ministry of Science, Technology and Higher Education (MCTES) such as: measures for scientific employment, CoLabs, GoPortugal, Atlantic International Research Centre; measures to support the modernisation of polytechnics; measures to promote digital skills and incentivise high-skilled employment through fiscal measures, etc. In 2016 the Commitment to Knowledge and Science Agenda did propose the creation of an inter-ministerial working group composed of representatives from the Ministries of MCTES, Finance, Economy, Environment, Maritime affairs, Planning and Infrastructure and Defense, as well as the Council of Rectors of Universities, the Coordinating Council of Polytechnics, FCT and ANI. However, to date, this working group has not been created and no multiannual financial framework has been put in place (OECD, 2019).

Second, in 2017 the Ministry of Economy launched an ambitious programme to disseminate, demonstrate and support the development and adoption of technologies related to "Industry 4.0". The programme was divided into two stages. The first stage of dissemination was commissioned to COTEC[11] and the current second stage has a specific line of support for training and skills as well as projects in the domain of "Industry 4.0".

Third, in 2016 – "StartUp Portugal" – the National Strategy for Entrepreneurship, was launched by the Ministry of Economy with the objectives of supporting the national ecosystem, to attract national and foreign

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[10]   http://poacores2020.azores.gov.pt/candidaturas/aumentar-a-producao-cientifica-de-qualidade-e-orientada-para-a-especializacao-inteligente/

[11]   COTEC Portugal is a private not-for-profit Enterprise Association, created in 2003 and sponsored by the President of the Portuguese Republic. COTEC envisions to disseminate the culture and practices of innovation in the private business sector. In Europe COTEC Portugal works in partnership with similar assocations in Spain and Italy, also sponsored by their respective heads of State.

investors and to accelerate the growth of Portuguese startups in foreign markets. It consists of series of measures that support incubation, acceleration and internationalisation. Funding comes from Portugal2020 and from public venture capital companies. In 2018, this initiative was significantly expanded with new measures called "Startup Portugal+".

Figure 1 Strategies, Agendas and Plans for Research and Innovation Policies in Portugal
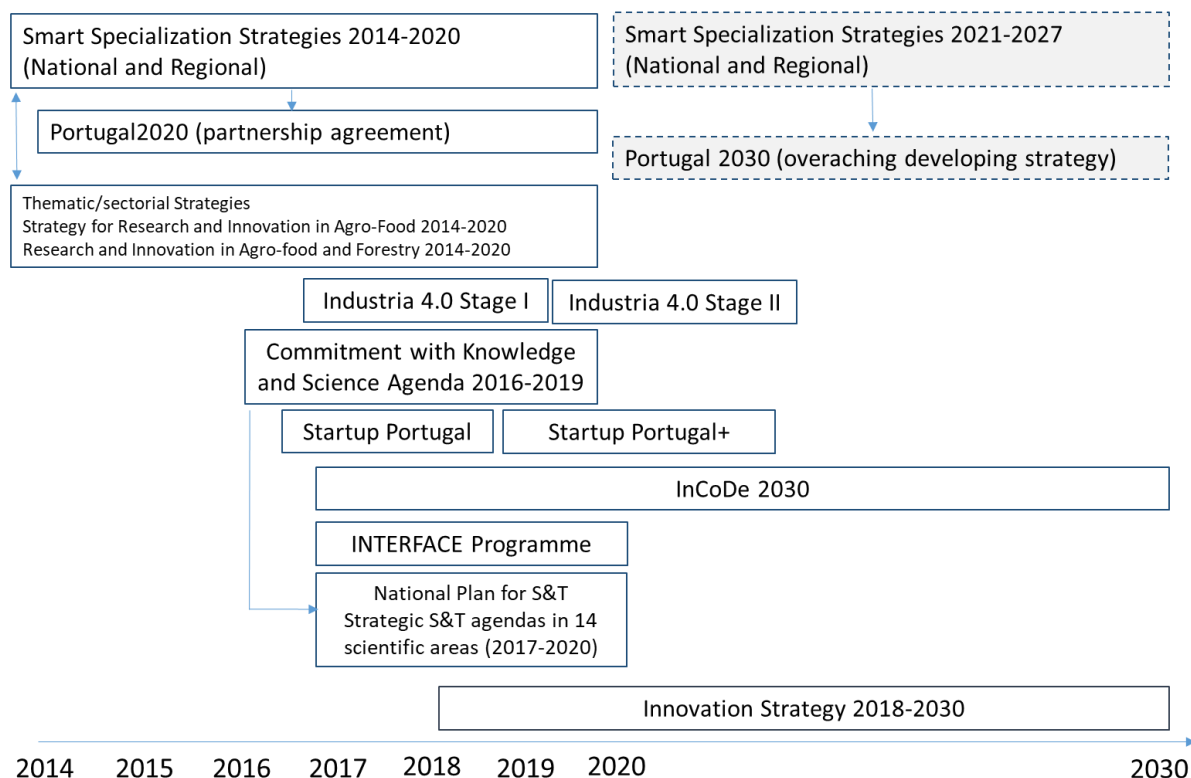
Source: own elaboration

Fourth, in 2017 the National Science Foundation (FCT) launched the National Digital Skills Initiative (INCoDe.2030). This initiative has a broad scope, focusing on the promotion of digital inclusion and literacy, qualifying the active population and specialising its graduates for advanced digital jobs.

Fifth, the INTERFACE Programme aims at accelerating the transfer of technology from research and technology centres (including university-based centres and institutes) to companies, and enhancing the certification of products and companies in national and international markets. Funding comes from the revolving funds (originating from the returnable subsidies of previous ESIF periods).

Sixth, also funded by the Portuguese Public Budget and following from the Commitment to Knowledge and Science Agenda in 2016, the Portuguese Government proposed in 2017 a National Plan for Science and Technology 2017-2020. Led by FCT in co-operation with ANI and "Ciência Viva", this strategic initiative consists of 14 R&D thematic agendas – Table 7. Dedicated groups composed of researchers, policy makers and industry representatives developed these agendas. While considerations regarding the international context also occupy a prominent place in each thematic agenda, it is far from clear how these R&D thematic agendas relate to national and regional S3.

Finally, another important strategy elaborated after ENEI in 2014 is the 2018-2030 Innovation Strategy (RCM 2018-2030) adopted by the Council of Ministers in March 2018. This new strategy also covers R&I and

sets ambitious objectives and targets[12]. The document is short and broad, released as an annex to a Resolution of the Council of Ministers. Apart from referring to already existing programmes and initiatives (Start-UP Portugal, INCoDe.2030, Interface programme, etc.), it does not provide information on new actions and funding sources. This strategy also covers R&I and is implement by the National Innovation Agency – ANI, and yet there is no relationship with the national S3 (ENEI).

Table 7. Thematic Agendas for Research (2016)

National Science Foundation – Thematic R&D Agendas
Agri-food, Forestry and Biodiversity
Climate Changes
Portuguese Architecture
Urban Science and Cities for the Future
Culture and Cultural Heritage
Circular Economy
Space and Earth Observation
Social Inclusion and Citizenship
Industry and Manufacturing
Oceans
Health, Clinical and Translational Research
Cyber-physical Systems and Advanced Forms of Computation and Communication
Sustainable Energy Systems
Labour, Automation and Job Qualification in Portugal
Tourism, Leisure and Hospitality

Source: FCT

In summary, since 2015 there has been an increasing strategic fragmentation leading to a lower commitment at the national level to S3. At the regional level, there appears to be a certain perplexity with the creation of FCT's 14 Thematic Agendas of Research and Innovation 2030, somewhat detached from the alignment of priorities under the multi-level S3 framework and which may push universities and other actors to allocate scarce R&I resources to domains other than the S3 priorities. In addition, because national and regional S3 were designed to focus the funding instruments of PT2020 and almost all of these more recent R&I strategic plans and agendas also use PT2020 as their main funding instrument, there is a risk that the instruments themselves become loosely connected to any strategic orientation.

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[12] The ambitious European convergence goals set by the government in 2018 is to reach 3% of GDP in R&D expenditures by 2030. However, this will require doubling public R&D expenditures and quadrupling private R&D expenditures. Although expenditure on research and development has rebounded after the financial crisis of 2008, achieving these goals requires a rate of growth in spending that Portugal has not previously achieved, even prior to the financial crisis. Experience shows that R&D intensity targets must be credible and widely embraced if they are to be implemented by policymakers. Moreover, growth in spending needs to be complemented by reforms that support the capacity of firms to engage in knowledge-based innovation, and reforms in the governance of the public research sector. It is also important for Portugal to ensure sufficient stability in the levels and methods of public funding, while reducing the administrative burden for firms to obtain funding (OECD, 2019)

3.4 National and multi-level governance of S3 implementation

As suggested in the previous section, the initial process of defining the S3 resulted in too many and too broad priority domains, diluting the need to focus on innovation and entrepreneurial discovery of knowledge application opportunities that could transform and restructure the economy. In addition, since 2015 there has been a fragmented strategic landscape, with the proliferation of multiple national science, technology, innovation and entrepreneurship plans and agendas.

In this section we show how the capacity to continuously discover and adjust S3 priority domains at the adequate level of granularity, as well as to fund potentially transformative projects and initiatives, is further hindered by a number of national, regional and multi-level governance problems. The following analysis focuses on the structure and composition of the governance bodies and their coordination when implementing S3. It also looks at how the regional structures fit into the overall multi-level governance of R&I policies and whether it promotes inter-regional cooperation. We will also attempt to map relevant changes, if any, at the S3 implementation stage. Particular attention is given to the presence of higher education institutions and private sector actors in the bodies that compose the governance structures.

At its inception stage in 2014, the national S3 – ENEI (2014) proposed a comprehensive multi-level governance structure that intended to articulate S3 horizontally across relevant policy areas and vertically across geographical levels. Figure 2 illustrates such multi-level governance structure at the implementation stage, and how it fits within the larger government structure for R&I policies[13].

At the highest level, implementation of the national S3 is governed by an inter-ministerial Committee combining three ministries: the Ministry of Science, Technology and Higher Education (Ministério de Ciência, Tecnologia e Ensino Superior - MCTES), Deputy Ministry and Ministry of the Economy (Ministro Adjunto e da Economia), and the Ministry of Planning and Infrastructure (Ministro do Planeamento). While MCTES has responsibility for higher education, public research and science-based innovation activities, primary responsibility for business innovation policy lies with the Deputy Ministry and Ministry the Economy. The Ministry of Planning also has a fundamental role since it coordinates the ESIF framework. Horizontal coordination between ministries with relevant activities in science and innovation (e.g. Defence, Health, Agriculture, etc.) happens at this higher policy level through this inter-ministerial committee. At the highest level, an International Strategic Monitoring Committee composed of recognised international experts from the scientific and business sectors was also proposed but never created. Although monitoring information would be gathered by the national S3 secretariat (hosted at ANI – the National Innovation Agency), this international committee would be responsible for assessing how the strategy is implemented, particularly its results, impact and effectiveness.

In addition, another important component at the top level is the inter-ministerial committee for the coordination (Comissão Inter-ministerial de Coordenação - CIC) of the Partnership Agreement Portugal2020, headed by the Minister of Planning. This dedicated high-level body for inter-ministerial and multi-level co-ordination supervises the Agency for Development and Cohesion – ADC and the Managing Authorities for the thematic-national and regional operational programmes under PT2020, which manage the main instruments of S3 implementation at national and regional levels.

The proposed structure also included two advisory councils. Created by the previous government (2011–2015), respectively covering innovation and research policy areas, both chaired by the Prime Minister, the two councils would advise the higher-level S3 inter-ministerial council. One is the National Council for Entrepreneurship and Innovation (Conselho Nacional de Empreendedorismo e Inovação - CNEI), created in 2011 and composed by 25 member from the public and private sectors, to deliver advice on innovation policy. 10 public sector bodies are represented, including institutes such as IAPMEI, AICEP and ANI. The remaining 15 members are individuals (not representing any particular organization) invited as reputed opinion makers and experts in innovation and entrepreneurship. The other is the National Council for Science and Technology (Conselho Nacional de Ciência e Tecnologia - CNCT), created soon after in 2012, and composed of 20 high-level researchers, to deliver advice on research priority areas[14].

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[13] The description that follows designates Ministries and other bodies as they were designated by the XXI Government of the Portuguese Republic. Therefore, the designations used may not match exactly those used in the ENEI (2014) document, produced in the context of a previous government.

[14] See: https://www.historico.portugal.gov.pt/media/458941/20120206_cnct.pdf

In 2013 these two advisory bodies were chaired by the Prime Minister, giving them strong legitimacy and transversal scope to support co-ordination of S3 and R&I policies overall. However, while in the previous government (2011-2015) these two councils did meet, albeit infrequently, since 2015 we found no evidence of the proceedings of the S3 inter-ministerial committee and of the higher advisory councils CNEI and CNCT. As far as we know, the two councils have not met since 2015, and they apparently lack a clear mandate. In addition, in 2016, the Ministry of Science, Technology and Higher Education – MCTES relaunched a body that had nominally existed since 2007, the Coordinating Council for Higher Education – CCES (Conselho Coordenador do Ensino Superior – CCES), therefore effectively creating a third higher level council[15].

In our view, the existence of two higher advisory councils for innovation is a clear sign of policy cleavages, suggesting difficulties in creating one single high-level body for R&I policies that could have a prominent role in S3. On the other hand, the participation of two ministries, the Deputy Ministry and Ministry of the Economy and the Ministry of Science Technology and Education, in the joint board overseeing ANI – the National Agency for Innovation, would theoretically allow for operational coordination between R&I policies. However, from our interviews we confirmed that, in practice, this hybrid governance of ANI is perceived to have little or no effect in bridging the gap between research and innovation.

Governance of national S3 implementation includes an Executive Committee chaired by ANI and including the management authorities of relevant national/thematic Operational Programmes, namely Competitiveness and Internationalisation – COMPETE2020 and Human Capital – PO CH. It also includes relevant agencies such as the FCT, AICEP (Portugal Global Trade & Investment Agency) and IAPMEI – (Agency for Small and Medium Enterprises). The Executive Committee also includes representatives of the national and regional bodies responsible for regional planning and development policies namely the Agency for Development and Cohesion – ADC, regional governments of Azores and Madeira, and the Regional Coordination and Development Commissions (CCDRs), responsible for S3 at regional level. None of the S3 Executive Committee members works full time on S3 implementation. Only the national ENEI coordinator is fully dedicated to this task. ENEI's Executive Committee is supported by a dedicated technical secretariat, hosted at ANI. However, it is not clear how many people compose this secretariat. Since 2014 this Executive Committee has met only three times. It is also this Executive Committee and its Secretariat that are responsible for implementing the so-called "Entrepreneurial Discovery Spaces" – *Espaços de Descoberta Empreendedora* (EDE), one for each of the five thematic axes, and for monitoring. These EDE spaces would be a privileged place for interaction and discovery of initiatives and projects at the national level. The EDEs would come together in an "Innovation Forum", participated by the main actors of the research and innovation system, namely companies, higher education institutions, state laboratories and RTD bodies. However, as we will see in the following chapter these national level EDEs were never set up. After our interviews were concluded ANI started a series of events called 'Dynamics for Innovation' (*Dinâmicas para a Inovação*) based on the priority domains of the national strategy[16]. However, it is unclear whether these events are intended to act as EDEs. Therefore the only Entrepreneurial Discovery Processes that are being implemented are at the regional level.

Another serious governance cleavage at the national level is the dual role that ANI has to play. On the one hand, ANI hosts the Secretariat of the National S3 Executive Committee and supports the strategic management of the national S3, responding to the S3 inter-ministerial coordination committee. On the other hand, ANI is also an "intermediary management unit" for R&I instruments funded by national Operational Programmes, thus having a difficult dual dependency. That is, ANI responds as a S3 strategic coordinating body, reporting to the higher coordinating inter-ministerial committee and at the same time to the executive management bodies of the relevant OPs[17]. In theory, this dual dependency would contribute a much needed integration between policy strategy and policy-execution. However, in practice, it forces ANI to be too focused on managing and articulating funding instruments, overlooking its role of national S3 coordinator, organizer and facilitator of EDP processes and providing strategic intelligence monitoring to the upper levels.

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[15] The Council for Higher Education is chaired by a renowned Professor and it is composed by appointed experts and representatives of the National Science Foundation – FCT, the Agency for Innovation and Acreditation of Higher Education – A3ES, the Directorate-General of Higher Education (DGES), the Council of University Rectors – CRUP, the Council of Polytechnics – CCISP), the association of private higher – APESP and students' organisations.

[16] See: https://www.ani.pt/pt/portugal-inovador/portugal-inovador

[17] The PT2020 governance structure results from the governance principles declared by law for the governance of the "The Strategic Reference Framework 2014-2020, (Decreto-Lei n.º 137/2014, de 12 de setembro) in particular with article number 3 stating the need to articulate a multilevel system, central and regional.

Figure 2 S3 National and multi-level governance structure
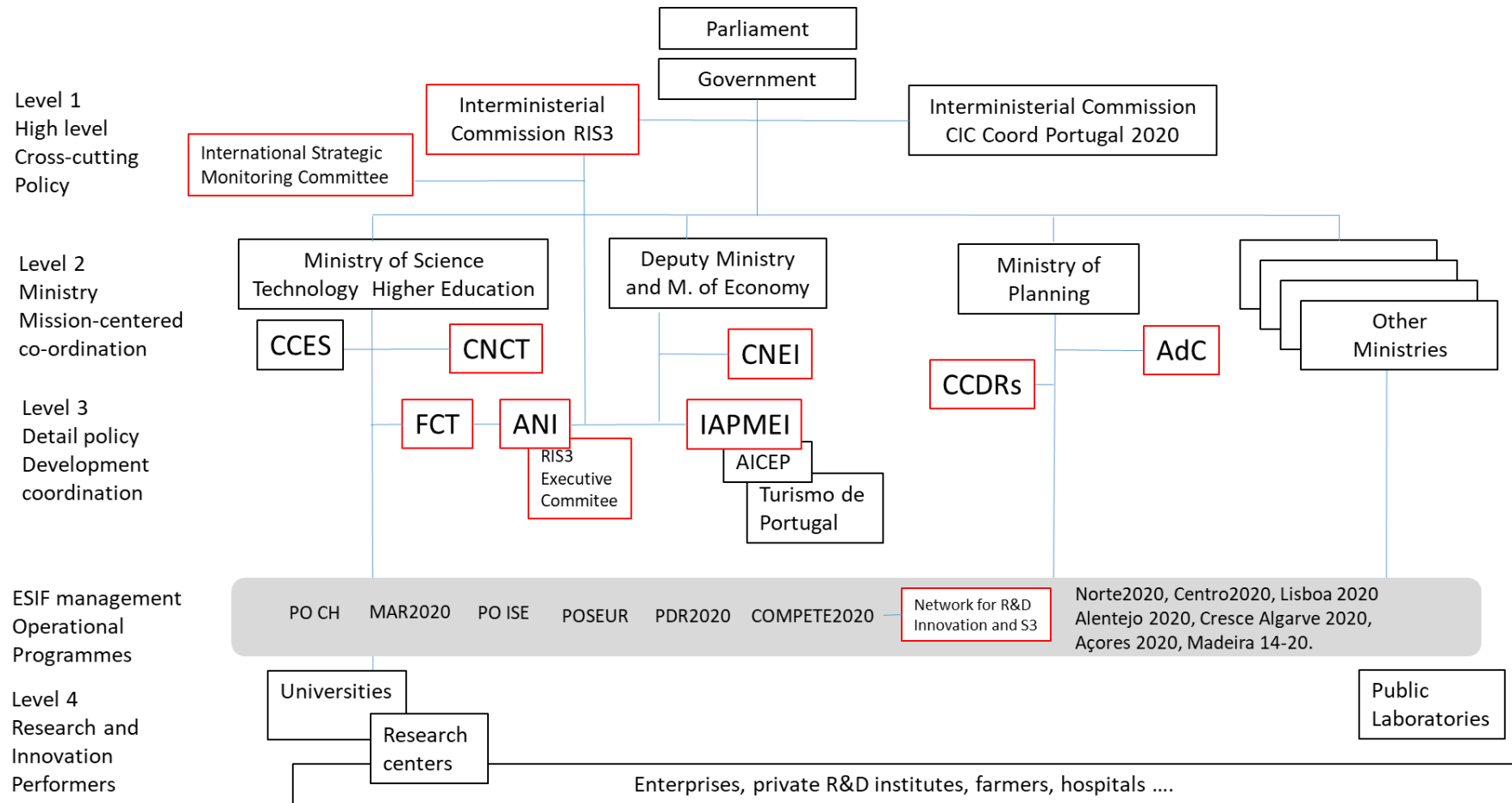
Source: own elaboration

The situation is similar at regional level, where both functions *i.e.* the strategic regional policy and the management structure for regional OPs are hosted at the same body – the CCDRs in mainland or the Autonomous Regional Governments in the islands. While in theory this facilitates communication and articulation, in practice, particularly for some regions, the high volume of projects combined with the small size of the regional S3 management teams, leads them to overlook their strategic management function and focus on applying a matrix of alignment and selection criteria to a wide set of funding instruments.

With regards to multi-level national-regional interactions at the S3 implementation stage, there are also a number of problems. In principle given that the composition of the ENEI Executive Committee includes national and regional authorities, as well as national-thematic and regional OPs, the ENEI Executive Committee would provide a channel for interaction and coordination. However, because in practice the Executive Committee is too large to be practical and operational, regular national-regional interactions occur mainly through specific PT2020 networks, namely the "Network for the Support to R&D and Innovation and Smart Specialisation Strategy" ("Rede do Sistema de Apoios à I&D&I e Estratégia de Especialização Inteligente") (see also Technopolis, 2017)[18]. This network is organised and managed by COMPETE2020, for articulation of national and regional OPs for the incentive subsidies to R&I. Representatives of the various agencies and OPs ensure alignment and conformity of the calls and the selection criteria for projects funded by all the OPs. Therefore, not only does S3 multi-level governance happen outside the S3 governance structures, but issues concerning strategic S3 management are completely overlooked. The current multi-level interactions, centred on COMPETE2020 is also in our view clearly contributing to justify the perspective taken at the S3 design stage, that the appropriate S3 policy is through standardisation of funding instruments across thematic and regional OPs and across priority domains.

3.5 Regional Governance of S3 implementation: comparison between regions

It is important to underline that, except for the islands of Madeira and Azores, there are no politically autonomous regions in Portugal. Regional Development and Coordination Commissions – CCDRs have a coordinating role of territorial planning, regional and urban development (Decreto-Lei n.º 228/2012). However, during the design of the national S3 CCDRs and the autonomous regional governments of Madeira and Azores were asked to collaborate with central bodies in the design and implementation of innovation policies at the national and regional level. In the well-known multi-level governance typology proposed by Perry and May (2007) Portuguese regions are taken by central government as "implementers" of innovation policy. However, from their own point of view they ambition more autonomy in the innovation policy areas and which to be seen as "partners" at a smaller scale.

The structures for S3 implementation in the regions is very similar. All regions, except Lisbon and Tagus Valley and Centro created a Regional Innovation Council. All regions also have a management unit to support S3 implementation. In addition, as we will see in more detail in the next chapter almost all regions created some form of groups or thematic platforms to support the promotion of EDP. Below is a brief description of S3 governance in each region, in order to analyse the main issues comparatively. A more detailed description of the S3 regional governance structures is provided in Annex 4.

Alentejo: The Regional Innovation Council was created at the end of 2018. While the Council initially included more than 70 members at the initial S3 design stage, it now has 30 members including representatives of local clusters. The Regional Council was not operational until 2017. At the operational level RIS3 implementation is supported by a "technical management unit" and, as we will see further in the next chapter, although Alentejo intented to have three EDP platforms aligned with their local priority domains, so far they have not been formally activated.

Algarve: The Regional Innovation Council (CIRA – Conselho de Inovação Regional do Algarve) was created in 2016, has 78 members and has met three times. CIRA analyses proposals emerging from the EDP working groups, and those found relevant for implementation of the S3 are forwarded to the relevant regional/national OP managing authorities. At the Operational level, S3 implementation relies on a "mission unit" within the governance structure of the regional OP managing authority. Algarve has also created a regional observatory for monitoring S3 priority domains, which analyses data and information from all relevant OPs.

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[18] The Network for the Incentives Schemes also plays an important role (Decreto-Lei n.º 137/2014)

Azores: The current Regional Innovation Council was created in 2017. It has 13 members, mostly from public administration, the local university, university-based research centres, and local enterprise associations. No individual firms participate. The Executive Committee of S3 Azores was also formally created in 2017. This Committee is composed of public sector bodies such as the Regional Directorate for Science and Technology DRCT, Regional Directorate for Agriculture, Regional Directorate for the Sea, Regional Directorate for Tourism and the Regional Directorate for Employment and Skills. There is also a management team that supports operations hosted at the DRCT with six people.

Centro: The S3 governance system closely followed the Commission guidelines, with a multi-layer scheme. The Extended Regional Council corresponds to the Regional Council established within the scope of the CCDR-C (Decree-Law no. 228/2012, of October 25), with a broad composition, in order to represent all the relevant regional actors and has met regularly. The Coordination Council (which can be considered the Regional Innovation Council in other regions) and the Strategic Counselling Group were bodies created specifically for the S3 implementation. The first one is composed of key organisations, while the second includes relevant individuals and opinion makers who are able to help detect new trends and opportunities. These two bodies met regularly in the initial phase of designing the S3 but did not meet regularly since. The regularity of the meetings was not established; after a more intense initial period, the last meetings of the Coordinating Council were on 02/16/2016 and 05/05/2018. This last meeting was jointly organised with the Strategic Counselling Group. The thematic working groups lead the entrepreneurial discovery process. The Centro governance model allowed for a widespread public consultation process, resulting in the revision of the lines of action, and the inclusion of Qualification of Human Resources in the transversal priorities of the S3. In 2017 and 2018 the CCDR in cooperation with the Joint Research Centre managed EDP workshops and Project Development Labs in selected domains. According to many interviewees, the fact that the region was involved in several external initiatives to benchmark its S3 with other European regions, was a critical element to learn and strengthen the S3 process and the governance framework. Even if the S3 management team is relatively small (six members, but only equivalent to three full time employees due to other tasks), no other Portuguese region has so many staff members dedicated to S3. This capacity was built through internal coordination and strong leadership by the President of CCDR-C.

Lisbon and Tagus Valley: In contrast to the other regions, a Regional Innovation Council was not created, rather the existing Regional Development Council was used to discuss issues of science and innovation policy. A higher advisory board working with the Regional Development Council in matters concerning Science and Innovation policies was also initially designed, but it was not implemented. At the operational level the region has an S3 Executive Committee composed of 2 people.

Madeira: The archipelago has a more elaborated S3 governance structure, composed of two councils: One is the Regional Innovation Council, created in 2015 and composed of 14 members including all the institutions related to ESIF management such as the IDR – IP RAM, IDE – IP RAM, the coordinators of the priority domains, enterprise associations such as ACIF – CIM, Start-up Madeira and the University of Madeira. However, the Council has no individual firms as members. During our interviews we were informed that it meets once a year. The Regional Innovation Council makes decisions concerning S3 i.e. it does not function as an advisory council. It is chaired by ARDITI – Madeira's Agency for Development of Research, Technology and Innovation, which was specifically created in 2013 to coordinate the region's R&I system. At the same time ARDITI has important functions in managing local funds for Science and Technology, as well as coordinating important research centres such as ITI, Mare-Madeira and OOM. In Madeira, S3 is operationalized directly through the coordinators of each priority domain that are also members of the Regional Innovation Council. ARDITI provides support to these coordinators and their working groups. A second body is the "Strategic Advisory Council" (COE – Conselho de Acompanhamento Estratégico), composed of seven individual experts (university researchers) in research areas of interest to the development of the regional S3 priorities. Its main contribution is to organise peer-evaluation of the S3 priorities. Finally, a local S3 Observatory was not implemented and therefore all monitoring is dependent on information about funded projects by the Regional Operational Programme and the statistical indicators for regional science and technology, such as R&D expenditure and number of publications.

Norte: The Regional Innovation Council was created in April 2017 and currently has 48 members. These include public sector entities such as local authorities, associations of local authorities, representatives of labour unions, enterprise associations, universities and other higher education institutions, representatives of

sectoral and regional development agencies, representatives of the relevant central/national public authorities related to S3, as well as representatives of the eight EDP platforms. As the EDP platforms were only created in June/July 2019, their coordinators did not participate until quite recently. The Council does not include individual firms. Chaired by the CCDR, the Regional Innovation Council analyses ESIF project applications in the S3 priority domains, reviews the annual monitoring reports and decides on whether to redefine priority domains. At the operational level, the governance structure of S3 Norte includes a management team within CCDR Norte, which also supports the work of the regional innovation council, the various EDP platforms and the monitoring and reporting activities. The Norte region has also actively participated in cross-border and international projects, notably the "Galicia-Norte Smart Specialisation Strategy" (RIS3T), the "Vanguard Initiative – New Growth through Smart Specialisation" or the monitoring project "Monitoris3" funded by Interreg Europe.

From our institutional interviews in the regions we concluded that in general, the Regional Innovation Councils are highly valued by local actors as an important body for local reflection, design and validation of regional innovation policies. In all regions, and in particular for regions of lower business density, we notice a dominance of public sector bodies, universities and university-based research centres. While enterprise associations representing the interests of local companies may be present, direct participation of local firms is usually very low (see Table 8).

At the intermediary level, we find mission units or management teams that operationalise S3. In our visits to the regions, we found that in most cases except for Azores, these operational teams are clearly under staffed and need resource to adequately perform their work (see Table 8). Management of S3 implementation includes a range of complex tasks related to driving the strategy, providing information for the regional innovation council, organising and/or promoting local EDP platforms. In some regions, monitoring of S3 is also a function attributed to the management team.

Although in theory, regional S3 governance is independent from management of operational programmes, in practice we found that to a large extent the resources are the same and therefore there is a need to clarify the boundaries. While this proximity between the two structures may facilitate communication and pooling of resources, it also focuses the work of S3 management units on issues of administrative compliance and assessment of projects according to the S3 criteria for multiple funding instruments. Consequently these units are distracted from their most important function of S3 strategic management, which consists in helping the search/discovery process and understanding the contribution of projects and other activities to the definition and exploration of knowledge and innovation within priority domains, which can help to trigger regional related variety and socio-economic transformation.

With regards inter-regional collaboration, in 2018 ANI (chair of the national S3 Executive Committee) started to promote multi-level and inter-regional meetings to share good practices and "concept notes" on S3 and the EDP. At the time of interviewing ANI had organised five inter-regional meetings.

Finally, it should be noted that there are interesting cases of inter-regional collaboration and participation in international projects particularly in the Madeira and Azores regions. An example from the mainland is cross border cooperation between Alentejo, Centro and the Spanish region of Extremadura (the EUROACE euro region). This included the AGROPOL project (developed on the initiative of the European Commission's Directorate-General for Agriculture and Rural Development), that included an EDP workshop on PAM (aromatic and medicinal plants). This participation involves not just the regional authorities but in some cases also specific regional stakeholders according to their interests and the objectives of the projects.

3.6 Assessment: Overview of National and Regional S3 Governance at initial elaboration and at implementation

In this section, we summarise our main conclusions regarding the first assessment question, namely: what were/are the governance structures (national, regional and multi-Level) at the initial elaboration stage and during implementation? Factual information from the previous sections that support the conclusions is presented in Table 8.

How governance enabled initial elaboration of S3? The elaboration of S3 at national and regional levels in 2013 marked a significant shift in policymaking style towards evidence-based policy and an attempt to break with existing top-down R&I policies based on scientific excellence and promotion of technology transfer. It

also brought greater participation of stakeholders in R&I policy making, through multiple thematic sessions involving many actors. Based on the model recommended by the S3 Guide, the processes started by extensive and detailed national and regional diagnostics using statistical and other types of evidence.

Although extensive, participation of different kinds of actors (national and regional levels), served to discuss and validate the SWOT diagnostic and choice of priorities put forward by national or regional authorities, with little or no changes made to the initial top-down definitions of priority domains. There was widespread participation by many actors in events such as meetings, workshops, discussion-debates etc., but they were used for consultation and validation of already defined priority domains, therefore not engaging the stakeholders in participatory processes of discovery and co-creation of domains.

At the end of this initial S3 elaboration processes there were many priority-domains at both national and regional levels, and their definition was often too broad to provide a comprehensive focused vision guiding the development of specific technology and market trajectories with the potential to effectively concentrate efforts. The priority domains of national S3 – ENEI are in a few cases "General Purpose Technologies" rather than application domains related to the specific needs for transforming and upgrading the economy to higher value positions in the international value chains.

At the regional level, particularly for regions with lower capabilities and scarce R&D resources, we would expect S3 priority domains to be closer to the Doing-Using-Interacting – DUI innovation mode (Jensen et al., 2007). However, this is not the case. In particular, for economically over-specialised regions (e.g. Madeira in Tourism) where the economic strategy is to diversify, there are difficulties in seeing how concentration in certain knowledge and innovation domains can help economic diversification.

Table 8. Governance Structure indicators

	Regions							National
	Norte	**Centro**	**Lisboa**	**Alentejo**	**Algarve**	**Madeira**	**Azores**	
Date of creation of the Higher National/Regional Innovation Council	2017	2014	2014	2018	2016	2015	2017	2014
Nº of members in Higher Innovation Councils Total Private sector Public sector	 48 - -	 26 9 17	 N/A 	 40 - -	 78 30 48	 14 2 12	 13 5 8	CNEI CNCT 25 20 15 - 10 -
Number of meetings of the Higher National/Regional Innovation Council	1	6	N/A	1	3	5	2	
Number of people working full-time in the Management team	-	3 FTE	2	1	2	1	6	1

Source: own elaboration

S3 require a focus on vertical domains that enable entrepreneurial exploration of how to apply knowledge to products, services, processes and business models. In our view, the S3 framework currently in place in Portugal falls short of achieving this function. As a result, national and regional S3 do not provide a means to develop focused domains of knowledge application. In addition, at the initial elaboration stage, there was little opportunity to use the S3 to adjust funding instruments, particularly in the scope of TO1 and TO3 across regions. In 2014, at the time that S3 was finalized, the instruments for PT2020 were already set and therefore S3 is operationalised through standardised funding instruments, using a complex matrix of alignment and selectivity criteria.

What types of bodies compose the governance structure? What is their composition?

Current S3 governance bodies at national and regional level include higher innovation councils, management teams and, as we will see in the next chapter, groups and platforms for the promotion of EDP. At the top level of government, an Inter-Ministerial committee was created with two higher advisory councils – CNEI and CNCT. We found no evidence whether this inter-ministerial committee is effectively working. With regards to the higher innovation advisory councils, the composition of CNEI appears balanced with the representation of both universities and private sector business and entrepreneurs. While having two higher advisory councils (CNEI and CNCT) for the same policy arena creates unnecessary policy divisions between research and innovation, after 2015 we found no evidences of the workings of the these higher councils.

In terms of implementation, ENEI created an Executive Committee with more than 30 members. This committee is chaired by ANI, which also hosts the ENEI secretariat. However only one person – the ENEI coordinator – appears to be dedicated full time to the task of implementing the national S3. Since 2014, the Executive Committee met just three times. Given its size and composition, it is difficult to assemble such a large and diverse committee and consequently it has given little or no support to operational management which in practice is undertaken by ANI with few or no resources.

In summary, at the national level, the governance structure and processes are clearly not sufficient to ensure effective coordination. Existing imbalances and insufficiencies cannot be separated from a lack of effective horizontal mechanisms at multiple governance levels promoting wider coherence between policy areas under the umbrella of innovation policy, in particular between research policy and innovation policy.

At the regional level, S3 has had a great impact on the local governance structures, with the creation of Regional Innovation Councils. However, most of these councils were formalized very recently (Table 8). At the operational level, there is also a serious deficit of human resources involved in the management teams. In our interviews we noticed that because operationalisation of S3 is reduced to analysis of whether project proposals for funding comply with the defined alignment and selectivity criteria, people from the Operational Programme management units are included as working on the implementation of the regional S3. A strong relationship between S3 governance and OP management may effectively bring better strategic alignment and articulation between the strategic and the operational levels. However, overall, S3 management teams appear not to have sufficient resources to execute what should be their main task, which is promotion of local EDP and monitoring of their strategies.

In particular, how do Higher Education Institutions and the private sector participate?

There is a clear deficit of firms participating directly in the Regional Innovation Councils. In particular, for regions with many SMEs of lower absorptive capacity this deficit in firm participation enables a disproportionate influence from universities on the Regional Innovation Council (and on the overall direction of S3). The dominance of universities means that S3 becomes too easily influenced by academic interests related to particular research strategies that may not be aligned with the interests of the local economy.

How do regional governance structures fit with the national structures?

At the initial stage, it would have helped if the national S3 had more fully explored the thematic alignment with the priority-domains proposed by the regions. In addition, at the implementation stage, the national level could have done more to promote potential collaboration between the different regions in areas of common R&D and innovation interests. Such cooperation is particularly important to mitigate the risk of duplicating similar projects and infrastructures, particularly when each individual initiative is unable to achieve the critical mass needed to be effective at national and international levels. As pointed out earlier, national agencies such as FCT ANI, IAPMEI, that can best handle national policy issues in liaison with the relevant EU

bodies, appear not to provide any support to the regional authorities regarding S3. The recently created "inter-regional meetings" promoted by ANI are a most welcome step to improve coordination between regional authorities and central government within the framework of S3.

In addition, from our interviews we learned that multilevel governance and communication between national and regional level appears to work, but instead of being channelled through the governance structures designed for S3 (i.e. the ENEI Executive Committee) work through the operational networking groups of PT2020 (confirming what the Technopolis, 2017 report had already suggested). Hence, S3 multi-level coordination is working outside the proper S3 governance structures. In addition, because the networks of PT2020 were created to focus on compliance, conformity and standardisation of project funding across instruments and OPs, and the correct and effective disbursement of funds, we find that this current multi-level arrangement does not contribute to coherent national and regional strategic S3 management.

Another related problem is that the regional managing authorities in charge of S3 do not have sufficient flexibility to launch specific funding calls that arise from the workings of their local EDPs. Effective implementation of S3 would require specific thematic calls for proposals differentiated between regions and adjusted to their differences in priority domains. However, until now S3 has been mainly implemented through general calls combining national and regional OPs.

Do the governance structures enable inter-regional/international cooperation?

The existing cases of collaboration and participation in international projects suggest that existing governance structure do not constitute a barrier to increase collaboration. In addition, the recent meetings between regions promoted by ANI are a much welcome step forward in the promotion in inter-regional collaboration. However, notwithstanding the few cases of international cooperation between Portuguese and other European regions (notably by Centro and Norte), regional capabilities (in both the public and private sectors) to engage in international projects remain low, especially compared to those in other EU Member States.

What changes were made to S3 governance structures during implementation?

Since 2015, a multiplication of new general R&I agendas and initiatives created a fragmented strategic framework that limits the effectiveness of public investment. This recent multiplicity of national agendas and plans stems from different ministries of the current government and, as pointed out by the OECD (2019a), does not make for a consistent strategy. While these different plans for Science, Technology Transfer, Entrepreneurship, etc., cover various components of the R&I system, they are very general and broad (OECD, 2019). As we suggested, this is largely due to multiple policy silos in which the ministries in charge of their policy fields operate. What this means is that S3, particularly at national level, appears to compete with this wave of new top-down general agendas and strategies. In essence, and perhaps because S3 was operationalised not as strategy but as a set of project alignment and selection criteria for ESIF OPs, it is not clear whether the national S3 or the regional S3 can be taken as overarching shared national/regional R&I strategies.

Finally, in our view, Portugal lacks a single and integrated strategic innovation policy framework based on a focused view for S3. It is clear that at national and regional levels, Portugal has much to improve in the processes of S3 formulation and implementation.

4   Entrepreneurial Discovery Processes

While in the previous chapter we looked at the governance structures of S3 during the elaboration, and implementation stages, at both national and regional levels, this chapter examines practices of entrepreneurial discovery at the same time and scale. The focus is on assessing engagement and effective participation of different stakeholders and identifying which participatory methods have been used.

4.1   National S3 EDP

Beyond initial elaboration, at follow-up and implementation one critical aspect of S3 is maintaining and further developing the initial group work dynamics. Whereas at the initial elaboration stage the so called entrepreneurial discovery processes consists of thematic discussion groups envisioning the definition of priority-domains, at the implementation stage EDP envisions the discovery of innovation opportunities, identification of projects and other initiatives that enable regional related variety and, eventually, possible re-definition of the initial priority domains.

As reported in chapter three, the initial definition of S3 priority-domains at national and regional levels was essentially a "top-down" approach when stakeholder consultation only served to validate the choices and definitions of priority domains. However, implementation of S3 requires further engagement of local stakeholders in a continuous trial and error search process, initially bounded by the defined priority-domains but possibly leading to discovery of business opportunities that have the potential to trigger social-economic transformation.

However, so far, as hinted in the previous chapter, EDP at the national level was not carried out. ANI, which chairs the ENEI Executive Committee and hosts the secretariat in charge of implementing the national S3, has not created any of the "Entrepreneurial Discovery Spaces" foreseen in the original S3 document (ENEI, 2014). Therefore, at the national level, there is no engagement of the actors in a continuous search for projects and possible adjustments to the national S3.

4.2   Regional S3 EDP processes

The situation is different at regional level. With varying degrees of development in different regions, we were able to identify interesting attempts to interpret and operationalise the EDP concept, through the creation of regional platforms or thematic working groups aligned with the regional priority-domains. These experiences are however relatively recent and therefore it may be too early to assess their effectiveness. Nevertheless, while table 9 resumes the available data and some indicators collected by interviews, in the following we briefly describe the practices of EDP in different regions. More detail of the platforms and thematic Working groups in each region is provided in Annex 4.

Alentejo: At the time of our research EDP processes had not been activated in Alentejo. There are no platforms or thematic groups formally created. However, in our interviews we were informed that informal focus-groups ("ateliers"), similar to those created during the S3 design stage, are being assembled.

Algarve: In Algarve seven EDP working groups including a coordinator were created by invitation from the regional authority. However, they were not all created at the same time. Older platforms created in 2015, such as for "Life Sciences and health" and "Renewable Energies" are more advanced with a longer experience in meeting and producing concrete project proposals for their domains. However, overall engagement appears to be low.

Azores: The regional government created three EDP thematic working groups in 2018, aligned with the priority domains, namely: Agriculture, Livestock and Agri-business; Fisheries and Sea; and Tourism. Strongly promoted by the local authorities, these groups are very active in identifying project ideas and proposals and are currently developing their strategic visions for the next S3 cycle. As a low-density region, with relatively less qualified actors, EDP groups in Azores face difficulties in mobilizing local SMEs. Nevertheless, regional authorities in Azores are very active and supportive of these groups.

Centro: The EDP working groups, transformed into Innovation Platforms, were formed as focal areas grouping and mobilising the differentiating priority domains of the Centro Region: Sustainable industrial solutions; Valorisation of natural endogenous resources; Technologies for quality of life; and Territorial

innovation. Their work is coordinated by specialists, external to the CCDR-C. The creation of Innovation Platforms occurred during the initial steps of S3 in order to initiate the EDP. They were very active in 2015, followed by reduction in activities, but in 2017 the working groups were reactivated, in particular to re-align the areas of action and to improve the analytical grids of the regional OP calls. In total, there were, until late 2018, 15 meetings of WG, involving 720 participations. In addition, Centro took part in the JRC project on Targeted Support to Lagging Regions, which included an EDP workshop and a Project Development Lab within the wine sector. Two projects were subsequently funded by the regional OP. As already mentioned, it also helped organise a cross border EDP workshop in the priority domain of Aromatic and Medicinal Plants (PAM), which led to an approved project within the Interreg POCTEP programme.

Lisbon and Tagus Valley: Thematic groups initially formed to discuss the design of its S3 around 2015/2016 have recently been reassembled. The number of meetings and events of these thematic working groups particularly in the cases of "Exploration and exploitation of marine resources" and "Research, technologies and health services" occurred in a short period of time in 2015. Since then all the discussion groups were inactive. Nevertheless, these groups made interesting collective discoveries that were followed by design of calls for proposals by the regional managing authority. In a few cases, we were able to identify the initial stages of initiatives and projects with transformative potential. This is for example the case of one project funded by CEF – the Connect Europe Facility in the priority domain of "Transport and Mobility". In this case, it was the relevant working group that enabled new project proposals related to work being done in the region to be submitted to the CEF. This aimed to enlarge the scale of the project and its impact on regional ticketing and intermodal technologies. Another example of the potential of these groups in Lisbon is the formation of a new consortia between private and public sectors in the health sector to focus on biopharma activities. Also the group working on tourism proposed a much needed investment upgrade and expansion of the professional and vocational training activities for tourism (the International Tourism Academy).

Madeira: Aligned with the priority-domains, seven EDP working groups (out of the eight priority domains) were created in 2018. All the working groups are coordinated by researchers from the University of Madeira, and centre their activities on scientific research projects and technology transfer, attempting to involve firms. The groups display different levels of development. In particular, the dynamics generated by the "Maritime bio-sustainablity", the ICT, as well as the "Agri-Food" are interesting cases that have already produced promising ideas. The local development agency, ARDITI plays a pivotal role in promoting the recently created EDP working groups. As in other regions, the practices of EDP in Madeira are taken as meetings to join actors and align different interests of the local university with the perceived needs of the local sectors.

Norte: *EDP* platforms were assembled during the initial S3 definition stage. However at the implementation stage, EDP platforms were (re)activated only in 2019. This late launch of EDP platforms appears to be a response to present concerns about the need to adjust and/or redesign the next cycle of S3, and not so much the need to explore of the current cycle. Although formally created very recently, EDP platforms such as for "Advanced Manufacturing Systems", is already quite dynamic. This is because it is built on top of the pre-existent Produtech initiative, which is a local cluster (a regional association of enterprises, research institutes universities, etc.) for the development and diffusion industrial technologies, led by the research institute INESCTEC and strongly connected to the European Technology Platform Manufacture. The EDP platform for Culture Creativity and Fashion also shows interesting work and it is currently looking to narrow its scope to more technical issues related to the garment and textiles industry.

Based on what we know of the EDP at regional level, there are a number of issues to be considered. First, in general, the creation of EDP platforms/groups in the Portuguese regions is relatively recent, as shown in table 9. After the design of the regional S3 in 2014, there appears to have been a long period with few or no meetings/events related to the workings of these platforms/groups. In other words, the regions do not have in place a continuous process of entrepreneurial discovery that is essential to create local social spaces where actors get together to exchange views on new opportunities and how to develop previously defined domains of knowledge application and innovation. Consequently, these relatively recent platforms have not produced many ideas for experimenting with new projects. In our interviews, we also got the impression that in a few cases, the late creation of these EDP groups or platforms is motivated by the need to reflect and revise S3 for the next cycle 2021-2027, and not by a genuine concern with developing a continuous EDP.

A second important issue is the difficulty of local authorities in almost every region in involving and engaging local firms in the platforms and groups. Although lists of participants in the few EDP events identified were

difficult to obtain, our interviews revealed many difficulties in mobilizing the private sector, particularly with regard to smaller and medium sized firms. These difficulties are particularly severe in regions where business density is low and therefore they have almost no local firms with R&I capabilities.

Third, regional authorities often outsource the coordination of EDP platforms/groups to external actors, mainly university researchers but in a few cases also to local firms. The dynamics of these groups appear to depend to a substantial extent on the coordinator and the time he/she has to work in a voluntary capacity on the difficult task of organising meetings and events. Some group coordinators are very active and manage to create and maintain a more or less participatory process. Others are less dynamic, or simply lack the time. On the other hand, coordinators coming from the local universities naturally influence the thematic group for a search process related to "research" opportunities, hence overlooking market and business inputs.

Fourth, events organized by these groups tend to be 'formal meetings' to discuss project applications within the priority-domains. Participatory methods to promote an inclusive co-search/discovery process followed by specific design, prototyping and pilot projects are not used., which restricts the emergence of transformative insights with potential for further specialisation. Nevertheless, interviewees frequently mentioned the importance of these groups/platforms to increase regional networking, trust, and learning on how to collaborate. We may therefore conclude that, although recently formed these groups/platforms may be contributing to a change in mind-sets.

Fifth, although it is too soon to have a general evaluation of EDP practices in the Portuguese regions, according to the dimensions defined in table 1, from our interviews we learned that in general all actors value the work of the platforms/groups. They are usually created through formal invitations from the regional authorities and in some cases, they are quite large groups working in a rather formal format. For regions with lower proportion of highly qualified firms, where difficulties in engaging direct participation from local SMEs are higher, the EDPs are at risk of being appropriated by the local universities, who transform it into a search process for research and technology transfer funding opportunities.

Finally, when asked about the results of their EDPs, interviewees did not mention how such processes contributed to identifying concrete knowledge–based innovation opportunities with regional transformative potential, nor how EDP contributes to adjusting and redefining the initial priority-domains. In fact, while changing mind-sets may be a visible result, output in terms of insights for new projects is low (table 9). In our view, while this is related to the late formation of these groups/platforms, it is also strongly associated with the way S3 is operationalised. The idea that EDP would be the arena where S3 is implemented has been substituted by an implementation logic based on the selection criteria for project applications from general calls for proposals. In addition, management teams (in particular for regions with very high volume of projects within their priority domains) have few resources to go beyond the task of classifying projects according to the criteria. Even if the recently created EDP groups/platforms would arrive at particular promising insights in their priority domains, in our interviews we learned that the possibility of turning these insights into specific regional calls for proposals or even specific project proposals for funding has not been particularly welcomed by the PT2020 managing authorities. Nevertheless is important to note that the regions of Lisbon and Tagus Valley and Azores have in fact designed regional calls for proposals, based on the workings of their local groups/platforms, showing that it is possible.

4.3 Assessment: EDP processes and National and Regional levels

At the time of our research there were no active EDP platforms, attempts to implement processes for further exploring national technology infrastructure across regions and priority domains, or identification of nationwide horizontal initiatives that could mobilize social-economic transformation[19]. Hence, in the following, our assessment relates only to the regional level.

When were the platforms/groups created? Is there a continuous process since definition of S3?

While platforms (and thematic discussion-groups) are operational in almost every region, they were created relatively recently (see table 9). After initial elaboration and definition of the S3 priority domains, there were

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[19]   At the end of 2019 ANI launched a series of events called 'Dynamics for Innovation' covering nine of the 15 ENEI priorities, with two more planned. The precise format and results of such events has not however been analysed in this report.

generally few or no attempts to continue the initial group dynamics search processes. Therefore, we cannot say that there are continuous EDP working since S3 inception in the Portuguese regions. In cases where the EDP platforms/groups were assembled quite late, our impression is that the main motivation was not to have a continuous process of entrepreneurial discovery and identification of innovation opportunities, but to kick-start the process of revision and eventual redesign of S3 for the next cycle 2021-2027. The exception to this analysis is the Centro region, where there has been a sustained effort to continue and strengthen EDP working groups.

Who coordinates/leads EDP at the platforms/groups?

Regional authorities initiative these EDP groups or platforms but in most cases, they outsource coordination to academic professors and researchers and, in a few cases, to local private sector companies (table 9). In cases where university-based researchers coordinated the EDP groups/platforms, the EDP and indeed the whole S3 appears to be centred on scientific research overlooking the needs for "non-technological" innovation and of upgrading capabilities in local SMEs.

Which actors are called to participate?

All actors are called to participate but it is easier to secure the involvement of the public sector and of universities in particular. There is a need to overcome SME individualism and resistance to participation in EDP activities. Regions with a higher proportion of low qualified SMEs suffer from low private sector engagement. It is therefore important to seek a greater involvement of low and mid-tech businesses whose needs are usually not about technological innovation, so that they can further develop their internal innovation capacity and exploit new opportunities.

How is the EDP implemented? What is the number/frequency of EDP meetings/events so far? What participatory methods are used?

Currently active EDP activities are implemented essentially through events and meetings that bring together actors to discuss and debate new opportunities for technology and innovation in the regions. The number of meetings/events is very low. However, events and meetings that join-up actors to reflect upon innovation opportunities do not necessarily make for an entrepreneurial discovery process. Search-identification processes (of discovery) require higher levels of engagement and collective learning based on real insights about what are the most adequate future possibilities. In addition, platforms and groups are not equally active and even when they are active, there is no use of participatory methods to support search, identification and exploration of innovation opportunities.

What is the perceived goal of the EDP processes?

The perceived goal of EDPs is to bring together actors to reflect upon common problems and opportunities related to their priority-domains. In general, EDPs are taken as opportunities to network, strengthen university business cooperation in the pursuit of opportunities for technology transfer and innovation. More recent EDP groups/platforms are motivated by the need to revise and redesign S3 for the 2021-2027 EU funding period.

How do EDP processes feed the decision-making process regarding identification of projects and adjustments to the priority-domains?

Feedback from EDP to higher levels regarding identification of projects and adjustments to the priority domains is still tepid. Nevertheless, in our view that the outputs of the current platforms and thematic groups could contribute to the design of specific thematic S3 calls for proposals to be issued by the relevant OPs. However, because of the particular way S3 was operationalised, regional authorities face high resistance from the managing authorities to any project suggestions coming from these platforms or thematic groups that imply a modification or adaptation of existing standardised policy instruments.

Is there a consensual revised/adjusted S3?

At the time of interviewing there was only one RIS3 that had undergone modifications, which was Centro in 2017. However, when asked about changes to the current S3, regional and national authorities usually point to a need to revise priority-domains that currently face lower demand for funding. In our view this may be a narrow view of strategy implementation driven by a need to spend public funds, not necessarily by the transformative potential of activities and projects discovered. In a few cases, they also mention the need to define domains at levels that are easier for SMEs to identify as more immediate areas for R&I.

Table 9. Indicators of Entrepreneurial Discovery Processes by Priority Domains

Region	Priority-domains / Regional Platforms	Date platform/ groups were created	Type of Coordinator	Number of meetings (up to July 2019)	Participatory methods	Projects co-designed as a result of EDP
Norte	Health and Life Sciences; Culture, Creativity and Fashion Maritime Resources and Economy Human capital and specialised services Mobility industries and environment Advanced manufacturing systems Food and agri-environmental systems Symbolic capital, technologies and tourism services	All created in 2019	– Private sector – – – Private sector – –	– 1 – – – 1 – –	Join-up actors	None
Centro	Adoption of sustainable Industrial Solutions Valorisation of natural endogenous resources Mobilisation of technologies for quality of life Promotion of territorial Innovation	All created in 2015	Private sector University Private sector Local Government	1) 6[20] 2) 7[21] 3) 6[22] 4) 6[23]	Join-up actors	None
Alentejo	Food and forestry Economy of mineral, natural and environmental resources Critical technologies, energy and smart mobility Heritage, cultural creative industries and tourism services Technologies and specialised services of social economy	Not created	–	–	–	–

[20] Two of these meetings were Joint Working Group Meetings; Another one of these meetings was in the context of the discussion of the Regional Agenda for Circular Economy and was together with a WG3 meeting.

[21] Two of these meetings were Joint Working Group Meetings; Another one of these meeting was in the context of the discussion of the Regional Agenda for Circular Economy and was together with a WG4 meeting.

[22] Two of these meetings were Joint Working Group Meetings; Another one of these meeting was in the context of the discussion of the Regional Agenda for Circular Economy and was together with a WG1 meeting.

[23] Two of these meetings were Joint Working Group Meetings; Another one of these meeting was in the context of the discussion of the Regional Agenda for Circular Economy and was together with a WG2 meeting.

Region	Priority-domains / Regional Platforms	Date platform/ groups were created	Type of Coordinator	Number of meetings (up to July 2019)	Participatory methods	Projects co-designed as a result of EDP
Algarve	IT and creative industries Life sciences, health and recovery Renewable energies Tourism and leisure Agri-food industries and forestry Sea industries, fisheries and aquiculture	2015 2015 2015 2017 2017 2017	University University Private Sector University Private Sector University	1 3 - - -	Join-up actors	1
Lisbon and Tagus Valley	Transports and mobility Exploration and exploitation of marine resources Research, technologies and health services Tourism and hospitality Cultural industries and resources for creativity	2016 2015 2015 2015 2016	Public Sector Public Sector Public Sector Public Sector Public Sector	2 7 6 5 2	Join-up actors	1 - - 1 -
Madeira	Tourism Resources and technologies of the sea Health and well-being Food quality Sustainability and infrastructure management Energy, mobility and climate change Information and communication technologies	All created in 2018	All groups coordinated by University researchers	n.a.	Join-up actors	None
Azores	Agriculture, livestock and agri-business Fisheries and sea Tourism	All created in 2018	University Private Sector University	4 4 4	Join-up actors	None

Source: own elaboration

5 Monitoring

While the previous chapter analysed the practices of EDP, in this chapter we turn to issues of monitoring the strategies. Our aim is to assess the systems that were designed (national and regional levels), how they were implemented and whether eventual changes to the strategy result from feedback.

5.1 Monitoring of National S3

The national S3 (ENEI, 2014; p.81) included the setup of a comprehensive monitoring system, comprising four different types of reporting, as presented in table 10. As a complement to the monitoring system, a specific web page of the strategy involving interconnection with the national and regional components would also be made available to facilitate effective information, appropriation and follow-up of the strategy by all the stakeholders.

Table 10. Types of monitoring reporting defined by the National S3

Types of reporting	Documents to be produced
Periodic reports	Annual reports Reports on the development of domain priorities
Follow up of expectations and perceptions	Gap analysis report
Biennual diagnostic of the R&I system	Benchmarking report – with 10 other countries
National S3 panel report	Main indicators Result indicators Execution indicators

Source: ANI (2019)

The first type of reporting would be an annual progress report to be prepared by the ENEI Executive Committee, in addition to each of the priority domains. Based on 'gap analysis', the second level monitoring would include a survey of actor's expectations and perceptions of the system. The third type of reporting would update the initial SWOT analysis (FCT, 2013) every two years. Comparison with other European countries would also be undertaken with the same format, every two years. The aim of this third type of monitoring exercise would be to have an in-depth comparative analysis of the evolution of the different components of the S3 in similar countries, in order to evaluate whether the weaknesses of the system are reduced and strengths reinforced. Finally, a fourth type of reporting would consist of a context analysis based on output and performance indicators (compilation of a panel of 135 indicators) (ENEI, 2014; tables 16 and 17, on pages 82 and 83) selected to monitor each of the dimensions of the national S3 policy mix. This would therefore include the objective increasing and adjusting skills and qualifications within the priority domains; enhance the excellence and competitiveness of the R&I system; increase and deepen the interactions in knowledge networks, mobilize innovative grassroots entrepreneurship, increase the base of the innovation system and its competitiveness, and finally internationalise scientific and technological flows. The panel of indicators, initially proposed by ENEI (2014), is however too broad and based on a set of generic indicators that are more adequate for evaluation of outcomes and impacts, and less for monitoring.

Perhaps due to the governance problems affecting the national S3 described in the previous chapter, we found no evidence of reports other than the first type of reporting (ANI, 2019). However, this report provides little analysis of progress in the national S3. For example, while it describes the governance bodies at national and regional levels, it provides very little detail on their composition. Also it provides little or no information on how regional platforms promote EDP and in particular it does not provide any explanation for the non-existence of the EDP at the national level (EDE spaces). It also registers how alignment and selection criteria used in the deployment of funding instruments have been fine-tuned to positively discriminate project proposals that contribute to the domain-priorities defined by S3 (national and regional levels). Specifically, it registers how criteria for alignment (eligibility) and selection of project-proposals were

introduced across a long list of 23 instruments that support R&D, innovation, entrepreneurship, business internationalisation under TOs 1 and 3. The same for instruments that promote human capital formation in the scope of TO8 and TO10 (see section 3.2). However, although the PT2020 instruments are effectively coordinated and discriminate in favour of projects aligned with priority domains (see Technopolis, 2017), this type of monitoring is of little use to understand whether the objectives of the different S3 are being met.

During our institutional interviews, ANI and other actors considered the increase in number of entities applying for the funding of large "mobilizing" projects aligned with S3 as an important monitoring indicator. These projects bring together national consortia of private sector businesses, universities and/or public research centres that are apparently growing in terms of the number of entities participating in each consortium. In their view, this is a sign that different activities along the value chain are present in the same project. However, while this may be a good indicator of innovation collaboration between clients and specialised suppliers, upstream and downstream in their respective value chains, it does not indicate higher specialization levels in the defined knowledge and innovation priority domains.

The ANI (2019) report does prove interesting results from its preliminary demand analysis of all ESIF projects aligned with S3 priority-domains up to June 2017, including the cumulative distribution of approved projects (as well as excluded projects that were nor considered aligned to any of the S3 domains): It suggests that demand for public funding is higher for the broad domains of Agri-Food, ICT, Production Technologies (process and product industries), Tourism, Automotive and Aeronautics, Health and the Creative Industries.

To summarise, the national level monitoring report fails to provide relevant information to understand whether S3 is on the track to achieve any of the national or regional specialisations envisioned. This is because it provides input information on projects approved for funding but no indication of possible context changes that might already be happening, the project results/outputs, and whether they contribute to the strategies' overall objectives and vision.

5.2   Monitoring of Regional S3

In this section we analyse the monitoring activities related to the regional S3 strategies. The section is based principally on the information gathered through interviews with the regional authorities. More information about monitoring in the regions is provided in the annexes.

At the time of research **Alentejo** was in the process of defining terms of reference for contracting out the implementation of its S3 monitoring system. While there has been no formal S3 monitoring system, the region uses information from the thematic and the regional OPs to follow up demand and project funding in the defined priority-domains.

In **Algarve**, monitoring activities also rely on the information obtained from the OPs. As in other regions there is a comprehensive follow-up of input indicators related to projects approved by type of instrument and priority-domain. While tourism clearly dominates, other areas such as the sea industries, renewable energy and life science and health also show interesting levels of demand.

The government of **Azores** produces *a*nnual S3 reports focus on the activities undertaken to implement the strategy, including calls for funding, complemented with information about which publicly funded projects were aligned with S3. As in the other regions, this kind of monitoring is therefore focused on input indicators related to number of projects by thematic objective and by priority domain.

The initial S3 of **Centro** did not include a monitoring system (because this was to be done at national level, according to the national strategy). In the first half of 2018, discussions began to try and better specify indicators and measures of success. A monitoring system was created by the technical team during 2017, and validated in May 2018 at the last Coordinating Council and Strategic Counselling Group meetings. CCDR-C sees S3 design as a continuous and evolving process and has been the most active Portuguese region in this regard, evidenced by a series of documents on a dedicated S3 webpage, including a dedicated webpage for monitoring[24]. Participation in the horizontal activities of the Lagging Regions project and other international benchmarking exercises were highly relevant for the institutional learning in this topic.

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24   See: http://ris3.ccdrc.pt/index.php/ris3-documentacao/regional and http://ris3.ccdrc.pt/index.php/monitorizacao

Lisbon and Tagus Valley has no specific monitoring reports concerning S3 implementation. The region only has data of projects funded by the regional OP, using input indicators related to projects approved by type of instrument and by priority-domain.

Because the Observatory proposed at the S3 design stage in ***Madeira*** was not operationalised, monitoring activities are the responsibility of the local Agency for Research, Technology and Innovation – ARDITI. Monitoring is similar to those of the mainland regions and it is based essentially on data from the regional OP. Nevertheless, ARDITI also uses a table of regional context indicators such as R&D expenditures and scientific publications to set long-term objectives and monitor changes. For 2023 the region sets an ambitious objective of reaching 0,7% of regional GDP on R&D expenditures, rising from 0,26% in 2011 (latest available year). However, 50% of such increase is attributed to future efforts of local firms that have generally not applied for ESIF R&I projects or participated in EDP activities. Monitoring of demand for funding in Madeira suggests however that complementary linkages between the domains of Agri-Food and Maritime bio-sustainability should be further explored and perhaps that the domains could be merged.

The participation of ***Norte*** in the Interreg Project Monitoris3 (CCDR-Norte, 2018) resulted in a proposal for a comprehensive monitoring system including input, output, results and context indicators. However, in practice, the monitoring of S3 Norte uses input indicators based on data from the regional and national-thematic OPs concerning number of projects and amount of investment by priority domains, thematic objective and type of instrument. The data shows low demand for funding in the broad domains of Maritime resources and economy and Symbolic capital, technologies and tourism services. The broad domains of Culture creativity and fashion and Mobility industries and environment together represent around 60% of all ESIF provided via incentive schemes for innovation and 30% of incentives for R&D. Both EDP and monitoring activities in the Norte region suggest that the initial definition of the domain 'culture, creativity and fashion' involves many different dynamics on a wide set of actors e.g. textiles industries and creative industries, and therefore it is suggested to re-define this particular domain. While demand for funding in the Norte region appears aligned with regional strengths, it is not possible from this data to understand whether such demand (in broad domains) is inducing related variety around and within the priority-domains as planed in the initial strategy (EREI-Norte, 2015).

To summarise, we did not find monitoring systems that could effectively measure the progress of the regional S3. What we found was monitoring activities based on data extracted from the information system that support the national-thematic and regional PT2020 OPs. Monitoring activities rely on input-indicators related to which project proposals submitted to general standardised calls for R&D and Innovation receive funding. Monitoring of project finance is usually presented by type of funding-instrument, domain-priority, and type of project. Therefore, current monitoring activities focus on execution of policy instruments, neglecting a much needed monitoring dimension related to early signs of changes in the regional innovation system and landscape as possible results of the strategy (monitoring for strategic intelligence).

5.3   Assessment: Monitoring practices at national and regional levels

What are the objectives of the Monitoring System?

The objectives of current monitoring practices are to follow-up project funding. They are clearly insufficient to form what can be described as a strategic monitoring system, which includes feedback loops to make changes. A fragmented governance framework as described in chapter 3 and a general lack of resources and skills for S3 strategic monitoring at both national and regional level greatly contributes to the problem.

What are the indicators used? What sources of information are used?

At the national level, the first report produced by ANI in 2019 only provides input indicators. There is little or no concern with context change i.e. whether the S3 strategy is being accomplished. At the regional level monitoring focus on how well tuned PT2030 instruments are in terms of the alignment and selection criteria. Monitoring is concerned with how these instruments effectively and positively discriminate projects classified by broadly defined priority-domains. Hence, the monitoring system is essentially based on input indicators related to the number and type of projects funded (and not funded), type of instruments, investment amounts and number of projects by priority-domains. We find little or no monitoring activities to understand how the regional/national contexts are (or not) changing towards the envisioned specialisations, even if based on qualitative evidences.

How the performance towards the objectives of S3 is measured? What changes were made to the initial S3 as a consequence of monitoring?

Current practices of S3 monitoring suffer from a number of serious limitations resulting from being a procedural process, centred on execution issues related to funded projects. Therefore, there is no information enabling a reflection around whether context changes (if any) can be associated to the funded projects. In other words, existing monitoring does not show whether the strategy is on track and if any adjustments and revisions are needed. In some regions low level of demand for project funding and/or different dynamics of sub-areas within some domains is taken as an indicator that redefinition of priority domains is needed. However, making strategic decisions based on the demand for funding in a particular priority-domain may be misleading. Demand may be low because the region lacks the capabilities it needs in a domain that is considered strategic and therefore precisely because of the absence of capabilities the strategy may be to focus on building knowledge and innovation capabilities first, in order to generate demand for project funding at a later stage.

6 Recommendations

6.1 Rebalance the governance structure

In an increasingly complex global world, successful innovation strategies must involve a wide range of actors with relevant knowledge, interested in formulating and agreeing objectives, implementing activities and adjusting the strategy when needed because of fast changing circumstances. This requires a much more effective co-ordination and co-operation between different policy areas and government levels than the current S3 governance system in Portugal. In particular, it requires mechanisms for horizontal articulation between different ministries and agencies, vertically between national and regional authorities, and between public authorities, education and research institutions, businesses and civil society.

As reported in chapter 3, the governance structure for initial elaboration and implementation of S3 at the national level was built on top of the existing multi-level legacy, without proper adaptation. At the regional level, S3 brought greater impacts with the creation of Regional Innovation Councils, management teams and platforms/groups to support EDP. While the composition of the different bodies associated to strategic steering of S3 appears clearly skewed towards public sector institutions, there are other serious governance limitations. One is the classic cleavage between research and innovation policies and lack of horizontal governance mechanisms at the national level. A second limitation is the particular way in which S3 was operationalised – a matrix of alignment and selectivity criteria applied to standardised funding instruments covering essentially TO1 and TO3, common to all OPs. In our view, such operationalisation reduces the strategy to the application of funding criteria and subordinates S3 to the administrative "compliance" structures designed to support management of ESIF, hence effectively removing any strategic steering. To be more effective S3 requires stronger horizontal governance and integration across policy areas. In addition, it requires a stronger integration between strategic intelligence and management of the instruments used to implement the strategy.

We recommend establishing (or re-activating) a high-level inter-ministerial commission in order to support a wider cross-ministerial decision-making concerning S3. This inter-ministerial commission should include the Ministry of Economy, the Ministry of Science and Higher Education and the Ministry of Planning, in addition to the Ministry of Territorial Cohesion which was created in November 2019. Given the priority domains already identified during this first cycle of S3, the Ministries of the Sea, Agriculture Forestry and Rural Development, as well as the Ministry of Health should also have a role in S3. However, because we are talking about a knowledge-based and innovation strategy for economic development (it is not a Science and Research strategy), the Ministry of the Economy should take a clear leading role in this inter-ministerial commission. Technical staff drawn from the different ministerial cabinets would support this commission. In addition, instead of two higher national councils for the same policy, there should be just one single National Advisory Council for Innovation Policy, with a role of validating, complementing and supplementing the National/Regional S3 bottom-up processes. This Higher National Innovation Advisory Council should be composed of people (not organisations) known for their work as entrepreneurs and innovators.

Instead of the current large non-operational Executive Committee, we recommend a much smaller National S3 management team focused on supporting the development of regional EDPs and strategic-monitoring. Such a smaller team should include people with the skills needed to perform the difficult task of executive-coordination of the national level S3.

The new governance structure should also provide a clearer definition of the role of fundamental agencies, in particular ANI and the FCT. These bodies must assist the management team and the Inter-ministerial commission with S3 policy implementation, as well as prioritisation of actions to achieve the overall goals. Central funding agencies, such as AdC and management structures of the major thematic operational programmes related to R&I such as COMPETE2020 should also be involved, but it should be understood that management of cohesion funds cannot substitute the need for strategic steering.

In several of the regions, the composition of the Regional Innovation Councils needs to be revised. The Councils are too large and lack the presence of the private sector. In addition, the management teams at the need to be endowed with resources to organise and facilitate EDP activities and, in particular with regards the use of monitoring for strategic intelligence. Both at the national and regional levels, S3 management teams should not be involved with management of ESIF OPs. This is the task of the management units and

intermediary bodies of the PT2020 (or next) structure. The relationship between the two structures is that the S3 team deals with strategy design, implementation, EDP and follow-up monitoring, consequently leasing with managing authorities about the instruments it needs to execute the strategy.

6.2   Refocus national and regional S3

At the national level, instead of multiple sectoral R&I strategies, there is an urgent need to have only one single overarching national strategic framework. The national S3 could be such a strategy, providing an initial definition of focused R&I priority domains in line with long-term social and economic goals, as well as a clear focus for the use of ESIF over the 2021-2027 programming period, since this is the main source of public funding for R&D and innovation in Portugal. Successful R&I policies are guided by one single clear and shared vision and characterised by stability and predictability in the objectives, governance structure and funding. One single vision and stability is needed because this enhances the level of trust between the different actors of the system and enables them to set and act upon medium to long-term plans – for hiring, investing, co-operating – with confidence.

However, S3 at the national level must be coherent with regional S3 specialisations proposed by the regions. Unlike 2013 where the process was centralised and participation of private sector actors and civil society confined to final validation of proposed domains, the process for the design of the next S3 should be truly participative and depart from already existing regional EDP groups/platforms. National S3 would frame, promote and help to further develop existing regional EDPs. At the national level, S3 must also provide clear directions on how to bridge different core capabilities in different regions in the pursuit of "interfaces" between regional research and application priority domains. This latter aspect is particularly important because regions that contain a disproportionate concentration of knowledge resources may contribute with their knowledge resources to EDP processes in other regions. On the other hand, regions with fewer resources may not need to replicate resources already existent in other regions but instead may connect for inter-regional collaboration.

Following the example of other countries, S3 could have a seven or eight-year time horizon, with a rolling cycle of revision every four years with corresponding R&I monitoring and follow-up, providing detail on specific discoveries and experimentations in each region. Unlike the past, orientations included in this new cycle of S3 should inform the structure, the content and the design of the instruments of the OPs for ESIF in the period 2021-2027. As reported in earlier chapters, in the period 2014-2020 Portugal overlook the need to have a long-term entrepreneurial discovery process and reduced S3 to a one-time choice of broad priority domains used to focus standardised funding-instruments. The focus of such standardised funding instruments was accomplished through a complex matrix of alignment and selection criteria across a wide array of multiple instruments.

For the 2021-2027 cycle, if the S3 is to be properly designed/implemented, it cannot be taken as a set of Innovation Plans i.e. one-time definitions of general science and technology domains or broad societal challenges that could actually serve any region. The new S3 must be based on long-term processes of discovery and experimentation, leading to identification of trial-activities and new refocused domains at a lower level of granularity. These new domains should be "market-application" domains providing clear directions for experimenting with new or improved products, services, processes or business models.

However, the design/implementation of S3 as a long-term discovery process requires a different governance of the policy-decision process. Although much could be said about this process, in our view this new governance should be organised as a public-private participatory process. The initial stages of this long-term process may take at least 12 months and go through different stages. For example a first stage of listening, harvesting and collating inputs from the existing platforms and thematic groups at the regional level. In this initial stage of a long-term discovery process, facilitated by public authorities, regional platforms and thematic-groups should go beyond the (re)definition of market-application domains and identify large mobilizing projects (ambitious risky projects with transformative potential) joining companies and academic research centres, but focused on solving specific market problem-needs and challenges.

Although this process would be facilitated by policy makers through a series of workshop-events using specific facilitation tools such as Open Space Technology for example, the process is not to be driven by

regional authorities. Public organisation are not to lead the processes, but they can play a key role as "facilitators" using facilitation tools.

In addition, the current use of standardised instruments across regions and the lack of flexibility to issue specific targeted funding calls aligned with S3 thematic needs as they arise along the discovery process, need to be significantly revised. Different policy-instruments should be used to stimulate discovery and experimentation based in entrepreneurial knowledge as the process enfolds itself. For example, at the beginning of a S3 cycle, it may make sense to organise regional hackathons to identify which market-applications to address and then to design calls addressing specific issues and problems related to the market-applications the region wants to explore. The rationale for public funding here is to cover entrepreneurial failures and losses associated to such complex discovery, experimentation, and testing activities. Once a new entrepreneurial trajectory is discovered, other policy-instruments may be used to help promote imitation and regional spill-overs. At later stages in the process we would recommend that private and public actors join to organise Regional Accelerators. Funding not only from EU programmes but also from seed and venture capital may be used to support the more advanced stages of the entrepreneurial discovery process. Finally, in order to refocus policy-makers should bear in mind that a "good" priority is one which:

Associates one (or several) sector(s) with one direction of change.

Finds a balance between a too broad and a too narrow definition of the priority

Reflects regional specific capacities (strengths and potentials) and regional specific opportunities (innovation and megatrends).

- Takes into account what is the meaning of innovation and innovative activities in the particular context of the considered region and the considered industries.

6.3   Reinforce practices of EDP

As reported in chapter 4, there are no EDP activities at the national level, and those at regional level are relatively recent, framed by the newly created platforms and thematic groups. Hence, there is a need to increase engagement and strengthen a step-by-step discovery and experimentation processes in the regions. The platforms need to learn how to use participatory methods, so that they can effectively work as 'spaces' for inception, experimentation (and failure) of ideas and projects, driven by entrepreneurs and co-designed by the relevant stakeholders. The benefit of the existing regional platforms and thematic groups lies in their systematic approach to (re)definition of their own priority domains and within each domain systematic search and test of innovation opportunities. Regional EDP platforms should or could be directly associated with the existing regional clusters. While platforms for EDP do not need a formal structure, they must nevertheless be resourced with experienced facilitators. Platforms are spaces for inspiration, creativity and collective learning, enabling participants to see a range of future possibilities, while understanding how to use current regional and extra-regional knowledge resources.

However, SMEs with lower absorption capacity and with practices of non-technological innovation, play an important role in the Portuguese economy. This is particularly the case in regions of lower density. For this reason, it may be useful to distinguish two types of platforms – associated with the two modes of innovation; STI and DUI. These two types contrast in terms of internal organisation and priorities for each platform.

Therefore, we propose to distinguish between:

Doing-Using-Interacting-DUI platforms (extensive entrepreneurial discovery)

- Science, Technology and Innovation-STI platforms (intensive entrepreneurial discovery)

In regions with lower absorptive capacity and thinner institutional capacity, there is no critical mass for science-based innovation. Therefore, qualified entrepreneurial discovery is likely to be limited or it may even be captured by a small elite of more qualified actors e.g. a few small research centers at the local university. Hence, the focus of this type of platform for these regions would be in helping local enterprises to discover, understand and formulate their own problems first, while helping to improve their in-house innovation capabilities. DUI platforms could therefore be established for any priority-domain (and not necessarily only for lower density regions) and would include the activities of awareness raising, capability building, including

identification of training needs for the effective use of more advanced technologies, actions to stimulate networks, cooperation and partnerships at national and inter-national level (see also OECD, 2011).

While DUI platforms seek to stimulate entrepreneurial discovery in less qualified SMEs, STI platforms would focus on firms with more advanced in-house innovation capabilities. These platforms would promote closer interactions with regional (and extra-regional) research communities, and aim to strengthen the knowledge-intensity of medium high and high-tech industries and services. For these sectors the focus and working of the EDP is quite different. For example, each STI platform should combine methodologies currently used to implement 'regional business accelerators'. Accelerators are usually assisted by design-thinking methods, such as Lean Startup and Customer Development, to help test new innovative business ideas. Accelerators at a regional scale could easily feed into existing regional incubation centres.

6.4   Improve Monitoring

As reported in chapter 5, there is a clear need to establish an effective monitoring system that feeds strategic intelligence. Monitoring should inform whether the regional/national S3 are on track to achieve the desired goals, yet current activities illustrate how criteria, introduced to fine tune a pre-existent complex set of PT2020 standardised instruments, positively affect the allocation funds to different national/regional priority domains. However, it does not help to know the progress of the strategy in transforming the region i.e. it does not provide information for strategic intelligence.

In addition, current monitoring is dependent of the information system used for follow-up the use of ESIF. However, the development and monitoring of S3 should not rely only on input-funding indicators but also on specific indicators that allow a measurement of progress in discovery and experimentation.

To meet these monitoring needs at national level, we recommend setting up an analytic monitoring unit drawn from ministries responsible for S3 development and implementation. This unit should provide the inter-ministerial commission with a detailed monitoring report every two years and concrete proposals for revision of the national S3 every four years (at mid-cycle).

We recommend similar developments at the regional level. Regional S3 management units should internally develop strategic intelligence skills (or acquire externally from experts) in order to 'sense' how the regional activities are progressing. Regional monitoring reports should also be produced every two years and concrete proposals for the S3 revision every four years.

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List of abbreviations and definitions

AICEP Portugal Global – Trade & Investment Agency

ANI – National Innovation Agency

AdC – National Agency for Development and Cohesion

CCDR – Regional Development and Coordination Commissions

CCDR-Norte – Norte Regional Development and Coordination Commission

CCDR-Alentejo – Alentejo Regional Development and Coordination Commission

CCDR-Algarve – Algarve Regional Development and Coordination Commission

CCDR-LVT – Lisbon and Tagus Valley Regional Development and Coordination Commission

CNEI – National Council for Entrepreneurship and Innovatio

CNCT – National Council for Science and Technology

CoLABs – Collaborative Laboratories

COMPETE 2020 – Competitiveness and Internationalisation Operational Programme 2014-2020

COTEC – Portugal – Enterprise Association for Innovation

DG – Regio – Directorate General Regional and Urban Policy

EC – European Commission

EDE – Entrepreneurial Discovery Spaces

EDP – Entrepreneurial Discovery Process

ENEI – National Strategy for Smart Specialisation

EREI – Regional Strategy for Smart Specialisation

ERA – European Research Area

ESIF European Structural and Investment Funds

EU –European Union

FCT – National Foundation for Science and Technology

HESS – Higher Education for Smart Specialisation

ICT – Information and Communication Technology

IAPMEI – Competitiveness and Innovation Agency (for the support of SMEs)

INESCTEC Institute for Systems and Computer Engineering, Technology and Science

JRC/EC – the European Commission's Joint Research Centre

KET – Key Enabling Technologies

LR1 – S3 Support to Lagging Regions, Phase 1

LR2 – S3 Support to Lagging Regions, Phase 2

MCTES – Ministry of Science, Technology and Higher Education

NGO – Non-government Organisations

OP – Operational Programmes

POCH – Human Capital Operational Programmes

PT2020 – PORTUGAL 2020 Partnership Agreement between Portuguese State and the European Commission

R&D – Research and Development

R&I – Research and Innovation

S3 – Research and Innovation Strategy for Smart Specialisation

S3 – Smart Specialisation Strategy

SME – Small and Medium-Sized Enterprises

TO – Thematic Objectives

List of figures

List of tables

Annex 1. Assessment questions used for this assignment

Q1. What were/are the governance structures and processes in place at National and Regional levels and at initial and implementation stages?			
Questions	**Criteria**	**Indicators and other Evidences**	**Sources of information**
How governance enabled initial elaboration and definition of priority-domains?	Range of priority-domains. GPT versus application domains	Description of the governance structures, their composition, and the S3 strategies	Desk research
What types of bodies compose the governance structure?	The balance of bodies at different levels of the MLG structure.	Evidences on types of bodies, their functions and responsibilities	Interviews
What is their composition? In particular how Higher Education Establishments and Private Sector participate?	Existence of competent regional / national institution or body, responsible for the management of the smart specialisation strategy	Evidences that higher education establishments and private sector participate	
How Regional governance structures fit with the National structures?	Fit and coherence between national-regional levels.		
How the governance structures enable inter-regional/international cooperation?	S3 multi-level cooperation		
What changes were undertaken is S3 governance structures?	Presence of relevant stakeholder groups including Higher Education and Private sector.		

Q2. How is the EDP – Entrepreneurial Discovery Process effectively implemented?			
Questions	**Criteria**	**Indicators and other Evidences**	**Sources of information**
When where the EDP platforms/groups created? Who coordinates/organises EDP processes/events? What actors are called to participate? How is the EDP implemented? Whether it is a continuous process since definition of S3? What is the number/frequency of EDP meetings/events so far? What participatory methods are used? What is the perceived goal of the EDP? How EDP processes feed the decision making process regarding identification of projects and adjustments to the priority-domains? Is there a revised/adjusted S3 to the initial proposal?	Involvement of relevant actors and stakeholders In particular, Education Establishments and private sector actors Sufficient opportunities to participate / to provide inputs Use of participatory methods Enables learning and feedback to the policy decision process Actions necessary to improve national/regional R&I systems Actions to manage industrial transition	List of EDP events Frequency of EDP events/meetings List of EDP organizers List of participants in EDP events Description of participatory methods used? Evidence of how EDP contributed . Adjustments to the selected specialization domains . Identification/selection of projects Evidence of EDP contribution to behavior additionality	Desk research Interviews

Q3. Is there a specific follow up monitoring of the implementation of the projects, to make sure they contribute to S3?			
Questions	**Criteria**	**Indicators and other Evidences**	**Sources of information**
What are the objectives of the Monitoring System?	Up-to-date analysis of bottlenecks for innovation diffusion, including digitalisation		Desk research
What are the indicators used? Provide Examples What sources of information are used?	Indicators are accessible, reliable, transparent.	Description of the Monitoring System	Interviews
How the performance towards the objectives of S3 is measured? What changes were made to the initial S3 strategy as consequence of Monitoring?	Enable to measure the performance towards the objectives of the strategy. Enable to measure projects and actions are contributing to S3 – concentration of activities on priority-domains	Written Monitoring Plan Meta-info on indicators definition Monitoring reports on how the strategy is being accomplished	

Annex 2. List of actors interviewed

Alexandre Almeida, ENEI coordinator hosted at ANI – National Innovation Agency

Madeira

Pedro Campos, M-ITI Universidade da Madeira Information Technologies

José Carlos Marques, Universidade da Madeira Agri-Food

Miguel Ângelo Carvalho, Universidade da Madeira Maritime Bio-sustainability

Filipe Oliveira, AREAM – Agencia Regional da Energia e Ambiente, Madeira

António Almeida, Observatório do Turismo, Universidade da Madeira

Elsa Fernandes, Vice-Chanceler Universidade da Madeira

Rui Caldeira, OOM – Observatório Oceânico da Madeira Universidade da Madeira

João Rodrigues, CQM – Centro Quimico da Madeira Universidade da Madeira

Carlos Lopes, Startup Madeira

Pedro Diniz, Investigação e Transferência de Biotecnologia, Lda

Azores

Simão Neves, Câmara do Comércio e Indústria dos Açores, Azorfisk

Ana Tavares, Direção Regional do Emprego

Pedro Miguel Pacheco de Lima, ACPD- Associação de Comerciantes de Pescado

Carlos Santos , Observatório de Turismo dos Açores – OTA

Ana Isabel Moniz, Universidade dos Açores

Teresa Ferreira, NONAGON

Célia Pereira, Cresaçor

Conceição Melo, Direção Regional do Emprego e Qualificação Profissional

Carlos Furtado , CALL (Centro Açoriano do Leite e Lacticínios)

José Batista Alfredo Borba, Universidade dos Açores

Manuel Martins Ledo, Associação Terra Verde

Bruno Pacheco, DRCT / S3 Açores

Deborah Estima, FRCT, Secretaria Regional do Mar, Ciência e Tecnologia

João Gregório, DRCT / S3 Açores

Ana Pacheco, DRCT / S3 Açores

Mónica Cerda, DRCT / S3 Açores

Maria Ananias, DRCT / S3 Açores

Lisbon and Tagus Valley

Teresa Almeida. President CCDR Lisboa and Tagus Valley

Fernando Nogueira, CCDR Lisboa and Tagus Valley

Ana Ramos, CCDRLVT, Serviços da Direção de Serviços do Desenvolvimento Regional

Nuno Bento, CCDRLVT Observatório de Análise das Dinâmicas Regionais.

Miguel Miranda – IPAM, Portuguese Institute of Ocean and Atmosphere

Rogério Gaspar – University of Lisbon

Isabel Feijão Ferreira (Turismo de Portugal)

Tiago Farias – Lisbon City Council

Centro (interviews December 2017 to February 2018)

The coordinators of the four S3-Centro platforms were interviewed.

Vitor Ferreira, Platform 1 – Sustainable industrial solutions: Cluster do Habitat Sustentável

Ana Catarina Gomes, Platform 2 – Valorisation of natural endogenous resources: CNC

António Cunha, Platform 3 – Technologies for quality of life: IPN

Paulo Fernandes, Platform 4 – Territorial innovation: Municipality of Fundão

José Pedro Soares, CVR Bairrada

Ana Palmeira, Labfit & UBI

Carina Dantas, Caritas de Coimbra

Elisabete Rita, AIDA

Alexandre Almeida, ANI

António Ramos, AD&C

CCDR-C, collective interview with Alexandra Rodrigues, Sophie Patrício, António Cardoso, Alexandra Gomes, Carla Coimbra)

Annex 3. Interview Guides

All regions except Centro (in 2019)

1. What are the governance structures and processes in place?

How governance enabled initial elaboration and definition of priority-domains?

What types of bodies compose the governance structure?

What is their composition? In particular how Higher Education Establishments and Private Sector participate?

How Regional governance structures fit with the National structures?

How the governance structures enable inter-regional/international cooperation?

What changes were undertaken is S3 governance structures?

2. How is the EDP – Entrepreneurial Discovery Process effectively implemented?

Who coordinated/leads EDP at the platforms/spaces/groups ?

Who organizes EDP events? (provide list of EDP organizers)

What actors are called to participate? (provide list of participants in EDP events)

What is the goal of the whole EDP?

When where the platforms/spaces/groups created ? (frequency of events/meetings, where the meetings occur, provide a list of EDP events)

How is EDP implemented? What participatory methods are used?

How EDP processes feed the decision making process regarding identification of projects and adjustments to the priority-domains?

Is there a consensual revised/adjusted S3 proposal?

Is there evidence that EDP contributes to behavior additionality?

3. Is there a specific follow up monitoring of the implementation of the projects, to make sure they contribute to S3

What are the objectives of the Monitoring System?

Is there an up-to-date analysis of bottlenecks for innovation diffusion, including digitalisation

What are the indicators used? Provide Examples

What sources of information are used?

How the performance towards the objectives of S3 is measured?

If Monitoring enable to measure the performance towards the objectives of the strategy?

What changes were made to the initial S3 strategy as consequence of Monitoring?

Show examples of how Monitoring enables to measure whether projects and actions are contributing to S3 – concentration of activities on priority-domains.

Centro (in 2018)

1. Synthesize your organisation's interest in being involved in this RIS3-Centro process?
2. From your perspective what has RIS3 been up to now? A set of measures. A way to generate synergies? A real regional strategy?
3. How has your organisation been involved in RIS3 governance mechanisms (eg. explaining participation in the platforms)?
4. Do you consider the governance model of RIS3 at regional and national level clear? (Who should be the pivotal actors in the implementation of RIS3? Are there regional resources, capacities and competencies for RIS3 governance?)

5. Do you consider that there has been complementarity between the public investments in the region related to RIS3 and other (national - as thematic OPs - European as European programs such as INTERREG or H2020) in the Centro?
6. Consider that additionality between private investments and RIS3-related investments has existed in Centro (refer to large anchor projects that have been / are being developed by private parties)?
7. What are the main positive elements of your participation in RIS3, particularly in the WGs in Centro?
8. What are the key elements to improve that you would like to highlight from your participation in RIS3, in particular the WGs in Centro?
9. Opportunities? Threats?
10. Any monitoring issues to be referred?
11. Communication of RiS3? Is it effective?
12. Any issue that you would like to stress about the implementation of RIS3 in the Centro and/or in Portugal?

Annex 4: Regional Smart Specialisation Strategies

S3 Alentejo

Alentejo – Governance of S3 Initial elaboration

The conception stage of the Alentejo S3 was based on the Commission Guide. It was a collective exercise with the participation of relevant actors who actively contributed to the definition of a vision for the development of Alentejo by 2020. This exercise combined a diagnostic analysis with foresight, positioning the region on the global scale. For Alentejo, the focus of this initial process of defining priority-domains was not only on the production of new knowledge but, fundamentally, harnessing existing knowledge and technologies to support innovation, including organizational and social innovation. The principles and assumptions that underline the construction of the Alentejo S3 were the following:

1. Regional R&I priorities were chosen on the basis of their strengths in the regional context and ability to from partnerships, avoid duplication and fragmentation and/or where efficiencies and large-scale would impact with critical mass already existing or expected.

2. Where competitive advantages were possible through the mobilization of talent and the articulation of R&I capabilities with business needs.

3. Priority domains would support the development of clusters and interdisciplinary linkages within and outside the region.

4. The principle of collaborative leadership *i.e.* the possibility to develop the regional innovation system based on public-private partnerships (quadruple propeller).

The first step in analysing the regional context was to map the existing resources and knowledge assets (analytical, synthetic and symbolic knowledge) and evaluate their potential for economic added value, as well as the actual relations between knowledge assets and the local production of goods and services. This was followed by an assessment of technology and market relatedness, supported by studies and input from stakeholders. The result was the proposal of five domains for smart specialisation, which were then more closely analysed in terms of human capital and economic activities. The analysis concluded with a foresight exercise to evaluate how resources and assets would develop and their potential for translation into marketable goods and services. Several thematic workshops were also organised, and questionnaires were sent to participants seeking to test and validate the choice of priorities.

Thus, the identification of strategic priorities in Alentejo was based on the analysis of the local economy (statistical information analysis) and scientific, technological and regional innovation, validated at later stages by participation of the main actors in the region (business associations, companies, entities of the science and research system, intermediary organisations, etc.). More than 500 actors participated at this stage of the process either through written contributions or through the participation in meetings. Of the several initiatives during the initial definition stage CCDR - Alentejo highlights the following:

- Joining the European Commission's S3 Platform" in November 2012 helped with methodologies for developing the strategy;

- A questionnaire sent to 42 organisations that undertake R&I activities in Alentejo, which allowed: (i) to identify areas where the region has a greater number of research projects and scientific publications; (ii) to know more about the typologies of actors in recent years; (iii) to identify the themes considered as priorities for the development of research and innovation in the region;

- Organisation of eight specific workshops, integrating a wide range of public and private entities, aiming at strengthening reflection and participation of all actors in the selected domains;

- Taking advantage of the presence of a European Commission appointed expert, sectoral meetings were held, with a wide participation of the regional actors (companies, business entities, intermediation entities in the processes of technology transfer, entities without regional SCT);

- Joint participation with Extremadura in initiatives to promote cross-border and transnational cooperation, leading to Alentejo joining two Euroregions: EUROACE (Alentejo, Centro, and Extremadura) and EUROAAA (Alentejo, Algarve and Andalusia). Similarly, Alentejo joined another transnational project which shared information and defined a set of indicators for monitoring S3, the social economy and renewable energy.

In summary, S3 Alentejo is the product of a long process of listening and interaction with regional actors. The initial priority domains defined for Alentejo were the following:

- Food and forestry
- Economy of mineral, natural and environmental resources
- Critical technologies, energy and smart mobility
- Heritage, cultural and creative industries and tourism services
- Technologies and specialised services of the social economy

Alentejo – Governance of S3 implementation

The governance structure of RIS3 implementation at Alentejo is similar to that of other regions. At the top level the proposed composition of the Regional Innovation Council involved more than 70 members including regional research institutes and centres, companies in the region, users, relevant institutes for policy planning, municipality associations and other relevant actors. Such a large regional innovation council, proved difficult to operationalise and only in 2019 CCDR-Alentejo reformulated this Council proposing a new one with around 30 members. The Regional Innovation Council at Alentejo met for the first time in January 2019.

Steered by CCDR-Alentejo the Regional Innovation Council coordinates and promotes regional innovation policies. At the operational level, the TMU – Technical Management Unit is concerned with promoting participation and engagement of the regional stakeholders in the definition and implementation of RIS3. So far, no specific EDP thematic groups or platforms were activated at Alentejo. However, a focus group to work on the next RIS3 cycle was created in 2019 and, through this group some discussion and debate around the priority areas for 2030 has been promoted.

In addition monitoring activities associated with the RIS3 Alentejo are based on input indicators related to regional/national projects approved for ESIF funding.

S3 Alentejo Governance Structure
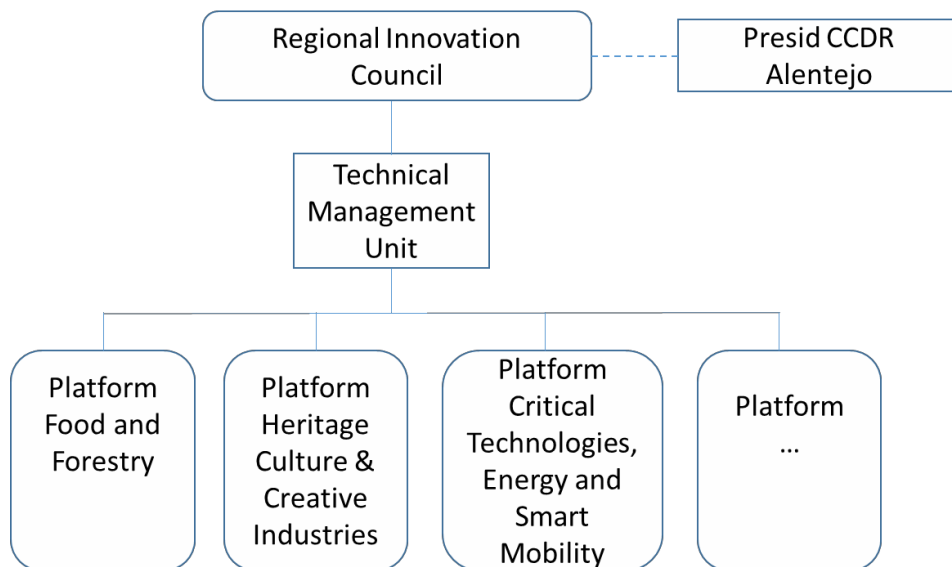
S3 Algarve

Algarve – Governance of S3 elaboration

As in the other Portuguese regions, the Algarve S3 was prepared following the six-step methodology proposed in the Commission Guide. According to the principles of Smart Specialization, the process of defining the priority domains was organized as a dual process: On the one hand top-down, starting by setting the major objectives in line with EU level priorities, in particular the Europe 2020 strategy; and on the other hand a bottom-up process of entrepreneurial discovery. While the former resulted from extensive analysis of statistical evidence about the regional economy and its knowledge assets, the later resulted from a series of restricted meetings, seminar, and thematic working groups, to reach a common and consolidated understanding of the current situation in the region.

During the preparatory work at this initial definition stage, the Algarve Regional Coordination and Development Commission (CCDR), Algarve University, the Algarve Inter-municipal Community and seven business associations signed an agreement reinforcing their commitment to the development of a regional S3. In February 2013, a questionnaire was sent to about a hundred companies, to establish their capacity in regard to research, innovation and internationalization. Throughout 2013, several workshops and events were implemented, some more sectoral / thematic and others of a general nature, which were attended by companies and other entities, as well as Algarve University. The preparation of S3 also included public presentations, peer discussions and comments, from Portuguese and European partner regions, as well as local stakeholders. A peer review process was held on 4 and 5 July 2013, and a thematic seminar was held (jointly with the JRC), focusing on the concept of related variety and its application to European regions with specialisation in tourism. An expert appointed by the European Commission validated the approach and options of the Algarve in his assessment report.

In 2014, 71 bilateral meetings were held between the S3 Algarve working team (which included specialized external consultants) and companies from the region, business associations and research centres. These meetings had the central objective of discussing and validating the proposals, including operational tools that could adjust the instruments to the needs of the quadruple helix actors. Following these meetings, "Innovation Communities" were created. In this first phase these communities were structured around the domains identified as priorities and included representatives of the most dynamic companies in each sector, as well as the scientific community and other civil society organizations. In addition, it was foreseen that the "Innovation Communities" would also foster cross fertilization among the priority domains, thus helping in the implementation of the strategy.

Overall, given the constraints associated with over-specialization in tourism and tourism-related activities, deficits of critical mass in relevant science domains and weak inter-sectoral connectivity, the Algarve strategy focuses on niche areas of future experimentation and development, namely:

- Tourism and leisure
- Agri-food industries and forestry
- IT - Information Technologies
- Creative Industries
- Life sciences, health and recovery
- Renewable energies
- Sea industries, fisheries and "aquicultura"

Originally the there was only one domain for "Information Technologies and Culture Industries – ICC", that are now separated into two different domains.

Algarve - Governance of S3 implementation

In order to implement the designed RIS3 strategy, Algarve created in 2016 an Advisory Regional Innovation Council – Conselho de Inovação Regional do Algarve – CIRA, whose composition is proposed by CCDR- Algarve and validated by the Regional Council. CIRA advises the Algarve Regional Council and it has 78 members. CIRA it is composed by local 30 enterprises (38%), 13 organisations of the Scientific and Technological System including the University of Algarve (17%), 34 public organisations and other associations (44%) and 1 inter-municipality association (1%). CIRA meets in plenary sessions or in thematic sessions oriented towards the priority domains of smart specialisation in Algarve. So far CIRA has met 3 times. The Algarve Regional

Innovation Council – CIRA appreciates proposals arising from the work of the Thematic Working Groups at the operational level, and those found relevant for implementation of the regional RIS3 are forwarded to the relevant (regional or national) OP management authorities.

At the Operational level, strategic implementation relies on a "mission unit". This mission unit is integrated in the governance structure of the Algarve OP management unit, under Portugal 2020. Therefore, for Algarve strategic activities and funding operations are somewhat mixed. In supplement to their administrative management of ESIF funds, this unit accumulates the administrative support to the Regional Innovation Council and other important functions such as:

- Preparation of the thematic meetings or platforms for the Regional Innovation Council. These thematic meetings aim to follow-up the implementation of the strategy on their respective domains as well as stimulate local networking, innovation and internationalisation. The platforms are also places for entrepreneurial discovery processes.

- Organisation of UTDs (technical units for dynamic promotion) organised around each priority domain and participated by members of the management unit and with the support of external experts. Each UTD has its own structure for promotion of applied research (in each strategic domains), support to entrepreneurship, innovation and promotion of business internationalization, as well as attraction of In parallel to UTD.

- Creation and follow up of Thematic Working Groups to mobilize local actors (on a quadruple helix), and to include actors external to the region, if needed, to reinforce local reflexive capacity.

So far, there were 15 formal meetings of the Thematic Working Groups and 27 meetings with regional stakeholders. Overall the RIS3 regional governance structure in Algarve produced a specific protocol for the creation of the Regional Tourism Observatory. It also promoted the CULATRA 2030 (demonstration project), the project Digital Innovation Hub Smart Destination, as well as a reference site for active and wealthy ageing. There was no specific RIS3 in Algarve with the exception of one local call geared towards the support local research and technology centres/institutions.

Finally, also at the operational level, working with the "mission unit" Algarve created a regional observatory for monitoring and evaluation of the domains of smart specialization. The observatory uses data and information from project execution (projects approvals) of relevant OPs.

S3 Algarve governance structure
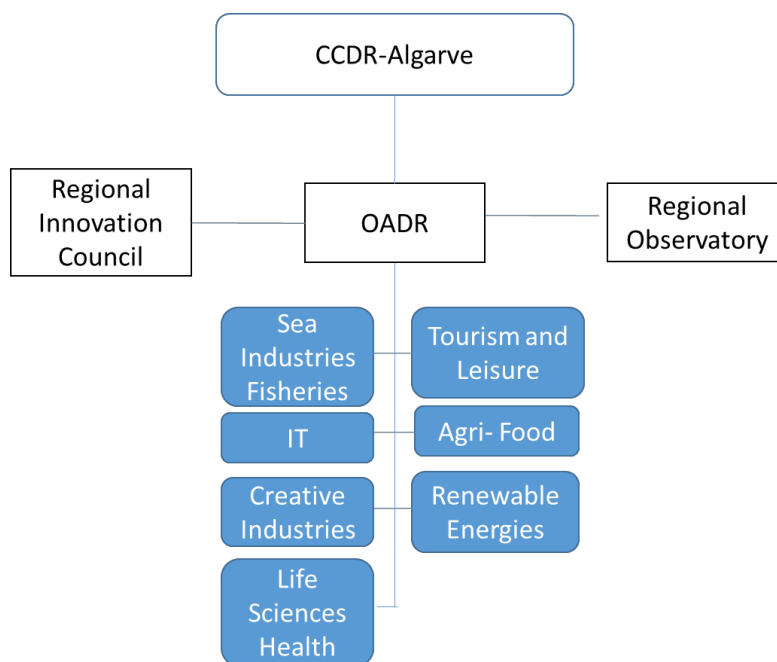
S3 Azores

Azores – Governance of S3 elaboration

Based on the guidelines of the S3 Guide, the development of the S3 Azores started by analysis of the regional context enabling to identify broad thematic areas namely Agriculture, Livestock and Agribusiness, Fisheries and sea and Tourism. These thematic areas were then analysed with respect to the existence of specific resources (or combination of resources), the potential for differentiation, the existence of critical mass and existing external links. This initial analysis was materialized in the form of "summary sheets" for each thematic area.

Departing from these thematic sheets, working groups were also defined. In each thematic area workshops and interviews to relevant stakeholders were carried out. Hence, at this initial stage the process included the participation and mobilization of a wide range of actors. The whole process included more than 40 individual meetings and the promotion of four workshops (one for the launch of the process and three thematic workshops), involving a total of more than 50 participants, covering the different components of the quadruple helix (companies, science and technology entities, public entities and society).

Although the participatory effort did not change any of the broad thematic areas previously identified, it enabled definition of a specific vision for each thematic area as well as lower level definitions of sub-areas (i.e. more focused specialisations within the broader areas), and a detailed action plan materialised in a list of strategic projects for the region.

Azores - Governance of S3 implementation

At the Azores Autonomous region, the Regional Innovation Council in its present form was created in 2017. It currently has 13 members, mostly from public administration, the local university and university-based research centers, and local enterprise associations. Although there are members of local enterprise associations and chambers of commerce and industry, no private sector companies participate directly at the Regional Innovation Council. Because in general local companies are relatively fragile and do not have internal capabilities for R&D and Innovation, it is more difficult for the Regional Authorities to directly mobilize local private sector companies to participate. In addition the local geographical dispersion in Azores (which is a region composed of 9 islands in the North Atlantic) does not help and possibly generates problems of equal representation and inclusiveness.

Nevertheless, the Regional Innovation Council plays an important Advisory role to the Executive Commission of S3 Azores, which was also formally created in 2017. After the design of S3 the local Directorate for Science Technology DRCT was restructured and separated into two different functions: science was joined with education directorate and technology with transports. This move delayed the deployment of S3, and therefore it was only in 2017 when the DRCT was reassembled to its previous form, that effectively the Regional Innovation Council and the Executive Commission became fully operational.

The Executive Commission is composed of public sector bodies such as the Regional Directorate for Science and Technology DRCT, Regional Directorate for Agriculture, Regional Directorate for the Sea, Regional Directorate for Tourism and the Regional Directorate for Employment and Skills. There is also a management team that supports operations hosted at the DRCT with 6 people. While DRCT manages S3 in the Azores regions there appears to be a clear separation between the management team of S3 and the management unit in charge of the local OP.

One interesting aspect in the Azores is that, despite the geographical dispersion, local government is still able to maintain a close contact with many different actors, thanks to the region's low density. This is the case, in particular, of the EDP working groups. In some cases, the Azores region as also managed to issue S3 specific calls. These calls for R&D and Innovation project-proposals are designed for the 3 priority domains in simultaneous, hence excluding proposals outside S3. The specific calls were designed by the S3 management team and passed to the OP management unit. This is an interesting case where S3 operationalisation appears to go beyond application of criteria for alignment and selectivity in general standardized calls for R&D and Innovation.

Recently in 2018, EDP thematic working groups were created for each priority domain. The groups are revising and validating the initial strategy and developing their vision for the next S3 cycle. For example, the fisheries and sea group which works with SMEs of little or no innovation capability, needed some time to explain to the private sector what is S3 and what would be the work within the priority domain. Participants of these priority-domains working groups consider that identification and gathering of actors is itself already an important achievement. Nevertheless, these thematic working groups have not met with the Regional

Innovation Council. They meet only with the Executive Commission and therefore feedback from the working groups to the Regional Innovation Council is not direct. Overall, thematic groups have not yet had the time to design and arrive at projects and/or the design of calls for proposals addressing common challenges within the priority domain.

S3 Azores Governance structure
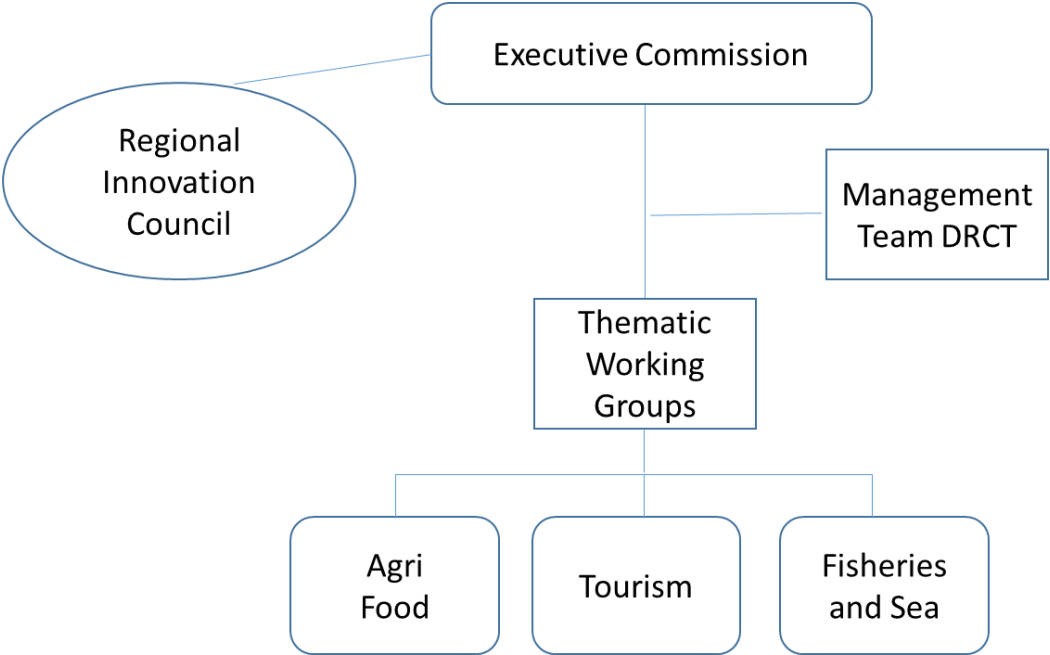
S3 Centro

The S3-Centro was designed in the context of a wider exercise of strategic reflection on the future of the region by 2020. Based on the identification of thematic domains in which Centro excels or possesses latent potential and considering a set of transversal domains (figure 1), it was possible to reach four main areas, which mobilise the differentiating domains in regional priorities, and which are currently functioning as Innovation Platforms:

1 – Sustainable industrial solutions

2 – Valorisation of natural endogenous resources

3 – Technologies for quality of life

4 – Territorial innovation

Differentiating Domains of S3-Centro (Source: RIS3 do Centro de Portugal 2020)
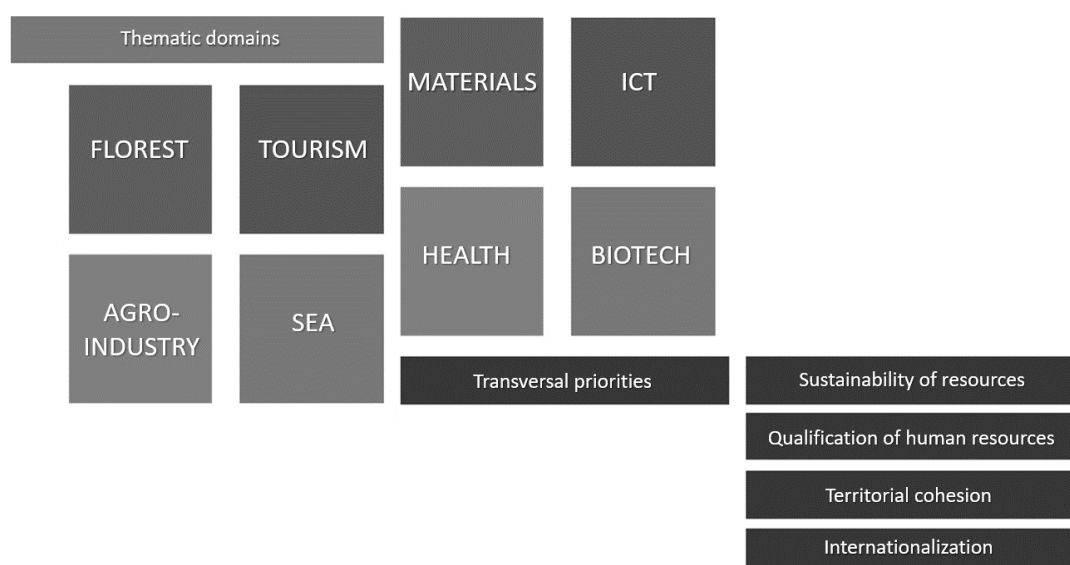
In Centro, the S3 governance system followed closely the guidelines and general recommendations of the European Commission for the implementation of S3 processes. A multi-layer scheme includes: a "strategic layer" to facilitate high-level coordination, long-term planning and decision making (that includes three bodies, the Coordinating Council, the Extended Regional Council, and the Strategic Counselling Group), a "technical body" with a team of officials that plans, implements, coordinates the S3-Centro in its different elements, and a "bottom-up element" comprising groups of stakeholders and innovation performers from businesses, public research and civic society, organized along S3 platforms.

The system created is the following:

Extended Regional Council – corresponds to the Regional Council established within the scope of the CCDR-C (Decree-Law no. 228/2012, of October 25), with a broad composition, in order to represent all the relevant regional agents of the four typologies that are important to be involved in this process: public administration, scientific and technological system, companies and citizens.

Coordinating Council – led by the CCDR-C and composed by a group of regional entities that manage the development and follow-up of the S3-Centro. In addition to the CCDR-C, the following participate: Entities of the Scientific and Technological System, Representatives of the Universities of the region, Representatives of the region's Science and Technology Parks, Representatives of the region's Polytechnic Institutes, Representatives of the region's incubators, Representatives of the Technology Transfer Units of the region, Representative of regional businessmen, Representatives of the municipalities, Representative of PROVERE in the region, Representatives of exporting firms in the region, Representatives of the excellence SMEs in the region, Representatives of business angels in the region, Representatives of local development associations, Representatives of Social Solidarity Private Entities, Representatives of clusters (and PCTs) relevant to the

region, President of ANI, President of the AD&C, President of FCT, Representative of COMPETE Operational Programme, Regional Tourism Entity of Centro (Turismo de Portugal), President of Portugal Social Innovation, President of UMVI, Coordinator of NCPs (GPPQ).

Thematic working groups – These are the "spaces of entrepreneurial discovery" within which the relevant agents in each area are articulated, seeking to stimulate innovation and internationalisation, cooperation and networking. They were formed following the identification of the four Innovation Platforms as focal areas mobilizing the differentiating domains of the Centro Region and their work is coordinated by external experts to the CCDR-C. The Working Groups / Innovation Platforms are the follow: Sustainable industrial solutions; Valorisation of natural endogenous resources; Technologies for quality of life; and Territorial innovation.

Strategic Counselling Group – composed of well-known personalities who have a strategic thinking about the region and that can make a valuable contribution to the process.

Management Team – This team is made up of members of CCDR-C, having executive functions and being responsible for streamlining work, promoting meetings and producing documents, and mobilising the necessary resources.

S3 Centro Governance Model (Source: CCDR-C)
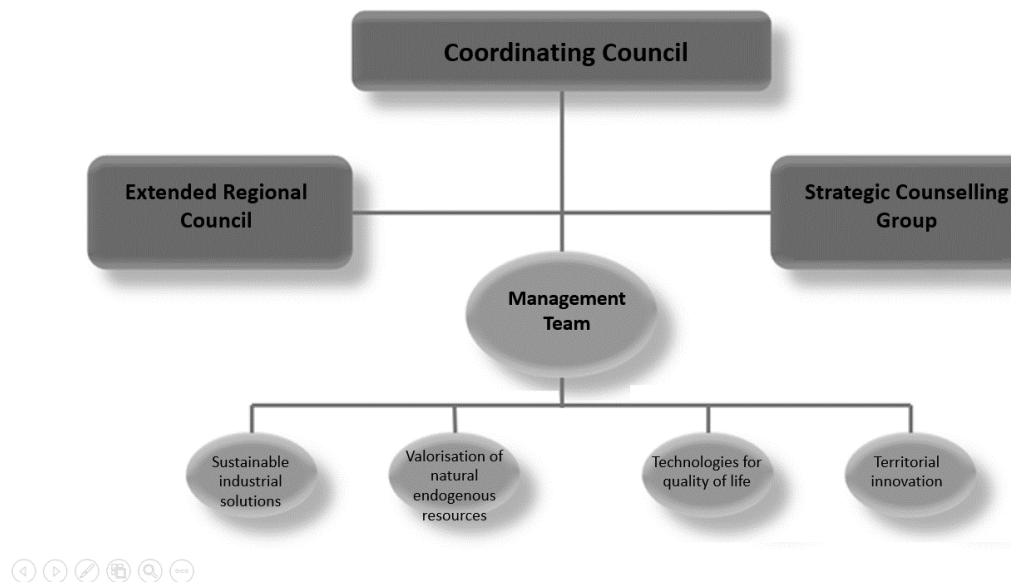
S3 Lisbon and Tagus Valley

Lisbon and Tagus Valley – Governance of S3 elaboration

The initial definition process for S3 Lisboa was a component of a wider Regional strategy design process, resulting in the Regional Action Development plan for Lisboa 2020 – Plano de Ação Regional de Lisboa 2014-2020 (PAR Lisboa 2014-2020), the regional Smart Specialisation Strategy and the regional OP – Programa Operacional Regional de Lisboa 2014-2020. This process was essentially top-down, but involved an intensive consultation of local and regional actors, lasting from April to October 2013 and involving around 500 actors who participated in 22 seminars and workshops. During this process different working groups were formed, involving science and technology actors, entities of the Regional Council, local business association and enterprises. These groups were formed by formal invitation of the regional authority CCDRLVT to different members from public and private sectors. After formed and during their meetings the group elected their coordinator which in most cases was someone from the University.

However, the development of the smart specialisation strategy for Lisbon cannot be dissociated from the specific role that Lisbon plays in Portugal. Because Lisbon and Tagus Valley is the region containing the Capital, it concentrates a significant proportion of resources in research and innovation. Lisbon and Tagus Valley is the Portuguese region with the greatest research capacity in the framework of the global economy, attracting investment and location of qualified resources, and therefore, also the resources in this region also feed R&D and development of other Portuguese regions and the integrated development of Portugal.

In this sense, the identification of the S3 domain-priorities for Lisbon and Tagus Valley resulted from a methodological exercise that using both statistical evidence and auscultation of local relevant actors considers:

- Activities in which the Region is specialized or that show strong dynamics of growth, innovation or insertion in globalization, and that are linked to the potential of the regional scientific and technological system. These activities will form the central and priority nucleus of the Region's smart growth strategy.

- Activities in which the region is specialized or that show strong dynamics of growth, innovation of insertion in globalization, but which are not linked to the potential of the regional scientific and technological system. These activities can play a role in pulling the production of knowledge and innovation as new bases of the region's intelligent specialization.

- Activities in which the region is not specialized but where there is a strong potential for the region to produce knowledge and innovation in the future and that can foster the development of new economic activities.

- Knowledge production and innovation activities, which cannot be directly associated to economic activities in which the region is currently economically-specialized or that register high growth, but that correspond to areas of specialization other regions in the in Portugal. These activities are important because they can be associated with the role that Lisbon assumes to be central to the rest of the national territory or to interface the Portuguese economy in international networks.

Lisbon and Tagus Valley – Governance of S3 implementation

Taking into account the needs of multi-stakeholder engagement, the Lisbon S3 governance model includes a top level advisory council that validates the strategic options related to regional policies for R&D and Innovation and a lower executive level, focused on the management and operationalization of the strategy (see Figure below).

The top level is composed of two bodies, the Regional Council and the Advisory Board. These two bodies ensure, on the one hand, participation of the majority of the actors in the region and the possibility of having experts and key players involved in defining and monitoring the implementation of the strategy.

Unlike other regions, Lisbon did not create a Regional Innovation Council. To avoid duplication of bodies the Regional Council (already existent body in all CCDRs) where all the relevant stakeholders for research and innovation policy already participate, is also used for S3. However, initially there was the intention to create a specific Advisory Board for S3, which would include experts in innovation and in particular cross-cutting areas crucial to the success of smart specialization strategies. The Advisory Board however was also created.

S3 Lisbon and Tagus Valley Governance Structure
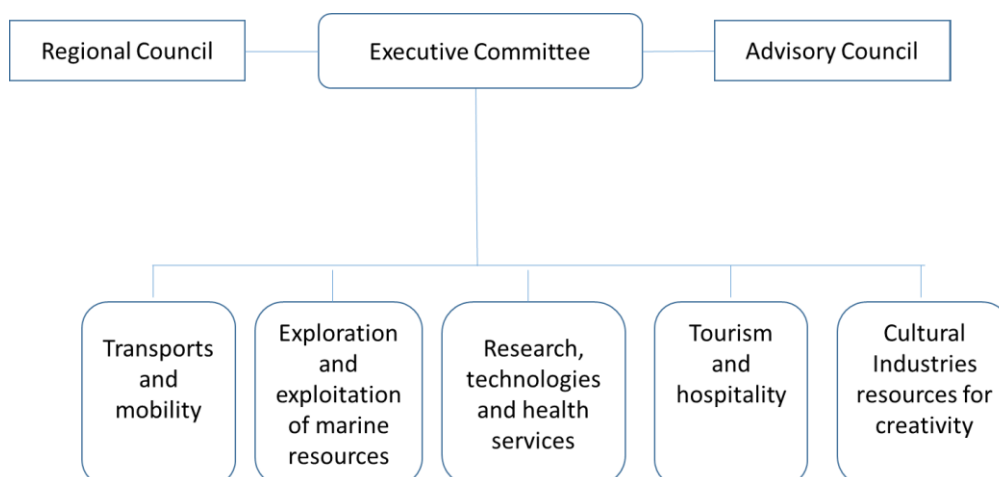
Hence, at the top level, an Executive Committee coordinates operational thematic working groups in each priority-domain supporting the operational framework for preparing and implementing the strategy. The Executive Committee includes the CCDRLVT that chairs the Committee, the coordinator of S3 and the leaders of the Working Groups. This Committee is responsible for the management of S3, including its monitoring, evaluation and the production of reporting information. The S3 coordinator has a central role in the implementation of S3, which includes not only the articulation and monitoring of the activity of the existing Working Groups but also the identification and proposal of possible new thematic priority areas to integrate the strategy according to the dynamics economic activity and production and knowledge in the Region.

Thematic Working Groups – one for each of the five priority domains in the Region were also created. Lisbon and Tagus Valley is probably the only region that maintained the original groups from 2013 that collaborated in the design of S3, working throughout the period, albeit with different compositions.

Except for the group of Creative Industries, each of these working groups is led by a reputed expert and integrates elements of the business community, higher education institutions, interface and support entities, and relevant public entities. The composition of the working groups reflects the strategies of differentiation in each priority-domain and takes into account market niches and complementarity between sectors, favouring innovation and creativity. The thematic working groups have the task of identifying typologies of priority interventions and anchor projects, defining the goals in each area and the criteria for selecting projects and initiatives in need of public support. The working groups may have variable configurations and dimensions throughout their existence, and it is the responsibility of the group leader to mobilize at all times the most relevant agents for the implementation of S3 in each domain-priority.

In the following, we resume the workings of these groups that support Entrepreneurial Discovery Processes in the priority-domains of Lisbon and Tagus Valley.

- Cultural Industries and resources for creativity

The work group for the support of entrepreneurial discovery processes in the domain of "cultural industries and resources for creativity was created in 2016. The regional authority leads the group. The group met two times and discussed problems and possible solutions related to the important role that the cultural and creative industries have, not just in urban environments per se but also as important components of inter-regional and international value chains. The group did not organized any EDP events but it refers to participation in other events relevant to the domain such as seminars on what sources of funding are available and how to apply, and seminars focusing on networking (sponsored by local Interreg projects). Therefore, we cannot really identify a series of events organized by the local regional authority leading to entrepreneurial discovery. Nevertheless, the group reports important connections to the local Operational Programme POR Lisboa suggesting the design of specific calls to help local private sector companies from the cultural and creative sectors in their processes of internationalization.

- Research Technologies and Health

The work group for the support of Research Technologies and Health was created in June 2015 when the group first met in a public seminar. The group is composed of public sector institutions (the regional authorities, public hospitals and health institutions, universities and their health research institutes) and health associations, with only a few local companies participating. Apparently, the group was only active for a short period, during the second half of 2015. However, the focus of the group's meetings was on identifying how existing (and new infrastructures and equipment) would be used for clinical research in a number of important areas e.g. diagnostic technologies, regenerative medicine, simulation and robotics applied to medicine. Once a set of strategic investment needs for the health sector in the region was identified, no more meetings/events took place. Following from the identified needs regional authorities in Lisbon and Tagus Valley published a number of calls for proposals oriented towards the investment needs. These calls cover essentially infrastructure and investment needs in the identified sub-domains of the "research technologies and health" priority domain for the region. Overall, as a result of the workings of this group the regional Operational Programme supported 67,6M€ in this priority-domain. In our interviews it was clear that these key investments in infrastructure and advanced equipment enabled related projects in biotechnology and in pharmaceuticals.

- Transports and Mobility

The transport and mobility group that supports entrepreneurial development processes in this priority domain, was created in 2016. The group is composed mainly of national government bodies and institutes as well as regional authorities (relevant for transport policy) and the city councils. Various transport associations also participate. Only a few private sector companies participate in this group led by the regional authority. Overall, the group had two meetings. The group has, nevertheless managed to focus the research and innovation strategy for this priority-domain in the area of "integrated ticketing systems" and as a result, the regional Operational Programme published a call for funding proposals related to the implementation of a regional integrated ticketing systems (including all modes of transport!).

- Tourism

The working group on tourism was created in 2015. As in the other groups for the support of EDP in the region Portuguese Institute of Tourism (Turismo de Portugal, IP) leads the group. The group is composed mainly of tourism associations and public institutes. Only a few companies directly participate. The group met five times over a period or around one year. Since 2016, there was no more meetings or events. Nevertheless, the workings of this group can be associated to the creation of a business incubation center for the tourism start-ups. Also the launching of a regional project envisioning the creation of an international tourism academy (international professional school) in the region and the reinforcement of the support given to the existing Estoril higher school of hotels and tourism (Escola Superior de Hotelaria e Turismo do Estoril – Estoril).

- Exploration and exploitation of maritime resources

The working group that supports processes of entrepreneurial discovery in the priority-domain of "exploration and exploitation of maritime resources" was created in 2015. The group is essentially composed of public authorities (national and regional levels) for the sea industries including fisheries. The group had 7 meetings during the second half of 2015 but, since then, there were no more meetings or events. The group focus has been on debating the strategy and involving the key actors. The group has not proposed any particular insight or project initiative. In addition, unlike the other priority-domains the regional authority CCDRLVT has not designed calls for proposals based on the workings of this group.

S3 Madeira

Madeira – Governance of S3 elaboration

S3 in the Madeira Islands resulted from a revision of the Action Plan for Research, Technological Development and Innovation of the autonomous regions of Madeira RAM, elaborated in 2013, in close collaboration with the definition of the Operational Program for RAM 2014-2020.

The elaboration of S3-Madeira followed the 6 steps as recommended by the European Commission S3 Guide. Although it was essentially a top-down process driven by the regional government it had the input of different working groups organised by thematic areas. The final result of such exercise was the definition of seven priority domains, namely:

- Tourism;

- Resources and technologies of the Sea;

- Health and Well-Being;

- Food Quality;

- Sustainability and infrastructure management;

- Energy, mobility and climate change;

- Information and Communication Technologies.

Madeira – Governance of S3 implementation

The top level of the Madeira S3 governance structure relies on a Regional Innovation Council chaired by ARDITI and composed by representatives of the intermediary bodies of the Community funds. These include the IDR IP-RAM and IDE, the Regional Directorate of Professional Trainning, the Regional Directorate for Innovation, the coordinators of the 7 domains (all from the University of Madeira) and the local business associations ACIF –CCIM and AJEM. Unlike other regions, the Regional Innovation Council in Madeira is not an advisory council. It is the main driver of S3, taking decisions about the implementation of the S3 strategy based on recommendations proposed by the regional specialization groups. It also promotes the coordination of actions and articulation with the Managing Authorities of the Regional Operational Program. The role of the Regional Innovation Council is also fundamental with respect to the necessary liaison with the Regional Operational Programme, in particular proposing the thematic content of the programme calls, as well as their timing. The Regional Innovation Council has met 5 times since in 2015.

In addition to the Regional Innovation Council the Autonomous Region of Madeira considered important to establish a Strategic Advisory Council, composed by a group of well-known technical, scientific or business personalities recommended by the thematic areas of specialization. The purpose of this Advisory Group is to evaluate the process and/or on particular aspects of its development, at the request of the Regional Innovation Council, as well as to advise the priority domains on how to improve their strategies.

Unlike other Regions in Madeira, S3 strategy is operationalized directly through the coordinators of each priority domain, who are also members of the Regional Innovation Council. The regional Science and Technology agency – ARDITI provides support to these coordinators and their working groups. It was intended that each of the working groups would be as much as possible led by people with the capacity to coordinate and develop each priority domain, thereby contributing to the concrete definition of investment priorities and regional support. Overall, all the priority domains are led by a local university professor/researcher from the local Madeira University.

In line with the recommendations of the European Commission and in support to the needs of the Regional Innovation Council and the Managing Authorities of the relevant Operational Programs, Madeira S3 governance intended to create a Regional Observatory covering all the priority domains. However, this Observatory is not in operation.

S3 Madeira Governance structure
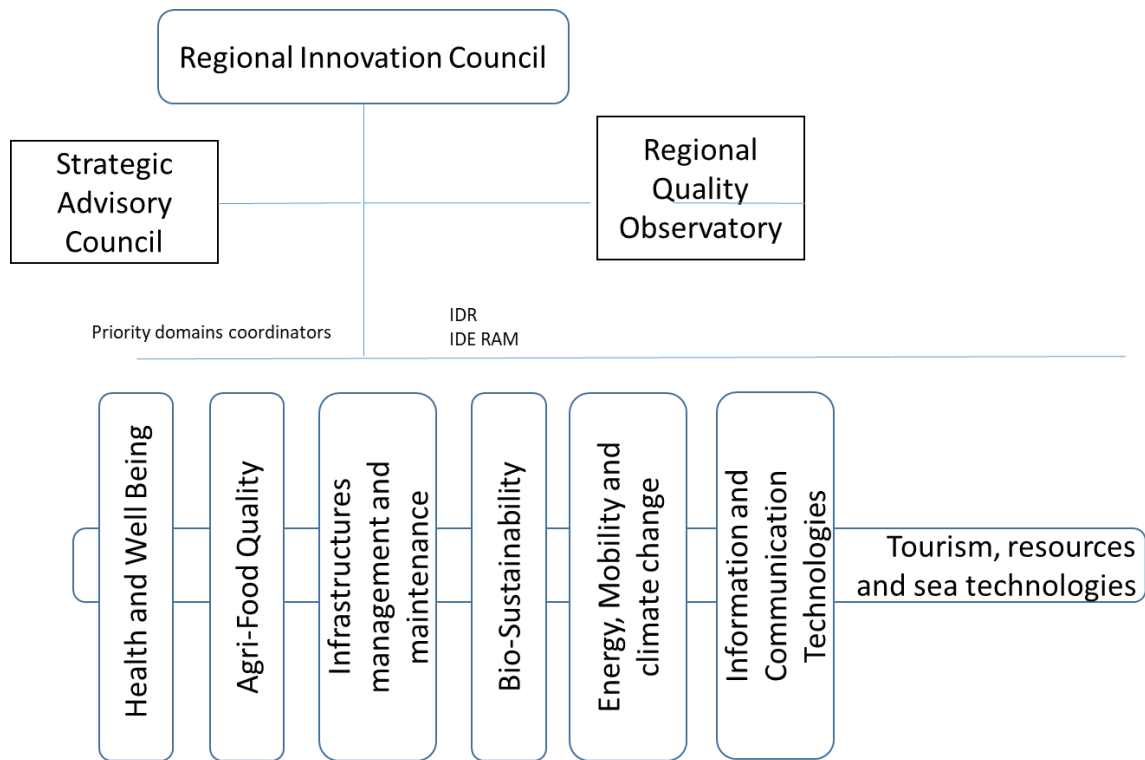
S3 Norte

Norte – Governance of RIS3 initial elaboration

In the Norte Region, the design of RIS3 was a collective construction process that began in June 2012, with strong involvement of the main regional actors. The initial elaboration stage, driven by the Regional Development and Coordination Commission (CCDR-Norte), started by consulting the Regional Council of Norte and by organising thematic workshops, in an attempt to test and clarify the rationale and to identify the areas in which the region could build competitive advantages. In a second moment, the strategy was submitted to public consultation, seeking a broad regional participation in order to enrich and improve the regional strategy of smart specialisation.

For the initial definition of priority-domains, the Norte region defined its own original criteria. A domain would be considered a priority when it already had regional critical mass, or strong possibilities to have, in at least one of the three vertices of a triangle, namely: regional public and/or private resources and assets regarding scientific and technological capacity; private producers and innovation capacity, and; advanced users. This initial conceptual work enabled CCDR-Norte to pre-identify eight priority domains.

- Health and Life Sciences

- Culture, Creativity and Fashion

- Maritime Resources and Economy

- Human capital and specialised services

- Mobility industries and environment

- Advanced manufacturing systems

- Food and agri-environmental systems

Symbolic capital, technologies and tourism services

After definition of priority domains, the next stage consisted in consulting regional stakeholders, through the promotion of thematic workshops, one for each priority domain. The workshops were organised following the quadruple helix model, hence involving companies, universities, R&D and interface institutions and final users in the process of collaborative leadership and entrepreneurial discovery. These work sessions were complemented with surveys that enabled fine tuning each domain. Finally, the process was submitted to wider public consultation. The whole process concluded with the approval of the priority domains by the Steering Committee of NORTE 2020, created to monitor the NORTE RIS3 and the preparation of the European Structural and Investment Funds programming period for the region. This Steering Committee was created within the Regional Council of CCDR-Norte.
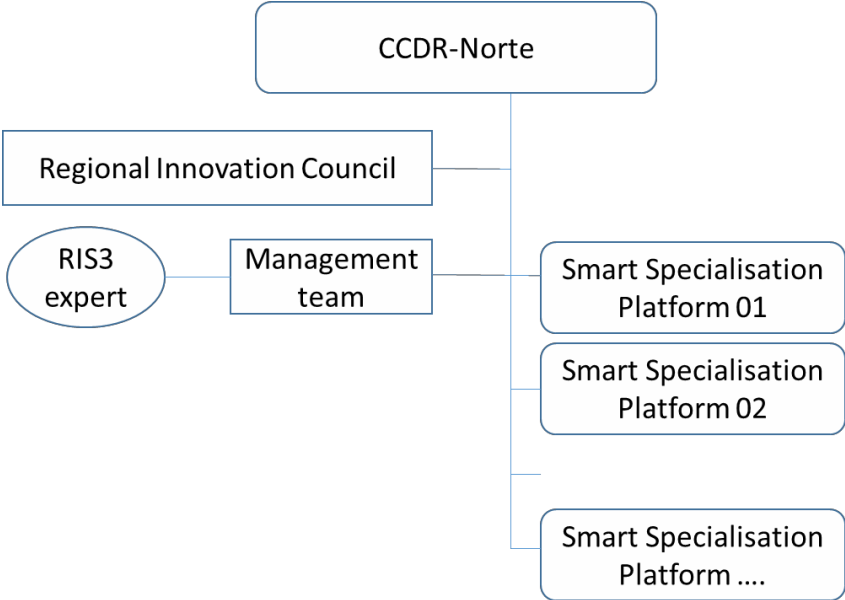
Norte – Governance of S3 implementation

The Norte Regional Innovation Council is the top level of the governance structure of RIS3 Norte and it has an advisory role to the Regional Council in matters relating to regional R&D and innovation. The Norte Regional Innovation Council was approved and established by the Regional Council in 2017. It is composed by 50 representatives from different regional and national organisations, such as: municipalities, municipality associations, employers' associations and trade unions, higher education institutions, regional development agencies, etc. It also contains representatives of the national public agencies in charge of research and innovation policies, and representatives of RIS3 Norte smart specialisation platforms (one representative per platform). The Norte Regional Innovation Council considers and approves new actions within RIS3 Norte priority areas and submit proposals to the OP – NORTE2020 managing authority (e.g. content for calls for proposals); approve RIS3 Norte yearly monitoring reports; and approve changes in the RIS3 Norte strategy.

At the operational level, the governance structure of the RIS3 Norte Region includes a management team, hosted by CCDR Norte, that supports the overall work of the innovation council and its various specialisation platforms. In addition, the management team is in charge of monitoring and reporting the smart specialisation strategies development.

Finally, at the bottom-level, in 2019 the Norte region created smart specialisation EDP platforms involving business associations, clusters, RTDI centres, and a representative of CCDR Norte. Up to now only two EDP platforms are fully operational. One of the fully operational platforms is on the domain of "Advanced Manufacturing Systems", and it is built on top the Produtech initiative which is a local cluster (regional

association of enterprises, research institutes universities, etc.) for the development and diffusion industrial technologies, led by the research institute INESC-Tec and strongly connected to the European Technology Platform Manufuture. The other fully operational EDP platform is on the domain of Culture Creativity and Fashion and it is currently looking to narrow its scope to more technical issues related to the garment and textiles industry.

S3 Norte Governance Structure

The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

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